Vision Brazil 2050

The new agenda for business
Inspired by the World Business Council for Sustainable Development’s (WBCSD) project Vision 2050 - the new agenda for business, CEBDS took on the challenge of developing Visão Brasil 2050 – a nova agenda para as empresas during the past year. Both studies mean to present the vision of a sustainable future and the way to reach it through nine basic elements. The difference is that the Brazilian paper uses the current scenario as a starting point to develop the short, medium and long-term visions, making it easier to identify the targets that the strategic planning of both the country and companies must adopt.

Brazil today has a good competitive edge in the green race because of its clean energy supply mix, rich biodiversity and increasing per capita income, but the path there was unplanned. Here, as in many parts of the world, sustainability and development are not considered together, which makes achieving medium and long-term projects difficult. Adopting sustainability principles and practices relies on this integration. The futures of companies, government and society are the same; agendas cannot be drawn up separately.

Vision Brazil 2050 shows that the main challenges of this agenda are the need to encourage low-carbon activities, to establish payment for environmental services and to promote sustainable initiatives for housing, sanitation, mobility, solid wastes and vocational education. The recommendation for significant investments in primary, secondary and technical education is strategic for ensuring innovation, an essential requirement for sustainability.

**Vision Brazil 2050** is not a set of rules and commitments nor does it provide a plan or descriptive model, rather it aims to be a platform for dialogue that can provide support to companies and the country on the path to sustainable development. Specific targets can be determined later through this dialogue. For CEBDS, the greatest advantage of **Vision Brazil 2050** is to steer the discussion of a common agenda that brings together development and sustainability in Brazil, enabling the dialogue between these segments, preventing isolated decision making, and pursuing, as far as possible, a win-win situation.

CEBDS has been supporting the idea that short or long-term - economic measures should be integrated with the social and environmental dimensions. Similarly, socio-environmental initiatives must be connected to the economic dimension. Sustainability only exists when these three pillars are intertwined. This is the only way to overcome the short-term obstacles of the economy and to create conditions to replace the current model by a sustainable one, preserving environmental assets and ensuring quality of life for the population.

The launching of this document during Rio+20 is symbolic, as it represents the importance of this moment, when we need to decidewhether we want to live in a better country or if we prefer to continue in a scenario of far-reaching climate changes, severe financial crises, unplanned growth in cities and irrecoverable losses in all biomes. The decision of whether to interrupt this process is ours, it belongs to each and every one of us. CEBDS delivers Vision Brazil 2050 with the intention of helping companies, governments and society come together to plan the future we want for Brazil.

Rio de Janeiro, June 2012

Marcos Bicudo
Chairman

Marina Grossi
Executive President

Brazilian Business Council for Sustainable Development (CEBDS)
Executive Summary

The Vision 2050 Project
This document is based on the project Vision 2050 – the new agenda for business, spearheaded by the World Business Council for Sustainable Development (WBCSD). It aims to build a path to ensure that by 2050 human presence and economic activities are more sustainable. The document puts forward fundamental changes in governance structures, corporate management and human behavior. In its conclusion, the changes required are shown to be extraordinary opportunities for those companies that adopt sustainability as their strategic guiding principle.

Vision Brazil 2050 is based on projections and expectations drawn up by companies, government agencies, civil society representatives and experts that were willing to take part in this effort. Basic elements are proposed to guide government, corporate and civil society leaderships in their decision-making processes towards a sustainable economy. One of the main premises of this model is the open and transparent dialogue among all relevant segments for building and permanently adapting the foundations of the new economies.

Since Vision Brazil 2050 is a prospective report, it covers several sectors of the economy, proposes a multidisciplinary and multi-sectoral approach as well as a systemic vision to address the main challenges affecting our society.

Starting point
In the first decade of the twenty-first century, with an accelerated economic growth and attracting capital for more investments, Brazil was hit by unexpectedly intense growth anxiety. The vision for 2050 proposed here may act as an inspiration for circumventing the risks that are always present in rapid growth processes.

If, on the one hand, there is an encouraging increase in the number of jobs, in income, in the purchasing power of the poorer population and in the level of education, we already see, on the other hand, great deterioration of biomes, such as in the Amazon, and particularly in the Cerrado, air and water pollution, soil degradation and species extinction. It is also necessary to protect the advances achieved with the 1988 Federal Constitution and with the socio-environmental regulations currently in force in Brazil. The Rule of Law ensures the broad implementation of these principles and rights, which are essential to achieve the vision described here and whose permanence is the premise of a sustainable future.

Science’s warning about environmental degradation must be included in this context. Over the last forty years, scientists have shown that the problems associated to climate change are the cause and the consequence of today’s main environmental and human disasters. Extreme weather events (such as droughts, hurricanes and storms) are likely to worsen, affecting the economy as well as the poorer and more vulnerable populations. Farming is already feeling the consequences of climate change, and these may increase, according to projections contained in the latest IPCC (Intergovernmental Panel on Climate Change) report, prepared by UN scientists.

Brazil is one of the world’s five major greenhouse gas (GHG) emitters. Most of the net estimated CO₂ emissions in Brazil come from changes in land use, mainly from the deforestation resulting from the conversion of forests into farming land, according to the Second Greenhouse Gas Emissions Inventory, published in October 2010. Federal and local (state and municipalities) governments in Brazil have shown keen interest in climate change issues, leading to the adoption of public policies and programs to combat climate change. In Brazil today there are a number of public and private entities adopting programs and projects to combat GHG emissions or to absorb emissions through agricultural or forestry projects. This issue is already included in corporate sustainability initiatives and government programs and can even be found in campaign speeches.

Brazil is a megadiverse country - one that holds most of the plant and animal species of the world – and it is possible to find significant answers for medicine and the future green economy in biodiversity. Science is still far from exhausting its knowledge of the profusion of species found...
in Brazilian biomes. Little has been invested in this knowledge and a vast library of nature is being lost even before it is known. The National Biodiversity Plan and strategic corporate actions are necessary to build an inclusive and green economy, as proposed by so many papers published by the UN and other actors, such as the Brazilian Government, companies and think tanks throughout the world.

Brazil must create new economic instruments and increase their synergy through public policies or market initiatives to enable the green economy. Incentives and mechanisms must be created to provide equilibrium of efforts among all actors to foster sustainability. Some of the instruments put forward here are essential for enabling corporate action to foster sustainability.

The significant increase in energy demand in the various economic sectors is a result of the increase of the Gross Domestic Product (GDP), population growth and industrial activities so that they may keep pace with the accelerated rate of growth of the Brazilian economy. The vision proposed here presumes greater attention to the new business opportunities that renewable energies bring to the country’s energy supply mix. It also takes into account that the world’s other economic giants are accelerating their investments to achieve an energy mix with fewer GHG emissions, and Brazil cannot take a back seat and lose the energy race of the coming future. In the vision presented here, the issue of climate change is dealt with from a cross-cutting perspective and many are the paths proposed for a low-carbon economy.

The future: Brazil is a model of green economy
The transition to a new economy, the green economy, is already under way. It will be guided by a responsible, fair, efficient and inclusive production and growth model.

Brazil has the potential to lead the process because of its large natural capital, its heterogeneous population, its vibrant economy with a predominantly clean energy supply mix and the current process for reducing social inequalities. Opportunities are present in various sectors of the Brazilian economy.

The country has been developing a range of institutional, economic and technological instruments to preserve and use natural resources in a sound and sustainable manner. Examples include the National Climate Change Policy (PNMC) and the National Solid Wastes Policy (PNRS), which establish guidelines and targets to achieve increased economic performance and environmental protection. Although different, the policies are closely linked. Given the need to close down all Brazilians dumps by the year 2014, the country will be able to achieve a substantial reduction of greenhouse gas emissions arising from waste decomposition.

These policies also cater to the reduction of GHG emissions from the herd-raising sector, one of the major emitters in Brazil. Promoting sustainable production in this industry is essential for reducing the country’s emissions, a commitment undertaken both in the Copenhagen Agreement, during the 15th Session of the UN Framework Convention on Climate Change, and in the National Climate Change Policy. The policy for the farming sector was detailed in the ABC Plan (Agriculture for Low Carbon), whose guidelines are reflected in our vision. The ABC Plan seeks to encourage technological processes that neutralize or minimize the effects of greenhouse gases in the field for adoption by farmers in the coming years. These conditions are required to attain competitiveness of the industry in the globalized economy.

1 The UNEP (United Nations Environment Programme) Green Economy Initiative, launched in 2008, defines green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.
It is extremely important to prepare the Brazilian population for the jobs in this new economy. Investments in the development of clean technologies and in the creation of green jobs have been growing rapidly, but their consolidation depends on greater incentives. Training qualified personnel with a competitive education for the international marketplace is essential. Investments for training graduates have increased recently, but they must be further increased to reduce the still existing abyss between the average professional in Brazil and those in other major economies.

Management of Brazilian cities should be based on integrated planning, specially to transform accessibility and urban mobility; to expand basic sanitation using architectural and building standards with low pollutant emission and less intensive use of non-renewable natural resources; to reduce atmospheric pollutants and to expand green areas. Some elements of sustainable cities are addressed here since they are essential for the new economy.

Making it happen: for new commitments, a new agenda
Given the challenges of transforming the current economy, companies, together with government and society have a long path to travel. The process is laborious, requiring changes in values and breaks with conservative ideals. Creating an integrated agenda is imperative for achieving truly sustainable development in 2050.

“Vision Brazil 2050 defines nine areas to trace the paths towards a sustainable future, inspired in the guidance provided by Vision 2050, but adapted to the Brazilian reality.”

Companies have to be structured for this new era. The difficulty in providing a positive analysis of the relationship between corporate economic performance and socio-environmental responsibility must be overcome. Several experiments have shown that a company’s responsible attitude drives innovation, leading to competitiveness. Competitive companies can acquire new capacities and manage existing ones, transforming themselves in face of their competitors.

In Brazil, companies have the weighty responsibility of determining the rate and direction of technological progress. At the same time, with advances in knowledge and ever more aware consumers, public policies will induce manufacturing processes that are efficient, use fewer non-renewable resources and generate less pollution.

Breaking paradigms: actions that will enable a new country in 2050
Vision Brazil 2050 defines nine areas to trace the paths towards a sustainable future, inspired in the guidance provided by Vision 2050, but adapted to the Brazilian reality. These are Values and Behavior; Human Development; Economy; Biodiversity and Forests; Farming; Energy and Power; Buildings and Built Environments; Mobility; and Materials and Wastes.

These basic elements were used to bring together and develop proposals for action in the short term (immediate actions and for the 2012-2020 period) and in the medium and long terms (2020-2050).

Some issues are not explicit in these nine dimensions. However, they are dealt with in a cross-cutting fashion and are included in several of the areas covered by this document. Examples of cross-cutting issues are combating poverty, combating corruption, construction of sustainable socio-environmental models of governance, adoption of economic incentive instruments for the green economy, construction of a sustainable logistics model, climate change, water, among others. These cross-cutting elements demonstrate that the change in people’s values and behavior and a universal, political, civil-minded and empowering education are as important for building a sustainable world as are better solutions and technological innovations.
In addition to the cross-cutting issues, several basic actions were identified that must be implemented in order to arrive at the vision built by the consulted actors. Overall, the pathway chosen goes through education and capacity building for green jobs, innovation in clean technologies, internalizing negative environmental and social externalities in the costs of products and services, drastic reduction in the rate of deforestation and GHG emissions, universal access to mobility, investments in the diversification of clean energy sources, sustainable credit lines, incentives for local economy and basic sanitation for all.

Without a doubt, implementation of these elements - as well as of others in this report - will contribute to breaking the historical cycle of socio-environmental imbalance and protecting Brazil’s environmental assets and human capital in order to establish a solid foundation for a green economy. The country will, thus, be apt to ensure the conditions for the development of Brazilian society guided by environmental protection, social justice and well-being.
Introduction

This document is structured by a shared vision of the future and its leitmotif is the path required to actually achieve this vision in 2050.

Section 1, Construction of Vision Brazil 2050, gives a brief overview of the process of building this vision in 2011 and 2012.

Section 2, Brazil in 2012, describes the reference scenario in Brazil, from a socioeconomic perspective, highlighting the legal and institutional framework that supports the policies and measures proposed in this document; the actions carried out by the private sector for sustainability; and the actors involved in the implementation of the process towards Vision 2050.

Section 3, Vision 2050 for Brazil, describes the vision itself, from a broader perspective, in a conceptual approach that includes expected goals. It is the scenario we expect to attain through actions coordinated with all relevant sectors and stakeholders.

Section 4, Pathway to 2050, defines nine priority reference elements for building the paths towards the sustainable development scenario in Brazil. The nine elements are addressed separately, first describing the current situation and then a more detailed sectoral vision 2050, taking into account the 2050 scenario and presuming that changes will actually occur. This section also describes the paths to achieve these goals through actions for the short, medium and long terms: the first phase, until 2020, when implementation is expected all through the next decade; and from 2020 to 2050, when the path of the country to 2050 will, in fact, be decided with a new development model steered towards sustainability.

Section 5, Threats and Risks, evaluates the dangers along the path, vulnerabilities and associated risks that can compromise the success of the undertaking.

Section 6, Opportunities, argues in favor of transforming risks into opportunities for society, identifying the areas - or pillars - for concerted efforts by all stakeholders.

Section 7, Conclusion and Next steps, finally, proposes a reflection on the process in its entirety, indicating the next stages intended to ensure that the actions described throughout the document Vision Brazil 2050 are carried out.

The document also includes, in section 8, References, a list of publications and websites used as reference for the document, which may inspire readers to broaden their knowledge and understanding of the ambitions of Vision Brazil 2050.

The organizers and participants of Vision Brazil 2050 hope that this document may be an inspiration for many others that come to join this process on the path to building a better Brazil.
1 Construction of Vision
Brazil 2050
The adaptation of the original World Business Council for Sustainable Development document to the Brazilian reality arose from the need to develop a tool to facilitate the implementation of sustainability practices in companies, based on a widely recognized platform.

In Vision 2050, the approach taken was to seek the pathways and actions towards the vision for 2050, based on the conventional business-as-usual scenario. The nine elements of Vision 2050 – People’s Values, Human Development, Economy, Agriculture, Forests, Energy and Power, Buildings, Mobility and Materials - reflect a broad agenda towards a sustainable world in 2050, going through a transition period called “Turbulent Teens”, until 2020, followed by a period of mature transformation, between 2020 and 2050, when actions are consolidated to achieve the new vision.

Vision 2050 underwent “tropicalization”, by seeking to identify the main challenges for Brazil in each of the nine reference elements deemed relevant for the country. The elements for Brazil, which relate to the world vision, are Values and Behavior, Human Development, Economy, Biodiversity and Forests, Farming, Energy and Power, Buildings and Built Environments, Mobility, and Materials and Wastes. Based on the current scenario, we sought to define what the country we desired would look like in 2050 and then, what were the pathways that could get us there.

CEBDS entered into a partnership with PwC Brasil\(^2\) to carry out this work in 2011. Altogether 11 workshops were held with about 500 people from more than 70 companies and dozens of academic institutions, NGOs and government representatives. An Advisory Board with nine specialists was also set up to add new perspectives and identify the gaps in the document. In September, the development of the document took center stage at the 4th International Conference on Sustainable Development, when CEBDS dedicated special time for nine Vision Brazil workshops. Discussions there were used as reference for the key-issues identified in the workshop held in May and in the survey of existing literature.

The first draft was delivered in February 2012 and distributed to the members of the Advisory Board and some CEBDS thematic chambers. During this phase, the document received further contributions, formally presented at the last workshop, in March, dedicated exclusively to the associated companies.

To assess the contents and carry out the final editing of the document, CEBDS established a scholars committee. The committee adjusted possible inconsistencies and aligned and enhanced the contents, providing structure to the analyses. The final version also incorporated the general proposals for alteration suggested by the CEOs of the companies that participate in the CEBDS Council of Leaders in Sustainability.

The result is a document that is a starting point for more efficient strategic planning towards sustainability, capable of supporting the building of bridges and alliances among the interest of companies, government and society.

\( ^2 \) The PwC consultancy assisted in the preparation of the global document: www.wbcsd.org/web/vision2050.htm.
Brazil in 2012
and violent deaths.

The characteristics of population growth in Brazil will have significant consequences for the future economy of the country, in terms of both risks - spending on health and pension systems - and opportunities. The quality of education and the faster population growth in the North and Midwest regions reflect the expanding farming frontier in these regions.

The combination of innovative social policies for income distribution, financial stability, sustainable growth and fiscal accountability led Brazil to become one of the largest economies of the planet in the twenty-first century.

In 2012, Brazil surpassed the United Kingdom, becoming the 6th largest economy of the world. The country’s economic growth is more robust than that of Europe or the US, although it is growing at a lower rate than other developing countries, like China or India. Even so, Brazil has advantages with respect to these countries, such as its democratic maturity, when compared to China, and a higher income per capita and better social indicators with respect to India.

In 2011, direct foreign investment in Brazil reached US$ 69.1 billion, or 2.78% of GDP. Although the Brazilian per capita income is still low in comparison to that of wealthy

“The combination of innovative social policies for income distribution, financial stability, sustainable growth and fiscal accountability led Brazil to become one of the largest economies of the planet in the twenty-first century.”

Source: IBGE (Brazilian Geography and Statistics Institute), 2010.
countries (US$ 12.5 thousand in Brazil and US$ 40 thousand in the UK, for example), the index has tripled in the last decade.

