ConstruBusiness

10th Brazilian Construction Congress

BRAZIL 2022: Planning, Building, Growing

Department of the Construction Industry - DECONCIC

FIESP

Investing in development, investing in construction.

The Civil Construction Industry has a strategic importance for economic growth and for the generation of jobs and income in Brazil. Investing in civil construction means stimulating a sector that greatly contributes to the development of our country. For this reason, the Federal Government has significantly increased its investments in housing, basic sanitation and infrastructure, so needed for the growth of our nation and essential to stimulate the construction industry. The success of programs such as the *Growth Acceleration Program – PAC* and *My Home, My Life Program*, shows that, with planning, good partnerships and continued investment effort, we can strongly improve the quality of our productive and social infrastructure.

In addition to public investment, we have created other stimuli for private investment in order to accelerate growth and make our economy more competitive. With the *Brasil Maior* Plan, we have significantly reduced costs, among which payroll related costs, making for lower labor costs without detriment to workers' rights. We have launched various special tax regimes, reduced the IPI tax (Tax on Industrialized Products) for various production segments, including construction industry inputs; furthermore, we have used public procurement systems as an instrument to boost national production. With the Logistics Investment Program, we will invest BRL 133 billion in the expansion and modernization of our railway and road network, always in partnership with the private sector. We will also invest in airports and ports to ensure to Brazil a transportation infrastructure compatible with our territorial greatness and productive diversity.

The challenges are not few, but we have the tools and the political will to address them. We also have strong and fruitful partnerships with the Brazilian industry to ensure a new level of country development and more and better opportunities for all Brazilians. In discussing proposals that contribute to overcome the major bottlenecks in the construction industry, indicating the necessary improvements to Union policies, ConstruBusiness asserts itself as an event of great importance for Brazil. Thus, we are really enthusiastic to welcome the 10th edition of this Congress, since the construction industry has all the credentials to suggest routes of sustainability and competitiveness for the Brazilian development.

Dilma Vana Rousseff
President of the Republic

Time to Make Decisions

The 10th edition of ConstruBusiness coincides with a strategic moment for the future and competitiveness of the construction industry in Brazil.

Programs announced by the Federal Government, aimed to accelerate infrastructure works through grants and partnerships with private initiative, put the entire production chain of the sector before a cycle of new opportunities and important decisions.

The country will greatly need the ability, the excellence, the greater integration and the global view of our constructors to successfully organize and execute three major world sports events: Confederations Cup, World Cup and Olympic Games. And the sector itself will need these attributes to achieve its goal of building 23 million households by 2022.

In order to meet these goals, the Brazilian construction industry will have to find solutions for bottlenecks that today compromise its competitiveness, that include the need for better qualified labor and technological resources that provide faster, more consistent and more quality implementation for their projects.

In order to advance, the sector will also need stimuli. To reduce costs and enable sustainable practices, it would be very important for the Government to adopt a differentiated tax treatment for our civil construction industry. Likewise, it would be essential to add new sources of funding to ensure the pace required for the industry's growth, and consequently, for the growth of the Brazilian economy.

And this is what the 10th Brazilian Construction Congress will be about, and its central theme could not be more appropriate: "Sustainable Competitiveness of the Production Chain of the Construction Industry – Brazil 2022: Planning, Building, Growing."

Recently raised to the rank of the world's sixth largest economy, Brazil will only keep this position in the coming years if it invests heavily in infrastructure and improves the housing conditions of the population, with greater offer, credit and appropriate buildings.

Our industry has the strength to build this future. So let's get to work!.

Paulo Skaf
President of the Federation of Industries of the State of São Paulo - FIESP

Brazil with great opportunities

The Production Chain of the Construction Industry in Brazil is on track for continued development. The prospects of the industry are very positive, with high economic relevance, since it accounts for more than 8% of GDP, i.e., of all wealth produced in Brazil.

With the inclusion of new consumers in the domestic market, "the growth of class C", we have more people on social ascension and plenty of room for sustainable growth. We have a new family dynamics, with young people constituting families, which causes strong increase in the demand for new dwellings.

