

The Brazilian Financial System and the Green Economy

ALIGNMENT WITH SUSTAINABLE DEVELOPMENT

FIRST EDITION - SEPTEMBER 2014



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

FEBRABAN

Federação Brasileira de Bancos

The Brazilian Financial System and the Green Economy

ALIGNMENT WITH SUSTAINABLE DEVELOPMENT

FIRST EDITION - SEPTEMBER 2014

**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



TEAM

An initiative of
FEBRABAN – Brazilian Federation of Banks

Murilo Portugal - **PRESIDENT**
 Mário Sérgio Fernandes de Vasconcelos - **INSTITUTIONAL RELATIONS DIRECTOR**
 Alessandra Panza - **ADVISOR OF THE INSTITUTIONAL RELATIONS DIRECTORATE**

SUPPORT

UNEP – United Nations Environment Program

ORGANIZATION RESPONSIBLE FOR THE STUDY

Center for Sustainability Studies at Getulio Vargas Foundation (GVces)

STUDY COORDINATORS

Mario Monzoni, Aron Belinky, Annelise Vendramini

STUDY TECHNICAL TEAM

Fernanda Casagrande Rocha, Gisela Chulman, Luciana Betiol, Mariana Xavier Nicolletti, Susian Martins

EXTERNAL CONSULTANTS

Patrícia Padin, Thaís Magalhães (Kalo Taxidi), Ricardo Baitelo

PARTNER ORGANIZATION FOR STUDY

Resultante Consultoria Estratégica -

Maria Eugenia Buosi, Paula Peirão, Rafael Antonelli Marcos, Bruno Youssif

DESIGN

Marco Antonio Rodrigues (Miolo Editorial)

PROOF-EDITOR

Kátia Shimabukuro (Miolo Editorial)

TRANSLATION

Barry Buys
 Maria Fernanda Lana
 Renata Hetmanek dos Santos

S62 The Brazilian Financial System and the Green Economy – ALIGNMENT WITH SUSTAINABLE DEVELOPMENT. – CENTER FOR SUSTAINABILITY STUDIES

AT GETULIO VARGAS FOUNDATION (GVces / FGV-EAESP), Brazilian Federation of Banks (FEBRABAN)

1ST ed. – São Paulo : FEBRABAN, 2014

116 p.

PREPARED FOR UNEP AND FEBRABAN IN THE FRAMEWORK OF INQUIRY INTO THE DESIGN OF A SUSTAINABLE FINANCIAL SYSTEM.

1. Sustainable 2 . Financial System 3. Sustainable Development

CDD-338.040981

TABLE OF CONTENTS

ACRONYMS	8
LIST OF TABLES	9
LIST OF FIGURES	9
FOREWORD	10
I. INTRODUCTION	12
II. ACKNOWLEDGMENT	13
III. ASSUMPTIONS	14
IV. EXECUTIVE SUMMARY	16
Summary of the studies main reflections and conclusions	19
'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)	19
Brazilian Finances: A Strategic 2020 Agenda for Renewable Energy and Agriculture (Study 3)	22
Bibliographical references	27
V. THE BRAZILIAN FINANCIAL SECTOR INSTITUTIONAL CONTEXT IN THE TRANSITION TO SUSTAINABLE DEVELOPMENT (STUDY 1)	28
Introduction	30
History of environmental protection laws in Brazil	30
The Brazilian Financial System (SFN) and environmental protection	33
The Brazilian Central Bank and the regulation of socio-environmental topics at SFN	34
The Basel accords	35
Conclusions	37
Bibliographical references.	37
VI. CURRENT FINANCING FOR THE GREEN ECONOMY IN BRAZIL (STUDY 2)	38
Introduction	40
Context	40
Credit and financing	42
Introduction	42
Results	44
Credit and financing: constitutional and non-reimbursable funds	47
Investments	49
Introduction	49
Results	52
Insurance	57
Introduction	57
Results	59
Conclusion	61
Bibliographical references	62
Annexes	63
Annex I - List of thematic products and services	63
Annex II - thematic lines for constitutional funds	64
Annex III - list of thematic investment funds	64
Annex IV - list of thematic PE	65

VII. BRAZILIAN FINANCES: A STRATEGIC 2020 AGENDA FOR RENEWABLE ENERGY AND AGRICULTURE (STUDY 3)	66
Introduction	68
Purpose and scope	68
Methodology	69
Principles	70
Renewable Energy	71
Introduction	71
Focus on New Energy	72
Brazil in the global context	74
Brazil's investments on New Energy	75
Recent trends and perspectives for the Brazilian market	76
Financing	77
Conclusions and recommendations	78
Agriculture	80
Introduction	81
ABC Plan and Program	83
ABC Program - analysis and recommendations	85
Conclusions	92
Bibliographical references.	95
VIII. INTRODUCTION TO THE DISCUSSION OF ECONOMIC OPPORTUNITIES IN BRAZIL FOR BIODIVERSITY AND CITIES.	96
Biodiversity	98
Introduction	98
The state of Brazilian forests	98
Preservation and recovery of Brazilian forest assets	99
A new economic development model for Brazilian forest regions	100
Emerging markets for ecosystem services	101
Conclusions	103
Bibliographical references	104
Cities	104
Introduction	104
The urban scenario in Brazil	105
Smart Cities	106
Intelligence in electricity production, distribution and consumption.	110
Agriculture as a means of a new relation with public space	111
Conclusions	112
Bibliographical references	113
Annex I - Rural Environmental Registry (CAR)	114

ACRONYMS

- 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:** Brazilian 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 on 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 Producer
- PSI:** Principles for Sustainable Insurance
- SAF:** Agroforestry Systems
- SFN:** Brazilian Financial System
- SHP:** Small Hydroelectric Plant
- SIN:** National Integrated System
- STJ:** Superior Court of Justice
- SPD:** Direct Planting System
- UNEP:** United Nations Environment Program
- UNICA:** National Union of Cane Sugar Industry

LIST OF TABLES

Table 1. Brazilian Central Bank resolutions and circular related to socio-environmental topics	35
Table 2. Amounts allocated to the “Green Economy and its enabling conditions” in 12/31/2013 in the category Credit and Financing.	44
Table 3. Institutions and sectors covered by specific socio-environmental policies	46
Table 4. Amounts allocated to the Green Economy by Constitutional and Non-Reimbursable Funds	48
Table 5. Pension Funds Analyzed	50
Table 6. Investment Managers	51
Table 7. Assets under management according to the proposed methodology	52
Table 8. Volume and percentage of equities invested in CSI companies	54
Table 9. Assets under management according to the proposed methodology	54
Table 10. Assets under management PE funds	56
Table 11. Technical Provision Signatories of PSI and PRI	59
Table 12. List of thematic products and services	63
Table 13. Thematic lines for constitutional funds	64
Table 14. List of thematic funds	64
Table 15. List of thematic PE	65
Table 16. Brazil’s investment in NE sources, by technology and financing (2013)	75
Table 17. Overview of the current situation in Brazil in relation to NE sources	78
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.	84
Table 19. Purpose of investment and refund deadlines	84
Table 20. Total amount available and implemented for the ABC Program since the 2010/11 crop until the end of 2013/14 crop year	85
Table 21. Schedule and effective application of resources of the ABC Program in 2010/11, 2011/12, 2012/13 and 2013/14 crop years (in BRL million)	85

LIST OF FIGURES

Figure 1. Selected milestones in the history of environmental protection laws in Brazil	31
Figure 2. Timeline for the Green Economy in the Brazilian Financial System	40
Figure 3. Data scope for Study 2	41
Figure 4. Methodology	42
Figure 5. Proposed methodology for Credit and Financing analysis	43
Figure 6. Investment Methodology	51
Figure 7. Scope and Methodology in Insurance Reserve Management	59
Figure 8. Analytical Framework	70
Figure 9. Global investments on NE, by asset class (2004-2013)	73
Figure 10. Brazilian energy matrix by primary source - 2010 and 2020	74
Figure 11. Investments in new energy, by region (2013, U\$BN)	75
Figure 12. Contracted value versus value available for the ABC Program in 2011/12, 2012/13 and 2013/14 crop years	85
Figure 13. Total amount contracted for the ABC Program in 2011/12, 2012/13 and 2013/14 crop years	86
Figure 14. Number of contracts entered into for the ABC Program in 2011/12, 2012/13 and 2013/14 crop years	87
Figure 15. Contracted amount of operations via BNDES for the 2013/14 crop year	88
Figure 16. Participation of financing sources for the ABC Program 2013/14 crop year	88
Figure 17. Contracted amount for the ABC Program in the Midwest, North, Northeast, South and Southeast in 2011/12, 2012/13 and 2013/14 crop years	89
Figure 18. Regional participation in the contracted amount from the ABC Program in the 2011/12, 2012/13 and 2013/14 crop years	90
Figure 19. Contracted amount of operations via BNDES for the 2013/14 crop year for investment purposes	91
Figure 20. Land distribution in Brazil in millions of hectares (Millions of hectares)	102



FOREWORD

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.

Sustainable development occurs primarily through the education and awareness of people. It is only when

we change our consumption habits and begin to give more importance to the environment – mainly in our practical day-to-day choices – that we can solve these problems in a permanent manner. We know, however, that cultural changes of this type demand time and, for this, we cannot hope that only education and awareness will produce the desired change in habits.

There is an important role for public policy and through regulation, taxation, and incentives, this transition can be accelerated and targeted. It is fundamental that the prices of the goods and services produced in the economy reflect environmental costs, because private companies make their decisions based on price signals.

The financial sector is already the most regulated in the economy due to issues of information asymmetry, moral hazard, and adverse selection. In order to establish good quality regulation, it is important to bear in mind the difficulties, risks and problems involved in the regulatory process.

The banking sector acts as an intermediary between savers and investors, functioning with a high degree of leverage: or, in other words, lending a multiple of its capital, which enhances the positive and negative impacts of asset allocation decisions. For these reasons, financial institutions must be prudent in their decisions. They must also respect, in the allocation of resources for projects or activities, the wishes and mandates of the final holders of the resources, who are the savers and investors that have entrusted their savings to the institutions.

In the transition process to a green economy, the strengthening of global governance is also fundamental in order to define and enforce minimum environmental standards in all countries.

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 scarcities¹.

A global initiative designed to be run over an eighteen-month-period, the *Inquiry* aims at engaging and outreaching 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*. As part of this process, 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'¹, 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.

¹ More information on the *Inquiry* and the Green Economy at: <http://www.unep.org/newscentre/Default.aspx?DocumentID=2758&ArticleID=10698>



II. ACKNOWLEDGMENT

In order to elaborate this work, we interviewed people and organizations involved with the topics covered. We thank them for their participation and contribution to this work:

Alexandre Schwartzman, Carlos Nomoto, Carlos Donizeti Macedo Maia, Claudio Pádua, Daniel Izzo, Fabio Feldmann, Fernanda Gimenes, Hélio Mattar, Jose Luis Majolo, Manoel Serrão, Manuela Mendes Prata, Maria Christina M. Gueorguiev, Renata Soares Piazzon, Roberto Waack, Rômulo Silveira da Rocha Sampaio, Rosa Lemos, Rubens Sardenberg, Rubens Yukiharu Tsuchida, Samuel Roiphe Barreto, Sergio Besserman Vianna, Sergio Weguelin, Werner Grau.

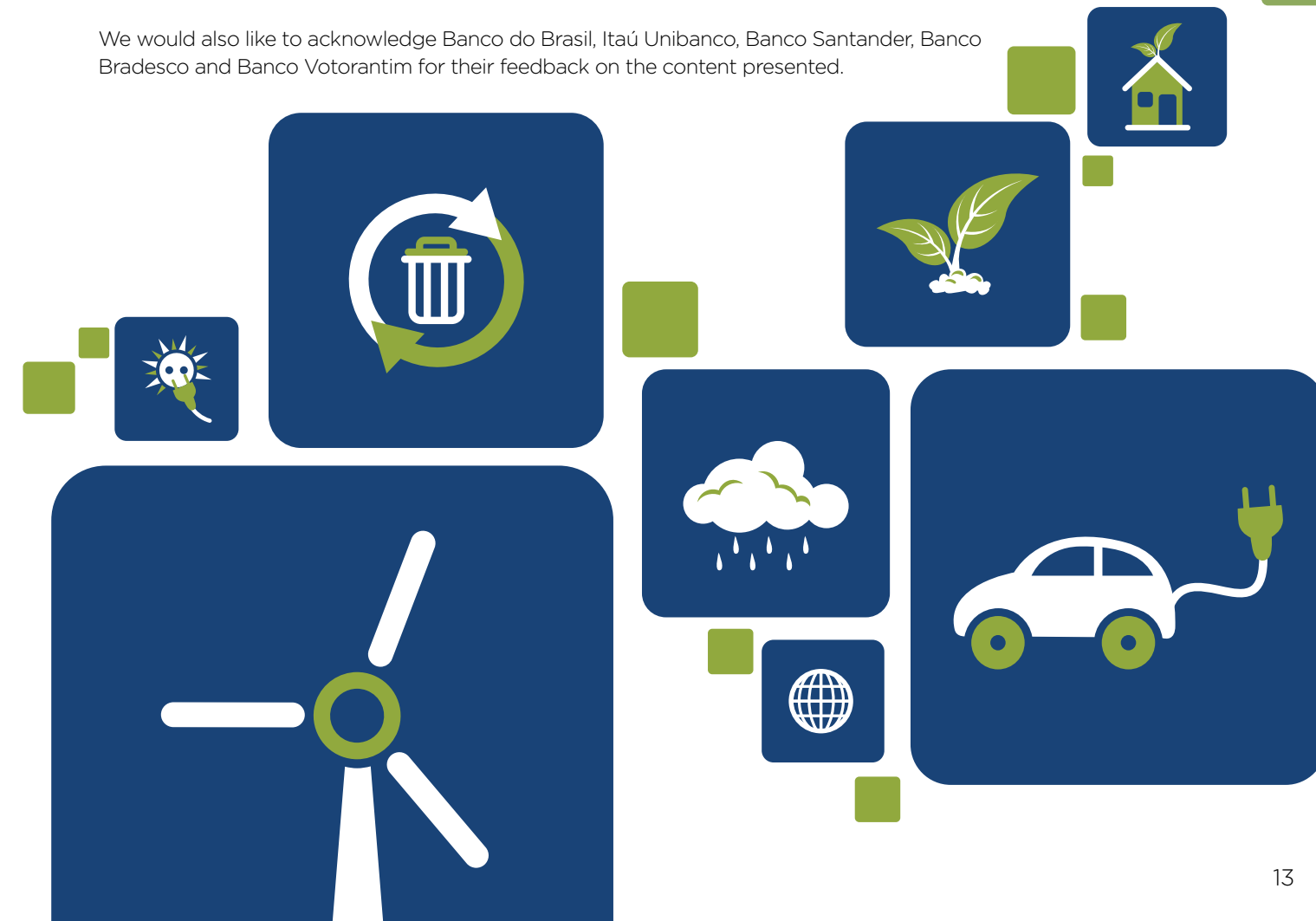
ABRAPP - Guilherme Leão, Milena Miranda, Marcus Vinicius M. da Fonseca

BM&FBovespa - Sonia Favaretto, Luiza Nunes Junqueira

BNDES - Guilherme Narciso de Lacerda, Vania Borgerth, Gabriel Rangel Visconti, Caio Barbosa Alves de Araujo, Tiago Luiz Cabral Peroba, Marcelo Ponteiro Cardoso, Francisco Oliveira, Guilherme R. Cardoso

CNseg - Solange Beatriz Palheiro Mendes, Maria Elena Bidino, Adriana Boscov, Pedro Pinheiro

We would also like to acknowledge Banco do Brasil, Itaú Unibanco, Banco Santander, Banco Bradesco and Banco Votorantim for their feedback on the content presented.



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 inclusive².

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 sustainability³. 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 responsibly⁴.

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

² “For the purposes of the Green Economy Initiative, UNEP has developed a working definition of a green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one which is low carbon, resource efficient and socially inclusive.” <http://www.unep.org/greeneconomy/AboutGEI/WhatisGEI/tabid/29784/Default.aspx>

³ Porrit, 2007

⁴ Harris et al, 2001

because, different from sectors that are part of the real economy⁵, crises in banks are contagious and cause systemic impact. This aspect became particularly sensitive after the crisis initiated in the United States in 2007, when losses originated in the sector adversely impacted economies worldwide.

3 UPON 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.

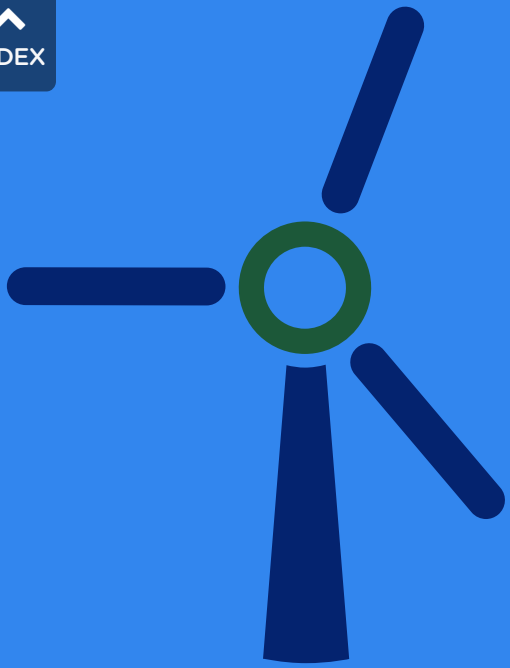
5 ECOLOGICAL BOUNDARIES IMPLY RISKS AND OPPORTUNITIES THAT ECONOMIC DECISIONS AND THE SOCIAL DEVELOPMENT AGENDA IN BRAZIL MUST CONSIDER IN AN INTEGRATED MANNER.

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.

⁵ Real economy refers to the production of goods and services.



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 analysis-, 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 between 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 to the Green Economy 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 clear 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 combining advancements in the economic, social and environmental areas, positioning itself as one of the leaders towards sustainable development. In order for this 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 deploying economic tools capable of remedying market 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 FEBRABAN), 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 6⁶

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

⁶ Recommendations 6, 7 and 8 can, whenever and if applicable, be considered as global recommendations.

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):

This is a broader agenda that refers to the design of incentives to foster an institutional framework for investing in new energy sources. The recommendations are:

- 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 energy to 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 products 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 are 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 the 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 society, so 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 purposes⁷.

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.
- Implement monitoring systems for the financing granted to ascertain whether they are actually promoting the reduction of greenhouse gases 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 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.

⁷ Available at <http://www.bcb.gov.br/?SICORNOTICIAS> - July 16th, 2014.

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 those 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 emerging ecosystem service segments which, if leveraged and encouraged, could channel resources for preservation. Among those segments, we highlight the following, in different levels of deployment:

- 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 security⁸.

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.

BIBLIOGRAPHICAL REFERENCES

FGV Projects, 2014. Cidades Inteligentes e Mobilidade Urbana (Smart Cities and Urban Mobility). Available at: http://fgvprojetos.fgv.br/sites/fgvprojetos.fgv.br/files/cadernos_fgvprojetos_smart_cities_gwa_0.pdf. Accessed on September 01st, 2014

HARRIS, Jonathan; WISE, Timothy; GALLAGHER, Kevin; GOODWIN, Neva. (Org.). *A survey of sustainable development: social and economic dimensions.* Washington: Island Press, 2001

PORRIT, Jonathan. *Capitalism as if the world matters.* Reino Unido: Earthscan, 2007

⁸ FGV Projects, Cadernos Cidades Inteligentes e Mobilidade Urbana (Smart Cities and Urban Mobility Booklets), 2014



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.