Consumption drives the growth of the Brazilian economy, which now has a better income distribution

Consequences of economic growth include reduction in national unemployment figures (6.4% in 2010), expansion of formal jobs (due to government initiatives to support micro and small enterprises), increase in minimum wage and appreciation of the Brazilian currency. These factors provided a significant portion of the population with an unprecedented purchasing power. Consumption by families is still the main driver of Brazilian economic growth, representing 60% of the national GDP, as in the US, whereas in China it is a mere 30% of GDP. Growth strategies in Brazil over the last two decades have sought to distribute the resources generated by the increase in wealth and, clearly, social indicators have improved steadily. Nevertheless, there is still much to be done.

The Brazilian scenario presents a paradox of economic growth without the corresponding human development, as evidenced by its Human Development Index (HDI) rank of 84th, reflecting a series of social problems. Lack of access to basic sanitation affects 56% of Brazilian households that do not have sewage collection, and in about 50% of municipalities solid wastes are still disposed of in open dumps.

Investments in public health are low - in 2009, only 3.6% of the GDP was used to provide cost-free health care to the population. Data from the Ministry of Cities show a housing deficit of 5.5 million homes. Although 9.7% of the population in 2009 was illiterate, a reduction of 1.4% was observed with respect to 2004, showing that education has been

Figure 2: GDP Growth in Brazil

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<td>Global GDP (Δ% p.a.)</td>
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<td>Global trade (Δ% p.a.)</td>
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<tr>
<td>Domestic GDP (Δ% p.a.)</td>
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Sources: IBEGE and IMF (historical data) and EPE (projections); Ten Year Energy Expansion Plan, MME/Eletrobrás, 2011.

Figure 3: Changes in the distribution of classes and income of the Brazilian population

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<th>Distribution of economic classes in Brazil (% of population)*</th>
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*Monthly household per capita income per class at 2009 prices:
Class A/B: more than R$ 4,800, Class C: from R$ 1,115 to R$ 4,800,
Class D: from R$ 804 to R$ 1,115, Class E: up to R$ 804

Source: FGV/PNAD, Calculations of the Ministry of Finance, UNDP
Reference Scenario: a growing country

Vision Brazil 2050 is launched at the United Nations Conference on Sustainable Development, Rio+20. Two main themes permeate the discussions at Rio+20:

- Green Economy in the context of sustainable development and poverty eradication.
- Institutional framework for sustainable development.

Brazil’s hosting of the conference reflects its efforts to achieve a leading role in the global scenario towards sustainable development. In this regard, President Dilma Rousseff defended sustainable development as the country’s “historical mission”.

Having a large share of the world’s biological resources and being very important for the global environment, Brazil is one of the countries most closely watched in environmental issues. Nevertheless, it faces the challenge of reconciling its economic development projects with the environmental preservation and social inclusion.

Brazil has an area of 8 million square kilometers and a population of 190 million inhabitants, 84% of which live in cities. The sociocultural diversity is a characteristic of Brazil, which has millions of immigrants and their descendants, more than 200 indigenous peoples and countless traditional communities such as quilombolas (descendants of former slaves), extractivists, fishermen and family farmers.

In 2050, the population is expected to reach 260 million. The age distribution has been changing considerably over the years. The graphs below (Figure 1) show that between 1950 and 2050 there will be an accelerated evolution towards an older population, which will triple in the next four decades (less than 20 million elderly in 2010 to approximately 65 million in 2050). Worth noting is the drop in birth and mortality rates, as well as the change over the last 40 years in the leading causes of mortality - from infectious causes to external causes like accidents.

**Figure 1: Evolution of age distribution of the population in Brazil by sex– 1950 to 2050**
Brazil is a leader in renewable energy generation
According to the 2011 National Energy Balance, 45% of the energy supply mix in Brazil comes from renewables, in comparison to a mere 13% in the world. Furthermore, Brazil is also a leader in bioenergy production. Already self-sufficient in oil production, Brazil is the world’s leading ethanol exporter, a biofuel made from sugarcane. As to electricity, generation from renewable sources corresponds to more than 80% of all power generation, a large share coming from hydropower.

Brazil is one of the world’s major producers and suppliers of food and fibers and is the third largest exporter of agricultural products.

In 2010-2011, Brazil had a record grain harvest. The increased food production reduced food insecurity. Modernization of agriculture, with gains in productivity and more intensive use of land, on the one hand, and expansion of specialized and mechanical monoculture systems, on the other, resulted in impacts on the environment and social structures. An example of this is the deforestation of areas with natural coverage, leading to the devastation of forests and native fields, loss of biodiversity and genetic resources widely found in forests, contributing to climate change.

From 1994 to 2005, Brazilian greenhouse gas emissions increased by 17%, the main cause being deforestation from land use changes.

Brazil was the country that most lost forest areas from 2000 to 2005 – the equivalent of 165 thousand square kilometers of deforestation, or 3.6% of all forest losses in the world. 2011 saw the smallest rate of deforestation in the Amazon since 1988. About 62% of deforestation is intended for grazing. Trends show that in the next 10 years Brazilian economic and population growth will most likely occur in the Northern and Midwest regions, home of the Amazon and Cerrado biomes.

The Atlantic Forest, which has already lost 93% of its original area, is the biome with the richest biodiversity of the planet.

Brazil is characterized by its megadiversity. Its territory today holds from 15% to 20% of all globally recognized species. Every year, given the notable advance of scientific knowledge, 700 new species of animals are recognized. There are 1,790 protected areas (Conservation Units as they are locally known) in Brazil, making up a total area of approximately 1.5 million square kilometers, a little over 17% of Brazil’s continental area and 1.4% of its waters.

Brazil is very privileged in terms of water resources. In its territory are found 13.7% of the world’s freshwater, in rivers, including the largest river of the planet in both extension and water volume, the Amazon. Water, however, is distributed unevenly: the Amazon area, with a relatively small population, has 78% of the surface water; in the Southeast, this ratio is inverted: the greatest population concentration in the country has 78% of all the available water resources. In addition, the country has the largest reserve of drinking water in the world, namely the Alter do Chão and Guarani aquifers, that respectively have 86 thousand and 45 thousand cubic kilometers of freshwater, an amount greater than the water of all the rivers and lakes of the world.

Although Brazil is the country with the most water availability, pollution and inadequate use have damaged this resource in various regions and risk contaminating the aquifers. Given this natural heritage, the concept
of environmental assets must be strengthened. This requires the economic valuation of environmental assets and implies analysis of the polluter pays or user pays principle. An example of how this approach can be successful is the inclusion of payment for water in the National Water Resources Act (1998), considered to be the most advanced legal framework for managing strategic natural resources.

**An urbanized country, but without adequate planning**

In the 1950s, Brazil began to accelerate and intensify its urbanization process, as it became increasingly industrialized, spurred on by the developmentalist policy of President Juscelino Kubitschek. In 1950, 36% of the population of Brazil lived in urban centers. Just over fifty years later, 84.2% of Brazilians live in cities and projections show that by 2050 that figure will rise to 93.2%.

This growth, however, occurred in an unplanned fashion, resulting in typically urban socio-environmental problems, such as occupation of high-risk areas, lack of basic sanitation infrastructure, increase in solid wastes generation and in motor vehicle traffic.

To provide guidance for planning and management of cities to solve these problems, the 1988 Brazilian Constitution included a specific chapter on urban policy. In 2001, after 13 years of negotiations in Congress, the City Statutes Law was sanctioned. It defines instruments for urban management in Brazil, one of the most important being a city’s Master Plan. The basic premises of the law are participatory management and the social function of property.

**Public policies for sustainability**

The legal and institutional framework that guides and regulates sustainability actions in Brazil includes international standards and treaties, in addition to laws, regulations and the government’s various national programs, at all levels of government.

In the international arena, environmental issues started taking center stage during the latter half of the twentieth century, becoming part of the UN negotiations agenda, particularly after the 1972 Stockholm Conference. This conference gave rise to a process of discussions and negotiations ending in the 1992 United Nations Conference on Environment and Development, or Rio 92. It can be regarded as a watershed from a civilization point of view, laying the foundations for a truly planetary citizenship.

Among the most significant guiding principles of modern socio-environmental protection are the documents that came from the Rio Conference, such as Agenda 21 and the Biodiversity (CBD) and Climate (UNFCCC) Conventions. Nevertheless, there are other regulations that are being developed to steer mankind towards sustainability, such as those intended to combat corruption, human trafficking and slave-like working conditions. Other treaties that are particularly relevant for the private sector include the Basel Convention on the transport of hazardous wastes and the protocols of international conventions such as the Montreal Protocol, for the protection of the ozone layer, and the Kyoto Protocol, on the emissions of greenhouse gases.

In Brazil, the foundation of the modern legal environmental framework can be said to be the creation of the Special Secretariat for the Environment in 1973. In 1981, Law No. 6,938, which instituted the Nation Environment Policy, established the National Environment System (SISNAMA) and its regulating body, the National Environment Council (CONAMA), whose resolutions and decisions guide environmental policies in Brazil. A chapter of the 1988 Federal Constitution is dedicated to the environment, recognized as one of the most advanced in the world: Article 225 ensures the right to an ecologically sound environment for present and future generations. In addition to this chapter, several provisions of the Constitution recognize the importance of environmental protection, such as Article 170, on the economic order, that mentions sustainable development.

Other laws which support the management of Brazilian natural resources include the 1965 Forest
Code, altered in 2001 and 2012; Law No. 9.433, dated 8 January 1997, which establishes the National Water Resources Policy, recognizing the economic value of water; Law No. 9,605, dated 12 February 1998, on environmental crimes; and Law No. 9,795, dated 27 April 1999, which instituted the National Environmental Education Policy.

In 2002, Brazil established the National Biodiversity Policy to ensure the implementation of the objectives of the UN Convention on Biological Diversity (CBD). In the following year, the National Biological Diversity Program (PRONABIO) and the PRONABIO Coordinating Commission (CONABIO) were established. Throughout 2011 and 2012, with the aim of implementing the biodiversity conservation targets approved at the 10th Meeting of the Conference of the Parties to the CBD, in Nagoya, the Brazilian Government promoted an initiative for the participatory drafting of the Brazilian biodiversity conservation strategy. The process underwent several stages of public participation and its result will be presented at Rio+20.

In 2009, Brazil sanctioned the National Climate Change Policy, in which it voluntarily commits to reduce its emissions by 36 to 39% by 2020, with respect to its business-as-usual growth in 2005. The target was reaffirmed at the 16th Session of the Conference of the Parties to the Climate Convention (COP 17), held in Durban, South Africa, in 2011. Its main strategy for reducing emissions is to avoid deforestation in the major biomes, such as the Amazon and the Cerrado.

The states are also increasingly concerned and have established policies with mitigation and adaptation actions, such as in Amazonas (2007); Goiás (2009); Santa Catarina (2009); São Paulo (2009); Espírito Santo (2010); Pernambuco (2010); and Rio de Janeiro (2010).

In addition to policies to protect biodiversity and climate, Law No. 12,305, dated 2 August 2010, established the National Solid Wastes Policy (PNRS) and has a strong impact on manufacturing in Brazil. The PNRS encourages the adoption of sustainable production and consumption patterns and stimulates the recycling industry through mandatory waste sorting, reverse logistics and appropriate disposal of urban solid wastes in municipalities, among others.

Public policies for energy and power are also decisive for sustainability in the manufacturing industry. A series of federal directives and programs regulate and provide incentives for energy efficiency and use of renewable energies in Brazil since 1975, when Brazil innovated by creating the National Alcohol Program (Proálcool), to address the first world oil crisis in 1973.

Since then several programs have been implemented, like CONSERVE in 1981, to promote energy conservation in industry, to develop more energy efficient products and processes, and to encourage the replacement of imported energy sources by domestic alternative sources; PROCEL (National Electricity Conservation Program) (Interministerial Directive No. 1.877/1985) to integrate energy conservation actions in Brazil under a comprehensive and coordinated vision.

Also from this period is the Program to Conserve Electricity in Household Appliances, which was renamed Brazilian Labeling Program in 1992, maintaining its original provisions and adding safety requirements as well as definition of the minimum levels of energy efficiency.

From 1990 to 2001, the government undertook several actions to regulate the use of energy, including: National Program for the Sound Use of Oil and Natural Gas Byproducts (CONPET); the establishment of the Brazilian Electricity Regulatory Agency (ANEEL); the Oil Act, which establishes the National Energy Policy and creates the National

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1. SEMA was created within the Ministry of Interior, through Decree No. 73,030, dated 30 October 1973, altered in 1990, when it became an agency directly under the President of the Republic. Decree No. 6,101, dated 26 April 2007, currently in force, details the responsibilities of the Ministry of the Environment.


“A strong movement for corporate sustainability is in place in Brazil. It started when Brazil hosted the United Nations Conference on Environment and Development (UNCED), known as Rio 92.”

Petroleum Agency (ANP); and the Energy Efficiency Act.

The National Logistics and Transports Plan (PNLT) and the National Climate Change Policy (PNMC) emphasize the need to reduce the volume of cargo transported by highways and invest in more energy efficient and environment friendly transport modes. The PNLT projects an increase, in 15-20 years, of the share of rail transport from 25 to 32% and water transport from 13 to 29%. Air transport and pipelines would increase to 5% and 1% respectively of the transport mix and road transport would fall from 58% to 33%.

Still in the area of transports in Brazil, the 2012 National Urban Mobility Policy (PNMU) establishes principles, guidelines and instruments for municipalities to plan a public transport system capable of meeting the needs of the population and contribute to sustainable urban development. The law encourages giving priority to public, nonmotorized, transport rather than individual, private and motorized. Several mechanisms are defined, for example, to ensure the provision of cost-free use and maintenance of affordable public transport tickets.

Finally, the 2011 economic development policies, such as the plans Brasil Maior (program to increase industrial competitiveness), Brasil Sem Miséria (expansion of the conditional cash program, Bolsa Família) and the Plan of Action for Sustainable Consumption and Production (PPCS), revision of Law No. 8666 and the various sectoral rules approved in this period, point to greater participation, greater integration of sustainability concepts and criteria in the country’s government actions. Furthermore, the Law of Access to Public Information (Law No. 2,527) ensures transparency in public administration processes, which supports the implementation of government policies and plans. It entered into force in May 2012 and is an essential instrument for sustainability in Brazil.

**Corporate Sustainability in Brazil**

A strong movement for corporate sustainability is in place in Brazil. It started when Brazil hosted the United Nations Conference on Environment and Development (UNCED), known as Rio 92. Since then the issue of sustainability has been the object of direct action by companies in numerous corporate initiatives. The timeline of institutions and instruments related to corporate sustainability in Brazil closely follows international evolution, sometimes anticipating demands, establishing a model for global tools. The private sector has been very active in the debate and actions to address problems and generate new market opportunities for sustainability issues.

The first institution dedicated to the promotion of sustainability in the business sector was the Brazilian Foundation for Sustainable Development (FBDS), established in 1992 by an association of 24 major business groups. Five years later, the representative of the World Business Council for Sustainable Development, CEBDS, was established in Brazil. Since its very beginning, it has promoted discussions and initiatives with its members and relevant actors of the country’s government and society.

One of the first modern Brazilian tools for corporate sustainability was the Social Report, launched by Ibase in 1997, which proposed a template for reporting a company’s environmental and social performance to interested parties. The Ethos Institute’s sustainability assessment model, launched in 1998, is another important tool, which currently uses the lines proposed by Ibase and GRI, adding details of the organization’s principles and actions. The Brazilian Global Compact Committee (CBPG) was established in 2003 to promote the adoption by Brazilian companies of the principles of the United Nations Global Compact.

Companies have recently begun to focus on climate change, which has two important initiatives in Brazil:
the GHG Protocol and the Carbon Disclosure Project (CDP). CEBDS launched the partnership of the Brazilian GHG Protocol Program in 2008 with the WBCSD, WRI, Ministry of the Environment and the Center for Sustainability Studies of the Fundação Getúlio Vargas (GVCes). The GHG Protocol has made it possible to train and assist dozens of companies in Brazil as they prepare their GHG emissions inventory, which is the foundation for future action on emission mitigation. The Carbon Disclosure Project, an initiative of international investors to increase the transparency of GHG emissions and carbon risk, published its sixth report in Brazil in 2011.

Leading the pack was the government of the State of Rio de Janeiro, which established a green business stock exchange (BVrio), a model that incorporates sustainability into a market mechanism. BVrio will be the first carbon emissions market in Brazil. Since its creation, CEBDS has been promoting discussions on climate change, integrating Brazilian and international companies, with a view to preparing them for the challenges of a low-carbon economy. In this stimulated environment, discussions in favor of the installation of a carbon market are intense, fostered by both government and civil society.

Another important initiative in Brazil is the Corporate Sustainability Index (ISE) at BMF&BOVESPA, launched in 2005, which since 2010 has incorporated indicators related to the challenges of climate change in criteria to assess corporate sustainability. Recognition by the stock exchange of the importance of corporate responsibility with regard to climate change is one more indication that the issue occupies a privileged spot in corporate decision-making. Furthermore, BMF&BOVESPA launched in 2009, during COP 15, in Copenhagen, the Carbon Efficient Index (ICO2), to assess corporate performance.

One of the institutions in the ISE project was the Brazilian Corporate Governance Institute (IBGC), a non-profit organization that provides guidance to corporate managers and directors on governance. Joining sustainability to governance, IBGC presented in 2007, the Sustainability Guide for Companies, to assist in the adoption of new concepts and tools in management processes, so as to incorporate economic-financial and socio-environmental aspects.