Our current economic and social reality clearly shows a reduction of the inequality between social classes, strong poverty eradication, and the increase of middle class, but the housing deficit is approximately 6 million dwellings, and by 2022, bicentennial year of our republic, we will have to produce over 23 million dwellings, which means that we will need investments of BRL 250 billion, totaling in 12 years more than BRL 3 trillion. The goal for infrastructure investments by 2022 exceeds BRL 2 trillion.

Public and private resources, though increasing, are insufficient to meet all this demand, but with integrated planning between government and industry there will be investments that are essential for the sustainable growth of the country.

Fiesp represents more than 110 entities of the Production Chain of the Construction Industry, which includes projects, industrial activities, equipment, as well as maintenance of housing and infrastructure works. Our actions are aimed primarily to promote the sector. We hold the "Construbusiness", the most important congress of the industry, with the mission to propose a policy of sustainable growth in the middle- and long-term for the whole construction industry, organized with the participation of the main entities of the production chain of the construction industry and authorities of the Federal, State and Municipal governments.

The theme of the 10th Construbusiness is "sustainable competitiveness of the production chain of the construction industry", which involves presenting diagnoses and proposals for the major bottlenecks, including topics such as qualification of manpower, productivity, quality, differentiated tax treatment, new funding lines and sustainability. The greatest challenge is directly linked to the country's need to increasingly adjust to sustainability issues. To this end, the stimulus of the government maintaining economic, social and political stability should accelerate the growth and development of the construction industry and of Brazil.

José Carlos de Oliveira Lima
Vice-president of the Federation of Industries of the State of São Paulo - FIESP
President of the Superior Council of the Construction Industry - CONSIC

Sustainable Competitiveness

Making history while contributing to the development of the country, – FIESP´s Department of the Construction Industry (DECONCIC), opens the 10th edition of the Construbusiness Congress with the formulation of proposals that are fruit of the effort of managing ideas, which were conceived, discussed, reworked and consolidated by over a hundred entities represented in this department.

These proposals materialize guidelines of the segments that produce basic raw materials – mineral and industrial, finishing materials, engineering and projects – via executors of interventions in infrastructure, housing, transportation, sanitation works and many other urban requirements that the country needs so badly to leverage and sustain its development. A task force that brings together unique experiences, and formats the contents of sound proposals so that, in this beginning of the 21st century, we may contemplate the new business and development model that is based on the concept of sustained competitiveness.

In sustainable competitiveness, companies self-impose the management of economic results, of their environmental impacts and their social actions under the auspices of one and the same commitment, associated and unflagging. These actions are requested by the market and its demands, indicating a new way of doing business.

It is faced with this scenario – and the prospects of building objective solutions – that FIESP and the Production Chain of the Construction Industry dedicated themselves to uphold the conducting of studies and proposals capable of contributing to the elimination of infrastructure bottlenecks, the actual villains of sustainable growth and competitiveness. These actions gave origin to this technical guidebook, which we consider the repository of solutions gestated in the minds of those who have in-depth knowledge of our problems and our reality. It was the inspiration of the experienced men from the Construction Chain and its over one hundred entities, that enabled the construction of this new contribution which, certainly, once adopted, will represent a step ahead for the development policy of the Federal Government.

Carlos Eduardo Pedrosa Auricchio
Vice-President of the Superior Council of the Construction Industry – CONSIC
Incumbent Director of the Department of Industry and Construction – DECONCIC

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Introduction

The United Nations Organization (UNO) predicts that by 2030, because of the population growth and increase in population income, with poverty reduction, the world will have to generate 50% more food, 45% more electric power, and 30% more water[1]. Brazil, with its current economic growth, feeds this movement of increased consumption. From 2002 to 2011, 15% of households in Brazil increased their buying power, migrating from classes D and E to classes of higher income. This translates as strong pressure on the productive sector and generates the need for compensation with an increase in production.

This increase in production should be accompanied by improved logistics, infrastructure, housing, sanitation, education, healthcare and services. Quick improvements as described above cannot take place in a country that is not **competitive**, and for this growth to last, it should be **sustainable**, i.e., it should be supported on the tripod of economic prosperity, social balance and environmental quality.

Thus, the agents that shape and define the Brazilian economy, both in the public and private sectors, should obtain an answer for three major questions:

1) Is Brazil a competitive country?
2) How do the sustainability agenda and the competitiveness agenda become integrated?
3 What hinders our competitiveness and sustainability?