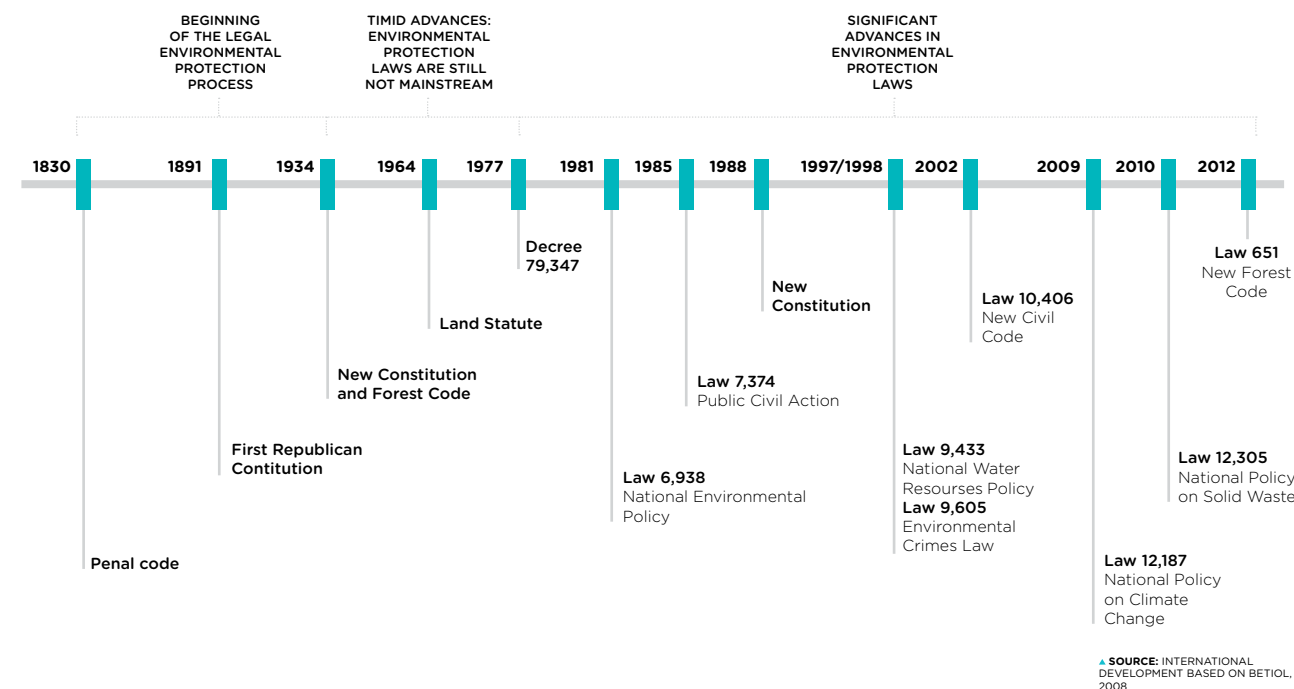
It is important to emphasize that the original motivation for this study is also associated with the fact that the Brazilian Central Bank published, on April 25th, 2014, Resolution 4,327, that deals with financial institutions socio-environmental responsibility, listing guidelines that shall be observed 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 and financing. 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 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 BRAZIL⁹

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:

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



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 221/1967) and the Code of Mining (Decree Law 227/1967).

⁹ Based on Betiol, 2008

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 (Decree Law 1,143/1975). 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 7,347/1985 - 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 the Environment in the Federal Constitution, and public authorities and the society as a whole 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, also known as 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.

In the 2000s, we highlight the law on radioactive waste (Law 10,308/2001) and biosafety, regulating aspects concerning genetic engineering (Law 11,105/2005). 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 2009, 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 2010s, 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, areas of legal reserve, forest legal exploration, supply of forest-based raw material, among other topics, and establishes economic and financial instruments to meet its goals.

As for environmental protection laws in Brazil, we highlight the following:

- ▶ The National Policy on the Environment (PNMA) determines what polluter means, defines two different types of polluters (direct and indirect) and links the loans to licensing by governmental authorities.
- ▶ Historically, in Brazil, civil liability is considered strict, meaning the fault must be proved, there must be a proof of chain of causation between the cause and the action and its corresponding effect, and the extent of the damage must be determined in order to calculate damage awarded. However, due to the massification of production and consumption processes and, therefore, greater risks of damage massification, in a context of higher complexity and greater distances between causes and consequences, the theory of strict civil liability emerged in Brazil, and the role of neglect was redefined when it comes to attribution of responsibility. In the theory of strict civil liability, it is not necessary to prove neglect, as stated in the New Civil Code (Law 10,406/2002), Article 927.
- ▶ The Environmental Crimes Law (9,605/1998) holds the ones involved in the environmental damage responsible ('directors, administrators, council and technical body members, auditors, managers, agents or representatives of a legal entity who, aware of the criminal behavior of other people, refrain from preventing their practice, while they could act in order to avoid it'.)

THE BRAZILIAN FINANCIAL SYSTEM (SFN) AND ENVIRONMENTAL PROTECTION

There are legal doctrines and judicial reviews that extend the chain of people responsible for environmental damages, linking the financial institutions involved - even though indirectly - with the project that caused the environmental damage¹⁰.

With the purpose of mapping legal decisions and case laws related to constitutional actions in the framework of Regional Federal Courts (Tribunais 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 on attribution of responsibility to banks in case of environmental harm. We found six decisions concerning this topic. Among the actions researched¹¹, we highlight the most recent ones¹²:

- ▶ 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

¹⁰ Sampaio, 2013

¹¹ With the purpose of identifying potential risks for the Brazilian Financial System that may be originated in civil actions (civil liability for environmental damages linked to loans), we carried out researches in legal databases, with the intent to map court decisions and case laws related to constitutional actions (both for diffuse and collective rights) in the framework of Regional Federal Courts (Tribunais 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).

The research was conducted using a selection of keywords (environmental harm, environmental law, joint liability; socio-environmental issues; financial system; bank; Green Protocol; Notice 41; Central Bank; PRSA - 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, LXXIII, 170, VI, and 225, FC; arts. 4 and 14, Law 4,829/65; art. 22, §§ 1, 3, 6, 7 and 8, Law 4,947/1966; art. 2, Federal Law 5,868/1972; art. 4, Decree 72,106/1973; arts. 10, 12, 14, § 1 and III, Law 6,938/1981; arts. 1, I and IV, and 5, I, Law 7,347/85; arts. 50 and 59, Law 8,171/91; art. 2, 70 and 72, item VII, §8, item IV, Law 9,605/1998; art. 11, Decree 6,321/07; art. 16, 17, 18 and 54, Decree 6,514/2008; Forest Code; CMN Resolution 3,545/2008; BACEN Resolution 4,327/2014; CONAMA Resolutions 001/86, 011/86 and 237/97). For complete research results, please refer to Annex I.

¹² 2003 - Public Civil Action RV-05-320/89, which was processed under the 6th Federal Court of Joinville. 2006 - Ordinary Action, process 2001.38.03.003747-8, in procedural process under the 3rd Federal court of Uberlândia

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 reporting judge was Minister José 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 finance projects 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 sector¹³. 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 4327/2014, 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 1. BRAZILIAN CENTRAL BANK RESOLUTIONS AND CIRCULAR RELATED TO SOCIO-ENVIRONMENTAL TOPICS

Resolution/Circular	Bank operations impacted	Description
Resolution 3,545/2008	Rural Credit - environmental compliance in the Amazon	Applies to the Amazon biome. Requires financial institutions to demand from credit borrowers documentation proving environmental compliance.
Resolution 3,813/2009	Rural Credit - sugar cane expansion	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.
Resolution 3,876/2010	Rural Credit - slave labor	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.
Resolution 3,896/2010	Rural Credit - Low Carbon Agriculture	Establishes the Program for Reducing Greenhouse Gas Emissions ('ABC Program') in the Brazilian Development Bank (BNDES) framework.
Resolution 4,008/2011	Credit for mitigation and adaptation to climate change	Rules on the financing of projects aiming at climate mitigation and adaptation, backed by resources from the National Plan for Climate Change (FNMC).
Circular 3,547/2011	Internal Process of Capital Adequacy Assessment - ICAAP	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.
Resolution 4,327/2014	Financial Institutions Socio-Environmental Responsibility	Rules on guidelines that shall be observed upon establishing and deploying socio-environmental responsibilities by SFN institutions.

SOURCE: INTERNAL DEVELOPMENT BASED ON BACEN, 2014

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), linked to 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 G10 members) counts with Central Bank representatives from: Argentina, Australia, Belgium, Brazil, Canada, China, France, Germany, Hong Kong, India, Indonesia, Italy, Japan, Korea, Luxemburg, Mexico, Holland, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. (BIS)

➤ **CMN/ BACEN regulations that introduced the Accord to Brazil:**

- Resolution 2,099/1994: Sets out that institutions authorized to operate in the Brazilian market shall have Required Equity (PLE) equal to at least 8% of capital based on a percent of risk-weighted assets, exactly the same amount established by BIS.
- Circular 2,784/1997. The index was changed into 11%.

➤ **Basel II, 2004.** Extended the need of financial institutions to manage their risks beyond the minimum capital requirements. In this sense, risk definition and measurement became a task of the institutions, monitored by their regulator. Basel II has three pillars: (i) Pillar 1: capital requirements; (ii) Pillar 2: supervision of the adequacy assessment process of bank capital; (iii) Pillar 3: market discipline.

➤ **CMN/ BACEN regulations that introduced the Accord to Brazil:**

- Notice 12,746/2004. Establishes a schedule to deploy the new capital structure.
- Resolution 3,490/2007 and Circular 3,360/2007: Review of risk weights to determine the Required Reference Equity.
- Resolution 3,380/2006: Establishes the Operational Risk Management Structure.
- Resolutions 3,490, 3,488 and Circulars 3361, 3362, 3363, 3364, 3366, 3368, 3464 e 3465, - all from 2007: Review and introduction of new capital installments. Establishment of the Market Risk Management Structure.
- Circular 3,478/2009: Establishes minimum requirements and procedures to calculate the Required Reference Equity (PRE) - stress testing.

➤ **Basel III, 2010.** Extends capital and liquidity requirements, in response to the crisis in 2008. It sets more rigid rules as to what can be considered capital, introduces new liquidity standards, enhances risk coverage, and introduces systemic risks.

➤ **CMN/ BACEN regulations that introduced the Accord to Brazil:**

- Resolutions 4,192, 4,193, 4,194, 4,195, from 2013: Cover assessment of minimum requirements for Reference Equity (PR), Level I and Main Capital, introduce Main Capital Addition, and determine elaboration and submission of Analytical Financial Statement - Prudential Conglomerate.
- Circulars 3634, 3635, 3636, 3637, 3638, 3639, 3640, 3641, 3642, 3643, 3644, 3645, 3646, 3647, 3648 - from 2013: Establish procedures to calculate installments of risk-weighted assets.

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 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.

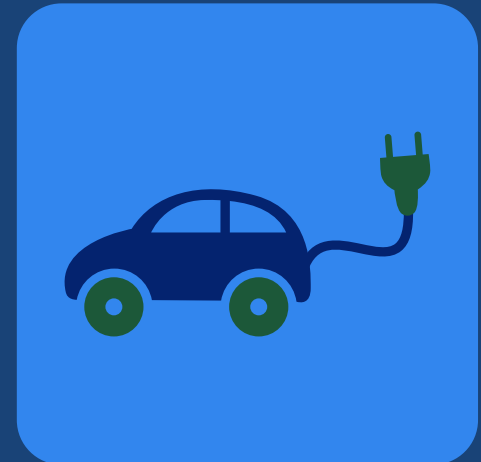
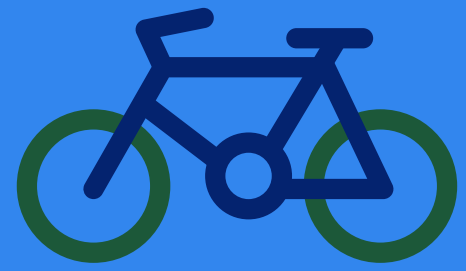
However, it is pivotal to ensure that financing to innovative projects, which naturally pose more risks, does not comprise the financial system resilience. Governments shall jointly act to establish economic instruments encouraging projects aligned with sustainable development, ensuring the growth of 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 chain 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 2008, BACEN has been regulating SFN operators' socio-environmental responsibility. Such process, besides reducing 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. The Basel Accords demonstrate how Central Banks are getting more demanding on prudential regulation, aiming at enhancing resilience of their financial systems and making them less prone to systemic crises. If, on one hand, this process is critical for welfare, on the other hand it may imply the financial system will offer a smaller amount of resources allocated to high-risk and long-term return productive sectors and activities, such as activities connected to the so-called Green Economy. Such aspect reinforces the role the Union plays in fostering new industries, developing an institutional framework that is capable of attracting financial system resources, while observing prudence standards needed to keep its resilience.
- Lack of accurate information regarding responsibilities attributed to financial system actors - such as financial institutions, investors, certifying and regulatory agencies - associated to socio-environmental impacts of projects and initiatives in which they are involved, is certainly an inhibitor to channel capital to the Green Economy, and it is a topic that must be addressed by applicable legal instruments.
- Public policies and regulations established by the Union - including taxation, subsidies and other economic instruments - have the potential to make prices in the economy more accurately reflect socio-environmental costs and benefits involved in productive activities and contribute to encourage projects and initiatives related to the Green Economy. The current scenario in Brazil requires a critical review under this perspective, aiming at generating conditions to attract SFN resources.

BIBLIOGRAPHICAL REFERENCES

- BACEN, B. C. (2014).** Resolution 4,327, from 2014. Café com Sustentabilidade (Coffee with Sustainability). Febraban - July 16th, 2014. Sao Paulo.
- Betiol, L. S. (2008).** Potencial e limites da responsabilidade civil como mecanismo econômico de proteção ao meio ambiente (Potential and Limitations of Civil Liability as an Economic Mechanism for Protecting the Environment). Puc Sao Paulo, Direito. Sao Paulo: PUC São Paulo.
- Carvalho, D., & Santos, G. M. (s.d.).** Os Acordos de Basileia - Um roteiro para implementação nas instituições financeiras (The Basel Accords - A Roadmap for Implementation in Financial Institutions). (p. 17). www.febraban.org.br.
- Sampaio, R. S. (2013).** Responsabilidade civil ambiental das instituições financeiras (Civil Liability for Environmental Damage in Financial Institutions). Rio de Janeiro: Campus Jurídico.



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.

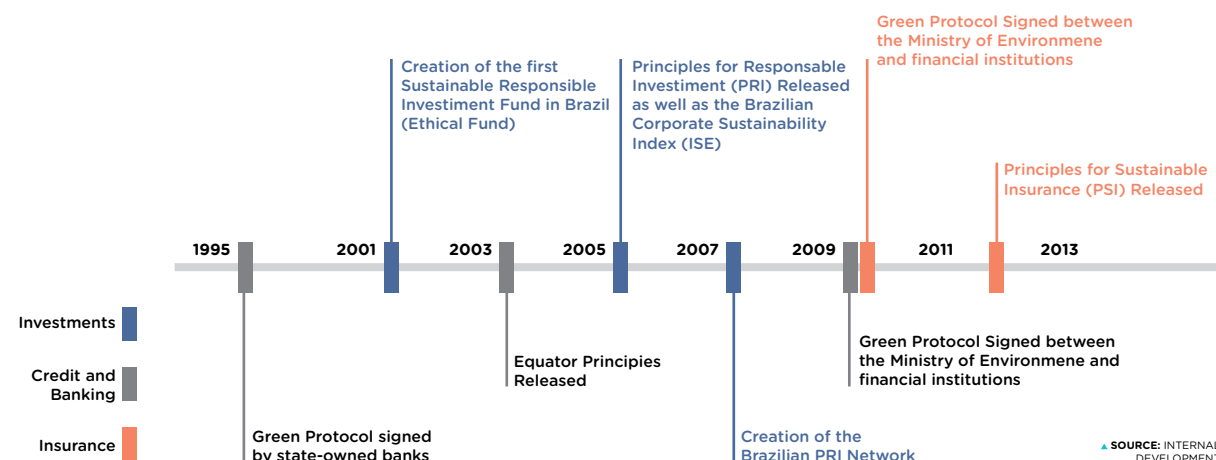
For this study, we adopted the concept of Green Economy as proposed by UNEP in order to insure methodological consistency with other national studies that are being coordinated within the framework of the *Inquiry*.

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, trends 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-environmental 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 CURRENT STATE OF THE NATIONAL FINANCIAL SYSTEM AND THE GREEN ECONOMY		
Financing and credit	Investments	Insurance
<ul style="list-style-type: none"> State-owned Banks Private banks Constitutional Funds Non Reimbursable Funds 	<ul style="list-style-type: none"> Pension Funds Investment Manager 	<ul style="list-style-type: none"> Reserves Management Corporate Practices

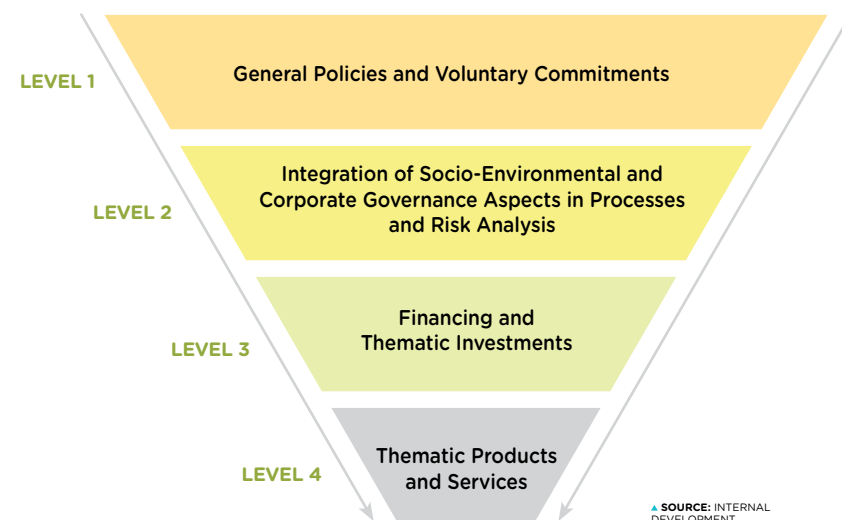
SOURCE: INTERNAL DEVELOPMENT



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:

FIGURE 4. METHODOLOGY



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 insurance¹⁵) 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.

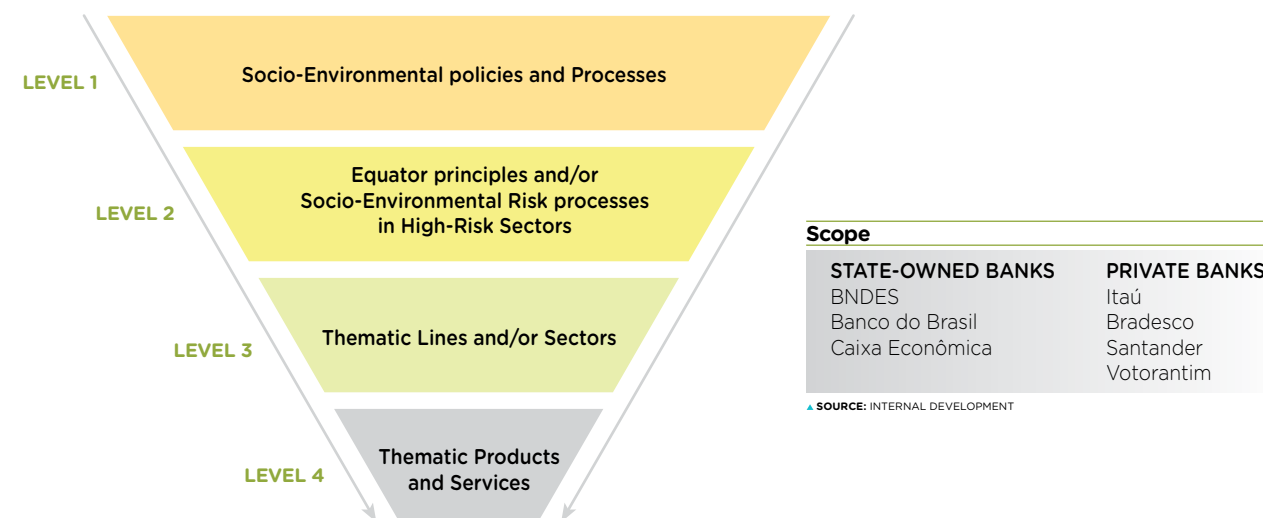
- > **Banco do Brasil:** the largest financial institution in Latin America, the Banco do Brasil is the principal financial institution for agribusiness in the country with over a 60% market share in this segment.
- > **Caixa Econômica Federal¹⁶:** the principal financial institution for urban development 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.