Among the most recent corporate discussions topics is risk and opportunity assessment, associated to biodiversity use and conservation. There are currently several tools, methodologies and standards available for valuing biodiversity. These, however, have different scopes and are mostly international. Furthermore, working groups and discussion forums bring together various companies and sectors to adopt and disseminate best practices that incorporate the sustainable use of biodiversity in their daily business.

The document “The Economics of Ecosystems and Biodiversity - for Business and Enterprise” is a guide to assist the business sector incorporate biodiversity in its strategies. The Portuguese version of the report had the support of the National Confederation of Industry (CNI), the German Technical Cooperation Agency (GTZ), the Ministry of the Environment, the United Nations Environment Programme (UNEP) and the World Bank. Another important initiative is the Corporate Partnership for Ecosystem Services (PESE), established by CEBDS, together with the World Resources Institute (WRI) and the Center for Sustainability Studies of the Fundação Getúlio Vargas Foundation (GVCes) and with the support of the United States Agency for International Development (USAID). It was launched at the 2012 Sustainable Conference.

Today, sustainability is an element present in the decision making of companies and is no longer only associated to the speeches of social movements or international negotiations of environmental or human rights treaties. There are several sectoral initiatives and forums, as well as some for small and medium-sized enterprises. Various laws and public policies on these matters are in force in Brazil, at both national and local levels, and the private sector has had an active role in the debate and actions to address problems and to generate new market opportunities.

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6 The program brings a unique and innovative tool, which will help companies manage risks and opportunities pro-actively in their businesses arising from their dependency and their impacts on ecosystem services.
“An active and organized civil society that demands its rights evolves to demand corresponding attitudes from the production sector. This has had significant repercussions in the environmental and consumer protection movements.”

**Agents of change**

Brazil began to consolidate a process of reorganizing civil society and the modalities of its interaction with the State since the 1990s, after the adoption of the 1988 Federal Constitution. New areas for negotiation and the inter-relations were created for social actors and the State, and the associative and organizational capacity of society to occupy public participatory spaces was consolidated. New formats for the organization of social movements and civil associations arose during the Brazilian democratization with an enormous growth of community associations, non-governmental organizations, civil associations and social movements. This new associative dynamic has led to expanded participation, increased demand for greater accountability of government and corporate performance, specially for the basic needs of the population, and the defense of constitutional rights acquired after years of military dictatorship.

An active and organized civil society that demands its rights evolves to demand corresponding attitudes from the production sector. This has had significant repercussions in the environmental and consumer protection movements. Scientists, the media, interest groups and non-governmental organizations are actors that have promoted intense discussions and questions on the attitude of companies in various areas of the sustainability agenda. With the increased power of these actors to exert pressure through social media, comes an increase in the scope and speed of their capacity to mobilize. Many companies involved these groups in their stakeholder consultation processes in Brazil, as they developed their sustainability strategies. None of this would have been possible had there not been a creative, dynamic and free press in Brazil, which has guided democratic debates efficiently and critically.
3 Vision 2050 for Brazil
Visão 2050:
The new agenda for business

Where we are headed
A premise of our vision for 2050 is that we have to set a direction, rather than a destination. We have to establish the desired goal to steer the actions that will lead society towards a possible future. Many of the elements are already found in the agenda of recent discussions in the United Nations and social actor forums that discuss the paths toward sustainable development. Therefore, to establish the vision implies defining the actions to achieve it.

- Brazil is consolidated as a developed country, particularly because of the balance achieved among economic, social and environmental factors in public and private administration. It is seen as a green power and a sustainable development model for other nations.
- Brazilian society has adopted the vision of a sustainable Brazil and accepted the restrictions and opportunities of a country in which 260 million people live well, respecting the natural limits of the planet.
- The country, in all spheres, has succeeded in achieving implementation and support for mechanisms to combat corruption. The watchword is transparency.
- The value of the participation of citizens and the community has been enhanced.
- People seek general well-being and a sense of achievement, prioritizing collective issues and quality of life, with a focus on human evolution, sustainable development and an inclusive society.
- The Sustainable Development Goals (SDGs) planned for the 2012 UN Conference in Rio were achieved successfully.
- With the eradication of child and slave-like labor, in addition to the incentives given to the production model based on solidarity, the level of unemployment is almost zero and the workforce is at full strength.
- Levels of violence have been drastically reduced in cities.
- The successive plans to combat poverty and promote women’s health developed since 2000 have contributed to Brazil’s achieving the Millennium Goals in 2015 and have consolidated the political foundation for drastic poverty reduction, promoting greater social equality in the country.
- In 2050, the country has increased its HDI and has one of the best results of the world, at the same time reducing its carbon footprint.
- Brazilians value natural resources, management and planning; ethics towards future generations is included in the agenda of the institutions.
- The culture of consumerism is replaced by the principles of sustainable development and by the factors of success and personal satisfaction.
- With the redirection of tax incentives, Brazil becomes exporter of high added value goods.
- Due to major investments in primary, secondary and technical education, Brazil is known as a storehouse of new talents in various sectors of the green economy, with emphasis on new technologies, innovation and services.
- Companies have motivated employees and administrators to become leaders in a more globalized world.
- Companies have implemented high standards of corporate governance, built a new model of business value and have created new products, services and strategies based on the principles of sustainability.
- Companies have encouraged governments to consider and adopt policies and legislation needed to guide and organize society in order to provide market incentives for sustainability.
- Companies, governments and major institutions report their financial, environmental and social performance in an integrated fashion.
- Economic indicators are no longer the only measure of development of a nation and the principles of indicators that seek non-material motivation for the happiness of
The population, such as the Gross Domestic Happiness indicator (GDH), are incorporated into the culture of the Brazilian society.

- The financial sector plays a fundamental role in consolidating the green economy in Brazil through financing and investment in new technologies.
- All citizens have access to collection and treatment of domestic sewage and to safe drinking water and basic sanitation.
- The water quality of the main rivers of the country is at an acceptable level.
- Water managers in the various states are established and water management in Brazil is decentralized and participatory, with emphasis on the roles of the basin committees in the effective and sustainable management of water resources.
- The mechanism for charging for water use is operational and all its revenue is reinvested in the constant improvement of water management in Brazil.
- Brazil is an example for its regulations on biodiversity protection and for society's recognition of the value of biodiversity.
- Brazil has an efficient “forest economy” model, which unites conservation of ecosystems with the sustainable exploitation of resources derived from Brazilian biodiversity and encourages sustainable extraction and eco-tourism to ensure jobs and quality of life for local populations.
- Companies recognize and incorporate biodiversity conservation and ecosystem services to their businesses.
- Ecosystem products and services are adequately valued and generate spontaneous demand, resulting in the construction of a Green GDP, which unites economic development and environmental protection.
- At the global level, Brazil occupies a leading position in the sustainable farming sector, including agribusiness and renewable energies.
- Agribusiness has developed sustainably, bringing together biotechnology and governance solutions, ensuring the nutritional needs of the entire Brazilian population and making Brazil a major food exporter.
- Governance mechanisms will lead to a low-carbon scenario, which in turn results in actual deforestation reductions, benefits for biodiversity conservation, social benefits and respect for the rights of indigenous peoples, family farmers and traditional communities.
- Brazil ranks as one of the countries with lowest levels of GHG emissions in energy use and generation. The actions of the production sector contribute to Brazil’s surpassing the progressive targets for GHG emissions reduction established in national and local climate plans of action.
- Thanks to the consolidation of public-private partnerships and incentive and fostering policies, the share of new renewable and sustainable energy sources in Brazil’s energy mix is increased. This mix, which is still predominantly clean, is a global benchmark in the use of sources such as hydropower, biomass, solar and wind energy.
- Brazil exports oil from the pre-salt layer, offsetting its emissions through biodiversity conservation and investing its revenues in technology, capacity building and education, which drive the green economy.
- Tax incentives and investments made in R&D to develop low-carbon technologies were essential

7 Green GDP is understood as the set of economic activities that are able to conserve or expand the natural capital stock of a country, where the natural capital are its natural resources, renewable or otherwise, when considered as means of production.
for achieving the goals of the National Climate Change Policy.

• Universal access to electricity in homes, cities and rural areas is ensured, industry consolidates and maximizes the use of co-generation, and energy efficiency programs are mainstream. Distributed energy generation reflects the regional needs and characteristics of the country and supplements the grid, which has a diversified mix and is in harmony with the environment.

• Brazilian cities are steered by integrated and participatory planning, to ensure security and quality of life, particularly with appropriate urban mobility and accessibility.

• Buildings have net zero energy balance and adopt the use of recycled materials for basic inputs. Urban vegetable gardens are found all over cities, and neighborhoods have an adequate infrastructure for pedestrians and cyclists, integrated to public transport systems and green areas.

• Universal access to quality public transport. Transport infrastructure is also diversified, providing more options by rail, rivers and sea, for both passengers and cargo.

• Companies are responsible for sustainable management throughout the entire production chain - from the extraction of raw materials to processing and appropriate waste disposal.

• Waste management in Brazil has become efficient, integrated and sustainable, even in large urban centers. The National Solid Wastes Policy is implemented throughout the country.

• Reverse logistics are fully implemented and industrial symbiosis is a wide scale practice, according to the characteristics of the industries and their location.

• Companies adopt environmental labeling to inform consumers about products and their impacts.
In the definition of the path to be followed by society towards the vision for 2050 for Brazil, nine reference themes were identified that consolidate the concepts of sustainable development in the country: Values and Behavior; Human Development; Economy; Biodiversity and Forests; Farming; Energy and Power; Buildings and Built Environments; Mobility; and Materials and Wastes. These, however, do not exclude other fundamental issues that, because they are cross-cutting, are implicit or underlie the themes defined as paths for the Vision Brazil 2050.

The nine themes will be addressed separately, first presenting their reference scenario and main challenges; then, the actual **Vision 2050** for the theme; and, finally, the paths that are developed through actions: until 2020, actions that are expected to be carried out immediately or in the next decade, to achieve the desired scenario in 2050; and, from **2020 to 2050**, a period which represents medium and long-term changes, actions that will actually define the direction of the country until 2050 to ensure and maintain the sustainable development model envisaged here.

Cross-cutting actions that will permeate all reference themes include:

- Provide capacity building and retraining of the population for green jobs.
- Ensure access to quality primary, secondary and technical education in all of Brazil.
- Review and create regulatory frameworks to promote the green economy and technological innovation.
- Include externalities in the cost of products and services.
- Expand and implement current protected areas.
- Ensure effective management of water resources taking into account the impacts of climate change.
- Reduce carbon emissions in various sectors, going beyond the targets of the National Climate Change Policy by 2020.
- Consider the sea level rise caused by climate change when making decisions on land use and occupation in coastal or vulnerable regions.
- Invest in the widespread use of alternative energy sources, by modifying the country’s energy mix in order to reduce the environmental and social impacts resulting from current energy generation processes and reduce dependence on fossil fuels.
- Educate consumers so that at the moment of purchase they can opt for products and services with smaller ecological footprints and fewer social impacts.
- Carry out the strategic territorial planning of the country, in the various geographical scales.

The main issues raised during the process of drafting Vision Brazil 2050 regarding how to proceed from the current scenario to the vision for 2050 are shown in Figure 4.

**By 2020**

In this decade, Brazil will undergo a period of when many questions will be raised. The conventional business model, in a country that is becoming a global economic powerhouse, clashes with the need for better income distribution and opportunities, social equality, valuing of the different regions and environmental quality. This increases the demands made by society and results in severe governmental and financial crises. More and more citizens react to risk situations and to unstable socio-environmental conditions. Civil society organizations mobilize to demand actions of their leaders.

Out of these questions arise new business models driven by the race against the clock to meet the targets of the National Climate Change Policy, the National Solid Wastes Policy, the Sustainable Production and Consumption Plan, among others. The clean technology market is strengthened and consolidated, specially in the sectors of new renewable energy sources, energy...
Dilemmas to achieve the vision for 2050 for Brazil

<table>
<thead>
<tr>
<th>Current Scenario</th>
<th>Vision 2050</th>
</tr>
</thead>
</table>
| **Values and Behavior** | • How can we invert the values of consumption into collective, participatory and inclusive ones?  
• How can we redefine standards of success for society through cultural change? |
| **Human Development** | • What are the financial mechanisms required to extend basic sanitation for all?  
• How can we achieve a standard for public education that is compatible with the challenges and ambitions of the country? |
| **Economy** | • What are the variables that we need to evaluate the country’s progress?  
• How can we effect the cultural transformation of the current business model to a new model? |
| **Biodiversity and Forests** | • How can we incorporate the value and the scientific knowledge of biodiversity in business?  
• How can we promote innovation in land use, taking advantage of the characteristics of the country’s different regions? |
| **Farming** | • How can we transform agribusiness into a sector of innovation for sustainability?  
• How can we promote fair trade between the farming sector and consumers to reduce poverty? |
| **Energy and Power** | • How can we make industrial production more energy efficient?  
• How can we grow economically while decreasing our dependence on fossil fuels? |
| **Buildings and Built Environment** | • How can we raise awareness and train relevant players to ensure a sustainable, transparent and ethical production chain?  
• How can we innovate the civil construction sector with a focus on materials and sustainable products? |
| **Mobility** | • How can we achieve a low-carbon economy in the transport sector?  
• How can we align urban planning of Brazilian cities taking socio-economic development and mobility into account? |
| **Materials and Waste** | • How can we encourage innovation to generate less waste?  
• How can we minimize the negative impacts of solid waste disposal? |
efficiency and technologies for production efficiency in farming, in response to land use control.

Inclusive and more sustainable businesses are strengthened and have a fundamental role in social development, sharing responsibilities with the government. Many of these new businesses operate in economically vulnerable regions of Brazil, heavily dependent on biodiversity conservation, and increasingly reliant on Federal Government funds.

Furthermore, the country now recognizes the importance of restructuring cities to meet the needs of residents, and the focus of urban planning becomes the citizen inserted in his community. This results in improved public health and sanitation systems, in the creation and maintenance of recreational areas and, specially, in the redevelopment of urban mobility systems to enhance the value of micro-accessibility and nonmotorized modes of transport, one of the key points for improving the well-being of the population in large urban centers.

The 2014 World Cup and the 2016 Olympics will be an important driving force for urban restructuring in the capitals that host the games. This period will see major investments in smarter and more efficient transportation systems, leaving a legacy for less developed cities and metropolitan regions. New investments will be made in inter-municipal rail and water transportation, to meet the increasing demand for mobility of people and

**Figure 5: Actions to achieve Vision 2050**

<table>
<thead>
<tr>
<th>Values and Behavior</th>
<th>Human Development</th>
<th>Economy</th>
<th>Biodiversity and Forests</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Promote education for social empowerment</td>
<td>▪ Eliminate poverty</td>
<td>▪ Standards, guidelines and targets based on a sustainable economy</td>
<td>▪ Promote business models that incorporate biodiversity</td>
</tr>
<tr>
<td>▪ Ensure the preservation of traditional cultures</td>
<td>▪ Access to basic sanitation and education for all para todos</td>
<td>▪ Tax incentives to stimulate sustainable practices</td>
<td>▪ Expansion of biodiversity corridors</td>
</tr>
<tr>
<td>▪ Formalize sustainability principles in public policies</td>
<td>▪ Legal incentives for entrepreneurship</td>
<td>▪ Investment in clean technologies</td>
<td>▪ Control deforestation</td>
</tr>
</tbody>
</table>

**2020 to 2050**

<table>
<thead>
<tr>
<th>By 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Transparency in company management</td>
</tr>
<tr>
<td>▪ Quality of life of the population and respect for local cultures</td>
</tr>
<tr>
<td>▪ Awareness raising and education on consumption</td>
</tr>
<tr>
<td>▪ Transform the education system</td>
</tr>
</tbody>
</table>

**By 2020**

| ▪ Meet the Millennium Goals |
| ▪ Combat corruption |
| ▪ Reduce social inequalities |
| ▪ Improve health conditions and educational quality for all age groups |

| ▪ Revise the concept of progress, taking development into consideration |
| ▪ Pricing of the real value of goods and services taking externalities into account |
| ▪ Green financing models |

| ▪ Strengthen traditional culture and sustainable use of biodiversity |
| ▪ Enhance the value of environmental assets |
| ▪ Disseminate knowledge of ecosystems |
| ▪ Preserve the various biomes |
inputs, and to facilitate connections between the regions of Brazil.

**2020-2050**
The actions of the previous decade create a new reality in the country. More effective plans for income distribution are consolidated and more opportunities in less favored regions are created, thus stabilizing rural-urban migration. Quality primary education expands, contributing to regional development. Society has more power and influence in decision making.

Companies contribute significantly to the reduction of greenhouse gas emissions through energy efficiency. The gradual reduction of deforestation is consolidated, and municipal transport policies enable transport integration, including nonmotorized transportation. Federal Government investment programs come to prioritize greater connectivity between the states by means of more efficient transportation.

Companies go through a transition period. Corporate sustainability practices are disseminated in small and medium-sized enterprises, particularly in promoting local development. Dissemination of cleaner and more efficient technologies encourages companies to produce more while consuming less. Figure 5, below, shows the systematization of actions within each reference element.