An interesting exercise to understand the concept of competitiveness is to follow the way of one BRL invested in production. How much of this real is lost with unnecessary delays? How much of this real is lost with transportation costs? How much of this real is paid as tax? How much of this real is wasted due to lack of qualified labor? In the end, the country that produces more with this real is the most competitive.

[1] *Inclusive Wealth Report 2012.*

This edition of Construbusiness makes an analysis of the competitiveness of the Brazilian economy based on concepts of sustainability, in order to select actions that compose the **Program Compete Brazil**, starting a positive agenda to overcome bottlenecks towards the continued growth of the Brazilian construction chain.

In recent years, Brazil has overcome major bottlenecks and today ranks as the sixth largest economy in the world. The construction chain stands out in this scenario: it represents 8% of the Brazilian GDP[2]. Each BRL 1,00 produced in construction generates BRL 1,88 in the country's production. The construction industry is responsible for 42% of the gross composition of fixed capital in Brazil. For each BRL 1 million produced in construction, 70 workers are employed. The construction industry is the country's 4th largest job generator. Between 2005 and 2010, the number of formal workers in the construction chain grew 101% (compared to the total growth of 24%). Construction pays its workers 11.7% more than other sectors of economy.

However, many points need attention so that prosperity does not have its history interrupted, and the **Program Compete Brazil** outlines six themes for the construction of a strategic agenda supported on the tripod of sustainability (economic prosperity, social balance and environmental quality):

1. Planning and Management: reduction of the risk of projects being interrupted;
2. Institutional aspects and legal security: business environment to expand investments;
3. Funding: diversity of resources for continued growth in housing and infrastructure;

[2] *Source: Estimates calculated by ABRAMAT-FGV, based on IBGE's National Accounts of 2010. Originally published in "Perfil da Cadeia Produtiva da Construção e da Indústria de Materiais e Equipamentos Ed. 2011". Note: the amounts as a percentage of the Brazilian GDP slightly differ from those published by Abramat, since the total Brazilian GDP of 2010 was reviewed by IBGE and updated by LCA.*

4. Labor: attract, train and retain;
5. Tax impacts and production costs: productive efficiency and more resources for production; and
6. Sustainability: respect for the principles of technical quality and the pursuit of productive efficiency.

The appropriate Planning of projects allows improvements starting at hiring phase, reducing the risk of interrupting works, and consequently, the cost of investments. The construction of a business environment more secure for investments increases resources, attracts investors, and also reduces costs by reducing slowness and risk perception. The various funding sources expand the possibilities of continued growth without interruption of the required flow of funds for defraying the cost involved, overcoming bottlenecks and increasing the competitiveness of Brazilian economy.

Labor qualification, with the corresponding valuation of workers, performs the role of increasing productivity and maintaining human capital in the required quantity and quality for the business of the construction chain industry in its various applications. The solution of tax distortions and tax reduction in sectors vital to the socioeconomic development, extend the range of social balance in Brazil, encouraging environmentally appropriate practices.

This extended range grants the **Program Compete Brazil** the principles of sustainability, in line with the best international practices, allowing Brazil to position itself in the international scenario as an economic power with social balance and respect for the environment: **Program Compete Brazil – Sustainable competitiveness in the construction chain**.

1. Macroeconomic Diagnosis 2012-2017

Until the early 1990s, Brazil was known in the international scene as a country with great potential, but a lot of instability. From 1969 to 1973, the country had an expressive average growth of 10% per year[3], known as the Economic Miracle. This period was interrupted by the oil shock of 1973 and, despite an attempt at recovery, a new oil shock shattered again the country's growth in 1979. The 1980s were marked by periods of strong economic slowdown, high unemployment rates and increasing inflation, reaching 82.39% per month in March 1990[4].

The reforms that began in the early 1990s changed this scenario. The monetary stability achieved with the Real Plan enabled long-term planning and Brazil started to envisage a stable future growth in a context of trade opening.