FIGURE 5. PROPOSED METHODOLOGY FOR CREDIT AND FINANCING ANALYSIS



¹⁵ For Insurance, the consolidated data of provisions and reserves available refer to 12/31/2012.

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.

Results	2013 BRL m	2013 USD m ¹⁶
CREDIT AND FINANCING		
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		
Sectorial 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
Sectorial Lines - (Disbursed Amounts)	31,396	14,535
Renewable Energy - except Large Hydroelectric Projects	8,367	3,874
Renewable Energy - Large Hydroelectric Projects	9,991	4,626
Sustainable Transport	5,311	2,459
Level 4		
Thematic Products and Services (Contracted Amounts)	137,504	63,659
Thematic Products and Services (Disbursed Amounts)	116,573	53,969

SOURCE: INTERNAL DEVELOPMENT

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 BACEN 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.

¹⁶ Foreign exchange rate – R\$ 2.16/ US\$ 1.00, according to data from the Brazilian Central Bank

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.

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 diligences 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 sectorial 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,

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/our+approach/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

Institution	Sectors Covered by Specific Socio-Environmental Policies
Itaú Unibanco	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
Santander	Energy (including hydroelectric); water (e.g.: treatment of potable water, sanitation, sewage treatment and selected infrastructure); forests
HSBC	Agricultural commodities; freshwater infrastructure (supply and sanitation); energy (generation, transmission and distribution)
Banco do Brasil	Agribusiness; civil construction; electrical energy; mining; petroleum & gas, and transport
BNDES	Livestock; sugar & alcohol; electrical energy generation

SOURCE: INTERNAL DEVELOPMENT

**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 the 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 BRL137.5 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

Results	2013 BRL m	2013 US\$ mm
CONSTITUTIONAL AND NON-REIMBURSABLE FUNDS		
Level 2		
Thematic Lines - Constitutional Funds	11,432	5,292
Thematic Lines - Non-Reimbursable Funds	712	330

SOURCE: INTERNAL DEVELOPMENT

LEVEL 1

SOCIO-ENVIRONMENTAL GUIDELINES

The information researched in Level 1 seeks to measure the amounts covered by the socio-environmental guidelines of the funds that create enabling conditions for the Green Economy. Many funds by their very nature are thematic and are directly related with the Green Economy. In this case, all guidelines, projects, and disbursements directly contribute a Green Economy.

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 available¹⁸.

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 BRL2.4trillion, 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 Ethical (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 ISE (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,

¹⁸ The Funds with lines available and calculated were: Fundo Amazônia (Amazon Fund), Fundo Social (Social Fund), Funtec (Technological Innovation Fund), Fundo Socioambiental (Socio-Environmental Fund).

¹⁹ The Principles for Responsible Investment is an initiative based on six principles that seek to integrate environmental, social and corporate governance (ESG) aspects in investment decisions by investors. The signatories to these principles are managers of their own resources, those of third parties and service providers. For more information, please visit: www.unpri.org

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), to obtain primary information that would permit the analysis of other aspects such as the investment of pension funds in companies making up the CSI. In addition to the signatories of the PRI, 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 5. PENSION FUNDS ANALYZED

PRI Signatories	AUM ²⁰ BRL m 2013	Non PRI Signatories	AUM BRL m 2013
Celpos	634	BFPP	2,522
CENTRUS	8,241	CBS	4,021
Economus	4,628	Fund. Copel	6,905
Faelba	1,421	Icatu	1,264
Fasern	229	Pouprev	162
Forluz	12,430	Previ-Novartis	738
Funesp	22,616	Total	15,612
Funcef	55,414		
Fundação Itau Unibanco	18,287		
Infraprev	2		
Petros	66,060		
Previ	171,084		
Real G.	11,076		
Sistel	7,000		
Valia	16,984		
Total	396,106		
% of Total Market	62%		

PRI Signatories	AUM USD m 2013	Non PRI Signatories	AUM USD m 2013
Celpos	294	BFPP	1,168
CENTRUS	3,815	CBS	1,862
Economus	2,143	Fund. Copel	3,197
Faelba	658	Icatu	585
Fasern	106	Pouprev	75
Forluz	5,755	Previ-Novartis	342
Funesp	10,470	Total	7,228
Funcef	25,655		
Fundação Itau Unibanco	8,466		
Infraprev	1		
Petros	30,583		
Previ	79,206		
Real G.	5,128		
Sistel	3,241		
Valia	7,863		
Total	183,382		
% of Total Market	62%		

▲ SOURCE: INTERNAL DEVELOPMENT - BASED ON PRI TRANSPARENCY REPORTS (PUBLIC INFORMATION) AND QUESTIONNAIRE RESPONSES FROM PENSION FUNDS

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 6. INVESTMENT MANAGERS

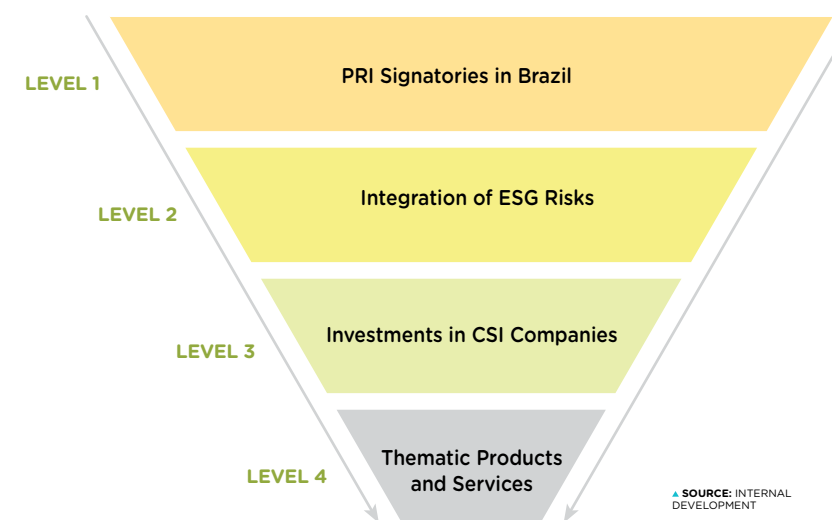
PRI Signatory Managers	AUM BRLm 2013	AUM U\$m 2013
BB DTVM	534,770	247,579
Bradesco Asset Management	305,276	141,331
Itaú-Unibanco Asset Management	336,000	155,556
Santander Brasil Asset Management	123,364	57,113
Sul America Investimentos	39,374	18,229
Votorantim Asset Management	18,219	8,435
Total	1,357,003	628,242
% of Total Market	56%	56%

▲ FONTE: PRI TRANSPARENCY REPORTS (PUBLIC INFORMATION)

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).

FIGURE 6. INVESTMENT METHODOLOGY



▲ SOURCE: INTERNAL DEVELOPMENT

RESULTS

PENSION FUNDS

TABLE 7. ASSETS UNDER MANAGEMENT ACCORDING TO THE PROPOSED METHODOLOGY

Results	AUM 2013 BRLm	AUM 2013 US\$ m
Market Total	640,327	640,327
Level 1		
Analyzed PRI Signatories	396,106	396,106
Market Percentage of Analyzed Signatory	62%	62%
Level 2	Not possible to determine amounts	Not possible to determine amounts
Level 3		
Investments in CSI Companies	33,485	33,485
Level 4		
Thematic Products and Services	3,041	3,041

SOURCE: INTERNAL DEVELOPMENT

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 they had specific responsible investment products or mandates. Due to the way in which the allocated resources are calculated and low quantitative disclosure, it was not possible to determine the amounts 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.

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 hovers 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 aspects 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 thematic into their shareholder participation strategies.

LEVEL 3

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

Questionnaires	% of CSI Companies		AUM Total of Respondents BRLm
	OWN BRLM	INVESTMENT MANAGERS BRLM	
Total	21,390	12,095	311,422
Signatories	21,350	12,041	295,809
Non-signatories	40	54	15,612

Questionnaires	% of CSI Companies		AUM Total of Respondents BRLm
	OWN USDM	INVESTMENT MANAGERS USDM	
Total	9,903	5,600	144,177
Signatories	9,884	5,575	136,949
Non-signatories	19	25	7,228

← SOURCE: PRI QUESTIONNAIRES

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

Results	AUM 2013 BRLm	AUM 2013 US\$ m
Market Total	2,407,000	1,114,352
Level 1		
Analyzed PRI Signatories	1,357,003	628,242
Market Percentage of Analyzed Signatory	56%	56%
	70%	70%
Level 2	Not possible to determine amounts	Not possible to determine amounts
Level 3	Not possible to determine amounts	Not possible to determine amounts
Level 4		
Thematic Products and Services	1,582	732

→ SOURCE: INTERNAL DEVELOPMENT

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. Asset managers 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 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:
 - Delineation 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

Results	AUM 2013 BRLm	AUM 2013 US\$ m
PE - Market Total	147,392	68,237
PE - Thematic Funds	21,573	9,987

SOURCE: INTERNAL DEVELOPMENT

A compilation was made of all of 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 preserving forests and 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 clients for investment managers, must include these criteria not only in the selection of 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 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.

INSURANCE²¹ 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”.
- > **FenaPrevi:** represents Insurers who act in areas of life insurance and/or open supplementary pensions.
- > **FenaSaúde:** 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 premium collection is made annually from car owners. Three types of coverage are offered:

- > **Death:** compensation of BRL13,500.00 per victim.
- > **Permanent Disability:** compensation up to BRL13,500.00 per victim according to after effects of the accident and in accordance with the Table under Law 11,945/2009.
- > **Medical and Supplementary Expenses (DAMS):** reimbursement of proven expenses up to BRL2,700.00 per victim.

²¹ For the segment on Insurance, the data refers to 12/31/2012, the latest information publicly available.

The insurance sector is becoming more and more important in the Brazilian economy, with annual revenue increases climbing from 2.81% 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.

FIGURE 7. SCOPE AND METHODOLOGY IN INSURANCE RESERVE MANAGEMENT



RESULTS

RESERVES MANAGEMENT

TABLE 11. TECHNICAL PROVISION SIGNATORIES OF PSI AND PRI

Results	2012 BRLm	2012 USDm ²²
Technical Provisions Market Total	432,153	221,616
Level 1		
Only PSI Technical Provisions Signatories	233,394	119,689
PSI and PRI Technical Provisions Signatories	227,497	116,665
Level 2	Not possible to determine amounts	Not possible to determine amounts
Level 3	Not possible to determine amounts	Not possible to determine amounts
Level 4	Not possible to determine amounts	Not possible to determine amounts

SOURCE: INTERNAL DEVELOPMENT

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.

LEVEL 1

ADHESION TO VOLUNTARY COMMITMENTS (PSI AND PRI)

The adherence 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

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 PSI 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 amounts for this study. Beyond public 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 adherence 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 associations of the respective sectors.

BIBLIOGRAPHICAL REFERENCES

ABRAPP. Available at: www.abrapp.org.br/. Accessed on July 1st, 2014.
ABVCAP. Available at: www.abvcap.com.br/. Accessed on July 1st, 2014.
ABVCAP and KPMG. "Consolidação de Dados da Indústria de Private Equity e Venture Capital no Brasil. 2011.2012.2103" (Consolidation of Private Equity and Venture Capital Industry Data in Brazil 2011, 2012, 2013). Available at: <http://abvcap.com.br/Download/Estudos/2716.pdf>. Accessed on July 1st, 2014.
Anbima. Available at: portal.anbima.com.br/. Accessed on July 1st, 2014
Banco do Brasil. Available at: www.bb.com.br. Accessed on July 1st, 2014.
Banco do Brasil. Relatório Anual 2013 (2013 Annual Report). Available at: www.bb.com.br. Accessed on July 1st, 2014.
Banco Votorantim. Available at: www.bancovotorantim.com.br/. Accessed on July 1st, 2014.
BBDTVM. Available at: www.bb.com.br. Accessed on July 1st, 2014.
BB Mapfre. Available at: www.bbmapfre.com.br/. Accessed on July 1st, 2014.
BNDES. Relatório Anual BNDES 2013 (2013 Brazilian Development Bank Annual Report). Available at www.bndes.gov.br. Accessed on July 1st, 2014.
BNDES. Brazilian Development Bank. Available at www.bndes.gov.br. Accessed on July 1st, 2014.
Bradesco. Available at: www.bradesco.com.br. Accessed on July 1st, 2014.
Bradesco. Relatório Anual Bradesco 2013 (2013 Bradesco Annual Report). Available at: www.bradesco.com.br. Accessed on July 1st, 2014.
Bradesco Seguros. Available at: www.bradesco.com.br. Accessed on July 1st, 2014.
Brazilian Central Bank. Available at: www.bcb.gov.br. Accessed on July 1st, 2014.
Caixa Econômica Federal. Available at: www.caixa.gov.br/. Accessed on July 1st, 2014.
Caixa Econômica Federal. Relatório de Sustentabilidade Caixa Econômica Federal 2012 (2012 Caixa Econômica Federal Sustainability Report) Available at: www.caixa.gov.br/. Accessed on July 1st, 2014.
Celpos. Available at: www.celpos.com.br/. Accessed on July 1st, 2014.
Centrus. Available at: www.centrus.org.br/. Accessed on July 1st, 2014.
CNseg. Available at: www.cnseg.org.br/. Accessed on July 1st, 2014.
CNseg. Balanço Social Mercado Segurador Brasileiro 2012 (2012 Brazilian Insurance Industry Social Balance). Available at: www.cnseg.org.br/. Accessed on July 1st, 2014.
CVM. Available at: www.cvm.gov.br/. Accessed on July 1st, 2014.
Economus. Available at: www.economus.com.br/. Accessed on July 1st, 2014.
Equator Principles. Available at: www.equator-principles.com/documents/ep_translations/EP_Portuguese.pdf. Accessed on July 1st, 2014.
Faelba. Available at: www.faelba.com.br/. Accessed on July 1st, 2014.
Forluz. Available at: <https://www.forluz.org.br/>. Accessed on July 1st, 2014.
Funcef. Available at: www.funcef.com.br/. Accessed on July 1st, 2014.
Fundação Cesp. Available at: www.cesp.com.br. Accessed on July 1st, 2014.
Fundo Constitucional do Norte (FNO). Available at: <http://www.sudam.gov.br/incentivo-a-investimentos/fundo-constitucional-do-norte-fno>. Accessed on July 1st, 2014.
Fundo Amazônia. Available at www.bndes.gov.br. Accessed on July 1st, 2014.
Fundo Clima (FNMC). Available at: <http://www.mma.gov.br/apoio-a-projetos/fundo-nacional-sobre-mudanca-do-clima>. Accessed on July 1st, 2014.
Fundo Nacional do Meio Ambiente (FNMA). Available at: <http://www.mma.gov.br/fundo-nacional-do-meio-ambiente>. Accessed on July 1st, 2014.
Fundo Brasileiro para a Biodiversidade (FUNBIO). Available at: <http://www.portaldomeioambiente.org.br/cidadania/36-fundo-brasileiro-para-a-biodiversidade-funbio>. Accessed on July 1st, 2014.
Fundo Constitucional do Nordeste (FNE). Available at: www.integracao.gov.br/web/guest/fne. Accessed on July 1st, 2014.

Fundo Constitucional do Centro Oeste (FCO). Available at: www.bb.com.br. Accessed on July 1st, 2014.
Fundos Setoriais. Available at: <http://www.mct.gov.br/index.php/content/view/725.html>. Accessed on July 1st, 2014.
Fundos Eletrobrás. Available at: www.eletobras.com/elb/data/Pages/LUMISIC20E00EPTBRIE.htm. Accessed on July 1st, 2014.
GVces. Financiamentos Públicos e Mudanças do Clima (Public Financing and Climate Change). 2010. Available at: <http://www.gvces.com.br/index.php?r=publicacoes/view&id=406>. Accessed on July 1st, 2014.
GVces. Financiamentos Privados e Mudanças do Clima (Private Financing and Climate Change). 2011. Available at: <http://www.gvces.com.br/index.php?r=publicacoes/view&id=406>. Accessed on July 1st, 2014.
HSBC. Available at: www.hsbc.com.br. Accessed on July 1st, 2014.
Infraprev. Available at: www.infraprev.org.br/. Accessed on July 1st, 2014.
Itaú Unibanco. Available at: www.itaunibanco.com.br. Accessed on July 1st, 2014.
Itaú Unibanco. Relatório Anual Itaú Unibanco 2013 (2013 Itaú Unibanco Annual Report). Available at: www.itaunibanco.com.br. Accessed on July 1st, 2014.
Itaú Seguros. Available at: www.itaunibanco.com.br. Accessed on July 1st, 2014.
IFC. IFC Performance Standards and Guidance Notes. Available at: <http://www.ifc.org/ifcext/sustainability.nsf/Content/PerformanceStandards>. Accessed on July 1st, 2014.
Líder DPvat. Available at: www.seguradoralider.com.br/. Accessed on July 1st, 2014.
Mongeral Aegon. Available at: <https://www.mongeralaegon.com.br/>. Accessed on July 1st, 2014.
Petros. Available at: <https://www.petros.com.br/>. Accessed on July 1st, 2014.
Porto Seguro. Available at: www.portoseguro.com.br. Accessed on July 1st, 2014.
Previ. Available at: www.previ.com.br/. Accessed on July 1st, 2014.
Principles for Sustainable Insurance (PSI). Available at: http://us-cdn.creamermedia.co.za/assets/articles/attachments/32201_the_principles_for_sustainable_insurance_-_global_consultation_version.pdf. Accessed on July 1st, 2014.
Principles for Responsible Investment. Available at: www.unpri.org/. Accessed on July 1st, 2014.
Real Grandeza. Available at: www.frg.com.br/. Accessed on July 1st, 2014.
RI Transparency Report 2013/2014. Available at: <http://www.unpri.org/areas-of-work/reporting-and-assessment/reporting-outputs/individual-2013-14/>. Accessed on July 1st, 2014.
Stratus. Available at <http://www.stratusbr.com/>. Accessed on July 1st, 2014
Santander. Available at: www.santander.com.br. Accessed on July 1st, 2014
Santander. Relatório Anual Santander 2013. Available at: www.santander.com.br. Accessed on July 1st, 2014
Sicredi. Available at: <http://www.sicredi.com.br/>. Accessed on July 1st, 2014
Sistel. Available at: <https://www.sistel.com.br/>. Accessed on July 1st, 2014
Sul América (FNO). Available at: www.sulamerica.com.br/. Accessed on July 1st, 2014
Sul América Investimentos. Available at: www.sulamerica.com.br/. Accessed on July 1st, 2014
SUSEP. Available at: www.susep.gov.br/. Accessed on July 1st, 2014
SUSEP. 1o relatório de análise e acompanhamento dos mercados supervisionados (First Report on Analysis and Follow-Up of Markets under Supervision). Rio de Janeiro. 2013. Available at: www.susep.gov.br/. Accessed on July 1st, 2014
Terra Brasis Resseguradora. Available at: www.terrabrasis.com.br. Accessed on July 1st, 2014
Valia. Available at: <https://www.valia.com.br/>. Accessed on July 1st, 2014
Votorantim Asset Management. Available at: www.vam.com.br. Accessed on July 1st, 2014
Vox Capital. Available at: www.voxcapital.com