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**Farming**
- Invest in logistics and technological innovation
- Socio-environmental adjustment of production chains
- Train rural entrepreneurs
- Sustainable development programs adopted by
- Enhance value of ecosystems with agroforestry systems
- Encourage family and sustainable agriculture

**Energy and Power**
- Invest in technology transfer for smart grids
- Diversification of clean energy sources
- Open up power grid to purchase energy from clean energy mix

**Buildings and Built Environment**
- Transform building construction into a sustainable production chain
- Consolidate certifications and regulations for sustainable construction
- Public policies to encourage new sources of renewable energy
- Regulations for smart grids and energy efficiency projects
- Awareness raising on energy consumption

**Mobility**
- Single national information system for urban transport
- Single planning for metropolitan agencies
- National integrated multi-modal transport network
- Focus on urban planning for quality of life
- Investment in public transportation and integration
- Subsidies for low-carbon technologies and taxing of externalities

**Materials and Waste**
- Incentive for eodesign innovation
- More ethical and transparent communications between companies and consumers
- Increase research on better use of materials
- Implement integrated solid waste management
- Consolidate Life Cycle Analysis and reverse logistics
- Invest in environmental education
- Reduce wastes in manufacturing
4.1 Values and Behavior

**Current Scenario**

The ecological footprint of Brazil is greater than the world average, according to data from WWF’s report, Living Planet 2012, which shows that mankind’s carbon footprint has already exceeded the regeneration capacity of the planet by 50%. If mankind does not dissociate economic growth from environmental degradation, companies will not be able to sustain their consumption patterns for much longer.

Review of assumptions and individual values is imperative. Personal reflection on happiness based on affection, compassion, spirituality, access to knowledge, family leisure time and artistic expression may lead to the replacement of consumption patterns based on a cycle of acquiring and discarding. To encourage this reflection, it is necessary to know the values and behaviors of society, who are its members, what are their needs and aspirations and, above all, how do they wish to share their values for the construction of a future guided by the principles of sustainability.

Data from the Sustainability Here and Now survey, held in 2010 with 1100 people in 11 Brazilian cities, show that Brazilians are in tune with the demands of their time with regard to the preservation of the environment. They desire products and services that

value innovation and are committed to the vision of a more sustainable world. The survey also shows that the environmental awareness of Brazilians is growing in all social classes and regions, but that there is still an abyss between the concern expressed and actual behavior.

Another surprising result is Brazilian’s answer to “what brings most happiness”. Almost half of the population in the major urban centers of Brazil sees its largest source of well-being in intangible assets, such as professional achievement or availability of more time for leisure activities or for family.

Analyzing these results, we see that the Brazilian society is sensitive to the challenges that it needs to face to keep the environment healthy and that all Brazilians are willing to contribute with their personal effort - often only requiring that they be shown the way.

One of the major challenges for emerging economies will be to maintain the population satisfied from the point of view of the economy, at the same time that it must be made aware that current consumption patterns are already unsustainable to maintain life on this planet, as demonstrated by the loss of 30% of biodiversity in just the last 30 years.

According to the American magazine International Living, in a ranking of almost 200 countries, Brazil is the 38th country in terms of quality of life, up from 43rd in the 2009 ranking. This assessment covers nine areas: cost of living, culture and leisure, economy, environment, freedom, health, infrastructure, risk and security, and climate. Brazil achieved its best ratings in freedom, risk and security and climate. The worst ratings were leisure, culture and infrastructure.

**Vision 2050**

People seeking overall well-being prioritize collective issues and shared quality of life. New ways of living, inspired in a change in the definition and measure of success, as well as in innovative means of education and connection among people, put down roots all over the world. The concept of “One world - people and planet” is incorporated and practiced all over the world, underlining the interdependence of all peoples.

Living in a community is recognized, in addition to the search for greater civil participation. The increasing awareness of others - of different cultures, social groups and age groups - promotes greater social cohesion and understanding of what it means to be interdependent and responsible for individual and collective actions, for the benefit of the planet and future generations. Schools highlight values such as ethics, civil rights and obligations, environment, and respect for others, in curricula. Society repudiates and combats unethical

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8 Ecological footprint is the amount of hectares needed to meet the consumption needs of every human being versus the regeneration capacity of the Earth.

9 The survey “What do Brazilians think of the environment and sustainable development” was carried out in partnership between the Ministry of the Environment and Walmart Brazil.
behavior and corruption.

The principles and recommendations of the Earth Charter and the Universal Declaration of Human Rights are fully respected and practiced. Society understands the value of civil participation and knows how to fight for its rights and the common good. Ethics and focus on innovation, sustainability and social inclusion are widespread in businesses. Individual identity and common issues related to quality of life are prioritized.

Citizens are guided by new concepts of cost and value of natural resources, and movements envisaging the sustainable use of the environment gain momentum. Society is participatory and entrepreneurial, and new business models are included in the debate on the social and governmental changes required for a more sustainable way of life. Brazilians appreciate the value of natural resources and the concern for planning for future generations becomes more evident.

**Actions**

**By 2020**

- Promote greater participation of the private sector and society in general in the design, evaluation, implementation and monitoring of public policies
- Implement greater transparency in business management through public sustainability reports
- Encourage fostering and implementation of inclusive businesses and local resources in the value chain, adapting products and processes in partnership with other institutions, with emphasis on generating value and open dialogue with the government.
- Support transition towards shared education for sustainability that addresses issues such as ethics, civil participation and environment
- Establish corporate policies that incorporate ethical principles as well as respect for the consumer, citizen and environment, for raising awareness and educating people on consumption.
- Value companies working to eradicate child labor and forced or mandatory labor, to combat discrimination in all its guises, to value diversity, to prevent moral and sexual harassment, to respect freedom of joining trade unions and the right to collective bargaining.
- Prioritize strategies for private social investment and relationships with communities with a view to local development and respect for people’s local culture and conditions.

**2020 – 2050**

- Support educational communities with room for community dialogue and exchange of ideas through innovation and technology, fostering social action.
- Prioritize formal and practical commitment of the public and private sectors to implement and monitor actions to eradicate poverty.
- Establish new measures of success and well-being at international, national and individual levels that lead to changes in human relationships and collective thought.
- Strengthen the understanding of the various areas, environments, conditions, cultures and aspirations, ensuring the preservation of traditional cultures.
- Formalize policies, infrastructure, corporate leadership, as well as products and services that foster sustainability and address the needs of all segments of society.
- Prioritize sustainable development as a broad, strategic commitment integrated and associated to all activities in company management.

“The issue of consumption should not just be seen from an environmental or financial perspective, since it is closely connected to people’s perception of their needs and satisfaction.”
4.2 Human Development

Current Scenario
In September 2000, 189 heads of State and Government adopted the UN Millennium Declaration - international cooperation commitments on peace, security and disarmament, development, poverty eradication, environmental and human rights protection, democracy and sound administration, based on a set of fundamental values that included freedom, solidarity, tolerance, respect for nature, and shared responsibility.

The Declaration establishes the Millennium Development Goals (MDGs) for 2015, with targets and indicators that galvanized broad international support with the active involvement of institutional and civil society actors, which stimulates the debate, promotes advances in the essential priorities of human development and defines the road map for change.

From a strategic perspective, the Brazilian Government recognizes the MDGs as a highly relevant document for steering the country’s socioeconomic development actions. According to data from the 4th National MDG Monitoring Report, in 2008, targets such as access to water for the urban population and reduction of extreme poverty and hunger have already been exceeded by Brazil. There are still, however, gaps in the regional meeting of targets, the rural areas being the most vulnerable.

Brazil has practically met the goal of universal access to primary education for children, but attendance levels are still low for the poorest children and those in the North and Northeast; the major challenge is to improve the quality of education.

With respect to gender differences, women study more than men do, but still have fewer job opportunities, lower salaries than men doing the same work, and have the worst jobs. In 2008, 57.6% of Brazilian women were economically active, compared to 80.5% of men and the percentage of documented male workers was 39.1%, whereas only 29.5% of female workers were documented. President Dilma Rousseff governs the country, but the percentage of women at decision-making levels is still small.

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Brazil excels in achieving Millennium Goals

The Millennium Development Goals program supported the guidance of strategic actions for Brazil’s development, whose efforts were recognized by the international community in 2012.

At the end of 2010, 11 million Brazilians had been lifted out of extreme poverty and 30 million rose to the middle classes through the implementation of integrated public policies. Reduction of extreme poverty and hunger is still a priority in the government’s multi-year plan for 2011-2015.

The Brazilian proposal for the UN Conference on Sustainable Development (Rio +20), in June 2012, includes a global program to combat poverty based on its social programs. Nevertheless, inequality is still widely prevalent and one of the main indicators of development, access to basic sanitation, continues to be low in 2012.
Social programs are part of the strategy to promote social inclusion and reduce poverty. In addition to programs like Bolsa Família (a conditional cash program), Saúde não Tem Preço (program to provide free continuous-use medication), Movimento Brasil sem Pobreza (civil society movement to end hunger) and Brasil sem Miséria (an expansion of the Bolsa Família), cross-cutting actions such as the Program to Accelerate Growth (PAC2), the National Broadband Plan (PNBL) and the Digital Inclusion Program integrate government and the private sector to improve the quality of life and equality in Brazil.

Sectoral programs of the Federal Government invest in partnerships with states and municipalities, such as the Light for All Program, which affects some 14.5 million people in rural areas all over the country, with investments that reach R$ 20 billion, of which R$14.5 billion come from the Federal Government. This program generated direct and indirect jobs by investing in technological innovation and energy efficiency.

With respect to freedom, Brazil is 74th in the ranking of 153 countries (nine positions higher than the 2010 ranking and its best placing since 2007) of the Global Peace Index, an annual survey of the security and violence indicators in the world carried out by the Institute for Economics and Peace in 2011. In South America, the Brazilian index is below that of most countries, except for Colombia, Venezuela and Guatemala. According to the Ministry of Justice, in the 1980s, 230,832 homicides were recorded in Brazil, in comparison to 248,461 in the 1990s. Since 2004 this number has begun to fall. Among the leading causes of deaths among males, homicides are ranked third, after cardiovascular disease and cerebrovascular accidents. According to the “Analysis of the costs and consequences of violence in Brazil”, a study carried out by the Institute for Applied Economic Research (IPEA), in 2004, the cost of violence in Brazil reached an estimated R$ 92.2 billion, or 5.09 % of the country's GDP.

Brazil reduced the rate of deforestation, helped stabilize the ozone layer and increased its energy efficiency with more widespread use of renewables. Access to clean drinking water should be universal by 2015; however, improving housing and basic sanitation conditions, especially in remote regions, such as rural areas and shantytowns, still depends on future investments and priorities adopted by the government.

With respect to climate change, Brazil suffers mainly with the impacts of extreme events. Unplanned urbanization is the most significant cause of the tragedies resulting from natural disasters in the past 10 years, such as landslides in risk areas, inundations and floods. These disasters have led to US$2.8 billion in losses. Risk management is undoubtedly the more economic and efficient path. Between 2004 and 2010, Brazil invested US$ 280 million in prevention. In the same period, the government spent US$ 2.6 billion in emergency aid to cities affected by inundations and landslides.

“The main threat to the progress of human development stems from the evident unsustainability of production and consumption patterns.”
Vision for 2050

The country achieves high levels of HDI, placing it among the best in the world

In 2050, Brazil surpasses the targets of the Millennium Development Goals, is an international benchmark for social, health and education policies and an example in the implementation of the Sustainable Development Goals, established during Rio+20, in 2012.

 Brazilians have an average life expectancy of 85 years and the health system becomes accessible to all the population, with actions to improve the quality of life and to prevent cardiovascular diseases, the main cause of death today. The rates of maternal and infant mortality are minimal, and all have access to adequate housing and sanitation. Implementation of policies and actions to combat extreme poverty begun four decades previously have led to decent living conditions for Brazilians who were in extreme poverty. Inequality in the distribution of family income has reached a level close to zero.

 The vulnerability of populations in remote areas and in the suburbs of cities was structured to respond to risk situations, minimized through integrated policies and adaptation strategies. Everyone can meet their basic needs and have a life with dignity and significant roles in their communities. Violence has decreased dramatically. Demographic profiles vary in the different regions of the country, and cultures and peoples remain diverse and heterogeneous, but have greater access to education.

 The structure of primary and secondary education has received more investments and shows great progress in the different regions of the country. Illiteracy in Brazil is close to zero, the lowest in Latin America and one of the smallest of the world, since the entire population has access to schools. The quality of teaching has reached levels comparable to the best educational centers of the world.

 A new profile of the active population is consolidated, the elderly and women have greater insertion in the labor market, on equal and competitive terms with men, and contribute significantly to income distribution in Brazil. Even in the smaller urban centers and rural areas, the role of Brazilian women is recognized and respected, and domestic violence in the country has been eradicated. With the incentives for a production model based on solidarity, child and slave-like labor has been eliminated, and the unemployment rate has been reduced to almost zero.

 With the increased availability of technical training and higher education, the development of new technologies and the consolidation of professions in different business sectors, income and green jobs generation indices are improved,
when compared to the indices of the old model of primary commodities exports and carbon intensive goods. Technical schools, restructured by public-private partnerships offer courses on technologies for low-carbon manufacturing and logistics strategies that are cleaner, meeting the needs of the country. In the various regions of Brazil, technology centers are in place to meet the specific industrial demands of each area.

**Actions**

**By 2020**

- Support the formulation of public policies and the implementation of practical measures to ensure compliance with the Millennium Development Goals by 2015.
- Support the implementation of the Sustainable Development Goals.
- Support government actions to improve health conditions and educational quality for all age groups
- Promote corporate policies and practices to reduce inequalities in income and opportunities.
- Create opportunities for the reinsertion of the elderly population in the labor market and support the reform of the social security system.
- Adopt and promote a production and growth model based on the solidarity economy.
- Promote solidarity-based economy throughout the country.
- Support the adoption of public policies for micro and small enterprises, aiming to increase formal jobs and maintain the reduction of the average unemployment rate.
- Invest in the creation of scholarships and research in fields relevant to the promotion of sustainable development.

**2020 – 2050**

- Encourage the creation of networks of solidarity-based economy.
- Involve consumers in discussions on innovation, customization and development of products for sustainability.
- Enable co-creation in innovation networks for stakeholders, products and services that help people to translate their new values and behaviors.
- Ensure that the systemic, holistic and multidisciplinary knowledge on sustainable development will be disseminated and the concept of preservation and sustainable use of natural resources is incorporated.
4.3 Economy

**Current Scenario**
In Brazil, studies show that, if the value of the consumption of the current natural capital were taken into account, the domestic GDP would increase by at least 2.5%, as would the investments necessary for its replacement. And if the socio-environmental impacts were included, there would be a financial loss from the environmental degradation, resulting in an estimated reduction in the Brazilian GDP of 0.5 to 2.3% by 2050, equivalent to R$ 3.6 trillion.

Major investment decisions are usually taken based on economic indicators with little or no consideration for more complex socio-environmental aspects, such as the development of sustainable technologies or the promotion of better quality of life in regions highly vulnerable to environmental impacts. The use of economic tools to demonstrate the impacts of unsound management of natural resources on the environment is hardly seen in most financial transactions and economic models.

In 2009, the government sanctioned the National Climate Change Policy, in which Brazil voluntarily commits to reducing its GHG emissions by 36 to 39% by 2020. The main strategy for reducing emissions has been to reduce or prevent deforestation in the major biomes, such as the Amazon and Cerrado, but very little has been done to add economic value to environmental protection strategies. Maintaining the standing forest has economic impacts, because in the current model the activities that generate income for the local communities, such as the extraction of forest products, are jeopardized. Experiences like the Program to Support Environmental Conservation - *Bolsa Verde*, developed by the Ministry of the Environment, must be expanded, and the projects to prevent deforestation should consider strategies for the sustainable use of forests, including payment for environmental services.

Implementation of a carbon tax on specific products with a higher level of emissions is one of solutions to meet the objectives of current climate change policies.

**Vision 2050**

*Brazil is recognized as “green power”*
Brazil is consolidated as a developed country, particularly because of the balance achieved between economic and socio-environmental aspects. Since the beginning of the twenty-first century, Brazil has shown its evolution in ensuring regulations and financial resources for the implementation of innovative and sustainable technologies, promoting the creation of green jobs and raising the awareness of the importance of sustainable business.

In 2050, the system of gains and losses, progress and the creation of values are redefined, with the inclusion of socio-environmental impacts and long-term social well-being. New rules for funding and the availability of innovative financial products stimulate entrepreneurship in an inclusive and advanced economy.

The new economy creates green jobs and at the same time improves productivity in the workplace, demanding a radical change in the way companies do business. Commercial transactions consider pricing the externalities into their business, while remaining transparent on socio-environmental, ethical and governance aspects.

The government guarantees access to information and the tax policy is balanced, conferring benefits on those who develop their business in a more sustainable manner. A classic success case is the integration of sustainability criteria into public bidding and procurement.

Companies work together with the financial sector to improve and redefine development indicators that internalize the value of ecosystem services. Consumers are aware and inform themselves about the social and environmental impacts of products and services they choose, preferring those that meet their needs and, at the same time, are most socially and environmentally friendly.

Sustainability reports are considered essential for business, the economy, society and the environment. They are seen to be strategic tools to help governments and civil society have access to and monitor the contribution of businesses to sustainable
development and the green economy. Reports are essential for risk analysis, impact assessments and investment decisions in the financial sector, in addition to being a way of catalyzing the transition towards the sustainable development model. They encourage transparency, lead to improved governance processes and generate greater trust in companies and greater responsibility towards society and the environment.

Legislation is seen to be adapted to the extent and scale of the differences of companies, improving efficiency, transparency, access of small and micro enterprises to incentives. This regulatory framework also fosters the expansion of opportunities by adopting manufacturing technologies that are less polluting and more efficient. Financial institutions are actively involved in this process, and analyze and incorporate socio-environmental risks in granting credit, in business lines, in insurance and financing.

The State creates favorable macroeconomic conditions to enable businesses to innovate in technology. Furthermore, the greater efficiency of command and control mechanisms, tax incentives and the elimination of subsidies for products and processes that are incompatible with the green economy encourage the private sector to invest in more sustainable strategies, so that transformation process has continuity.