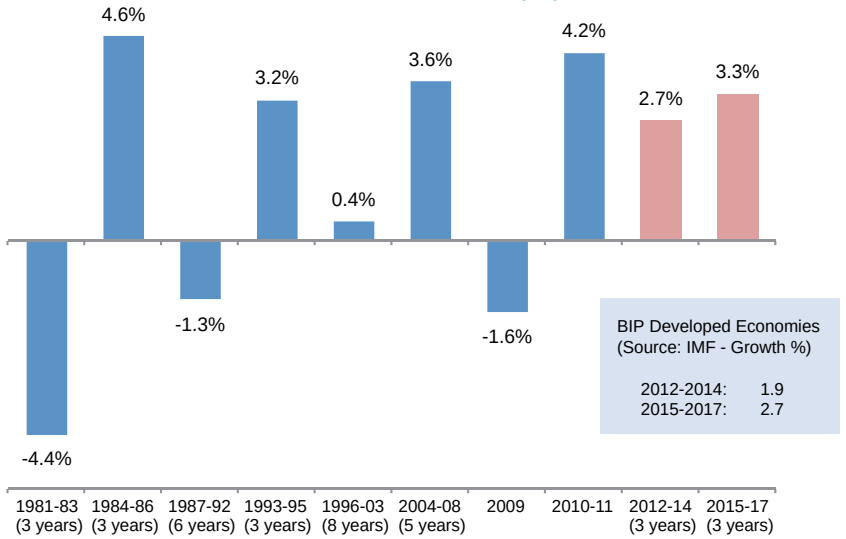
Many challenges had to be overcome in this undertaking, because the country still had a high foreign debt, which made it vulnerable to international instabilities. In the 1990s, several crises shook our economic consolidation, including two Mexican crises, the Russian crisis and the Asian crisis

In the first decade of 2000 there was great strengthening of the internal market, following the great increase in tax revenues; such factors, combined with the increase in exports and greater tax balance, allowed Brazil to significantly reduce its foreign debt, becoming less vulnerable to the instabilities of the world economy.

Thus the country reaches 2012 with a well established macroeconomic basis, envisioning a stable long-term growth with consistent improvements in the lives of all Brazilians.

Chart 1 shows the growth rates in Brazil for a 30-year period, where it can be noticed that instability has been overcome, with estimated annual growth above that of developed economies from 2012 to 2017.

Chart 1. Observed and projected GDP *per capita* – average annual variation (%).

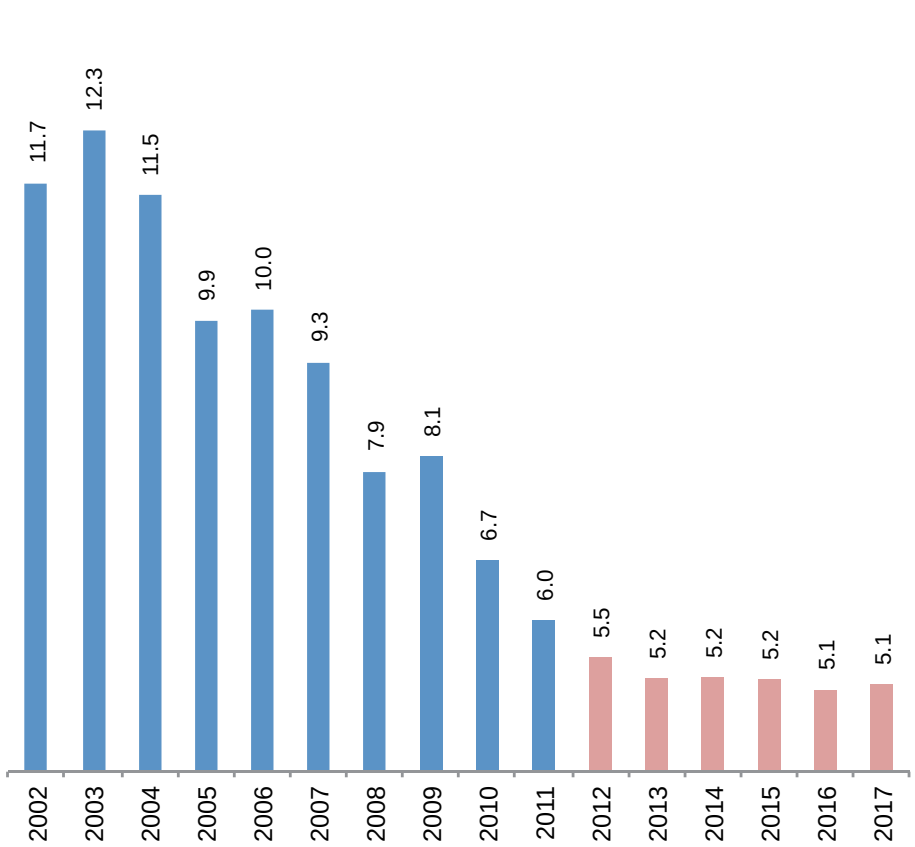


Source: LCA Projection, based on IBGE data.