ANNEXES

ANNEX I - LIST OF THEMATIC PRODUCTS AND SERVICES

TABLE 12 LIST OF THEMATIC PRODUCTS AND SERVICES

PRODUCT/SERVICE	
Aquisição de bens de capital	Repasse BNDES Moderagro
BNDES BK Usados	Repasse BNDES Finame - Micro, Pequena e Médias Empresas
BNDES Finame Moderniza BK	BNDES Governo
BNDES Florestal	Provias
BNDES Inovação	Programa Modernização da Administração Tributária e da Gestão dos Setores Sociais Básicos (PMAT)
BNDES Microcrédito	Operações com estados
BNDES PER Br	Caminho da Escola
BNDES Progeren	Repasse Finame PSI
BNDES Proplástico	Programa Saneamento para todos
BNDES Prorenova	Programa Minha Casa Minha Vida
BNDES Qualificação	Recursos FGTS- Habitação Popular e Saneamento
BNDES Saúde	Bens de Consumo Duráveis- Ecoeficiência
Capacidade produtiva - comércio, turismo, demais segmentos serviços	Sistema de Aquecimento Solar
CAPACIDADE PRODUTIVA - demais indústrias e agropecuária	Microcrédito Produtivo Orientado
Capacidade produtiva na indústria, agricultura, comércio e serviços	Banco Interamericano de Desenvolvimento
Capacidade produtiva - serv. educação, saúde, assis. social, segurança	Repasse BNDES Finem
Desenvolvimento limpo	Repasse BNDES Automático
ENERGIA - Geração de Energia Elétrica	CDC Sustentável
Energias alternativas	Giro Sustentável
Fundo Amazônia	CDC Eficiência Energética
Fundo da Marinha Mercante	CDC Produção e Processos mais limpos
Fundo Social	CDC Acessibilidade
Funtec	Repasse- Moderagro
Geração hídrica e térmica	Repasse- Moderinfra
Moderfrota	Repasse- ABC
Moderinfra	Repasse- Propflora
Outros	INDÚSTRIA, AGROPECUÁRIA E INFRAESTRUTURA
PASS	INVESTIMENTOS SOCIAIS DE EMPRESAS
PMAE	LOGÍSTICA - Modal Ferroviário
PMI	LOGÍSTICA - Modal Hidroviário, Portuário e Demais Investimentos
Procap-agro	MEIO AMBIENTE
Procapcred	MERCADO DE CAPITALIS
Pró-CDD estiagem	MICRO, PEQUENAS E MÉDIAS EMPRESAS
Procoop	Programa ABC
Proesco	Programa Caminho da Escola
PSI - inovação - BK eficientes	Programa Fundo Clima
PSI - projetos transformadores	Programa IES
Saneamento ambiental e recursos hídricos	PROJETOS ESTRUTURADORES DE TRANSPORTE URBANO
SERVIÇOS EDUCAÇÃO, SAÚDE, ASSISTÊNCIA SOCIAL, SEGURANÇA - Est. e Mun.	PRonaf INVESTIMENTO
Turismo, comércio e serviços	Pronamp INVESTIMENTO
BBB Microcrédito Desenvolvimento Regional Sustentável	Propflora
BB Microcrédito Empreendedor PF	PSI - BK - Demais Itens
Programa ABC -BB	PSI - BK - Ônibus e caminhão
BB Pronaf	PSI - BK - Rural
BB Pronaf Florestal	PSI - Capital Inovador
BB Pronaf Agroecologia	PSI - Exportação de Bens de Capital
BB Pronaf ECO	PSI - Inovação
BB Pronaf Eco - Dendê/Seringueira	Recursos FGTS - Programa Pró-Transporte

ANNEX II - THEMATIC LINES FOR CONSTITUTIONAL FUNDS

TABLE 13 THEMATIC LINES FOR CONSTITUTIONAL FUNDS

PRODUCT/SERVICE	
FNE Agrin	FNO Biodiversidade
FNE Proinfra	FNO Amazônia Sustentável Rural
FNE Procultura	FNO Pronaf
FNE Rural	FNO Pronaf Eco
FNE Verde	FNO Pronaf Floresta
FNE Inovação	FNO turismo
FNE Pro recuperação Ambiental	FNO pesca e aquicultura
FNE Aquipesca	FNO infraestrutura
FNE Proatur	FCO- Rural
FNE Profrota Pesqueira	FCO Rural Pronaf RA
FNE- Pronaf	FCO Rural- Pronaf
FNE - Pronaf Eco	FCO Rural- Desenvolvimento Rural
FNE- Pronaf Floresta	FCO Rural- Agropecuária Irrigada
FNE -Pronaf Semiárido	FCO Rural- Convir
FNE- Pronaf agroecologia	FCO Rural- ABC
FNE -Pronaf Semiárido Seca	FCO Rural - ABC ILPF
FNE Empreendedor Individual	FCO Rural- Retenção de matrizes
FCO Rural- Desenvolvimento de Aquicultura	FCO Rural- Adequação de sistema produtivo pecuário fronteira
FCO Empresarial Turismo	

ANNEX III - LIST OF THEMATIC INVESTMENT FUNDS

TABLE 14 LIST OF THEMATIC FUNDS

ADMINISTRATOR	FI FUNDS	PL (BRL)
BANCO J SAFRA SA	SAFRA SUSTENTABILIDADE FI ACOES	789,363.01
BANCO SANTANDER	SANTANDER FI ETHICAL II ACOES	270,689,867.30
BANRISUL	BANRISUL GOVERNANCA CORPORATIVA FI ACOES	3,036,345.55
BB DTVM S,A	BB PREVIDENCIARIO ACOES GOVERNANCA FI	250,891,820.80
BB DTVM S,A	BB TOP ACOES INDICE SUSTENTAB EMPRES FIA	17,916,314.40
BEM	ITAU GOVERNANCA CORPORAT ACOES FI GENOVA	97,026,250.26
BRADESCO	BRADESCO FIA INDICE DE SUST EMPRESARIAL	71,821,877.00
BRADESCO	BRADESCO FIA PREV GOVERNANCA CORPORATIVA	16,752,175.62
CAIXA	FI EM ACOES BOTANICA SUSTENTABILIDADE	69,106,429.12
CAIXA	CAIXA FI ACOES ISE	7,342,095.37
CAIXA	FIA SAVANA SUSTENTABILIDADE	176,836,345.90
CAIXA	CAIXA FIA CERRADO SUSTENTABILIDADE	68,980,813.74
HSBC	HSBC FI DE ACOES SRI	26,413,233.73
ITAU UNIBANCO SA	ITAU EXCELENCIA SOCIAL ACOES FI	201,922,090.00
ITAU UNIBANCO SA	ITAU GOVERNANCA CORPORATIVA ACOES FI	166,511,173.20
VOTORANTIM ASSET	FIA VOT SUSTENTABILIDADE	71,237,127.28
WESTERN ASSET	WA SUSTENTABILIDADE EMPRESARIAL FIA	65,420,700.55
TOTAL		1,582,694,022.83

ANNEX III - LIST OF THEMATIC INVESTMENT FUNDS

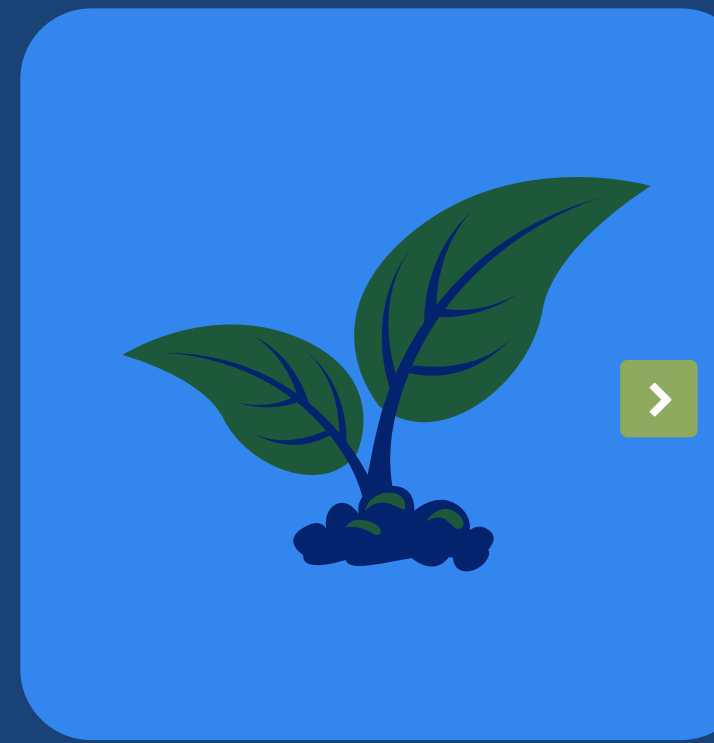
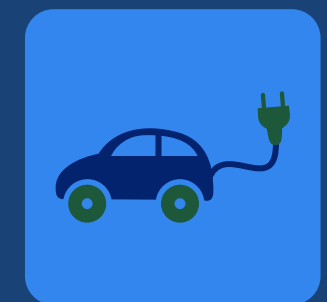
TABLE 14 LIST OF THEMATIC FUNDS

ADMINISTRATOR	FI FUNDS	PL (BRL)
BANCO J SAFRA SA	SAFRA SUSTENTABILIDADE FC FI ACOES	790,710.63
BANCO SANTANDER	SANTANDER FIC FI ETHICAL ACOES	95,625,162.40
BB DTVM S,A	BB ACOES ISE JOVEM FIC FIA	17,895,336.82
BRADESCO	BRAD PRIME FIC FIA IND SUST EMPRESARIAL	17,191,978.38
BRADESCO	BRAD PRIME FICFIA GOVERNANCA CORPORATIVA	4,725,061.01
BRADESCO	BRADESCO FIC FIA PLANETA SUSTENTAVEL	2,078,623.46
BRADESCO	BRADESCO FIC FIA GOVERNANCA CORPORATIVA	5,028,530.38
HSBC	HSBC FICFI DE ACOES SUSTENTABILIDADE	26,645,738.14
ITAU UNIBANCO SA	ITAU ACOES GOVERNANCA CORPORATIVA FICFI	10,357,117.52
ITAU UNIBANCO SA	ITAU ACOES EXCELENCIA SOCIAL FICFI	54,164,497.03
ITAU UNIBANCO SA	ITAU PERS ACOES EXCELENCIA SOCIAL FICFI	143,194,130.60
ITAU UNIBANCO SA	ITAU PERSON GOVERNANCA CORP ACOES FICFI	133,137,142.70
ITAU UNIBANCO SA	ITAU ACOES GOVERNAN CORPORATIVA II FICFI	2,408,591.46
ITAU UNIBANCO SA	ITAU PRIV EXCELENCIA SOCIAL ACOES FICFI	18,315,687.59
ITAU UNIBANCO SA	ITAU EMPRESA GOVERN CORP ACOES FICFI	5,205,581.11
WESTERN ASSET	LM WA ACOES SUSTENT EMPRESARIAL FICFI	65,473,268.35
TOTAL		602,237,157.58

ANNEX IV - LIST OF THEMATIC PE

TABLE 15 LISTO F THEMATIC PE

PRODUCT/SERVICE		
ACTIS BRASIL ENERGIA FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	LIONS TRUST ADMINISTRADORA DE RECURSOS LTDA	228,415.41
ALAOF BRASIL INFRA HOLDINGS FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	CRV DISTRIBUIDORA DE TÍTULOS E VALORES MOBILIÁRIOS S/A	113,068.01
ANGRA INFRA FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	BEM - DISTRIBUIDORA DE TÍTULOS E VALORES MOBILIÁRIOS LTDA.	963,885.65
ÁTICO FLORESTAL - PEF	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	158,871.72
ÁTICO GERAÇÃO DE ENERGIA - PEF	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	246,493.64
BNY MELLON AMBIENTAL FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	0
BRASIL AGRONEGÓCIO - PEF	BEM - DISTRIBUIDORA DE TÍTULOS E VALORES MOBILIÁRIOS LTDA.	310,236.62
BR EDUCACIONAL PEF	BEM - DISTRIBUIDORA DE TÍTULOS E VALORES MOBILIÁRIOS LTDA.	430,960.86
BR EDUCATION VENTURES FUNDO DE INVESTIMENTO EM PARTICIPACOES	BEM - DISTRIBUIDORA DE TÍTULOS E VALORES MOBILIÁRIOS LTDA.	8,727.92
BRASIL MEZANINO INFRA-ESTRUTURA PEF	DARBY ADMINISTRAÇÃO DE INVESTIMENTOS LTDA	119,656.07
BRASIL SUSTENTABILIDADE - PEF	BEM - DISTRIBUIDORA DE TÍTULOS E VALORES MOBILIÁRIOS LTDA.	135,292.30
BROOKFIELD AMERICAS INFRASTRUCTURE (BRAZIL POWER) FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	BROOKFIELD BRASIL ASSET MANAGEMENT INVESTIMENTOS LTDA	501,937.39
BROOKFIELD BRAZIL TIMBER PEF	BROOKFIELD BRASIL ASSET MANAGEMENT INVESTIMENTOS LTDA	703,657.29
BRZ AMATA FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	BEM - DISTRIBUIDORA DE TÍTULOS E VALORES MOBILIÁRIOS LTDA.	22,064.79
BTG PACTUAL INFRAESTRUTURA II FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	CITIBANK DTVM SA	416,821.92
BTG PACTUAL SAÚDE PEF	BTG PACTUAL SERVIÇOS FINANCEIROS S/A DTVM	922,405.61
CAIXA FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES AMAZÔNIA ENERGIA	CAIXA ECONOMICA FEDERAL	1,257,985.19
CAIXA FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES SANEAMENTO	CAIXA ECONOMICA FEDERAL	652,048.94
ENERGIA PCH PEF	CRV DISTRIBUIDORA DE TÍTULOS E VALORES MOBILIÁRIOS S/A	838,819.37
EUCALYPTUS FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	JS ADMINISTRAÇÃO DE RECURSOS S/A	133,206.69
PEF BRASIL ENERGIA	BANCO BRADESCO S.A.	1,311,081.75
PEF NORDESTE ENERGIA	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	22,511.96
PEF TERRA VIVA - PEF	DGF INVESTIMENTOS GESTÃO DE FUNDOS LTDA	270858
FLORESTAL FUNDO DE INVESTIMENTOS PARTICIPAÇÕES	PLANNER CORRETORA DE VALORES SA	1,553,960.14
FLORESTAS DO BRASIL PEF	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	216,789.60
FOCO FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES EDUCACIONAL	BRL TRUST DISTRIBUIDORA DE TÍTULOS E VALORES MOBILIÁRIOS S.A.	2,075.57
FUNDO DE EDUCAÇÃO PARA O BRASIL - PEF	PIP ADMINISTRAÇÃO DE RECURSOS LTDA	450,106v85
PEF PERFORMA KEY DE INOVAÇÃO EM MEIO AMBIENTE	LIONS TRUST ADMINISTRADORA DE RECURSOS LTDA	23,481.99
PEF INSEED FIMA - FUNDO DE INOVAÇÃO EM MEIO AMBIENTE	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	1,281.80
PEF - LACAN FLORESTAL	CRV DISTRIBUIDORA DE TÍTULOS E VALORES MOBILIÁRIOS S/A	527,392.84
PEF BIOENERGIA	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	666,371.33
PEF BIOTEC	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	37,497.62
PEF CAIXA AMBIENTAL	CAIXA ECONOMICA FEDERAL	417,420.78
PEF EM EMPRESAS SUSTENTÁVEIS NA AMAZÔNIA	BTG PACTUAL SERVIÇOS FINANCEIROS S/A DTVM	5,544.16
PEF EM INFRA-ESTRUTURA BB VOTORANTIM ENERGIA SUSTENTÁVEL I	VOTORANTIM ASSET MANAGEMENT DTVM LTDA.	94,605.28
PEF EM INFRA-ESTRUTURA BB VOTORANTIM ENERGIA SUSTENTÁVEL II	VOTORANTIM ASSET MANAGEMENT DTVM LTDA.	135,650.77
PEF BB VOTORANTIM ENERGIA SUSTENTÁVEL III	VOTORANTIM ASSET MANAGEMENT DTVM LTDA.	133,913.13
PEF EM INFRAESTRUTURA ANESSA	PLANNER CORRETORA DE VALORES SA	66,157.83
PEF EM INFRAESTRUTURA ENERGIAS RENOVÁVEIS	BTG PACTUAL SERVIÇOS FINANCEIROS S/A DTVM	84,996.73
PEF EM INFRAESTRUTURA ENERGIAS RENOVÁVEIS	BTG PACTUAL SERVIÇOS FINANCEIROS S/A DTVM	84,996.73
PEF EM INFRAESTRUTURA ENERGIAS RENOVÁVEIS	BTG PACTUAL SERVIÇOS FINANCEIROS S/A DTVM	84,963.82
PEF EM INFRAESTRUTURA XP OMEGA I	CITIBANK DTVM SA	108,090.41
PEF INSEED FIMA - FUNDO DE INOVAÇÃO EM MEIO AMBIENTE	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	1,281.80
PEF MEZANINO BRASIL ENERGY	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	0
PEF PERFORMA KEY DE INOVAÇÃO EM MEIO AMBIENTE	LIONS TRUST ADMINISTRADORA DE RECURSOS LTDA	23,481.99
PEF POTENTIA BIOENERGY	BRL TRUST SERVIÇOS FIDUCIÁRIOS E PARTICIPAÇÕES LTDA	160,071.96
PEF SAÚDE	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	171,722.84
G5 BR INFRA FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	BTG PACTUAL SERVIÇOS FINANCEIROS S/A DTVM	231,978.10
GERA EDUCAÇÃO FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	BANCO PETRA S.A.	41,740.54
INFRA SANEAMENTO - FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	CRV DISTRIBUIDORA DE TÍTULOS E VALORES MOBILIÁRIOS S/A	236,543.59
INFRABRASIL PEF	MANTIQ INVESTIMENTOS LTDA	1,164,052.67
INVESTIMENTOS FLORESTAIS FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	BROOKFIELD BRASIL ASSET MANAGEMENT INVESTIMENTOS LTDA	1,284,257.07
NORTE ENERGIA PEF	BANCO FATOR S/A	32,459.65
NOVA ENERGY I FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	637,695.38
NOVA ENERGY II FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES EM INFRAESTRUTURA	BNY MELLON SERVICOS FINANCEIROS DTVM S.A.	0
P2 BRASIL INFRAESTRUTURA PEF	P2 GESTÃO DE RECURSOS LTDA.	1,851,080.14
P2 BRASIL INFRAESTRUTURA III PEF	P2 GESTÃO DE RECURSOS LTDA.	52,746.00
PÁTRIA ENERGIA PEF	PÁTRIA INVESTIMENTOS LTDA	275,003.44
PÁTRIA ENERGIA RENOVÁVEL - FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES EM INFRAESTRUTURA	PIP ADMINISTRAÇÃO DE RECURSOS LTDA	48,490.35
RIO BRAVO ENERGIA I - FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	CAIXA ECONOMICA FEDERAL	544,942.83
RIO ENERGY FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	CRV DISTRIBUIDORA DE TÍTULOS E VALORES MOBILIÁRIOS S/A	66,560.78
SANEAMENTO 100% FUNDO DE INVESTIMENTO EM PARTICIPAÇÕES	BANCO PETRA S.A.	15,137.74
TRISCORP ATIVOS FLORESTAIS PEF	NSG CAPITAL SERVIÇOS FINANCEIROS DTVM S/A	146,094.12
VALE FLORESTAR	CITIBANK DTVM AS	598,425.51



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 SFN's 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 related 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.