The concepts of assigning value to socio-environmental externalities, proposed in “The Economics of Ecosystems and Biodiversity” studies, have become a reality in Brazil. Payment for water use is also consolidated and ensures resources for reinvestment in the recovery of the quality of water resources. Thus, companies seek investment and market opportunities based on the potential of the Brazilian biodiversity and protection of water resources.

Sectors of the economy innovate in management, and financial institutions foster the growth of small entrepreneurs through micro-credit, based on the principles of inclusive business. Businesses are linked to products with high environmental value and with certifications relating to the socio-environmental aspects of their production cycle.

**Actions**

**By 2020**

- Support and integrate formal public-private commitments to control and monitor combating of all forms of corruption.
- Formalize regulatory processes and public policies that encourage companies and other sectors committed to sustainability.
- Integrate government and financial sector planning and goals for the green economy with economic incentives and removal of perverse subsidies.
- Boost the green economy through incentives such as tax relief, for example, federal VAT (IPI) exemption for more efficient technologies, particularly low-carbon or those that promote environmental protection.
- Promote research to develop new markets and encourage the areas geared towards sustainability in scientific and technological institutions.
- Develop strategic planning so that public finances establish long-term investment programs, with effective results.
- Offer micro and small enterprises lines of credit with reduced interest rates for developing more sustainable manufacturing processes.
- Create and implement innovative models of financing and mechanisms that promote long-term investments in sustainable projects and diversify risks.
- Establish joint action of the financial and industrial sectors in new markets for commodities and environmental assets and in the development of cleaner technologies.
- Implement payment for the use of environmental assets and public resources.
- Provide data on the generation and distribution of economic value to interested parties.
- Increase transparency, self-regulation and access to the strategic goals of organizations, establishing processes with all interested parties.
- Establish mandatory publication of sustainability reports for large or publicly traded companies, based...
on the concept “report or explain”, which allows for the possibility of companies justifying their non-publication.

- Encourage small and medium-sized enterprises, governments and institutions to publish sustainability reports.
- Implement the actions and commitments contained in the sustainability reports in all sectors, strengthen the relationship with stakeholders and engage them in activities and decisions.
- Support local suppliers in the production chain to attract additional investment for the local economy.
- Encourage sustainable consumption and the adaptation of socio-environmental aspects by choosing products with fewer impacts.
- Establish other criteria for evaluating progress, in addition to the GDP, to measure the development of the country and the degree of well-being of its population.
- Establish and adopt performance indicators related to the activities of the organization (on the financial implications and other risks and opportunities arising from climate change).
- Implement education and capacity building of professionals for green and sustainable jobs, as well as meet industrial demands for cleaner production technologies and logistics strategies that promote development in various locations.

2020 – 2050

- Incorporate, definitively, socio-environmental aspects throughout the entire risk analysis and for funding and credits, and have finance institutions accede to voluntary international agreements.
- Insert initiatives in the rural credit programs to benefit low-carbon agriculture together with sustainable strategies.
- Build a green GDP, stimulated by the demand of products and services under new sustainable consumption patterns, as well as other possible measures of balanced socio-environmental progress.
- Establish new metrics for corporate performance.
- Include ecosystem conservation, sustainable use of resources derived from local biodiversity and the participation of local communities in the generation and distribution of value in sustainable businesses.
- Incorporate the socio-environmental agenda into economic growth and corporate strategies, by publishing sustainability reports integrated to financial reports.
- Establish integrated communication between interested parties and engage their participation in business processes and in the areas of public policy formulation and oversight.
- Definitively establish tax and economic incentives for the commitment to sustainable development in businesses.
- Promote tax incentives for companies that give preference to regional suppliers, including in rural areas, such as rural credit programs that benefit low-carbon agriculture together and with sustainable strategies.
- Support the local economy and foster investments to generate and distribute value throughout the entire production chain, contributing to the development of the local economy and the relationship with the community.
- Structure the supply and demand of green goods and services through investments in research and development, subsidies or exemptions, or even changes in regulatory frameworks.
4.4 Biodiversity and Forests

Current Scenario
The most important step taken until now for biodiversity (variability of living organisms from all sources) protection has been the adoption of the Convention on Biological Diversity (CBD) at the 1992 UN Rio Conference. This convention has been undergoing changes and improvements over the past two decades, generating obligations for governments and society to protect species and ecosystems. Brazil is home to the greatest biodiversity on the planet, having more than 20% of all species and it is the largest of the 17 megadiverse countries of the world.

As a megadiverse country, Brazil is particularly responsible for meeting international and national biodiversity protection targets. Targets, standards and public policies derived from the CBD are already fully in force in Brazil, under the guidance of the Ministry of the Environment and of other National Environment System agencies. Recently, with the aim of implementing the biodiversity conservation targets for 2020, approved at the 10th Meeting of the Conference of the Parties to the CBD, in Japan, the Brazilian Government promoted an initiative for the joint and participatory drafting of the Brazilian biodiversity conservation strategy. The process underwent several public consultation stages, promoting discussions with the business, academic and government sectors, as well as with civil society, traditional populations and indigenous communities. It is expected that the results of this initiative, known as “Dialogues on Biodiversity”, may in fact structure the development of an effective and strategic government plan of action.

In the domestic context, a crucial issue regarding the participation of the private sector in biodiversity conservation is the distribution of benefits arising from access to the assets of Brazilian biodiversity and traditional knowledge. Included in the Federal Government’s agenda since 2003, the reformulation of the legal framework on access to genetic resources and traditional knowledge as well as benefit-sharing still engenders heated discussions. In addition to the shortcomings of Provisional Measure No. 2,186-16, dated August 2001, the main difficulties of the sector are related to the slow administrative procedures of the Genetic Heritage Management Council (CGEN) and high operating costs.

Another essential component is the effective implementation of the National System of Conservation Units (SNUC). After nearly a decade of studies and proposals, Brazil established, on July 18, 2000, its SNUC, through Law No. 9,985/2000, regulated by the Decree No. 4,340, dated 22 August 2002, which integrates the protected areas of the three levels of government under the same guidelines for creation, implementation and management. The SNUC, by establishing a legal framework for a more consistent plan for nature conservation, has reaffirmed the commitment of Brazil to achieve the objectives of the CBD. The private sector is involved in this discussion particularly in the area of funding Conservation Units through a mechanism for environmental compensation.

In addition to the threat to ecosystems from countless human activities, the problem of biodiversity protection is worsened by climate change. The UN Convention on Climate Change recognizes the connection between climate equilibrium and biodiversity conservation, affirming the importance of avoiding dangerous changes in the climate system to allow ecosystems to adapt naturally to changes. In addition, the Convention also establishes that member countries should promote the sustainable management and conservation of forests and other terrestrial ecosystems to achieve climate equilibrium.

However, targets, rules and institutions aren’t enough. Each segment of society must take on its share of the challenge. Companies can contribute much to the protection of biodiversity and there are numerous initiatives in Brazil and in the world today for this purpose.

Actions envisaged here for the next decades will enable everyone to contribute to meeting national and international targets, comply with agreements to protect biodiversity and to find ways to ensure that ecosystem services will continue to be provided adequately.
Vision for 2050

The Brazilian market is strong in environmental assets

During the last decades several actions have been implemented in Brazil by public and private actors to eliminate deforestation and biodiversity losses as well as to promote the conservation of ecosystems and the fair and equitable sharing of benefits arising from access to genetic resources. Furthermore, states have met the targets set out in their state Plans for Prevention and Control of Deforestation and the National Biodiversity Program (PRONABIO) has been implemented.

Through investments in education and research, the value of biodiversity is recognized and widely disseminated in Brazilian society. With an ingrained culture of sustainability, civil society, the private sector, the government and academia formulate efficient public policies that contribute to equilibrium between rural and urban environments, preserving biodiversity and ecosystem services.

Green technologies and knowledge are shared and systems are set up for efficient production that ensure the conservation of relevant ecosystems. Brazil is a global benchmark on building inclusive economies to conserve biodiversity. Traditional knowledge in the use of biodiversity is acknowledged and compensation mechanisms related to this knowledge are established for traditional communities and indigenous peoples.

Implementation of the REDD mechanism (Reducing Emissions from Deforestation and Forest Degradation) has enabled the conservation of natural areas, created opportunities for executing actions to fight deforestation and ensured ecosystem services vital for farming.

Through a continuous process of education, communication and dissemination of biodiversity knowledge and values, increasingly more investments are made in research in green and innovative technologies, creating new opportunities for green jobs.

Governance mechanisms have led to a low-carbon scenario, which in turn resulted in effective deforestation reduction, social benefits, biodiversity conservation and respect for the rights of indigenous peoples, family farmers and traditional communities.

Companies recognize and incorporate biodiversity conservation and ecosystem services to their businesses. Furthermore, companies pay for ecosystem services such as water protection, biodiversity conservation, and carbon, among others. Companies incorporate in their procurement and hiring decisions criteria related to the protection of biodiversity and improving the lives of populations with traditional knowledge associated to the use of biodiversity.

Brazil has reduced illegal deforestation to zero. Brazilian biomes are protected and recovered according to their relevance to biodiversity and ecosystem services. Overfishing and ocean pollution were eliminated and recovery and conservation of marine and coastal ecosystems promoted.

Conservation Units created in the federal, state and municipal systems were implemented and a continuous sustainable management process is in place, with the participation of relevant actors in the area. The protected areas system is ecologically representative, inter-connected and of great importance for the preservation of biodiversity and ecosystem services.

Actions

By 2020

- Include guidelines for biodiversity protection in company policies that should be reflected in their planning and management processes.
- Incorporate the sustainable use of natural renewable resources as a primary requirement in corporate management processes.
- Identify, evaluate and monitor the environmental impacts of the actions of companies on biodiversity.
- Incorporate requirements related to biodiversity protection in the design of processes, products and services.
- Incorporate sustainability and biodiversity issues in companies’ innovation processes.
- Contribute to the conservation of residual ecosystems in companies’ areas of action and in other areas of
relevant importance.
- Support, develop, maintain and monitor projects for biodiversity recovery and protection.
- Support public and private Conservation Units.
- Contribute to the definition and regulation of public policies regarding payment for ecosystem services.
- Value environmental assets through a combination of public and market regulation, sharing responsibilities.
- Support public policies and market mechanisms to encourage businesses that favor biodiversity conservation.
- Require suppliers to comply with policies for sustainable use of natural resources and biodiversity protection.
- Insert criteria that ensure biodiversity protection in public procurement processes.
- Establish formal systems for recognizing best practices and initiatives for biodiversity protection.
- Promote awareness and guidance for consumers about sustainable use products and services aimed at biodiversity conservation.
- Recognize the intrinsic value and importance of biodiversity and ecosystem services as part of the production chains.
- Widespread communication and dissemination of the results related to biodiversity and ecosystem services, including valuation.
- Publicize actions on the sustainable use of natural resources and biodiversity protection.
- Contribute to the body of knowledge on biodiversity.
- Contribute to the construction of assessment scenarios for environmental impacts on biodiversity.
- Contribute to the construction of assessment scenarios for climate change impacts on biodiversity.
- Promote the fair and equitable distribution of the benefits arising from the use of biodiversity resources and, where applicable, take into account the traditional knowledge on the use of biodiversity.
- Contribute to the establishment of a plan of action to achieve the biodiversity targets proposed during COP 10.
- Contribute to the collection and dissemination of knowledge and to raising the awareness of the population on issues related to biodiversity and ecosystem services.

**2020 – 2050**
- Incorporate the principles and objectives of the Convention on Biological Diversity in the strategic planning of companies.
- Incorporate the protection of biodiversity as an aspect that adds value to the business.
- Ensure an integrated production chain, within the context of closed loops, according to the cradle-to-cradle methodology.
- Ensure the fair and equitable distribution of benefits arising from the use of biodiversity resources, taking into account traditional knowledge.
- Define strategy for action based on an integrated vision of the area and taking into account the various stakeholders.
- Incorporate biodiversity as a strategic business issue.
4.5 Farming

**Current Scenario**
The farming industry and agribusiness together make up one of the most complex and dynamic segments of the Brazilian economy. In 2008, the sector had 5.2 million establishments, responsible for 33% of jobs, 36% of exports and 27% of GDP. There are small, medium and large producers as well as different production models. Agricultural modernization of the 70s and 80s was directed to the large landowners in the South, Southeast and Midwest regions of Brazil and to the monoculture of exportable products, such as soybean and sugar cane.

The current Brazilian agrarian-exporter model is characterized by highly specialized technological standards, based on an economy of scale and low cost of land. The Brazilian agribusiness can be highly competitive on the international arena and Brazil is becoming one of the major exporters of fibers and food.

Modernization contributed to greater food production, reducing the rates of food insecurity. Despite this reduction in all regions of the country, approximately half of households in the North and Northeast Region still grapple with insecurity. The logistics of food distribution is a problem that needs solving. Close to 44% of what is planted is lost in production, distribution and sales. A further 20% of losses occur in cooking and eating habits, making for a total loss of 64% along the entire chain.

If, on the one hand, modernization of agriculture resulted in productivity gains and intensification of land use, on the other hand, the expansion of specialized and mechanized monoculture systems transformed the landscape and resulted in impacts on the environment and social structures. An example of this is the deforestation of areas with natural cover, leading to the devastation of forests and native fields, less biodiversity, loss of genetic resources widely found in forests, and, consequently, to climate change. According to Embrapa, global warming may compromise food production, leading to losses of R$ 7.4 billion in 2020, and may reach R$ 14 billion in 2070.

In 2010, the Brazilian Government created the Low-Carbon Agriculture Program (ABC) to assist farmers in the use of more sustainable techniques for reducing greenhouse gas emissions. In addition to providing financial resources, the program provides for actions, targets and results to be implemented by 2020, namely: (a) no-till agriculture into straw; (b) recovery of degraded areas; (c) integration of crop-livestock-forest; (d) planting of tropical forests; (e) biological fixation of nitrogen; and (f) treatment of animal waste. Implementation of these actions will be essential for achieving the emission reduction targets for greenhouse gases.

The agricultural sector consumes 73% of drinking water, while 21% go to industry and only 6% goes to domestic consumption. There is great inefficiency in the use of water in agriculture. Estimates indicated that about 60% of the water supplied to the sector is wasted. There is much room for improvement in this area because the existing policies to promote water efficiency are still incipient.

Historically, agriculture in Brazil is very dependent on the intensive use of fertilizers and pesticides. The use of these products can bring negative externalities to the environment and human health. As an alternative to the use of pesticides, some industry sectors advocate the introduction of genetically modified organisms, because they feel that they are more productive and resistant, and thus reduce the use of pesticides and contribute to alleviating world hunger. However, their use is still very controversial.

From a social perspective, family farming has proven to be an important domestic supplier of food. The 2006 IBGE Agricultural Census found that 84.4% of Brazilian establishments are described as family farms, although this represents only 24.3% of the area occupied by agriculture in the country. However, the productivity of large, small and medium rural landowners is asymmetric. Insertion in the market or in the development process depends on technology and political-institutional conditions, represented by access to credit, organized information, marketing channels, transport, and energy, among others.
These factors are currently limiting the development of family farming.

The government has encouraged this type of agriculture through the Family Agriculture Harvest Plan. The resources provided by this plan meet the costing, investment and marketing guidelines of the National Program for Strengthening Family Agriculture (Pronaf). This program has credit lines with lower interest rates for individuals or groups engaged in agriculture. Furthermore, in September 2011 an agreement was signed between the Federal Government and the Brazilian Supermarkets Association (ABRAS) to increase the access of family farming products to retail.

Structural and assistance policies are still required specifically to address the major problems of regional and income inequalities. The agrarian structure must be revised through an effective agrarian reform program together with a program for land tenure credit and technical assistance. Policies directed at family farming should encourage its gradual insertion in diversified and segmented markets for products of specific regions, emphasizing tradition and culture (denomination of origin), organic agriculture and agroecology.

**Vision for 2050**

**The goal of zero waste is attained**
There is significant poverty reduction, in addition to profound changes in eating habits, expanding and reconfiguring the agricultural market. In this way, social and environmental issues become increasingly important to agriculture and agribusiness.

Global warming and the scarcity or irregularity of water supply are issues that have been incorporated to the planning of farming production. Farming has an essential role in the reduction of greenhouse gas emissions, be it for the production of biofuels and reforestation or be it for the technological innovations, such as the no-till system, enabling the sale of carbon credits and driving national development.

The new agricultural model is inclusive and rural workers are appreciated and adequately paid. The rural population values the countryside and uses and disseminates traditional knowledge in agricultural production. Young people remain in the countryside, since farmers have the technical skill to exercise the economic activity. They have access to innovations and can implement them through public and private credit lines with low interest rates.

The growth of family farming results in distribution of wealth and regional development, through the decentralization of production and job generation. With the distribution of wealth in a fair and balanced way and with greater food production, everyone has access to adequate food. Crops are diversified and the variety of foods produced in the country increases.

Urban agriculture becomes a reality through cooperative systems. The consumer market buys socially responsible products, and with reduced environmental impacts, paying a fair price for them, incorporating in their costs the negative externalities generated. The use of natural resources is streamlined, with greater balance in the use of water resources, maintenance of soil nutrients, lower emission of greenhouse gases and generation of carbon stocks.

Production units internalize management of natural and human capital and execute it in a planned and participatory way (zoning), regulated by effective and feasible legislation. Production, inventory, distribution and storage receive new arrangements.

Foods based on animal products are developed with high technology and respect for animal welfare. Consumers only buy what they use and do not generate waste. The adoption of new production techniques allows the supply of agricultural products to be enough to meet demand, without occupying new areas and with greater water efficiency.

Agrochemicals and genetic modification of plants are employed rationally. Agribusiness is known for its technological innovation, promoting productivity increase with the use of smaller land areas.

The food industry and farmers work together to use wastes as raw material
and to generate energy whenever possible.

The State implements measures for the planned occupation of the national territory, such as participatory ecological-economic zoning, based on the potential of each region, in terms of its biodiversity and local ecosystem services, providing sustainable development.

**Actions**

**By 2020**

- Solve the issue of land tenure in Brazil collaboratively with all relevant actors.
- Prioritize and encourage rural extension and technical assistance as a way of reducing poverty, increasing food production and reducing environmental degradation.
- Establish policies and practices to support the implementation of systems for Payment for Environmental Services (PES).
- Expedite the implementation of the Rural Environmental Register (CAR).
- Strengthen and expand agrarian reform programs as a fundamental policy for sustainable rural development in Brazil.
- Create new national indicators related to the new sustainable agricultural model (carbon management, water footprint, biodiversity, soil conservation).
- Prioritize investments in innovation, technology and logistics, aiming to increase the country’s agricultural competitiveness.
- Encourage innovation for micro and small enterprises.
- Ensure technical and financial support to comply with regulatory frameworks.
- Promote public awareness initiatives on the importance of sustainable production models for the farming sector.
- Increase food production without increasing planted area.
- Promote the recovery of degraded areas to maintain environmental services (especially in Areas of Permanent Protection (APP) and Legal Reserves (RL) with predominant use of native species).
- Promote the ideas of the ABC Plan in farming: adopt agropasture, agrosilvipasture and no-till systems, while reducing the use of fertilizers, avoiding new deforestation and increasing carbon capture from the atmosphere and soil recovery.
- Focus on the following agricultural activities: recovery of degraded pastures; agriculture-livestock-forest integration and agroforestry systems; no-till systems; biological nitrogen fixation (BNF); planted forests; treatment of animal waste; adaptation to climate change.
- Implement policies and measures to protect animal welfare in livestock chains.
- Broaden and strengthen economic instruments to promote sustainable agricultural activities.
- Promote mechanisms for qualification and/or certification of sustainable production activities and their products.
- Broaden and strengthen opportunities for dialogue among the stakeholders of value chains for sustainable production.
- Eliminate child and slave-like labor in farming.
- Improve public monitoring and information systems for legal compliance of farming businesses.
- Improve and harmonize institutional and legal frameworks for socio-environmental aspects and streamline bureaucratic procedures.
- Eliminate financing, production, use, distribution and consumption of products originating in illegal deforestation areas.
- Promote participatory processes in genetic improvement programs.
- Promote sustainable fishing and aquaculture.
- Promote associations and cooperatives as a way of generating income, work and sustainable development.
- Manage farming irrigation systems sustainably to ensure multiple uses of water.
- Protect and recover watersheds and water resources to ensure sustainable farming.
- Ensure the reduction of solid wastes and control and reduction of air pollution in farming.
Pathway to 2050

2020 – 2050

- Maintain biodiversity conservation and the ecological functions of native ecosystems in tune with food production.
- Expand and foster payment for environmental services.
- Structure sustainable production chains.
- Enhance appreciation and revitalize existing ethnological sciences in the area of farming.
- Implement industrial symbiosis in the food supply chain.
- Develop and improve the technology for generating energy from farming wastes.
4.6 Energy and Power

**Cenário atual**
Brazil’s energy supply mix is among the ones with the highest percentage of generation from renewable sources. According to the 2011 National Energy Balance, 45% of Brazil’s mix is composed of renewable sources, while the world mix only has 13% of renewables. The country is also a leader in bioenergy, particularly in producing ethanol from sugarcane. It is expected that in the 2019/2020 harvest, production of ethanol should double in comparison to 2008/2009.

The National Agroenergy Plan for 2006-2011 aims to ensure competitiveness of the industry through incentives for research and innovation. According to the plan, Brazil could lead the bioenergy market, expanding production areas without reducing the areas intended for food production.

Today, the largest consumers of energy in Brazil, including oil, are industry and the transport sector. Oil production increased by 17.5% from 2009 to 2010. Industry is still a major consumer of coke, coal, LPG and natural gas. Brazil is a major exporter of raw materials and semi-finished products, which are energy intensive products.

As to electricity, generation from renewable sources corresponds to more than 80% of all power generation, a large share coming from hydropower.

**Figure 6: Energy sources in 2011**

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Brazil</th>
<th>World</th>
<th>OECD Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Renewable</td>
<td>54</td>
<td>87.1</td>
<td>93.3</td>
</tr>
<tr>
<td>Renewable</td>
<td>46</td>
<td>12.9</td>
<td>6.7</td>
</tr>
</tbody>
</table>

Source: ANEEL, 2011.

**Figure 7: Composition of electrical energy mix in Brazil in 2011**

- Hydropower: 71.74%
- Nuclear: 11.15%
- Gas: 6.11%
- Coal: 6.96%
- Oil: 1.79%
- Wind: 1.42%
- Biomass: 0.82%
- Solar: <0.01%

Source: ANEEL, 2011.

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<sup>10</sup>National Energy Balance, 2011.

According to the Ten-year Energy Expansion Plan, Brazilian demand for energy in the next ten years will grow by about 5% a year, higher than the average world growth projected by UNEP. The Brazilian region with the largest increase in demand for energy will be the Northern region, whose economy and population have grown steadily in recent years. The Southeast region should maintain its high energy demand, and it is also responsible for a large share of the consumption of domestic energy supply.

According to the Energy Research Corporation (EPE), the trend for the next 20 years is an increase from 2.6% to 4.4% a year in energy demand, depending on the scenario. The total energy intensity of GDP, in all scenarios, shows marked increase until 2020 - which may be explained by the current bottlenecks that some industrial sectors are experiencing, something that should be reversed in the ten subsequent years (Figure 9).

**Figure 8:** Expectation of power demand in electrical subsystems

<table>
<thead>
<tr>
<th>Year</th>
<th>Subsystem</th>
<th>SIN (National Interconnected System)</th>
<th>Isolated Systems</th>
<th>Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>North</td>
<td>Northeast</td>
<td>Southeast/Midwest</td>
<td>South</td>
</tr>
<tr>
<td>2011</td>
<td>31,058</td>
<td>62,876</td>
<td>266,154</td>
<td>74,259</td>
</tr>
<tr>
<td>2015</td>
<td>46,780</td>
<td>76,466</td>
<td>317,967</td>
<td>86,653</td>
</tr>
<tr>
<td>2020</td>
<td>68,837</td>
<td>96,814</td>
<td>385,447</td>
<td>105,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Period</td>
<td>Variation (% p. a.) *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010-2015</td>
<td>10.7</td>
<td>5.2</td>
<td>4.6</td>
<td>4.1</td>
</tr>
<tr>
<td>2015-2020</td>
<td>8.0</td>
<td>4.8</td>
<td>3.9</td>
<td>4.0</td>
</tr>
<tr>
<td>2010-2020</td>
<td>9.3</td>
<td>5.0</td>
<td>4.3</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Note: Taking into account the Tucurui-Macapá Manaus transmission line, which becomes operational in January 2013.

Source: Ten-year Energy Expansion Plan

**Figure 9:** Change in total energy intensity of GDP

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1 Ten-year Energy Expansion Plan, 2011
Until 2020, the Ten-year Plan projects a significant increase in the final consumption of natural gas and ethanol and a reduction in the consumption of oil byproducts and charcoal (Figure 10). In terms of the installed capacity, however, it foresees a decrease of almost 8 percentage points in hydropower generation (67% of the total in 2020), superseded by a large increase in wind energy (6 percentage points, 6.7% of the total, or almost 15 times more than the installed total in 2010) and fuel oil (3 percentage points, 5.1% of the total).

Also significant is the recent discovery and exploration of the oil layer located under a layer of salt situated a few kilometers below the sea bed. The pre-salt layer (as the layer is known) is estimated to contain the equivalent of about 1.75 trillion cubic meters of gas and oil, more than five times the country’s current reserves. This oil is expected to be mostly exported, contributing significantly to the inflow of financial resources in Brazil.

Vision 2050

Brazil consolidates a low-carbon economy and invests in technologies for innovative power generation and energy efficiency

Even with the increasing demand for energy due to population and economic growth in Brazil and the increased dependence on fossil fuels, the country is still a global leader in the use of renewable energy sources, such as hydro, biomass and wind. This has been possible through the consolidation of public policies to encourage and promote alternative and renewable energy sources and energy efficiency, which together with high private and public investments in R&D led to sustainable solutions for electricity and for the industrial and transports sectors, the largest energy consumers in the country.

Due to the investments in technology to deploy smart grids and the expansion of the distribution network, energy monitoring and distribution have become more efficient, almost eliminating the losses recorded in the early twenty-first century.

Brazilian energy efficiency programs contributed to a reduction of 25.7% in the industrial sector’s energy consumption. Investments in all these actions have been part of the government’s strategic planning together with the private sector and civil society.

This allowed Brazil to be one of the countries with the fewest GHG emissions per energy production and use, helping it achieve the reduction targets of the National Climate Change Policy of 39%. With private sector investments and national regulations in 2050, Brazil implements all the necessary actions to reduce up to 60% of global GHG emissions, in comparison

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**Figure 10**: Change in final energy consumption by source

**Source**: Ten-year Energy Plan

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1 Potencial de redução de consumo do setor industrial, de acordo com o Programa Nacional de Eficiência Energética.
to the business-as-usual growth since 2005.

The Brazilian population is aware of the issues related to energy consumption and remains politicized; demanding political and educational actions to keep the Brazilian energy mix an example for the world. Consequently, all existing legislation on energy production, distribution and consumption is clear-cut, and meets the interests of all stakeholders.

Investments in technology to implement and expand smart grids and distribution networks increased the efficiency of monitoring and the extent of energy distribution. Efficient energy production and demand play vital roles, enhanced by the increased efficiency of conversion and conservation and by supporting social and infrastructure needs.

**Actions**

**By 2020**

- Invest in R&D to implement energy efficiency, especially in distribution systems, for renewables and carbon sequestration.
- Encourage efficient public policies and planning to encourage and reduce costs for renewables, smart grids and co-generation.
- Develop strategic environmental assessment of the energy sector for more efficient environmental licensing of individual projects.
- Establish grants and tax incentives for the construction of wind farms, biomass production, small hydropower plants and other renewable sources of power generation, complementing the current hydropower-based mix.
- Increase the competitiveness of Brazilian industry towards a low-carbon economy with high added value, by reducing tariffs on industrial consumption of energy.
- Establish public-private partnerships to exploit the potential for production of biofuels, especially second-generation ethanol and solid biomass.
- Encourage integrated strategic planning and communication of the public and private sectors for sustainable energy production and consumption.
- Educate and raise awareness of the population about energy consumption, through environmental labeling.
- Establish an investment plan for the foreign currency received from the pre-salt oil, to bolster the transition to a green economy.
- Encourage the sales of hybrid vehicles, by reducing tariffs such as vehicle tax (IPVA), federal VAT (IPI) and others.

**2020 – 2050**

- Implement energy efficiency technologies, with emphasis on smart grids.
- Encourage and provide information for actions to drive the demand for energy efficiency gains.
- Focus on the demand for efficiency and in the associated behavioral changes.
- Encourage projects to generate energy from wastes and sewage.
- Invest in operation and logistics projects for the public and private sector to implement new transport modes with fewer GHG emissions.
- Invest in R&D to generate electrical energy using technologies such as fuel cells (gas, alcohol and hydrogen) and photovoltaic arrays.
- Invest in projects for the geological, biological and industrial sequestration of carbon from the pre-salt layer and other fossil sources.
- Develop and implement policies to reduce the cost of renewable energies.
- Stimulate the emissions market at the federal level and homogenize state climate change efforts.
4.7 Buildings and Built Environments

Current Scenario
In 2010, the construction industry accounted for 15.5% of the Brazilian GDP, employing more than 2.6 million people. In 2011, the sector registered a growth of 4.8% over the previous year and, according to the Brazilian Chamber of the Construction Industry (CBIC), this trend should continue in 2012. This growth stems mainly from investments of multinational companies, stimulated by Brazil's financial stability.

The civil construction sector is also one of the largest consumers of energy and natural resources. Its production chain is responsible for 75% of the extraction of these resources, especially water, minerals and timber, generating about 50% of municipal solid wastes. The figures for wasted materials are high, and may reach 40%, according to some estimates. Labor productivity is considered low and the sector registers one of the highest numbers of undocumented workers: almost 50% of construction workers are in this situation. Most Brazilian constructions use artisanal techniques, with inefficient tools and methods and employ labor that is practically unqualified. The exception occurs in large-scale commercial enterprises, mainly in the state capitals.

At the other end of the chain, according to the Brazilian Association for Recycling of Construction and Demolition Wastes (ABRECON), Brazil wastes R$ 8 billion by not recycling construction and demolition wastes.

The government already implements programs to evaluate and promote performance improvements in civil construction, such as the Brazilian Program for Habitat Quality and Productivity (PBQP-H), whose goal is to organize the civil construction sector to improve the quality of the habitat and modernize production. PBQP-H, however, does not consider sustainability criteria. With this in mind, the Blue House seal of the Caixa Econômica Federal (a government-owned financial institution) was created to provide guidelines for housing projects and it classifies initiatives in accordance with qualitative and quantitative socio-environmental indicators. The Blue House seal intends to encourage the sound use of natural resources and timber with verified legal origin in the construction of housing projects, to reduce the cost of building maintenance and the monthly expenses of its users, as well as to promote awareness of entrepreneurs and residents about the benefits of more sustainable practices in the construction and use of buildings. Furthermore, the Caixa Econômica Federal provides financial incentives for solar water heating systems and the required individual water and gas metering in buildings. According to Ministry of Cities data, in 2009 more than R$ 47 billion were financed, corresponding to 71% of the entire real estate credit, benefiting some 897 thousand families.

Other government actions contribute to income and job generation, such as the second Growth Acceleration Program (PAC 2) and Minha Casa, Minha Vida (social housing program), which will receive annual investments of R$ 137 billion by 2014. It is expected that 2.8 million new jobs will be created in this period. Industry is doing its part, in tune with the government’s social priorities. A promising initiative, which should be expanded in the coming decades, is qualification of the workforce, both for basic tasks and for the technological innovations that are emerging, increasing the participation of women in this market.

Actions at the construction site
The last National Survey of Sampled Households (PNAD), carried out by the Brazilian Geography and Statistics Institute (IBGE), reveals that there are 6.9 million workers in civil construction, of which 192.5 thousand, or 2.9%, are women. The Brazilian Chamber of the Construction Industry (CBIC), in partnership with SESI (Industrial Social Services) and SINDUSCON (Construction Industry Union), is promoting training in several states to increase the share of women in the workforce in the sector, through a program called Flores no Canteiro.
Certifications have played a key role in fostering the development of more sustainable buildings. The growing demand for sustainability standards for buildings is a global trend, no different in Brazil. In the United States, the use of sustainability standards for new government buildings is mandatory. In Brazil, several certification standards are already in use, such as AQUA and LEED. The AQUA certification (High Environmental Quality) takes into account the specific features of Brazil to draw up performance criteria for the environmental quality of the building and the requirements for the management system of the enterprise. Participation in the LEED system, which evaluates the environmental performance of buildings, has grown in Brazil, as has the PROCEL EDIFICA seal, whose use has been expanding in major Brazilian cities.

Brazil still faces the challenge of dealing with the solid wastes from construction and demolition. CONAMA Resolution No. 307 was approved for this purpose in 2002, regulating activities related to civil construction wastes and defining the Integrated Plan for Civil Construction Waste Management as an instrument to address a scenario of constant degradation, the result of inadequate management of these wastes.

To make sustainable construction a reality throughout the country, changes are required in the current scenario, based on planning with a systemic view. Investments in research and development are essential for the technological transformation of the civil construction chain. Some initiatives to improve its performance are being headed by SINDUSCON and CBIC, in partnership with government and civil society organizations, such as the launching in 2011 of the Sustainable Construction Program, which establishes a plan of action for the sector. The Federal Government also started a process to promote these initiatives through sustainable bidding, launching the *Esplanada Sustentável* program.

**Vision 2050**

**The level of wastes in civil construction is close to zero**

The National Housing Policy, approved in 2004 oversees the housing situation, and identifies the main problems and distortions of the institutional and financial model and recommends strategies to change the scenario, with results expected in the next few years of government. Building standards meet the needs of society, at the same time that they contribute to improving the built environment and the environmental performance of buildings.

All have access to quality housing, no matter the social class. There is no informal labor, illiteracy rate is zero.

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**PROCEL EDIFICA**

The National Program for Energy Efficiency in Buildings (PROCEL EDIFICA) was established in 2003 by ELETROBRAS/PROCEL in a participatory way by the government and other relevant actors of civil society. The program expands PROCEL actions, which promotes the rational use of electrical energy in buildings since its foundation, under Eletrobrás, in 1985. In 1991, PROCEL was transformed into a government program. PROCEL EDIFICA operates through training, technology, dissemination, regulation, housing and energy efficiency, and planning. PROCEL data from 2011 indicate that the program has led to savings of 1.56% of electricity consumption in the country, corresponding to 6.696 billion kWh, avoiding the release of 196 thousand tCO2e into the atmosphere.