METHODOLOGY

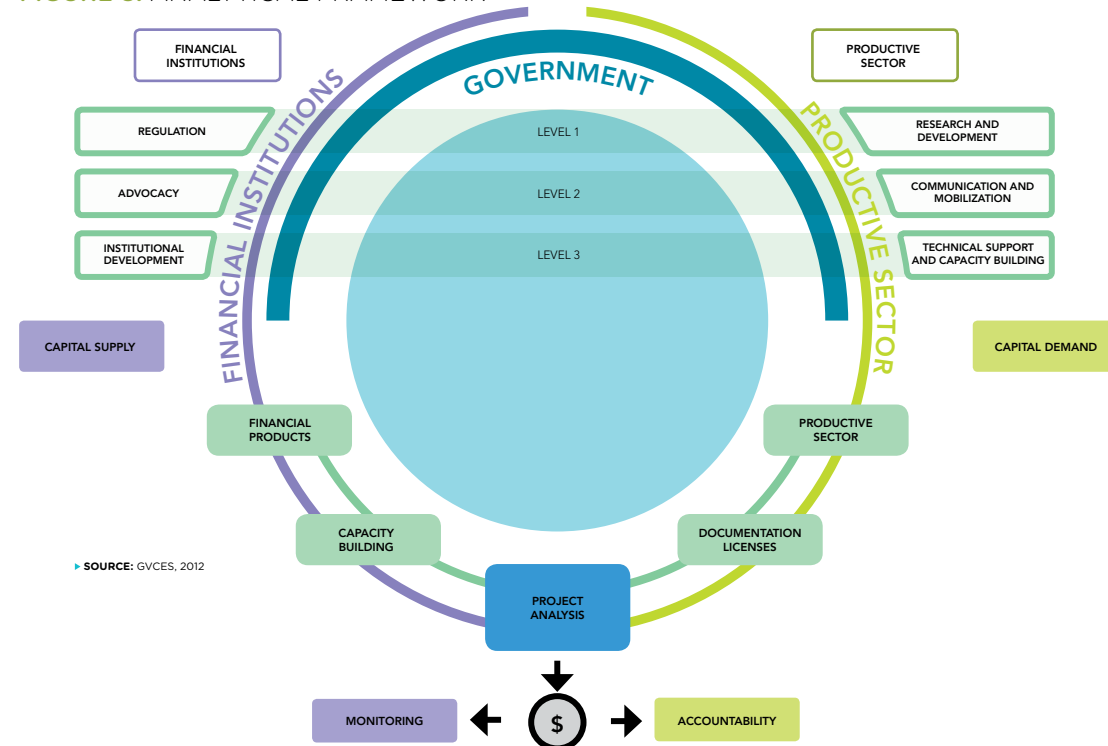
The methodology analysis used on this study was based mainly on previous works from GVces on the relation between the financial sector and a low carbon economy²³. On such studies, it was identified that the financial advancement of this type of economy cannot be found if the "financial economics" is 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.

²³ "Propostas Empresariais de Políticas Públicas para uma Economia de Baixo Carbono: Energia, Transportes e Agropecuária (Business Proposals for Public Policy for a Low Carbon Economy: Energy, Transport and Agriculture) (2010); Financiamentos Públicos e Mudança do Clima: Análise das Estratégias e Práticas de Bancos Públicos no Brasil na Gestão da Mudança do Clima (Public Financing and Climate Change: Analysis of Strategies and Practices of Public Banks in Brazil in the Management of Climate Change) (2011); Financiamentos Privados e Mudança do Clima: Análise das Estratégias e Práticas de Bancos Privados no Brasil na Gestão da Mudança do Clima (Private Financing and Climate Change: Analysis of Strategies and Practices of Private Banks in Brazil in the Management of Climate Change) (2011); Como avançar no financiamento da economia de baixo carbono no Brasil (How to Advance in the Financing of Low-Carbon Economy in Brazil) (2012); These studies are available at: www.fgv.br/ces

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
- **However, these could have a stronger impact on GE businesses:**
 - Lower economic ability and / or background of entrepreneurs.
 - Unawareness of SFN players with GE concepts.
 - 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

Storage) or to replace the burning of coal and oil by natural gas - have also been the focus of attention in many countries.

In parallel to this work for incremental gains with a focus on existing sources of energy, new energy sources - an innovative and disruptive movement to produce “clean energy” and build infrastructure to produce it on a large scale - have become a trend across the planet. The global market has undergone major transformations in the past decade, to the extent that traditional sources of renewable energy and low emission of GHGs (large hydroelectric and nuclear plants) face resistance to their expansion. At the same time, less impactful but also renewable energy sources with low GHG emission (solar and wind, mostly) gain competitiveness and investment opportunities within the agenda. This segment is known as “New Energy”, and is the focus of this study.

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:

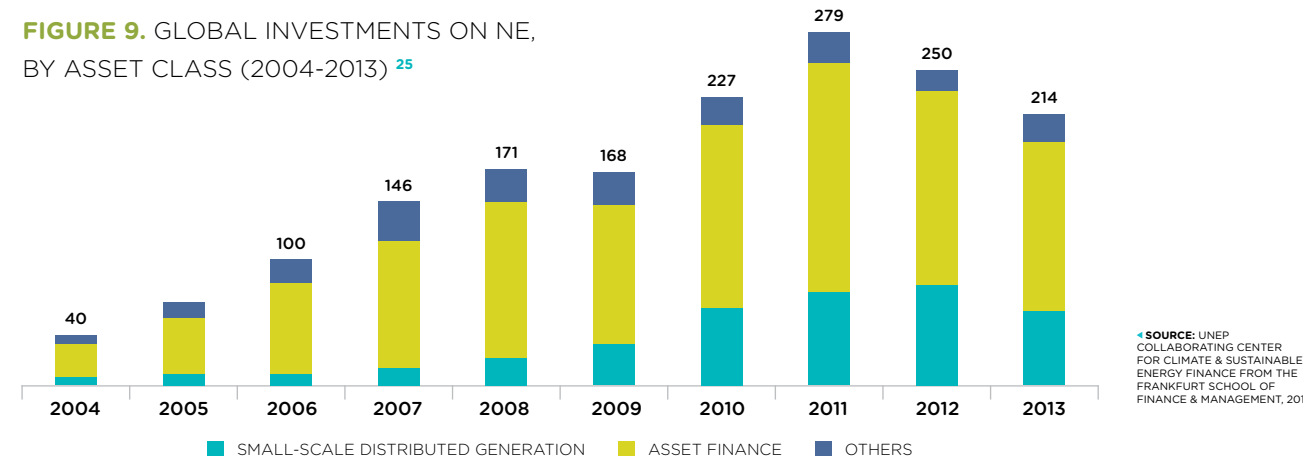
- Biomass or waste, of any size.
- Geothermal and wind, with size above 1 MW.
- Hydraulic, with size between 1 and 50 MW.
- Waves and tides, of any size.
- Biofuels with capacity of at least one million liters per year.
- Solar, of any size, with units below 1 MW separately considered and referred to 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 analysis of the Brazilian framework with a view of the near future, which we considered for defining the focus of this study, are:

- Greater resilience and security, to the extent that they compose a spatially distributed and diverse source in relation to primary sources, reducing the risks of natural or caused accidents that affect energy supply.
- Greater efficiency in logistics, since they allow for energy generation closer to consuming sources, reducing losses in transmission or transportation.
- Greater social acceptance, to the extent that they are less associated with impacts that cause social or institutional resistance (as great works in remote or preserved 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:

FIGURE 9. GLOBAL INVESTMENTS ON NE, BY ASSET CLASS (2004-2013) ²⁵



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 refinancing²⁶.

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 sharp 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 2011²⁷.

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 and escalation of some technologies that some years ago were still maturing. Global generation costs have reached the range of 50 to 150 U\$/MWh and multiple NE sources rapidly become more competitive, even when compared to traditional sources. Considering Brazil’s peculiar geographical conditions, the competitiveness of NE sources, in comparison to large hydroelectric plants, may not be as large, as explained above, but a strategic planning with a long-term view must take into account other factors than just current costs.

²⁴ <http://about.bnef.com/>

²⁵ “Global Trends in Renewable Energy Investment 2014”, Frankfurt School, UNEP Center & Bloomberg New Energy Finance. 2014. Accessed at: <http://fs-unep-centre.org/publications/gtr-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

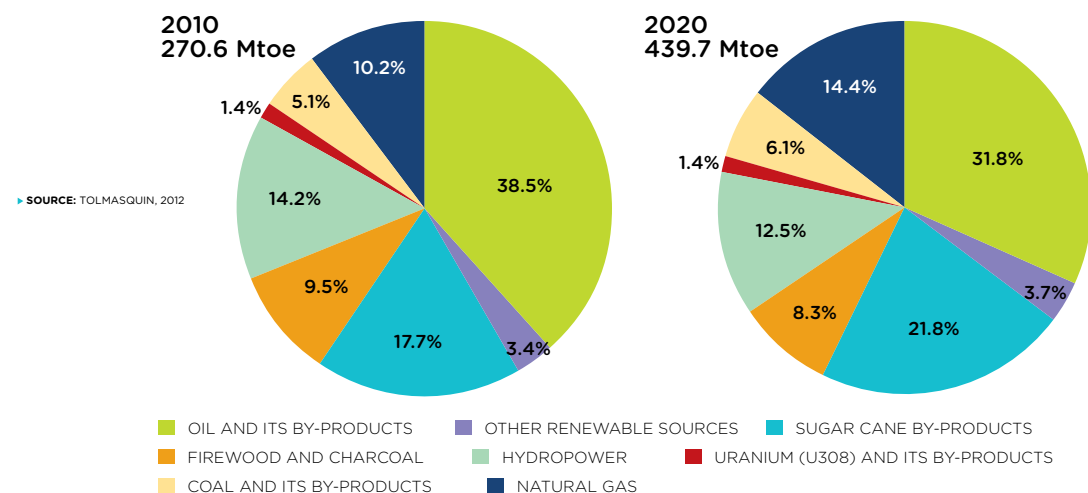
BRAZIL IN THE GLOBAL CONTEXT

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 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 world²⁸" - 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

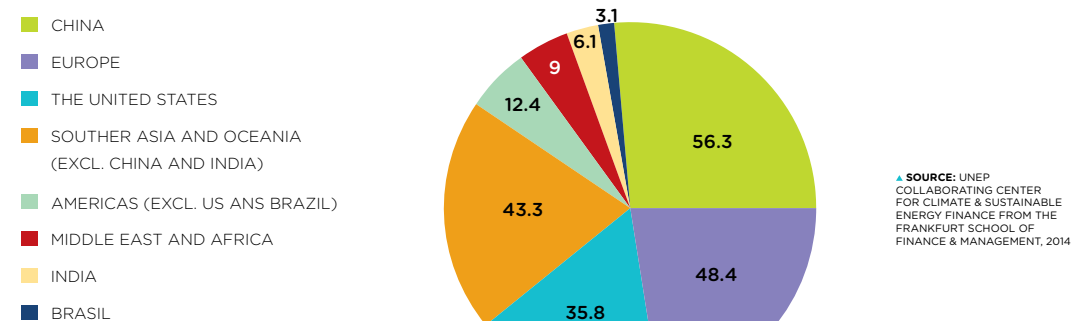
28 Tolmasquim, Maurício T., 2012; Perspectivas e planejamento do setor energético no Brasil; estudos avançados (Perspectives and Planning for the Energy Sector in Brazil; Advanced Studies) 26 (74), 2012, p.249

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)²⁹. 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 2035³⁰), 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 ON 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, U\$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)³¹

VC/PE, PUBLIC MARKETS AND ASSET FINANCE IN RENEWABLE ENERGY IN BRAZIL PER SECTOR, 2013, \$BI	Financing Type			Total
	Asset Finance	Public Markets	VC/PE	
Wind	2.1	0.2	0.04	2.3
Biofuel	0.5	—	—	0.5
Biomass	—	—	0.1	0.1
SHP	0.03	—	—	0.03
Solar	0.01	—	—	0.01
Total	2.6	0.2	0.2	3.0

31 SOURCE: UNEP COLLABORATING CENTER FOR CLIMATE & SUSTAINABLE ENERGY FINANCE FROM THE FRANKFURT SCHOOL OF FINANCE & MANAGEMENT, 2014

29 MME/EPE, "PDE 2013-2022 - Plano Decenal de Expansão de Energia - Relatório Final". Rio de Janeiro, janeiro de 2014.
30 IEA - International Energy Agency, "World Energy Outlook 2010" e "World Energy Outlook 2013 - presentation to press"

Considering the total amount invested in NE sources in the country in 2013, 70% refer to the construction of wind farms and 17% to biofuels production units. The very low total invested in energy from other sources, all in the range of tens of millions of dollars, also draw attention. We note that almost 90% of investments happen in the “asset finance” form, which corresponds to investment in units for power generation, with entrepreneurs’ private equity, direct investors or credit. The amounts invested through the capital market or venture capital funds (EV / PE) are low, approximately US\$ 200 million in each mode.

Other sources for assessing the volume of the country’s investments in NE are the plans and records, both official and unofficial, designed by Brazilian players. One of them is the PDE – Ten-Year Plan for Energy Expansion (PDE 2013-2022), regularly prepared by the Energy Planning Company (EPE), from the Ministry of Mines and Energy. The latest edition available (PDE 2013-2022) provides detailed information on the perspectives for this period. This plan provides, in summary, that in the next 10 years Brazil’s installed capacity in New Energy will increase to 22.7 GW, of which 15.6 GW correspond to wind power, 5.1 GW to biomass, and 2.0 GW to small hydroelectric plants (SHP).

A remarkable aspect is that the PDE 2013-2022 does not include solar photovoltaics, although the plan was created in a context where the advancement of this technology worldwide was evident. In an attempt to correct this flaw, EPE has recently included the projection of hiring 2 GW of solar photovoltaic energy by 2017. Another recent sign that this technology is starting to gain participation in the Brazilian energy matrix is the early inclusion of this energy source in the auctions of the National Integrated System. Based on the average cost of power generation recorded in the country, investments required for small hydroelectric plants, biomass, and wind will be around BRL81 billion in order to meet the PDE 2013-2022. Adding to this an estimated BRL39 billion for the installation of 5 GW in solar photovoltaic (average of 500 MW per year over 10 years, not included in PDE 2013-2022), we have an estimate of BRL120 billion to be invested in 10 years³².

RECENT TRENDS AND PERSPECTIVES FOR THE BRAZILIAN MARKET

In the last decade, Brazil has had some public policies regarding NE, especially PROINFA, which boosted the deployment of 131 plants (60 SHPs, 52 wind, 19 biomass-supported thermal) planned to generate 11.1 GWh in 2014.

In this scenario, the expectation based on observation of current market NEs - which still does not include solar photovoltaics - is that the wind must maintain a pace of annual contracting between 2 and 2.5 GW, if incentive and financing conditions persist. The biomass sector sees greater difficulty in terms of feasibility due to the higher average cost of cogeneration plants (BRL150/MWh compared to BRL130/MWh for wind) and a lower prioritization of government. Anyway, there is a potential for electricity generation from sugarcane bagasse proportional to the evolution of the harvest and production of sugarcane ethanol. UNICA (National Union of Cane Sugar Industry) projects a potential of 22 GW in bioelectricity in 2020 (Unica, 2014).

Small Hydroelectric Plants (SHP) have reported a low hiring level in recent years and, although the untapped potential of the source is around 20 GW, the rising cost of power and long delay for granting and licensing of power plants has discouraged many investors. A rate different from 200 MW of annual hiring to the source is not expected in the next ten years.

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: interests 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: interests rates = IPC-FIPE+5% pa, participation in up to 100% of the project, amortization in 10 years.

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.

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 the capacity to generate energy through special purpose vehicles (SPV) are considered as asset finance. Public markets: amounts invested in equity of companies listed on stock exchanges that are developing 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, equity. Excludes refinancing.

³² MME/EPE, “Balanço Energético Nacional 2013 – Relatório Síntese” (National Energy Balance 2013 - Summary Report), Rio de Janeiro, May 2014

The Chart below presents a summary of the current situation in Brazil regarding NE sources that are the focus of this study:

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

Sources	Technology/Market Perspectives	Financing	Barriers
Onshore Wind	Higher towers (300m) capable of improving utilization of wind. Consolidated market; logistical challenge to expand to allow annual contraction/installation in a volume greater than 2 GW.	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%.	Possibility of reducing incentives in the future in the face of increased competition from source
Biomass Cogeneration from Sugarcane Bagasse	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.	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%.	Uncertain conditions of the ethanol market have repercussions on bagasse cogeneration. Lack of incentives to retrofit boilers.
SHPs Small Hydroelectric Plants	More efficient and lower cost turbines.	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%. Specific conditions expected to be announced by September 2014.	Delay in the licensing term, Bureaucracy for the analysis of basic projects and projects enabling by Aneel, rising costs of construction
Solar Photovoltaic Plants	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.	RESIDENTIAL Santander: 5 years, interest rate of 1.8% per month Banco do Brasil: 5 years, interest rate from 1.6 to 2.1% per month Caixa Econômica Federal: 8 years, interest rate from 1.7 to 1.75% per month Instituto Ideal: Support between BRL1,000 and 5,000 for systems up to 5 kW	Minimum rates of nationalization of solar chain required by BNDES limit the financing capacity. High cost, incipient market in Brazil.
Solar Small-Scale Distributed Generation	Solar Plug'n'Play (easy installation being developed by the Fraunhofer Institut), storage improvement, module efficiency improvement. Increased scale and reduced soft costs (maintenance, installation). Alternative financing for panels (leasing, Power Purchase Agreement). Solar Community (choice of consumers buying power from commercial plants)	COMMERCIAL Banco do Nordeste (FNE Verde): 12 years, interest rate of 3.5% to 4.1% per year BNDES (FINEM): Minimum of 10 million, interest rate of 5% per year	Need for better financing conditions, net metering without ICMS tax charges

▲ SOURCE: INTERNAL DEVELOPMENT

CONCLUSIONS AND RECOMMENDATIONS

The scenario described above presents a range 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 set 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 challenges (and therefore opportunities for improvement) for which the SFN actions are required. For each of them, we indicate expected actions from the SFN in different categories: private actors, sectorial organizations, regulators, and government.

Importantly, the role of the SFN in building a Green and inclusive Economy is not only geared to its internal dynamic and routine, but it also includes a work in the public sphere, helping to formulate and prioritize an agenda for all society. In relation to the proposed actions, the players can take different roles in their involvement:

- **Protagonist:** What SFN members can do in regard to aspects controlled or strongly influenced by them.
- **Inductor:** What SFN members can do when they are expected to mobilize/guide other players` actions.
- **Participant:** What SFN members can do as active participants in initiatives from other players on the theme.

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 products 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 sectorial 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 below.

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 subject³³. Additionally, more recently, we included the ABC Plan Observatory³⁴, 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 partner³⁵.