Electrical energy consumption in buildings corresponds to about 45% of billed consumption in the country. The potential for consumption reduction is estimated at 50% for new buildings and 30% for those that undergo reforms to include the concepts of energy efficiency in buildings.
and women have equal participation in the workforce all over Brazil. Education is a cross-cutting issue present in all the links of the civil construction chain. The workforce is highly qualified, undergoing constant training to recycle and update its knowledge.

Certifications have been adapted with specific solutions related to climate and location of each enterprise. Building technologies have advanced to ensure greater efficiency, comfort and safety at the construction site and in the use of buildings. The number of accidents is almost zero and all workers are properly trained and equipped.

Buildings are integrated to the landscape and the urban environment, are accessible to pedestrians and connected to urban transport systems. From the project design to its implementation and use, buildings are guided by sustainability criteria: architectural solutions are compatible with the climate of each region of Brazil and are designed to save energy and contribute to the reduction of GHG emissions. Planning of the built environment and urban infrastructure takes into consideration the socioeconomic aspect, respects the environment and promotes quality of life for its inhabitants.

The sector has advanced much with the support of information and communication technologies. There are new materials and technologies to reduce the impact of buildings: smart materials for thermal control with minimal power consumption, optimized natural lighting and efficient artificial lighting contribute to achieving zero energy balance in large buildings.

New construction methods reduce waste generation. Lighter materials and smarter construction methods contribute to reducing the need for physical effort, speeding up the construction process. Waste is practically non-existent, with the reuse and recycling of inert wastes, and the increased durability of materials and equipment thanks to the standardization of construction and production methods. This scenario requires a new generation of workforce with greater intellectual capacity than physical force, because new materials and equipment make the work less heavy, but more complex.
Technical solutions are used for the construction of new buildings with low energy consumption. Studies on improvements in energy efficiency are advanced, and among the main topics discussed are: solar control (analysis of correct position of the building in relation to the sun’s path), thermal inertia (heat retention and release capacity of construction materials), natural lighting, permeability and green areas.

Clean energies improve the energy performance of the building industry. Electricity is generated with clean and renewable sources, such as solar (photovoltaic and thermal), wind power, hydropower (SHP), biomass, geothermal, wave and biogas.

Water is treated as a valuable resource and there is no waste. New measures for efficient water consumption, both during the construction process and throughout the useful life of buildings take into account responsible consumption. The use of individual metering systems is widespread in existing buildings and mandatory for new buildings.

The National Housing Policy is revised and adapted to the specific needs of different regions. Cities have master plans for management of mobility, solid wastes and neighborhoods, which are implemented with the support of private sector and civil society, and are periodically reviewed in participatory and decentralized processes.

In sustainable cities, socially degraded or abandoned areas are recovered. The historical, artistic, architectural, urban, environmental and cultural heritage is protected by the government, preserved in partnership with the private sector and civil society, and respected by all.

**Actions**

**By 2020**

- Reassess building methods to seek means of reducing waste production throughout the entire construction life cycle.
- Encourage research and promote the use of sustainable materials and products in the construction industry.
- Ensure verification of the legal origin of raw materials.
- Disseminate alternative technologies such as making use of natural lighting, external shading, natural ventilation, solar water heating, use of high-performance glass, use of rainwater and water reuse.
- Implement individual water metering in new buildings and when existing buildings are reformed.
- Ensure tax incentives and subsidies for investment in energy efficiency in buildings.
- Participate in and promote the integration of interested parties in the decentralized management of buildings and communal areas.

**2020 – 2050**

- Promote the integration, collective vision and shared responsibility among stakeholders, making the construction production chain more sustainable.
- Ensure individualized water metering in all buildings.
- Promote the awareness of businesses and the general public on the construction and use of buildings to ensure their better performance and lower environmental impact.
- Adopt tools such as Life Cycle Analysis (LCA), energy audits and others, to promote efficiency in the use of inputs.
- Consolidate certifications with a focus on sustainable construction adapted to the Brazilian reality.
- Support, regulate and consolidate the production chain, guided by ethics and transparency.
4.8 Mobility

Current Scenario
Population growth and the intensification of urbanization, added to the lack of urban planning and increased consumption of vehicles, have generated enormous challenges for mobility and accessibility in urban centers. The issue is complex because it involves a wide range of needs and aspirations of society, uses many forms of energy, on a massive scale, in the various existing transport modes, and consumes large quantity of public and private resources.

Today, 85% of the Brazilian population lives in cities. Most of the displacements in Brazilian municipalities are done on foot (37.5%), not by choice, but rather by the lack of public transport or resources of the low-income population. Travel by individual motorized transport in Brazil represents 30.4% of all displacements and are higher than travel by public transportation. Furthermore, public transportation tariffs in large Brazilian cities, such as São Paulo, are among the highest in the world, with an average increase of 60% since 1995.

Historically, the model of urbanization in Brazilian cities favored individual transport (car) and reversing this model is not simple. Mostly, public transportation is inefficient and lacks resources for investment in structured, high-capacity (trains and subways) and average capacity (various types of buses) systems. Measures to restrict the movement of cars are also lacking. In some cities, like São Paulo, mobility has reached a critical situation due to the excessive number of cars on the streets, inefficiency of public transportation and the lack of integrated and adequate planning.

The world already has some 1 billion vehicles, approximately one for every seven inhabitants, and Brazil has 70 million cars. In 1970, the 62 thousand motorcycles registered in the country represented only 2.4% of all motorized vehicles, but in 2010, they became 16.5 million units, representing 25.5% of motorized vehicles. Transport systems cause great damage to health and are the main source of air pollution, noise and vibration in urban regions. Their use causes traffic accidents that result in some 1.2 million deaths every year in the world and another 20 million serious injuries. Accidents make Brazil the fifth country with the most deaths from traffic accidents, according to the World Health Organization.

Air pollution and traffic are joint risk factors for heart attacks, and the infinite congestion in the city generates hours of lost work, affecting productivity.

Urban sustainable mobility must be sought, guided by some of these principles: universal access; fair distribution of benefits and burdens of the use of different modes and services; safe displacement of people; equal access of citizens to public transport and efficiency; equal access in the use of public circulation area, such as paths and streets; efficiency and effectiveness in the provision of urban transport services; sustainable development of cities; and transparency and social participation in the planning, control and evaluation of the policy.

The National Urban Mobility Policy is expected to be enacted in 2012, and it is then hoped that it will be possible to expand the horizons of alternatives to the chaotic state of mobility in the country. The Law encourages public, collective and nonmotorized transportation, as opposed to individual, private and motorized, in addition to promoting incentives to ensure cost-free or affordable transport services.

Some of the responses seen in municipal public policies associating the challenge of transport to the problem of climate change are being tested, as is the case in the city of São Paulo - one of the first in Brazil to join ICLEI’s campaign Cities for Climate Protection and to adopt a law on climate change and establish a committee for climate change, with the participation of government and society representatives.

The Ministry of Cities suggests that it will invest substantially in urban mobility in the next decade. The PAC Mobilidade Grandes Cidades (Large Cities Mobility PAC), for example, has R$ 18 billion set aside to implement public transport systems, promote the inter-modal integration of the various modes of transport and integrate mobility with urban development. For the 2014 World
Cup, particularly through the Cup PAC, the twelve host cities are the target of major investments in public transport infrastructure. Nevertheless, sustainability must be inserted at the core of these projects.

**Emissions and transport**

Motorized transportation consumes approximately 25% of the global energy demand, mainly in the form of oil-based fuels, and contributes an equal percentage to GHG emissions.

In Brazil, in 2005, the transport sector was responsible for 43% of the energy sector CO₂ emissions and 8.1% of the country’s total emissions, resulting in the emission of 133,431 GgCO₂, 92% of which comes from road transport. CO₂ emissions from road transport grew by 72.1% between 1990 and 2005.

In the transport sector, the main GHG emitter, with respect to the size of the vehicle population, is the automotive vehicle for individual use. Cars emit carbon dioxide (CO₂), a powerful greenhouse gas, sulfur dioxide, nitrous oxide and particulate matter into the atmosphere, contributing to several environmental and public health problems, in addition to climate change. The transport sector’s intensive consumption of non-renewable energy is one of the main causes of its significant contribution to climate change. Energy is used primarily to transport passengers and cargo.

Another significant cause of GHG emissions from this sector is the road-based model of production distribution and cargo and passenger transport. Inspired by the North American system, the model implemented in Brazil, a legacy of President Washington Luiz, induced the use of cars and access to them. Brazil’s development was based on the construction of highways, which encouraged the growth of the automobile industry, shaped cities, generated metropolises and opened roads throughout Brazil.

GHG emissions from automotive vehicles are made even worse by the increase in urban traffic. Chronic bottlenecks and mobility and accessibility problems are also factors that enhance the potential for GHG emissions. Planners, urban planners and environmental scientists believe provision of public transport to be the best solution for congestion, and which would also lead to a reduction of emissions of gas pollutants both locally and globally.

The lines of action for mitigating GHG emissions in the transport sector can be grouped into four areas: (a) Decreased use of fossil fuels and broad adoption of biofuels or other renewables in a very substantial number of vehicles; (b) Rationalization and modal change: reduce emissions by rationalizing and moving to less polluting transport modes and increasing the efficiency of existing systems; (c) Technological improvement: increasing the efficiency of vehicles’ energy consumption and GHG emissions; and (d) Demand management: reducing total mileage traveled by vehicles through better control and planning of activities.

Roads transport more than 60% of cargo in Brazil. The road network has 1.7 million kilometers of roads, to the detriment of railways, which only have 30 thousand kilometers. The structure of water transport is limited to 38 ports and a network with a potential commercial navigability of 55 thousand kilometers, although only 15 thousand kilometers are in use. This national transport structure is responsible for the territorial design (also of cities), resulting in problems such as the occupation and expansion of the margins of Brazilian highways and deforestation and fragmentation of ecosystems.

The National Logistics and Transportation Plan intends to respond to this problem by expanding the share of river transport from 13% in 2005 to 29% by 2025; and more than half (51%) of the total investments in logistics and transport in Brazil will be directed to rail transport and 25%, for road transport. In the second phase of the Growth Acceleration Program (PAC2), there are plans to expand the road and rail network by 2014, fostering multi-modal integration with ports, waterways and airports.
Vision 2050

Safe and low impact mobility for all
Brazilian cities provide access to safe and low impact mobility for all, increasing social and economic activities. Transport volume more than doubles in number of passengers per kilometer and in tonnes of cargo, and the country has an interconnected transport system among the various modes, prioritizing public and nonmotorized transport.

The systemic management of mobility involves all key actors and drastically reduces the number of deaths from transport and the negative environmental and health impacts. Greenhouse gas emissions are drastically reduced. Efficiency of vehicles improves and individual and public modes of transportation make use of advanced technologies such as electric vehicles and alternative and renewable fuels, such as sustainable biofuels, hydrogen, and low-carbon sources.

Greenhouse gas emissions are drastically reduced. Efficiency of vehicles improves and individual and public modes of transportation make use of advanced technologies such as electric vehicles and alternative and renewable fuels, such as sustainable biofuels, hydrogen, and low-carbon sources.

Municipalities install programs for vehicle inspection and maintenance for all vehicles, including motorcycles.

Limits and targets are set for progressive emissions reduction of municipal transport systems; monitoring of greenhouse gas emissions is promoted.

Policies to accelerate research, development and deployment of clean and smart transport technologies grow. Close cooperation between decision makers, planners and industries improves the smart transport infrastructure.

Organizations now incorporate mobility in their socio-environmental responsibility and have plans for sustainable corporate mobility for supplier displacements and for distribution, in addition to ensuring easy access for their employees. Demand management systems for transports are installed in the main office areas of major cities.

Traffic management mechanisms are implemented: planning and deployment of exclusive lanes for vehicles, with occupancy rates equal to or greater than 2 (two) passengers; programs and incentives for sharing rides, car pools and telecommuting; and reordering of private and public schedules and activity periods.

The interconnection of the various regions of the country with the road network and the broad development of railways and waterways increase their connectivity. The cost of cargo transport decreases, increasing the mobility of cargoes and expanding possibilities for trade. These measures have reduced dependence on the road system, making roads more suited to the traffic.

Less polluting transport modes are available that connect all the regions and major cities of the country more...
rapidly and affordably. All of this new urban mobility and interregional transport structure in Brazil contributes to improved health and quality of life of the population, and to significant reductions of the effects of global warming.

**Actions**

**By 2020**

- Develop and implement urban planning integrated with territorial zoning in the larger municipalities, especially those undergoing rapid growth.
- Adapt the road infrastructure for pedestrians and cyclists to ensure their safety.
- Define investments and planning in infrastructure for low-cost mass transport and in low-carbon technologies for the various transport modes.
- Encourage business strategies for improving energy efficiency in transport, aiming at solutions to improve performance of the chain and optimize operational logistics.
- Structure and ensure the legacy of the 2014 World Cup and the 2016 Olympics for urban mobility.

- Implement transport and urban mobility policies to contribute to the National Climate Change Policy.
- Plan technical investments for implementing restricted zones and charging for externalities for private motorized vehicles.
- Adopt and adapt international standards for sustainable biofuels and monitoring systems.

**2020 – 2050**

- Develop integrated systemic territorial planning in Brazil, having sustainable mobility as a guiding principle of the management of public space.
- Establish an integrated multi-modal network with railways, waterways and highways, with the aim of reducing GHG emissions.
- Improve energy efficiency of transports through systemic approaches along the entire value chain of the production process.
- Prepare public-private planning to accelerate research and implementation of alternative technologies and advanced biofuels.

- Formalize and implement integrated urban development policies for decentralization of commercial areas and creation of compact cities.
4.9 Materials and Wastes

Current Scenario
The generation, collection and final disposal of Municipal Solid Wastes (MSW) in Brazil are uneven and inadequate as shown by ABRELPE’S Panorama of Solid Wastes in Brazil. In 2010, there was an increase of almost 7% in the generation of MSW when compared to the previous year (for a total of 378 kg per inhabitants/year) and, more than 6 million tonnes of these are no longer collected (10%). The Southeast region generates more than half (53%) of the total MSW in Brazil, such that each inhabitant of this region generates per day, on average, 1.2 kg of garbage. The major problem, however, lies with the final disposal of these wastes. The study shows that more than 40% of all the garbage generated is not disposed of properly; rather, it is dumped in controlled landfills or dumps (Figure 12).

As to recycling, Brazil shows few positive signs. In spite of the country being a forerunner in aluminum recycling, with an impressive 98% of all aluminum being recycled, other important materials with high potential for recycling and with good cost-effectiveness, such as certain types of plastic, paper and glass, which barely cross the 50% line (Figure 13). The National Solid Wastes Policy (PNRS) was enacted in 2011 to change this scenario. The PNRS, through its plan, regulated and changed the way the government, businesses and citizens must address waste management and contribute to their appropriate disposal. Today, recycling must be prioritized and wastes must return to the production chain as inputs. Non-recyclable material should be sent to sanitary landfills or burned to generate energy. Dumps must be eliminated within the period established in law, within the possibilities and characteristics of each region and municipality.

Furthermore, differentiated and integrated solid waste management is mandatory, to ensure that as many valuable materials as possible can be

Figure 12: Final disposal of MSW

Source: ABRELPE.

Figure 14: System for Integrated and Differentiated Management of Urban Solid Wastes
recovered before being discarded as waste, so that the area required for landfills is reduced, collection and final disposal systems are rationalized, and, finally, social (the new situation of the former “scavengers”), economic (the opportunities generated in processing) and environmental benefits (fewer wastes and subsequently fewer emissions) are forthcoming (Figure 14).

**Figure 13:** Proportion of recycled material in selected industrial activities

![Graph showing proportion of recycled material](image)

Source: ABRELPE

**Figure 14:** System for Integrated and Differentiated Management of Urban Solid Wastes

- Compost
- Agriculture
- Wood
- Energy
- Distribution
- Industry
- Sanitary landfill
- Rejects
- Construction debris recycling unit
- Building components
- Civil construction
- Lata de alumínio
- Papel
- Vidro
- Latas de aço
- PET
- Longa vida

Source: ABRELPE
Speaking of consumers, one of the main examples of how PNRS affects the day-to-day of citizens is the discussion on the use of plastic carrier bags in supermarkets. Even today, it is common to hear opposing views regarding the fact that plastic bags will no longer be part of the Brazilian reality. This could mean the increase in the use of returnable bags made from various materials or disposable bags made from biodegradable plastic. Whatever the solution found by the entrepreneur and/or by the Brazilian citizen, the population already has a new perspective of wastes and their impact on cities. Partnerships between the private sector and the government were essential to encourage the consumer to reduce the waste from disposable bags.

Another fundamental point of PNRS deals with reverse logistics, which assigns part of the responsibility for the disposal of product wastes to manufacturers and traders. The State of São Paulo, for example, recently adopted Resolution SMA No. 038, dated 2 August 2011, establishing that manufacturers and importers of products listed in sections I and II of Article 1 must submit to the Environment Secretariat of the State of São Paulo a proposal for establishing a post-consumption responsibility program, with a set of actions, procedures and means to enable the collection and return of solid wastes to the corporate sector, for reuse in its own or other manufacturing cycles, or to another environmentally sound final destination.

### Vision for 2050

**Materials are part of a virtuous circle, from cradle to cradle**

The educational system is geared towards the awareness of the common good and the collective well-being, and consumers are aware and responsible from a socio-environmental perspective. They seek to maximize the positive impacts on the environment and society and minimize negative ones as they make their decisions regarding purchase, use and disposal of products and services.

Waste management in Brazil has become more efficient, integrated and sustainable, even in large urban centers. The entire population has access to goods and services that generate well-being and waste reduction. 100% of all materials have proper final destination and most are recycled. Public policies, together with education for sustainability, conscientious consumption and technological innovations have made for a more sustainable society.

Life Cycle Analysis (LCA) has become one of the main instruments in companies’ decision making on the introduction of products into the market. Consumers use this instrument to assess and decide on a product. Environmental labeling is widely disseminated and used, and is incorporated into the evaluation of products and services and in communications between suppliers and consumers.

Companies are responsible for their products and wastes, generating lower negative impact and greater positive impact on their surroundings, society and the environment. Technologies are advanced in both manufacturing and project design. Companies produce better, using fewer resources

### Action with society to reduce the use of plastic carrier bags

In 2008, the Instituto Socioambiental Plastivida, in partnership with the Brazilian Supermarket Association (ABRAS), began a campaign to reduce waste from plastic carrier bags. The “Program for Quality and Responsible Consumption of Plastic Bags” focused on the education of consumers at the same time as it ensured an adequate thickness of the bags to avoid double bagging.

In 2010, ABRAS also signed a Sectoral Pact with the Ministry of the Environment, in which it committed to undertake actions to reduce by 30% the distribution of plastic bags in stores by 2013 and by 40% by 2015.

The sectors involved understand that wastage of resources is not useful to anyone and nor does it contribute to the quality of life on our planet.
and avoiding waste. Reverse logistics are fully established.

Companies are prepared to meet the change in consumer profile. Structural factors, such as the aging population, greater appreciation for quality of life, consumption pressures from children and increased purchasing power of low-income classes are responsible for the inflow of new consumers who are increasingly demanding and responsible from a socio-environmental perspective.

Companies, worried about the longevity of their business, are sensitive to the perceptions of customers about the sustainability of the company and its products. Transparency is part of the corporate values and culture. Companies consolidate themselves into ethical brands in a new low-carbon economy, with gains in reputation and image. This qualification is given by the consumer market as a result of the social and environmental impacts of the production process and the use and disposal of products associated to the brand.

**Actions**

**By 2020**
- Implement integrated solid waste management.
- Stop the use of all dumps and provide for their correct disposal.
- Optimize the packaging process.
- Reduce manufacturing wastes.
- Reduce emissions throughout the production process.
- Increase the use of recycled materials.
- Use products that can be repaired, extending their useful life.
- Buy and use materials in a conscientious manner, exchanging disposable products for lasting products, or material products by virtual ones.

**2020 – 2050**
- Opt for the re-use of products and materials recycling.
- Consolidate the Life Cycle Analysis and reverse logistics of products.
- Increasingly implement reverse logistics, training employees and the production chain to join the process.
- Value and invest in basic and complementary education to contribute to raising the awareness of consumers.
- Promote and implement innovations in ecodesign.
- Organize society and create channels to monitor government actions and initiatives.
- Create more ethical and transparent communications between businesses and consumers.
- Expand research to better use materials, including recyclables.
- Develop closed cycle practices and products that do not have negative impacts.
- Significantly reduce the use of sanitary landfills.
5 Threats and risks
Global climate change affects everyone and it is the main environmental threat that human societies face this century. Its more significant impacts already occur in Brazil, to a greater or lesser degree, in cities, in forests and in coastal and rural areas, affecting biodiversity, water resources, agricultural productivity and the health of population. Climate change also affects the private sector, in so far as economic and production activities are heavily dependent on natural resources.

Brazil has already achieved a special position in the international community when it committed to voluntary targets for GHG emissions reductions. Meanwhile, it must expand its actions in the area of climate change to go beyond the concern for deforestation reduction. Measures to encourage the inclusion of renewable sources in the Brazilian energy mix must be enhanced and strengthened in the coming decades. The accelerated increase of the price of electricity is another important challenge to be overcome: the electricity tariff in Brazil is one of the highest in the world.

In addition to mitigating climate change with preventive actions, the government’s performance in adaptation must also be improved. Strengthen civil defense, create mechanisms to improve the resilience of cities, and implement adaptation measures together with mitigation measures, are all required to respond properly to these challenges.

Biodiversity is seriously endangered by activities such as felling of forests, forest fires, predatory and illegal hunting, overfishing, destruction of coral reefs, contamination of mangroves and marine environments, illegal housing developments in environmental protection areas, contamination of soil and rivers, lack of treatment of solid wastes and effluents, biopiracy, among others.

The Amazon is one of the biomes likely to reach the so-called tipping point - the condition of irreversible degradation -, even with the recent reduction in the rates of loss of forest area and with the plan to reduce deforestation. The UN warns that if the Amazon loses 20% of its original cover, in 2025 certain parts of the forest will enter into a cycle of disappearance, made worse by climate change, deforestation and forest fires, among others. The ensuing economic losses were not calculated, and perhaps can only be estimated when it is too late.

With respect to the pre-salt oil and natural gas, Brazil will have to administer their extraction to reduce the risk of accidents and contamination, as well as their use in industry. Thus, Brazil may be able reduce its dependence on these fuel sources, investing in innovation and technology, including in renewables, mainly wind and solar energy, and discussing with society, in a transparent way, about the use of these resources in the development of the country. The efficient and careful management of natural resources - renewable and non-renewable - will be the key to balance the development of the country and to prevent repeating the mistakes of the past.

Another important risk refers to temporality: changing behaviors involving all the strata and sectors of society is not a trivial task and perhaps it will not be possible to achieve these changes in time to prevent the worst consequences. Nevertheless, postponing the decision on concrete measures is not an option.

From an external point of view, the macroeconomic scenario will define policies and paths beyond Brazil’s reach. However, a firm position of the country and the production sector in favor of sustainability will be crucial to lead the change and demonstrate to the governments of the world that the society is really prepared. At an international level, regulation and a system of sustainability criteria for production that can be applied globally are still absent. The institutional and legal reference framework for foreign trade is still fragile and uneven, allowing, for example, that products from countries with little - or no - concern for sustainability in the production chain are preferred because they are cheaper.

Costs related to the legalization, technological innovation and the
meeting of more restrictive socio-environmental rules are reflected in Brazilian products and, when compared to suppliers from other countries without this type of concern, they lose competitiveness even domestically. In order to address these risks, Brazil should employ more efforts in multilateral negotiations, as in the World Trade Organization, and propose pacts that take into account these criteria. The various sectors must come together to discuss strategies and actions, in order to ensure a coordinated position in both economic and political international forums.

Domestically, the risks are wide-ranging from cultural and economic issues - lack of knowledge about sustainability, increasing the purchasing power of low-income population without preparation for sustainable consumption and lack of financial education of the general population - to the political issues based on dubious interests. Although Brazil has one of the most advanced environmental legislations of the world and government programs and actions with legitimate concerns and good results, adequate dissemination, clarity and oversight are still lacking.

Combating corruption has high priority in the agenda for Brazil's sustainable development. This practice endangers democracy and economic health in Brazil as it displaces resources that should be invested in improving the living conditions of Brazilians and in mechanisms and structures for greater productivity and competitiveness in the international market. Social control and improved public management associated to greater transparency of public acts are essential instruments to combat this threat.

Another risk refers to land tenure issues. The solution to these problems and the implementation of agrarian reform are crucial to ensure social justice, sustainable rural development and increase of production with quality.

The installation of suitable economic instruments through public policies to ensure sustainable production is a basic condition for the competitiveness of Brazilian products and services in the global market. Without this, the production sector and consumers would bear the high cost of transition to a green economy alone, impeding its achievement.

A risk factor common to several sectors refers to the logistical difficulties throughout the entire country, due to lack of infrastructure, investments and technical capacity. Greater efficiency should be sought in the transportation sector by modal integration. A mix with a greater share of rail and water transport (river and coastal shipping) is essential, because of its lower energy consumption and reduced logistic costs and delays.

An economic environment and an institutional framework that promote sustainable business in Brazil depend on a balanced geo-economic context, domestically and globally, in addition to carrying out important structural reforms, such as the political, tax and social security reforms, among others. The business sector and other segments of society have demanded these reforms for a very long time and, although a review of national policies has begun, little progress has been made in this direction in recent decades. Necessary vigorous measures are still pending at the beginning of the twenty-first century.

The lack of investments and incentives in the production sector outside agribusiness, mining and the automotive industry, the focus on exporting commodities and the bureaucracy are threats to the development of a healthy business environment in Brazil. Government and private sector will have to pursue long-term joint solutions to address and overcome these obstacles.

Another obstacle to sustainable development is the low qualification of the workforce in Brazil, because of persistent educational deficits, over several generations. However, if society joins in an integrated project for formal and informal education to combat poverty, functional illiteracy and the lack of qualified human resources in large cities, it will be possible to reduce this gap.

Finally, it is safe to say that, with the exception of unforeseeable risks and threats, such as wars, nuclear accidents, natural disasters, global
climate change and irreversible loss of biodiversity, the risks of implementing this sustainability vision for Brazil by 2050 are many, but almost all can be managed within this time frame. The technological and financial means exist and are affordable, but a joint effort of society will be required, with accountability and the commitment of each relevant actor, for this transformation to occur in the day-to-day and continuously.
6 Oportunidades
New business opportunities in Brazil in 2050

**Education**
- Mainstreaming environmental education
- Capacity building for and creation of green jobs
- Assign value to natural resources and ecosystem services
- Higher education courses for personnel
- Assign value to cultural diversity and Brazilian biodiversity
- Sustainable consumption

**Sustainable cities**
- Strategic planning
- Investment in quality of life
- Infrastructure and sanitation
- Renewable energy
- Infrastructure for sustainable and public modes transport
- Biofuels

**Industries**
- Sustainability certifications
- Creation of new products
- Life Cycle Assessment of products (LCA)
- Technological innovation
- Energy efficiency
- Ecoefficiency
- Green jobs
- Projects for reduction and compensation of GHG emissions

**Ecosystem services and biodiversity**
- Payment for ecosystem services
- Income generation through the valuation of natural resources
- Development of tools for valuation of ecosystem services and biodiversity
- Research and development
- Carbon market for REDD+
- Strengthening of cooperatives
- Valuation of standing forests

**Agroindustry**
- Organic products
- LCA
- Strengthening the small farmer
- Technological innovation
- Biofuels and Bioenergy

**New economy**
- Use of new development indicators
- Creation of environments to implement projects and trade carbon credits
- Micro-credit to foster inclusive businesses
- Valuation of ecosystem services and biodiversity
- Promotion of social inclusive businesses
- Criteria for funding
- Funds for socio-environmental projects
Brazil is a country rich in natural resources, energy, water and minerals, and has become one of the largest economic powerhouses of the day. The Brazilian economy, led by agriculture and livestock, by mining and the automotive industries, is under expansion, and poverty rates are in decline. In recent years, the country has achieved growth of its Gross Domestic Product and the benefits of this growth are being felt throughout the country. The increased purchasing power of Brazilians is attracting more investments and new businesses to meet the demand for goods and services, especially that of the new middle class. This trend, however, must be based on the principles that guide the green economy.

The progress of a low-carbon and green economy in Brazil is still only seen in plans and a few actions. If this agenda comes to steer policy and Brazil’s development model, the country’s potential to become a force in the definition of new directions for the economy increases. To do so, attention must be paid to the opportunities that are knocking at the door and follow the example of today’s leaders: China, United States, Germany and Denmark, for example, are paying attention to the increase of investments in new technologies for energy generation from renewable sources.

An example in which Brazil has historically stood out has been investments in the biofuels sector. The use of biofuels must now be expanded in the Brazilian transport energy mix as must the production capacity for exports, so that the country can remain at the forefront in this area, always taking into account socio-environmental criteria in production, distribution and consumption. Brazil can expand its ethanol production and export capacity, for example, given the increasing demand in the world for this energy source.

Another transforming opportunity in the near future is the hosting of major international events, the World Cup and the Olympics. Sustainability criteria must be incorporated in their planning and execution, under pain of losing a legitimate legacy of sustainability for future generations, as have other countries that hosted these events and inherited mainly debts and all kinds of negative impacts. Government and organizers are convinced of the need to develop “green events”, which could generate learning and opportunities for new businesses that are important to the country.

Brazilian entrepreneurs are aware and are beginning to invest in businesses focused on the base of the pyramid and in social business initiatives. All over the country, entrepreneurs are exploring market-based solutions to the challenges of poverty, including access to decent housing, provision of health and information technology services, agricultural production and sustainable forestry, among others. Investments in micro-finance initiatives grow throughout the country, with the participation of strong financial agents. Social entrepreneurship also increases and many new initiatives are born to develop businesses that promote inclusive markets.

The incipient market of ecosystem services needs to be better developed and have firm regulatory bases in order to attract more investments. Brazil has been one of the largest centers of attraction of the world for this type of economic activity, given the breadth of our natural treasures and the practice of associating production with environmental recovery inherited from traditional peoples.

Brazilian universities offer numerous undergraduate and graduate courses focused on sustainability, ensuring a supply of skilled labor to be absorbed by the domestic green economy market. Brazil also invests in training college level professionals abroad.
Soon, the positive impacts of this vocational qualification will be felt in the country’s economy.

The environmental legislation requires adaptation by the production sector and consumers, with implementation of mandatory reverse logistics, waste sorting and recycling in various situations. These demands from new public policies create new business and green jobs opportunities in waste management.

The demand for certified and organic products is growing with the increase of awareness of socio-environmental issues. This creates opportunity in the area of small and micro businesses, mainly in the rural area. The country is already well structured to produce and generate the appropriate certificates, but investments for producers are wanting.

Projects in the area of climate change will be possible by the creation of markets that value carbon credits, enabling Brazilian forests to have more value when standing than felled. There will be no room for implementing businesses that are out of tune with the principles of sustainable development, for which the Brazilian population will be educated and prepared in 2050.

For this reason, Brazil itself will be seen as a great investment opportunity. It is known for its creativity and innovation in the way of doing business that will really be sustainable, with minimum risks for financial and other markets.
Conclusion and next steps
A better Brazil, guided by the values of environmental protection, equality and well-being for all.

All over the world, the idea prevails that crises create opportunities and changes, no matter how difficult, are necessary for our progress towards sustainability. At this time of global financial crises and uncertainty about the ability to cope with the impacts of climate change, with uncontrolled population growth and with millions of people living in sub-human conditions, it is possible to see in Brazil great opportunities and capacity for transformation in the next few decades.

Given these challenges, companies, together with the government and Brazilian society have a long path to travel. The process is laborious; it requires a change of values and attitudes that breaks with conservative ideals. The creation of an integrated agenda is, therefore, imperative for achieving truly sustainable development in 2050.

Companies must be structured for this new era. The transition will depend on the openness and efforts of all sectors to innovate and lead the process. The difficulty of positively analyzing the relationship between corporate economic performance and socio-environmental responsibility must be overcome. The insertion of new leadership in this process, already created under the new rationale of sustainability, can facilitate this transition.

Brazil is experiencing a time of economic growth and increase in purchasing power that has been attracting the attention of the world for some years now. Nevertheless, in its vast and diverse territory many socio-economic and environmental disparities must still be addressed. If the management decisions of the coming decades do not consider this fact, the consequences for the development of the country may be pernicious and the collapse of natural resources could lead to the collapse of society itself, as in other moments in history.

In this document numerous opportunities were identified for technological and management innovation, as well as innovative ways of doing business and strategic planning for sustainability. Also identified in the document were risks and threats that Brazil will have to address to meet the challenges on the path to achieving greater sustainable development by 2050.

Of all the identified opportunities, both in the global report and in its Brazilian version, it is clear that there are great opportunities in appreciation and valuation of biodiversity, as well as in the investment in inclusive businesses and in the production of clean energy, always taking into account the efficiency of processes. For Brazil, this is a positive perspective, given that we are responsible for the conservation of one of the most important biomes for the world’s environmental equilibrium, the Amazon, and that our economy is growing steadily, enabling the creation of new inclusive and green business models. With respect to energy, we have already consolidated methods and a huge potential for the expansion of renewables, such as wind power plants and biofuel production, two major global prospects for the coming decades. Thus, the introduction of new technologies to improve the control of consumption and efficiency may easily allow satisfying the national demand.

The production sector is crucial in this process, because today it has a series of tools that enable it to identify the relationship of its activities to social and environmental aspects, in addition to the possibility of developing business models with fewer environmental impacts and that, at the same time, bring benefits and longevity for companies. The commitment of the public sector and civil society is also crucial to combat corruption, with the installation of mechanisms for social control, transparency and access to information. Society as a whole must seek and ensure regulatory frameworks that promote and encourage private sector actions to build more sustainable and efficient cities, thus reducing the social inequality existing in the country.

The vision for Brazil in 2050 shown here intends to provide inputs for discussions and contribute to the construction of a pathway towards sustainable development, the core of discussions of all countries during the United Nations Conference in 2012, Rio + 20, and beyond.
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What is CEBDS?

The Brazilian Business Council for Sustainable Development is a non-profit national association of companies, which leads the efforts to implement sustainable development in Brazil, with effective coordination among governments and the actions of Brazilian companies. Established in 1997, CEBDS integrates the network of councils associated to the World Business Council for Sustainable Development (WBCSD).

Recognized as the corporate institution with the greatest reputation in the world, the WBCSD brings together 200 business groups, acting in all continents. Here in Brazil, CEBDS has 74 significant business groups among its associates.

The CEBDS mission is based on promoting business leadership as a catalyst for change towards a business model that enables the success of economic activity, promotes social inclusion and conserves environmental assets.

Associates (June 2012)

Abralatas
AES Brasil
Alcoa Alumínio
Allianz Seguros
Amanco do Brasil
AmBev
Amil
AngloAmerican
ArcelorMittal Brasil
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Disclaimer

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