³³ GVces studies on sustainability in agriculture and financial sector: Propostas Empresariais de Políticas Públicas para uma Economia de Baixo Carbono: Energia, Transportes e Agropecuária (Business Proposals for Public Policy for a Low Carbon Economy: Energy, Transport and Agriculture) (2010); Financiamentos Públicos e Mudança do Clima: Análise das Estratégias e Práticas de Bancos Públicos no Brasil na Gestão da Mudança do Clima (Public Financing and Climate Change: Analysis of Strategies and Practices of Public Banks in Brazil in the Management of Climate Change) (2011); Financiamentos Privados e Mudança do Clima: Análise das Estratégias e Práticas de Bancos Privados no Brasil na Gestão da Mudança do Clima (Private Financing and Climate Change: Analysis of Strategies and Practices of Private Banks in Brazil in the Management of Climate Change) (2011); Como avançar no financiamento da agricultura de baixo carbono no Brasil (How to Advance in the Financing of Low-Carbon Agriculture in Brazil) (2011); O financiamento da agricultura de baixo carbono no Brasil: análise da safra 2011/12 (Financing Low-Carbon Agriculture in Brazil: Analysis of the 2011/12 Crop Year) (2012). These studies are available at: www.fgv.br/ces

³⁴ The ABC Observatory, launched in May 2013, is an initiative aimed at engaging society in the debate on low-carbon agriculture. Coordinated by the Center for Study of Agribusiness of Getulio Vargas Foundation (GVAgro) and developed in partnership with the Center for Sustainability Studies at FGV (GVces), it focuses on generating knowledge and information, promoting discussion and debate and fostering broad and inclusive implementation and improvement of the ABC Plan and Program.

³⁵ During the first year of activity, the ABC Observatory published three studies, which were launched in the presence of key decision makers involved with the ABC Plan Program. They were: Study 1 - Agricultura de Baixa Emissão de Carbono: A Evolução de um novo paradigma (Low-Carbon Agriculture: The Evolution of a New Paradigm). (2013); Study 2 - A Governança do plano ABC (Governance of the ABC Plan). (2013); Study 3 - Agricultura de Baixa Emissão de Carbono: Financiando a transição (Low-Carbon Agriculture: Financing the Transition). (2013). These studies are available at: www.observatorioabc.com.br

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%³⁶. 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 billion³⁷, 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 advantages³⁸. 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 risings, 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 friend³⁹.

³⁶ Food and Agriculture Organization of the United Nations [FAO]. (2012a). FAO Statistical Yearbook 2012.

³⁷ Source: Department of International Relations of the Ministry of Agriculture, Livestock and Food Supply (SRI/Mapa).

³⁸ Source: GVAgro

³⁹ Source: ICONE. Institute for International Trade Negotiations

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 were identified as currently in effect for this sector, which are more favorable or unfavorable to achieving the visions adopted as reference⁴⁰. 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 *Sectorial Plan for Mitigation and Adaptation to Climate Change in order to Consolidate an Economy of Low Carbon in Agriculture*⁴¹ (ABC Plan) incorporates the commitments made by Brazil under the National Policy on Climate Change (Law 12,187 / 2009 and Decree 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

⁴⁰ 2050 View from WBCSD/CEBDS, "O Futuro que Queremos" (The Future We Want), a result from Rio+20 and studies for the Post-2015 agenda, among others.

⁴¹ Low-Carbon Agriculture (ABC Agriculture) is the adoption of technologies and the enhancement of agricultural practices that optimize agricultural production and lead to a reduction in greenhouse gas emissions as part of a national strategy to mitigate climate change. SOURCE: ABC Plan Observatory.

and private sector investment to transform current agricultural practices in low-carbon practices⁴².

- Technologies and investment purposes proposed by the plan - restoration of degraded pastures (ABC Restoration); recovery of APPs, Permanent Preservation areas and RLs, Legal Reserves, (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 GHG⁴³.

This study focused its analysis and recommendations in the ABC Plan, particularly 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 this end, different actions have been proposed, such as the reduction in deforestation rates, increased energy efficiency, the use of biofuels, the supply from hydropower, wind power, recovery of degraded pastures, the use of charcoal from planted forests in steel mills, crop-livestock integration, etc⁴⁴.

These commitments were confirmed in Article 12 of Law 12,187, from December 29th, 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 Sectorial Plan for Mitigation and Adaptation to Climate Change for the Consolidation of Economics of Low-Carbon in Agriculture - ABC Plan⁴⁵.

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 civil society representatives. Between 2010 and 2011, 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 Of this total, BRL157 billion would be made available through the rural credit, with funds from the BNDES and other financial institutions. The application of these resources will result in costs to the Union, on an equalization rate of the order of BRL35 billion coming from the Federal Budget.

⁴³ 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 evaporation 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.

⁴⁴ ABC Plan Observatory - GVagro and GVces.

⁴⁵ 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 (SAFs) in 4 million hectares.
3. Expand the use of Direct Planting System (SPD) 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 Planted 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.

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.

Technological Process	Commitment (Increase in area/use)	Mitigation Potential (millions Mg CO ₂ eq)
Degraded Pastures Recovery	15 million ha	83 to 104
Agriculture-Forest Integration	4 million ha	18 to 22
Direct Planting System	8 million ha	16 to 20
Biological Nitrogen Fixation	5.5 million ha	10
Planted Forests	3 million ha	-
Animal Manure Treatment	4.4 million ha	6.9
Total		133.9 to 162.9

▲ SOURCE: ABC PLAN OBSERVATORY- GVAGRO AND GVCES

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 19. PURPOSE OF INVESTMENT AND REFUND DEADLINES

Purpose	Deadline (years)	Grace period (years)
Degraded Pastures Recovery	18	3
Agriculture-Forest Integration	8 ⁴⁶	3
Commercial Forests	12/15	8
Palm Tree (Dendezeiro) Forests	12	6
Animal Manure/Waste Treatment	10	5
Organic Agricultural Production Systems	8	3
Forest Seedling Nurseries	5	2
Rebuilding / maintenance APP and Legal Reserves	15	1
Direct Planting "On the Straw"	10	5
Biological Nitrogen Fixation	10	5

▲ SOURCE: ABC PLAN OBSERVATORY- GVAGRO AND GVCES

⁴⁶ It can be extended up to 12 years when the forest component is present.

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

ABC Program - 2010/11 until 2013/14 crop year	
Available amount	BRL13,050,000,000.00
Contracted amount	BRL8,120,465,095.85
Contracted / Available	62%

▲ SOURCE: BB, BNDES, BRAZILIAN CENTRAL BANK

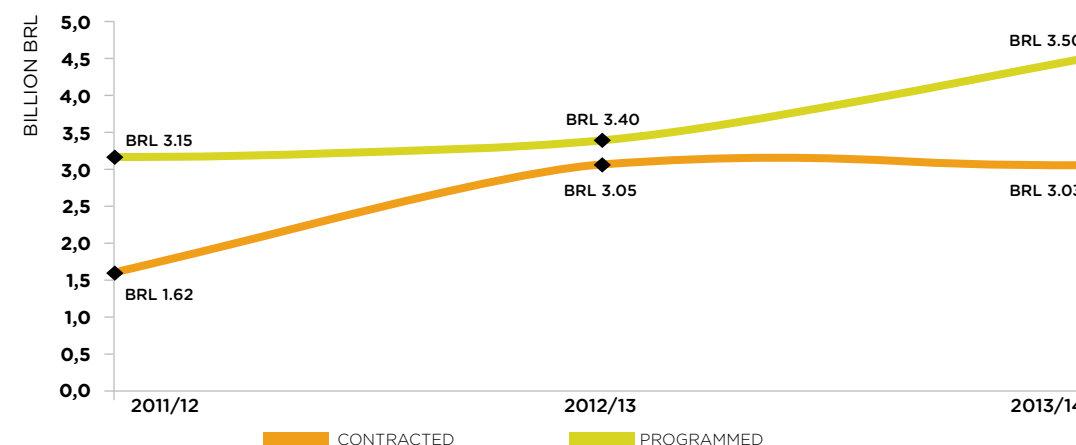
TABLE 21. SCHEDULE AND EFFECTIVE APPLICATION OF RESOURCES OF THE ABC PROGRAM IN 2010/11, 2011/12, 2012/13 AND 2013/14 CROP YEARS (IN BRL MILLION)

Program	2010/11		2010/12		2010/13		2010/14	
	PROGRAMMED	APPLIED	PROGRAMMED	APPLIED	PROGRAMMED	APPLIED	PROGRAMMED	APPLIED
ABC	2,000.00	418.50	3,150.00	1,624.86	3,400.00	3,049.68	4,500.00	3,027.41
BNDES		304.90	2,300.00	351.99	1,900.00	306.47	500.00	285.28
BB		113.60	850.00	1,272.87	1,500.00	2,743.20	4,000.00	2,742.13

▲ SOURCE: BB, BNDES, BRAZILIAN CENTRAL BANK

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



▲ SOURCE: BB, BNDES, MINISTRY OF AGRICULTURE AND BRAZILIAN CENTRAL BANK

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.

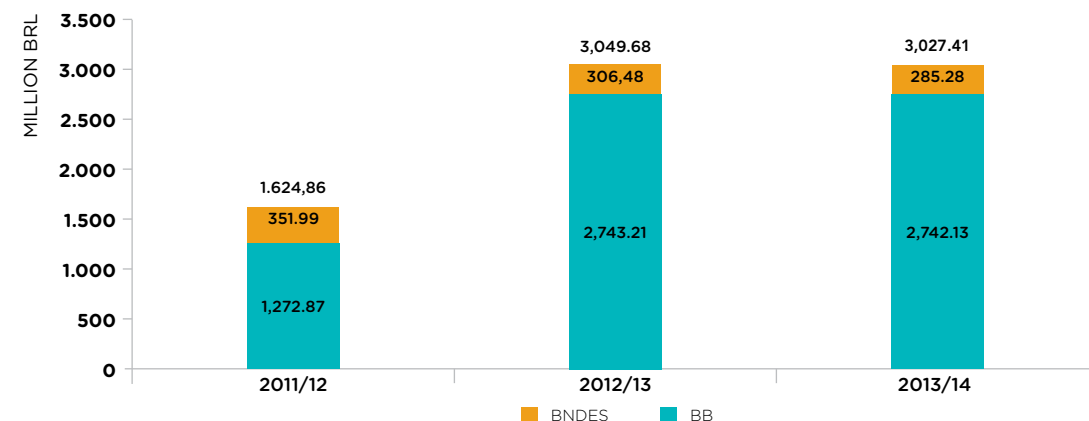
From the agricultural financing point of view, the ABC Program represents a paradigm shift for all parties involved. Lines of traditional rural credit financing were always directed to finance specific and concrete items such as agricultural machinery, seeds, fertilizers etc. In these cases, the internal 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 network 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



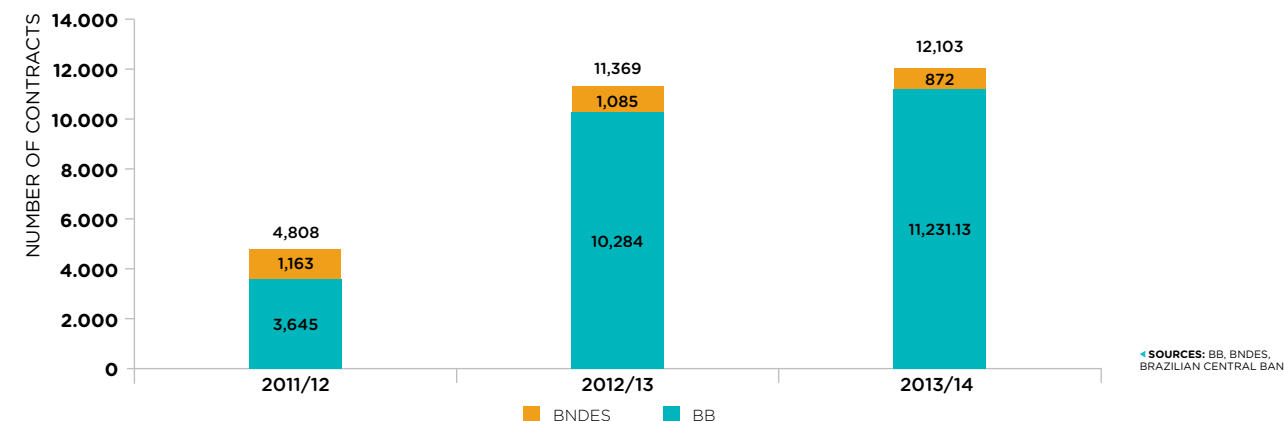
BB has strived to unlock the program using its own resources, from Rural Savings. The use of this source by BB to fund the actions of the ABC Program was crucial to unleash the performance of the line, but there is a built-in investment that is paid by the Union, as an equalization of interest in relation 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.

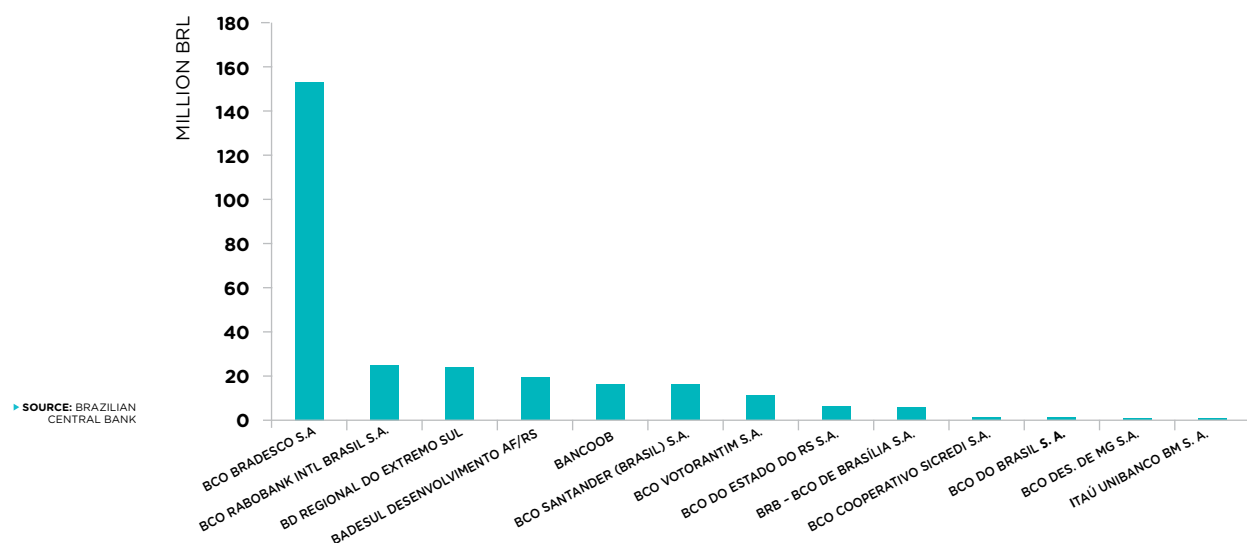
FIGURE 14. NUMBER OF CONTRACTS ENTERED INTO FOR THE ABC PROGRAM IN 2011/12, 2012/13 AND 2013/14 CROP YEARS



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:

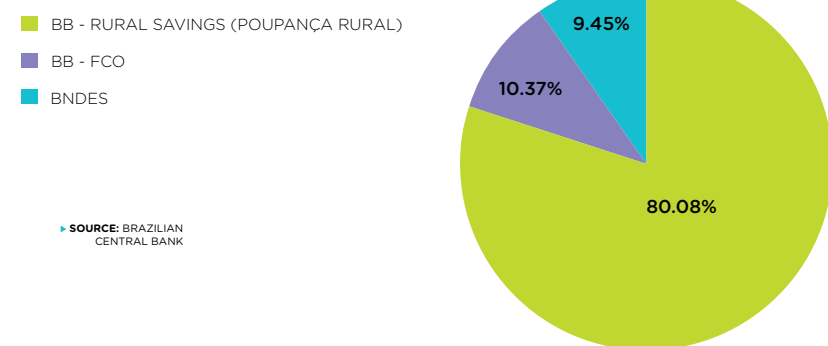
1. The long maturity of the operation (up to fifteen years for debt amortization).
2. The difficult access to information by the competent environmental authorities, as, for example, the situation of environmental regulation of the tenderer.
3. The high transaction costs for taking ABC credit from BNDES.
4. The risks 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.

FIGURE 15. CONTRACTED AMOUNT OF OPERATIONS VIA BNDES FOR THE 2013/14 CROP YEAR



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.

FIGURE 16. PARTICIPATION OF FINANCING SOURCES FOR THE ABC PROGRAM 2013/14 CROP YEAR



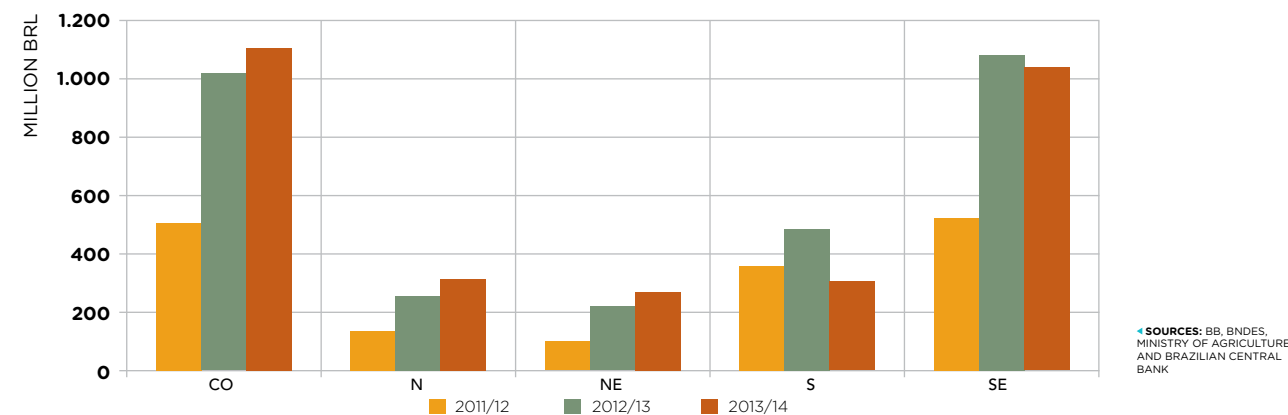
To ensure competitiveness of the program, it is necessary to reduce the transaction cost for private banks taking the ABC credit with BNDES. In addition, there should be investments in access to information by the competent organs, such as the formalization of the process for environmental regularization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

GEOGRAPHIC DISTRIBUTION

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 are seen as a priority for the credit line - due to their vast

expanse of degraded pastures and low efficiency agriculture. However, they remain with the least amount of contracts and funds received from the ABC Program: together in the 2013/14 crop year, they received only 21.8% of the contracts and BRL584.2 million, slightly more than half of what Midwest received.

FIGURE 17. CONTRACTED AMOUNT FOR THE ABC PROGRAM IN THE MIDWEST, NORTH, NORTHEAST, SOUTH AND SOUTHEAST IN 2011/12, 2012/13 AND 2013/14 CROP YEARS

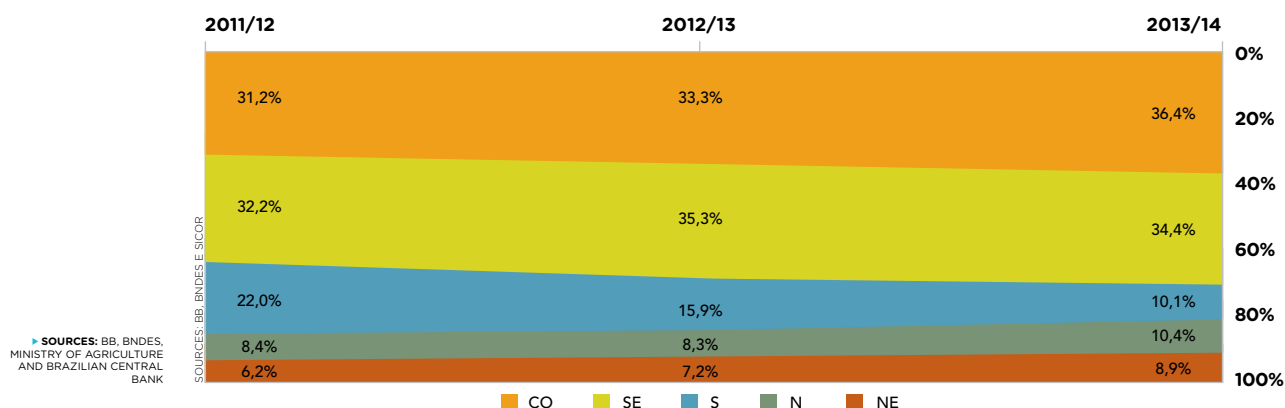


In 2013/14 crop year, the regional ranking of disbursement for the ABC Program showed changes from previous crop years. For the first time, the Midwest region overcomes the Southeast region, and the North region outweighs the South region in resources taken from ABC Program. Despite the increased participation of the Midwest in the 2013/14 season, the percentage of participation in the disbursement of the ABC Program in previous crop years remained close to the percentage of the Southeast region. Thus, the two regions are leading the procurement for these resources. One reason for this success is the broad technical support network present in both regions.

The South region has reduced the amount of contracted resources from the ABC Program, falling from 22.1% in the 2011/12 crop year to 15.9% in 2012/13, and 10.1% in the 2013/14 crop year. The North and Northeast regions have shown a gradual increase over the crop years. The northern region changed from 8.4% to 8.3% in the 2011/12 and 2012/13 crop years, respectively, to 10.4% on the 2013/14 crop year, while the Northeastern region had 6.3% and 7.2% share in the disbursement in the 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.

FIGURE 18. REGIONAL PARTICIPATION IN THE CONTRACTED AMOUNT FROM THE ABC PROGRAM IN THE 2011/12, 2012/13 AND 2013/14 CROP YEARS



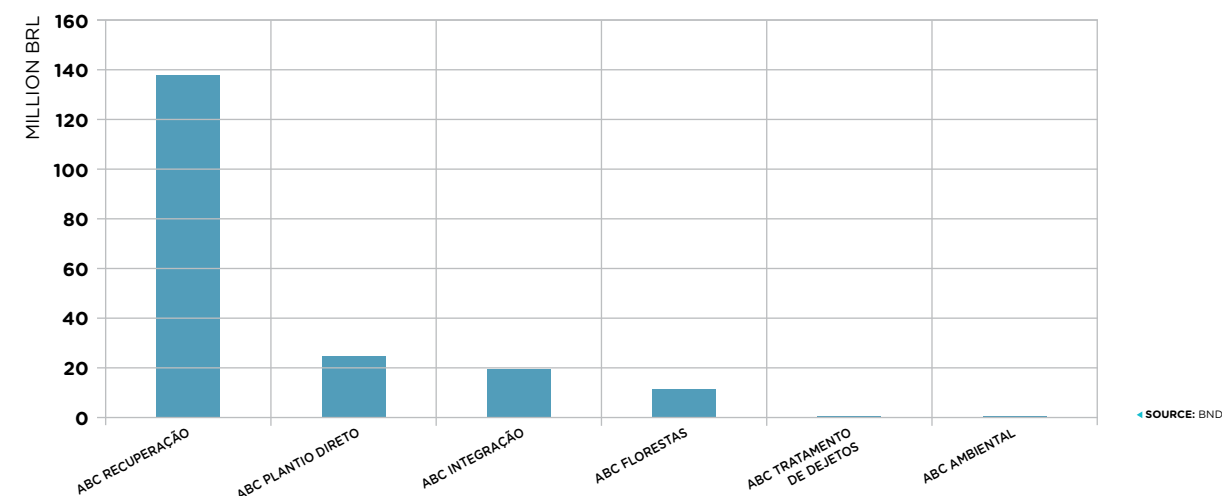
However, when comparing the total contracted value of the regions vis-à-vis the amount offered by the Federal Government via the Agricultural Livestock Plan (PAP), the ABC Program has not reached the expectation of contracted resources in none of the crop years analyzed, even considering the recent low 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.

FIGURE 19. CONTRACTED AMOUNT OF OPERATIONS VIA BNDES FOR THE 2013/14 CROP YEAR FOR INVESTMENT PURPOSES



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 Mapiitoba (that 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 and BNDES - and the civil society, through the ABC Plan Observatory - the ABC Plan's financial information is still not 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, GVCes 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 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 2010/11 to 2013/14 harvests (exactly BRL13.05 billion), the rate of implementation of the program (62%) also shows the need for non-negligible tactical and operational improvements, such as those mentioned on recommendations below.

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 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 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, 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 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 the 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 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 purposes⁴⁷.

⁴⁷ Available at <http://www.bcb.gov.br/?SICORNOTICIAS> - July 16th, 2014.

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 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 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 inductor - 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

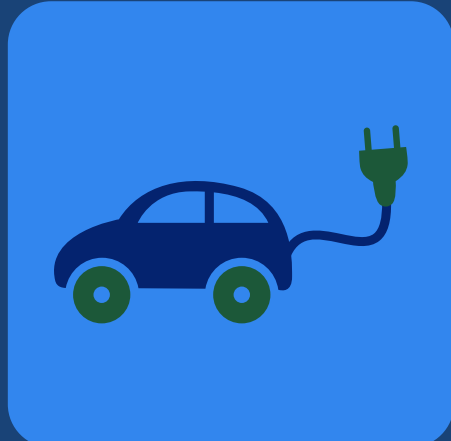
Development of better agricultural techniques, equipment, plant varieties and pasture management, and its dissemination among rural producers.

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.

BIBLIOGRAPHICAL REFERENCES.

- Food and Agriculture Organization of the United Nations [FAO].** (2012a). FAO Statistical Yearbook 2012.
- Ministry of Mines and Energy.** "Balanço Energético Nacional 2013 - Relatório Síntese" (National Energy Balance 2013 - Summary Report), Rio de Janeiro, May 2014
- ABC Observatory.** <http://www.observatorioabc.com.br>
- Tolmasquim, Maurício T., 2012;** Perspectivas e planejamento do setor energético no Brasil; estudos avançados (Perspectives and Planning for the Energy Sector in Brazil; Advanced Studies), 26 (74), 2012, p.249
- UNEP** Collaborating Center for Climate & Sustainable Energy Finance from the Frankfurt School of Finance & Management, "Global Trends in Renewable Energy Investment", 2014



INTRODUCTION TO THE DISCUSSION
OF ECONOMIC OPPORTUNITIES IN
BRAZIL FOR BIODIVERSITY AND CITIES

VIII. 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 of logging products, was selected for a more in-depth analysis. This looks at 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 31% of the area of the five continents 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 availability⁴⁸.

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 economic instruments and/or through payments for ecosystem services (PES). In the case of PES, the main modalities would be the REDD+⁴⁹ in the context of forest preservation, and atmospheric carbon capture contracts in the case of forest recovery.

⁴⁸ TNC Study. <http://sao-paulo.estadao.com.br/noticias/geral,reflorestar-area-ampliaria-reserva-de-agua-em-sp,1556046>

⁴⁹ REDD+ is an acronym that stands for Reducing Emissions from Deforestation and Forest Degradation. It consists of a mechanism to compensate those who preserve their forests, avoiding greenhouse gas emissions.

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. Regarding 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

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 GDP⁵⁰. In addition to direct financial resources, ecological tourism stimulates 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.

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 people⁵¹. These services can be divided into the following categories⁵²:

- Provision: of food, raw materials, water resources, genetic resources, medicines, ornamentation.
- Regulation: of climate, pollination, 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 segment 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" (NCF).

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 Preservation (APP) and Legal Reserves (RL). The "New Forest Code" (NCF) brought innovations that allowed for the increase of areas for economic exploitation. In particular, the NCF offered opportunities for the conservation of forested areas via compensatory mechanisms such as Environmental Reserve Quotas (CRA)⁵³ - that allowed the regularization of producers. The NCF permitted a rural property owner, who on July 22nd, 2008, had a Legal Reserve area smaller than that provided for under the law, could regularize their situation by recovering the Legal Reserve area by allowing the natural regeneration of the vegetation in the Legal Reserve area, or through compensatory mechanisms, among other forms through the purchase of Environmental Reserve Quotas⁵⁴.

⁵¹ Kumar, 2010 and the Millennium Ecosystem Assessment, 2005

⁵² GVces, 2013

⁵³ Soares-Filho et al, 2014

⁵⁴ Law 12,651/2012, Article 66

⁵⁰ There are 193 million acres (78,104,329 ha) in parks, the equivalent of about US\$ 180 per hectare per year, according to the American Forest Service.

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 (CRF) - issued under Law 4,771/1965. The CRA is issued by an organ of the National Environment System (Sisnama)⁵⁵. 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)

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

SOURCE: SPAROVEK ET AL., 2010

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 CRAs⁵⁶. 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)⁵⁷. 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 PNRS⁵⁸. Currently there are around 70 cooperatives offering CLRs⁵⁹.

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 materials⁶⁰.

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”⁶¹ 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 negotiations⁶².

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 transacted⁶³. It is also important to highlight the history of the country in relation to CDM (Clean Development Mechanism) projects, it being the third largest leading actor in this framework (5% of total global projects), after only China and India⁶⁴.

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 Producer Program from the National Water Agency that has 16 projects in varying stages of development and states⁶⁵.

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.

Brasil has already shown good development in ecosystem services, particularly in 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.

55 Law 12,651/2012, Articles 44 to 50

56 Idem

57 BVRio, 2014

58 BVRio, 2014

59 BVTrade, 2014

60 CEMPRES, 2013

61 BRASIL, 2009

62 Ferreira, 2011; Câmara dos Deputados (House of Representatives), 2014

63 Ecosystem Marketplace, 2014

64 World Bank, 2014

65 ANA, 2014

BIBLIOGRAPHICAL REFERENCES

- BRASIL. (February 28th, 2014).** Economia e Emprego: Agropecuária permanece entre destaques do PIB brasileiro (Economics and Employment: Agriculture Remains among the Highlights of Brazilian GDP). Accessed on August 14th, 2014, available at Portal Brasil: <http://www.brasil.gov.br/economia-e-emprego/2014/02/agropecuaria-permanece-entre-destaques-do-pib-brasileiro>
- BVRio. (2014).** Cotas de Reserva Ambiental (Environmental Reserve Quotas). Accessed on August 22nd, 2014, available at Bolsa Verde do Rio de Janeiro: <http://www.bvrrio.org/site/>
- BVRio. (2014).** Créditos de Destinação Adequada de Embalagens (Credits for Appropriate Disposal of Packaging). Accessed on August 27th, 2014, available at Bolsa Verde do Rio de Janeiro - Mercados - Resíduos Sólidos: <http://www.bvrrio.org/site/index.php/mercados/logistica-reversa/embalagens>
- Câmara dos Deputados (House of Representatives). (2014).** Relatório Final da Subcomissão Especial para Acompanhar as Atividades da Conferência das Partes sobre Mudanças Climáticas (Final Report of the Special Sub-Committee Monitoring the Conference of the Parties on Climate Change). Brasília: Câmara dos Deputados.
- Ecosystem Marketplace. (2014).** Sharing the Stage: State of the Voluntary Carbon Markets 2014. Washington, DC: Forest Trends and Bloomberg New Energy Finance
- FGV/GVces. (2013).** Diagnóstico preliminar das principais informações sobre projeções climáticas e socioeconômicas, impactos e vulnerabilidades disponíveis em trabalhos e projetos dos atores mapeados (Preliminary diagnosis of key information about climate and socio-environmental projections, impacts and vulnerabilities available in projects and works of mapped actors). Brasília: Ministério do Meio Ambiente (Ministry of the Environment).
- FGVces. (2013).** Tendências em Serviços Ecológicos (Trends in Ecosystem Services) - TeSe. Accessed on August 27th, 2014, available at TeSe: O que são serviços ecossistêmicos (What are ecosystem services?): <http://www.tendenciasemse.com.br/index.php?r=site/conteudo&id=2>
- IBGE. (2006).** Censo Agropecuário (Agriculture Census) 2006: Brasil, grandes regiões e unidades da federação (Brazil, extended regions and States). In: IBGE.
- IPEA. (2011).** Código Florestal: Implicações do PL 1876/99 nas áreas de Reserva Legal (Forest Code: Implications of PL 1876/99 in Legal Reserve Areas). Brasília: IPEA.
- Kumar, P. (2010).** The Economics of Ecosystems and Biodiversity: ecological and economic foundations. UNEP/Earthprint.
- Martins, S. (2013).** DIRETRIZES PARA UMA ECONOMIA VERDE NO BRASIL II - AGRONEGÓCIO E AGRICULTURA FAMILIAR (GUIDELINES FOR A GREEN ECONOMY IN BRAZIL II - AGRIBUSINESS AND FAMILY AGRICULTURE). Rio de Janeiro: FBDS.
- Mukai, Toshio. O Novo Código Florestal.** Anotações à Lei no 12.651, de 25 de maio de 2012 (The New Forest Code. Notes on Law 12,651, from May 25th, 2012). Rio de Janeiro: Forense, 2013.
- Soares-Filho, B., Rajão, R., Macedo, M., Carneiro, A., Costa, W., Coe, M., et al. (April 25th, 2014).** Cracking Brazil's Forest Code. *Science*, 344, 363-364.
- Stephanes, R. (2012).** Código Florestal - A lei e considerações (Forest Code - The Law and Considerations). Brasília: Brasília.
- World Bank. (2014).** State and Trends of Carbon Pricing 2014. Washington DC: World Bank; Ecofys.

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 cities⁶⁸.

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 population⁶⁹. 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 (52 million) overtook 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 the population with sewer service is less than 50% (48.29%)⁷⁰ 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 water stress, and 55% of Brazilian municipalities will suffer water deficits before 2015⁷¹.

One of the greatest challenges for the urban environment in Brazil is the management of solid waste. The increase of the population contingent and its concentration in urban areas have boosted the quantity of solid waste produced in function of increased consumption in the cities. In addition, besides the environmental issue, other harms resulting from this process, such as diseases resulting from contamination from landfills and the emission of greenhouse gases, are due to deficiencies in the management of urban solid waste.

In Brazil, the total generation of solid urban waste in 2013 was more than 76 million tons, representing an increase of 4.1% over 2012. This rate is higher than the growth rate of the

CITIES

INTRODUCTION

The importance of the themes of economic growth and development in discussions in the public and private realm is undebatable: they are sources of concern for public policy makers as well as the business sector. Among the other fundamental aspects surrounding the discussions of obstacles and levers for economic growth and the development of a nation – such as industrial productivity, levels of investment and savings, income inequality, and opportunities – one stands out in the contemporary, highly-connected and globalized world: the spatial dynamic.

As economies grow, production tends to be concentrated in certain geographic areas. In Brazil for example, the state of Minas Gerais, Rio de Janeiro and Sao Paulo represent 53.10% of the country's GDP⁶⁶, but account for only 15% of its area. In China, the coastal area represents more than half of the country's GDP – Cairo also represents 50% of Egypt's GDP and occupies only 0.5% of its area. The spatial concentration of production is highly influenced by economies of scale, resulting in a process of agglomeration, migration and specialization. "Agglomerated" economies attract people and resources, including financial. This process brings challenges of various natures. On one hand, there is the challenge to maintain, preserve and provide incentives for the economic benefits of spatial concentration that bring about economic growth. Also, in addition to economic growth, the areas favored by producers tend to develop policies and institutions that seek to make living standards more uniform. On the other hand, there still remains the triple challenge of favoring economic integration, disseminating, and unifying living standards at a national level. For example, families living in more prosperous areas from an economic point of view in Brazil, Bulgaria, Ghana, Morocco and Sri Lanka have consumption levels 75% greater than families in less prosperous areas⁶⁷.

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 in Brazil.

⁶⁷ World Development Report, 2009

⁶⁸ Simon et al. UN-Habitat, 2011

⁶⁹ IBGE, 2010 Demographic Census.

⁷⁰ 2012 Data. Source: Sanitation Ranking 2014, Trata Brasil

⁷¹ TNC (The Nature Conservancy) Report based on data from ANA (National Water Agency). <http://www.nature.org/media/brasil/agua.pdf>

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, 41.7% 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, must be implemented by cities. However, only 62% of municipalities in Brazil have some type of initiative in this area. Besides selective waste collection, the policy establishes the non-generation of waste through treatment and reutilization. With respect to the waste, the law determines that there must be adequate disposal with minimum impact on the environment. In 2013, Brazilian municipalities spent, on average, BRL114.84 per inhabitant/year on the collection of solid urban waste and other public sanitation services. The generation of employment in 2013 in public sanitation grew 3.6% compared to the previous year, exceeding 332,000 direct jobs. It should be pointed out that the number of people living directly from selective collection – so-called “recyclable waste pickers” – varies between 700,000 and one million. The market for solid waste in Brazil shows a potential for growth and opportunities for investment⁷³.

Another important challenge in the Brazilian urban environment is urban mobility, as the transport of people and merchandise in large conurbations directly impacts the quality of life and economic production. The profile of urban mobility in Brazil changed drastically in the period from 1950 to 2005: while individual transport was not an important mode of urban transport in 1950, by 2005, individual transport (predominantly automobiles) represented 49% of the mode of transport in Brazilian cities. Naturally, this drastic change in the transport profile impacted the emission of pollutants, seriously aggravating the health problems of the population in general and children and the elderly in particular. Private transport emits 15 times more pollutants and twice as much GHG as public transport. It also consumes 68% of the total energy used in commutes in cities with more than 60,000 inhabitants (the equivalent of 8.9 million tons of petroleum per year), versus 32% consumed by collective transport⁷⁴.

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 security⁷⁵. 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, hyperconnected 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 climatic events. Likewise, ICT tools can be applied in the composition of public and private techno-socio-political 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 in national GHG emissions is projected for 2020 (ICT Sustainability Index, 2010⁷⁶). The greatest potential for reduction in cities are 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: transport and 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 near 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 production⁷⁹.
- Curitiba is considered one of the ten “smartest cities in the world”⁸⁰. Investments made since the 1980s in urban mobility have been replicated in other cities around the world, such as the intermodal transport system⁸¹ built around Bus Rapid Transit (BRT), which inspired the

⁷⁶ Report from Computer World in 2010. Available at: <http://computerworld.uol.com.br/gestao/2010/04/12/uso-da-ti-pode-reduzir-em-27-emissoes-de-co2-do-brasil/>. Accessed on November 29th, 2013.

⁷⁷ According to a study by ITU (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 2020 (business as usual scenario). The study by the same organization about Ghana (ITU, 2012) 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 204,327,443 tCO₂e), which increased 144% in Brazil 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 GeSI, 2008). In Brazil, buildings located in urban centers are responsible for 47% of the country's electrical energy consumption (WELKER, 2013).

⁷⁹ Source: Pagina 22, Edition 52, 2011. “Inteligência à venda (Intelligence for sale)”. By Fábio Rodrigues. Available at: <http://www.pagina22.com.br/index.php/2011/05/inteligencia-a-venda/>. Accessed on November 29th, 2013.

⁸⁰ WEISS et al., 2013, p. 10

⁸¹ The system has bike lanes that connect neighborhoods with bus stations and bicycle centers and with buses that travel smaller streets transporting passengers to the BRT stations. The same system was implemented in other cities such as Guangzhou in China, London and Paris. Source: Mobilize. Mobilidade Urbana Sustentável (Sustainable Urban Mobility), 2013. “A solução para mobilidade urbana? Ônibus, diz Peñalosa (A solution for urban mobility? The bus, says Peñalosa).” By Amanda Previdelli. Available at: <http://www.mobilize.org.br/noticias/4894/a-solucao-para-mobilidade-urbana-onibus-diz-penalosa.html>. Accessed on November 29th, 2013.

⁷² ABRELPE (Brazilian Association of Public Cleaning and Special Waste Companies), 2013

⁷³ ABRELPE (Brazilian Association of Public Cleaning and Special Waste Companies), 2013

⁷⁴ Ipea (Institute of Applied Economic Research, 2011. A mobilidade urbana no Brasil (Urban mobility in Brazil).

⁷⁵ FGV Projects, Cadernos Cidades Inteligentes e Mobilidade Urbana (Smart Cities and Urban Mobility Booklets), 2014

TransMilenio in Bogota and initiatives in around 80 other countries. In addition, through communication between public and private sectors, Curitiba improved the development of technological solutions for the connection and real-time monitoring of public equipment in the public health network and the fleet of municipal buses. The promotion of internet access in public areas allows the inclusion of citizens in these information systems and thereby establishes new channels for transparency and participation in public administration.

- In Porto Alegre, the flow of vehicles is monitored by devices installed underneath public roads which determine the functioning of “smart traffic lights”⁸². Circulation time was reduced by up to 30% and polluting gas emissions fell by 18%. Besides mobility, citizens also participate in the management of public assets through an integrated system that receives failure alerts sent by users and forwards them to the public agency responsible such as lighting, public road maintenance, parks and gardens, health, and security.
- An initiative focused on the production, management and efficient consumption of energy has been in place in the city of Buzios since 2011. The local energy utility, Ampla, together with the local government, installed digital meters in residences and companies, allowing the establishments that produce energy to divert excess to the public electric network. The initiative functions as an incentive for the installation of energy production equipment, mainly solar, in houses, hotels and inns. Additionally, used cooking oil and recyclable trash is traded for a discount on electric bills, and solar energy showers were installed at the regions’ beaches. The initiatives that make up the project were developed from a survey of residents, summer residents and trade associations about their needs and demands in relation with the city.

These and other projects already in use in Brazil are some of the key ICT solutions applied to the configuration of smarter cities and include the bus information system, e-logistics, smart motor - a system for generating electricity, smart grid and e-commerce. At the same time the challenges of reassessing values, management strategies and models emerge in the private and public sectors, the development and implementation of these solutions translate into business opportunities, risk sharing and mitigation.

Traffic jams, a mobility problem that plagues citizens of large cities, result in unproductive hours, energy waste and public health problems which affect companies’ performance⁸³ and the economy of the country. The problem is compounded by the disorderly growth of urban centers 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 Telefonica Vivo 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 fed by data produced by the more than 700,000 cars the company tracks by GPS, showing traffic conditions in Sao Paulo, Belo Horizonte, Curitiba and Rio de Janeiro on their smartphones in real time. BMW, as part of an effort to reposition their business⁸⁴, 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 appear 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 economical⁸⁵.

This shows the emergence of a new market guided by the demand for bus/car information system services and the development of software and apps⁸⁶ 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.

⁸² Sistema de Controle de Trânsito Adaptativo em Tempo Real (Adaptive Real-Time Transit Control System).

⁸³ The Institute for Applied Economics Research (Ipea) showed in its research that traffic jam losses involve a drop in productive capacity due to the consumption of working time as well as the consequence of a lower quality of life. Source: Pagina 22 Magazine, 2013. “Mobilidade é um bom negócio (Mobility is a Good Business)”. By Carol Nunes. Available at: <http://www.pagina22.com.br/index.php/2013/10/mobilidade-tambem-e-bom-negocio/>. Accessed on November 29th, 2013.

⁸⁴ In February 2011, the company launched the sub brand BMW i with the motto “sustainable mobility solutions”.

⁸⁵ Source: Pagina 22 Magazine, edition 74, 2012. “O automóvel depois do carrocentrismo (The Automobile after Car-Centrism)”. By Ricardo Abramoway. Available at: <http://www.pagina22.com.br/index.php/2013/05/o-automovel-depois-do-carrocentrismo/>. Accessed on November 29th, 2013.

⁸⁶ Abbreviation of applications, programs that can be downloaded from the Internet and installed on select electronic equipment.

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” report⁸⁷ 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 buildings⁸⁸, 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 Plan⁸⁹, and the reduction of pressure on the supply of energy avoids the expansion of the matrix, which has become less carbon efficient in recent years⁹⁰, 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. Sharing 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 482⁹¹) 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.

⁸⁷ 2008

⁸⁸ The technical potential for the reduction of energy consumption by 2030 is 20% in the industrial sector, 13% in the public and commerce sectors, and 7% in the residential sector. (FGV, 2010).

⁸⁹ FGV, 2011

⁹⁰ The electric sector was responsible for the emission of 30 MtCO₂e in 2011 (8% of the total for the energy sector), and have emission projections of 68 MtCO₂e in 2020 (MME and EPE, 2012). The increase is a reflection of the current strategy of investing in the greater and greater participation of thermoelectric generating stations in the national matrix, to the detriment of prioritizing investments in the expansion of renewable alternative sources to match increasing demand (FGV, 2013).

⁹¹ Normative Resolution from April 17th, 2012 from ANEEL, reduced barriers to the installation of small-scale generation distribution in Brazil, allowing microgeneration (up to 100 KW) and minigeneration (from 100 KW to 1 MW) to be connected to the network, thereby creating the Energy Compensation System. This system allows the consumer to install small generating units in their consumption unit and trade the excess energy with the local utility (ANEEL, 2012).

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 meters⁹².

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”⁹³.

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 epidemic starvation when it ceased being supplied with tools and agricultural supplies from the Soviet Union⁹⁴. 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 such as: 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 dedicated 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 Ribeirao 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

⁹² Source: Smart Grid Technology Investment: Forecasts for 2012-2030 Report (Innovation Observatory, 2012).

⁹³ Source: Pagina 22 Magazine, edition 52, 2011. Estalo: uma nova ideia por mês. “Energia Interativa” (Snap: A New Idea per Month. “Interactive Energy”). By Manuela Azenha. Available at: <http://pagina22.com.br/index.php/2011/05/estalo-uma-nova-ideia-por-mes-2>. Accessed on November 30th, 2013.

⁹⁴ Source: Pagina 22 Magazine, edition 75, 2013. “Semente Urbana” (Urban Seed). By Regina Scharf. Available at: <http://www.pagina22.com.br/index.php/2013/06/semente-urbana/>. Accessed on November 30th, 2013.

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 step for the diffusion of the practice in large cities. This is already a reality in Chicago, San Francisco and Portland⁹⁵.

CONCLUSIONS

Mobilization between government, businesses and civil society organizations is required so that cities can be rethought and replanned in order to reconfigure themselves with ecosystems that are capable of satisfying the needs and desires of their populations in balance with the potential and limits of the environment.

If ICT present opportunities of efficiency gains, development of new business models and a redesign of the relationships between actors in modern society, there are challenges that must be overcome in order that they gain scale in Brazil. Therefore, structuring a system fostering solutions applied to smart cities is recommended, from concept to commercialization, including economic incentives and lines of credit⁹⁶; improvements in the regulatory framework, creating a safe environment for investing in these solutions; and the widening of the debate about patents so that acquiring tools is facilitated through innovative paths and the acknowledgement of the author-developer. Furthermore, the democratization of connection access is a fundamental step in some Brazilian cities⁹⁷.

In order that by 2030, 60% of the world's population can be effectively accommodated in the cities, the establishment of channels for ideas, solutions and best practices be replicated is required. Platforms, networks, case studies, and innovation recognition programs are some of the possibilities to provide visibility and encourage the exchange of practices⁹⁸.

The public sector needs, in partnership with private initiative and academia, to create a technical architecture that enables it to act in smart cities, evaluating and developing skills in its institutions, modernizing administrative and operational processes and encouraging continuous communication with the community. Of the 60% of Brazilian cities that have an active homepage on the Internet, only 27% use it to interact with its citizens; and those that do, focus on transactions relating to fees and taxes. Private initiative can offer a significant contribution related to services, smart buildings, operational and energy efficiency, and communication with citizens.

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 partnerships with the private sector, and widespread use of technology; ii) articulate civil support with the participation of society in the development of a shared future vision; iii) focus on smart growth, or in other words, that there is planning for growth, and necessary changes made to integrate environmental aspects into planning processes and a search for income opportunities and social development for all (inclusive societies)⁹⁹. It is also worth noting that,

⁹⁵ Source: Pagina 22 Magazine, 2012. "Cultivando alimento e mudança nas cidades (Cultivating Food and Change in Cities)". By Flavia Pardini. Available at: <http://www.pagina22.com.br/index.php/2012/08/cultivando-alimento-e-mudanca-nas-cidades/>. Accessed on November 30th, 2013.

⁹⁶ Investment in the expansion of some solutions, like that provided as the main solution in electric energy, the smart grids, is costly. An idea of this is offered by the Electric Power Research Institute (EPRI) that estimates an investment of between US\$ 338 and 446 billion is needed for the full functioning of the smart grid in the USA. Source: Pagina 22 Magazine, edition 52, 2011. "Energia Interativa (Interactive Energy)". By Manuela Azenha. Available at: <http://www.pagina22.com.br/index.php/2011/05/estalo-uma-nova-ideia-por-mes-2/>. Accessed November 30th, 2013.

⁹⁷ According to the study "Mapa da Inclusão Digital (Digital Inclusion Map)" (FGV, 2012a), around 33% of households are connected to the Internet in Brazil. Realities are very distinct between cities; while in Sao Caetano (SP), for example, this figure is 74%, in Aroeiras (PI), the result is zero.

⁹⁸ Private, governmental and non-governmental networks have been multiplying, examples are the Rede Global das Cidades Inovadoras (Innovative Cities Global Network), created by the FIEP (Federation of Industries of Parana) system to connect citizens so that innovations can be disseminated, and the Conselho das Cidades (Cities Council), structured by the Ministry of Cities as an example for the negotiation of housing, sanitation, mobility and urban planning between society and government.

⁹⁹ Mckinsey, 2013

for sustainability concepts to advance in the cities, it is fundamental that the education process contributes to raise urban citizens' awareness, so they 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.

The advance towards "smart cities" will shape itself - with improvements in public policies that enable the institutional framework to attract investment from both the productive and financial sectors - with the catalyst markets of the Green Economy. There is certainly space for the SFN (National Financial System) to engage in allocating resources for this transition - particularly through the so-called "infrastructure bonds"¹⁰⁰, in which infrastructure projects are financed with long-term debt securities, substituting the riskier and more expensive project finance structures -, or through investments in innovative businesses.

BIBLIOGRAPHICAL REFERENCES

- ABRELPE** - Brazilian Association of Public Cleaning and Special Waste Companies. Panorama dos resíduos sólidos no Brasil 2013 (Overview of Solid Waste in Brazil - 2013). Sao Paulo, 2014. Available at: <www.abrelpe.org.br/panorama_2013.php>. Accessed on: September 05th, 2014.
- ANEEL** - National Electric Energy Agency. ANEEL aprova regras para facilitar a geração de energia nas unidades consumidoras (ANEEL Approves Rules Facilitating Energy Generation in Consumer Units). Abril 17th, 2012. Available at: http://www.aneel.gov.br/aplicacoes/noticias/Output_Noticias.cfm?Identidade=5457&id_area=90
- Booz & Company, 2013**. "The Global Innovation 1000. Navigating the digital future". Available at: http://www.booz.com/media/file/BoozCo_2013-Global-Innovation-1000-Study-Navigating-the-Digital-Future.pdf. Accessed on November 29th, 2013.
- FGV**. Center for Sustainability Studies at FGV-EAESP (GVces), 2010. Propostas empresariais de políticas públicas para uma economia de baixo carbono no Brasil. Energia, transportes e agropecuária (Business Proposals of Public Policies for a Low-Carbon Economy in Brazil. Energy, Transport, and Agriculture). Available at: <http://intranet.gvces.com.br/cms/arquivos/epc2011.pdf>. Accessed on November 29th, 2013.
- FGV Projects, 2011**. Energia Elétrica e Inovações Tecnológicas (Electric Energy and Technological Innovation). Available at: http://fgvprojetos.fgv.br/sites/fgvprojetos.fgv.br/files/PUB_ENERGIA%20ELETRICA.pdf. Accessed on November 28th, 2013.
- FGV Projects, 2014**. Cidades Inteligentes e Mobilidade Urbana (Smart Cities and Urban Mobility). Available at: http://fgvprojetos.fgv.br/sites/fgvprojetos.fgv.br/files/cadernos_fgvprojetos_smart_cities_gwa_0.pdf. Accessed on September 1st, 2014.
- Center for Sustainability Studies at FGV-EAESP (GVces), 2013**. Energia Elétrica e Inovações Tecnológicas. Propostas empresariais de políticas públicas para uma economia de baixo carbono no Brasil: energia elétrica (Electric Energy and Technological Innovations. Business Proposals of Public Policies for a Low-Carbon Economy in Brazil: Electric Energy).
- 2012**. Coordination Marcelo Neri. Mapa da Inclusão Digital (Digital Inclusion Map). Available at: http://www.cps.fgv.br/cps/bd/mid2012/MID_texto_principal.pdf. Accessed on 30/11/2013.
- IBGE**. Censo Demográfico 2010 (2010 Demographic Census). <http://censo2010.ibge.gov.br/>
- IPEA**. A Mobilidade Urbana no Brasil. Série Eixos do Desenvolvimento Brasileiro (Urban Mobility in Brazil. Brazilian Development Axis Series) #94. May 2011. Available at http://www.ipea.gov.br/portal/images/stories/PDFs/comunicado/110525_comunicadoipea94.pdf
- Innovation Observatory, 2012**. Smart Grid Technology Investment: Forecasts for 2012-2030. England and Wales at Charter House.
- Global e-Sustainability Initiative (GeSI), 2012**. SMARTer 2020 - The role of ICT in Driving a Sustainable Future. Available at: http://gesi.org/assets/js/lib/tinymce/jscripts/tiny_mce/plugins/ajaxfilemanager/uploaded/SMARTer%202020%20-%20The%20Role%20of%20ICT%20in%20Driving%20a%20Sustainable%20Future%20-%20December%202012_2.pdf. Accessed on November 1st, 2013.
- IBGE. Instituto Brasileiro de Geografia e Estatística, 2012**. Estimativas Popacionais para os municípios brasileiros (Brazilian Institute of Geography and Statistics, 2012. Populations Estimates for Brazilian Municipalities). Available at: <http://www.ibge.gov.br/home/estatistica/populacao/estimativa2012/>. Accessed on November 28th, 2013.
- International Telecommunication Union (ITU), 2012**. Climate Change Adaptation, Mitigation and Information & Communications Technologies (ICTs): the Case of Ghana. Available at: http://www.itu.int/dms_pub/itu-t/oth/4B/01/T4B01000020001PDFE.pdf. Accessed November 19th, 2013
- International Telecommunication Union (ITU), 2013**. The case of Korea: the quantification of GHG reduction effects achieved by ICTs. Available at: http://www.itu.int/dms_pub/itu-t/oth/0b/11/TOB110000243301PDFE.pdf. Accessed on November 19th, 2013.
- Mckinsey. How to make a city great, 2013**. Available at http://www.mckinsey.com.br/LatAm4/Data/ICS_34_How_to_make_a_city_great.pdf. Accessed on September 05th, 2014
- Ministério de Minas e Energia (MME) e Empresa de Pesquisa Energética (EPE), 2012**. Balanço Energético Nacional 2012 (Ministry of Mines and Energy (MME) and Energy Research Company (EPE), 2012. National Energy Report 2012). Available at: https://ben.epe.gov.br/downloads/Resultados_Pre_BEN_2012.pdf. Accessed on November 29th, 2013.
- Mobilize. Mobilidade Urbana Sustentável, 2013**. "A solução para mobilidade urbana? Ônibus, diz Peñalosa." (Mobilize. Sustainable Urban Mobility, 2013. "A solution for urban mobility? The bus, says Peñalosa." By Amanda Previdelli. Available at: <http://www.mobilize.org.br/noticias/4894/a-solucao-para-mobilidade-urbana-onibus-diz-penalosa.html>. Accessed on November 29th, 2013.
- ONUUR. United Nations in Brazil**. "A ONU e os assentamentos humanos" ("The UN and Human Settlements"). Available at: <http://www.onu.org.br/a-onu-em-acao/a-onu-e-os-assentamentos-humanos/>. Accessed on November 28th, 2013.
- Pagina 22 Magazine, Edition 52, 2011**. "Inteligência à venda" (Intelligence for Sale). By Fabio Rodrigues. Available at: <http://www.pagina22.com.br/index.php/2011/05/inteligencia-a-venda/>. Accessed on November 29th, 2013.
- Pagina 22 Magazine, 2013**. "Mobilidade é um bom negócio" (Mobility is a Good Business). By Carol Nunes. Available at: <http://www.pagina22.com.br/index.php/2013/10/mobilidade-tambem-e-bom-negocio/>. Accessed on November 29th, 2013.
- Pagina 22 Magazine, edition 74, 2012**. "O automóvel depois do carrocentrismo" (The Car After Car-Centrism). By Ricardo Abramoway. Available at: <http://www.pagina22.com.br/index.php/2013/05/o-automovel-depois-do-carrocentrismo/>. Accessed on November 29th, 2013.
- Pagina 22 Magazine, edition 52, 2011**. Estalo: uma nova ideia por mês. "Energia Interativa" (Snap: a New Idea per Month. "Interactive Energy"). By Manuela Azenha. Available at: <http://pagina22.com.br/index.php/2011/05/estalo-uma-nova-ideia-por-mes-2/>. Accessed on November 30th, 2013.
- Pagina 22 Magazine, edition 75, 2013**. "Semente Urbana" (Urban Seed). By Regina Scharf. Available at: <http://www.pagina22.com.br/index.php/2013/06/semente-urbana/>. Accessed on November 30th, 2013.
- Pagina 22 Magazine, 2012**. "Cultivando alimento e mudança nas cidades" (Cultivating Food and Change in Cities). By Flavia Pardini. Available at: <http://www.pagina22.com.br/index.php/2012/08/cultivando-alimento-e-mudanca-nas-cidades/>. Accessed on November 30th, 2013.
- SEEG - Greenhouse Gas Emission Estimate System, 2013**. Energy Sector. Available at: <http://seeg.observatorioclima.eco.br/index.php/page/19-Energia>. Accessed on November 1st, 2013.

¹⁰⁰ According to the Financial Times, in the United Kingdom these bonds total around the order of US\$ 1.5 billion. <http://www.ft.com/cms/s/0/eff0aac8-5909-11e3-9798-00144feabdc0.html#axzz3CTjttW40>

SIMON, D et al. The Green Economy and the Prosperity of Cities. UN-Habitat, August 2011.

The Climate Group and Global e-Sustainability Initiative (GeSI), 2008.

Smart 2020: Enabling the Low Carbon Economy in the Information Age. Available at: http://www.smart2020.org/_assets/files/02_Smart2020Report.pdf. Accessed on October 10th, 2013.

World Development Report. Reshaping Economic Geography. The World Bank: Washington, 2009.

WELKER, 2013. Por que etiquetar um edificio? Ambiente Energia (Why Label a Building?). Available at: <https://www.ambienteenergia.com.br/index.php/2013/09/por-que-etiquetar-um-edificio/23327>. Accessed on November 18th, 2013.

WEISS et al., 2013. Cidades inteligentes: casos e perspectivas para as cidades brasileiras." (Smart Cities; Cases and Perspectives for Brazilian Cities).

Available at: http://www.altec2013.org/programme_pdf/1511.pdf. Accessed on November 28th, 2013

ANNEX I - RURAL ENVIRONMENTAL REGISTRY (CAR)¹⁰¹

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 Meio 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 7,830 of October 17th, 2012, which governs the Rural Environmental Registry System - SICAR. 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, if extant.

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, 2012, accordingly) financial institutions will only concede agricultural credit of whatever modality to property owners whose rural properties are registered in the CAR.

¹⁰¹ Sources: Law 12,651/2012 and Mukai, 2013



FEBRABAN

Federação Brasileira de Bancos