[3] *Source: Brazilian Institute of Geography and Statistics (IBGE).*
[4] *Source: Central Bank of Brazil (BCB).*

Chart 2 shows the annual unemployment rate with a downward trend in the period observed, expected to stabilize around 5%.

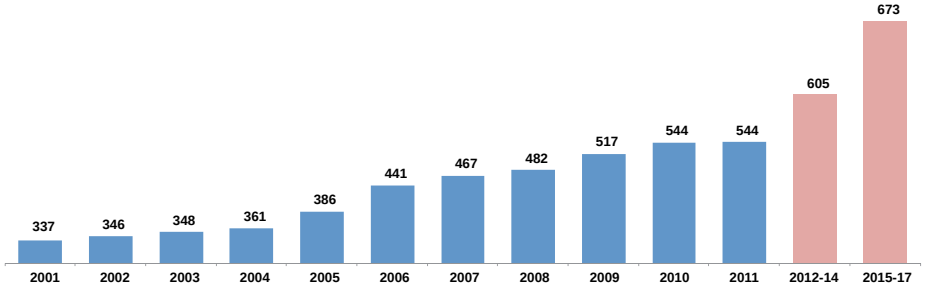
Chart 2. Observed and projected unemployment rate – annual average (%).



Source: LCA Projection, based on IBGE data.

The Minimum Wage has presented a real increase, with a growth of 61% between 2001 and 2011, and is expected to reach BRL 673,00 in 2017, as shown in Chart 3.

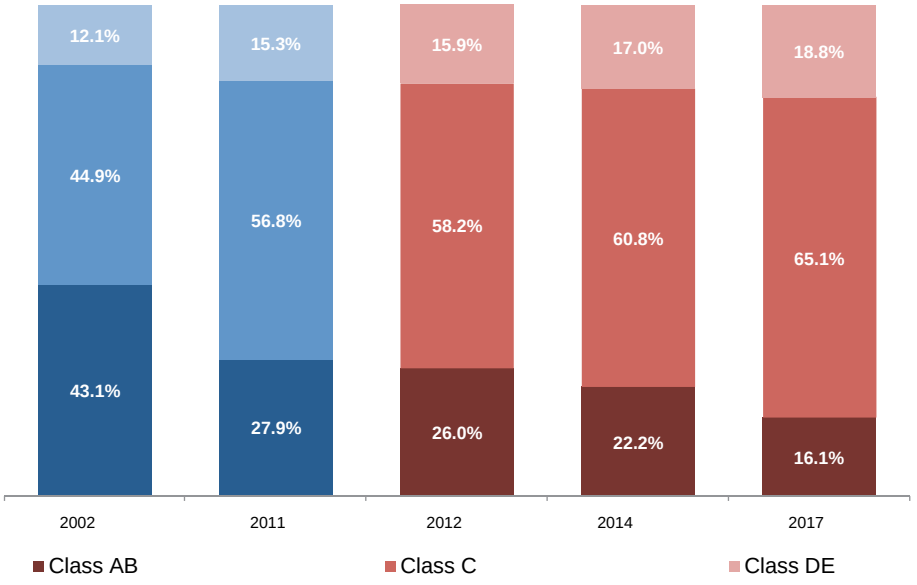
Chart 3. Minimum wage (BRL of 2011).



Source: LCA Projection, based on data from Ministry of Labor and Employment (MTE).

This enables a continuous improvement in income distribution. The main household surveys show that the average income of the population will grow at a pace faster than the GDP, contributing to the decline in income inequality. Households of class C, which represent more than half of Brazilian households, must further increase their participation in the total number of households until 2017, and households of classes D and E must reduce their participation in the total number of households, as can be seen in Chart 4.

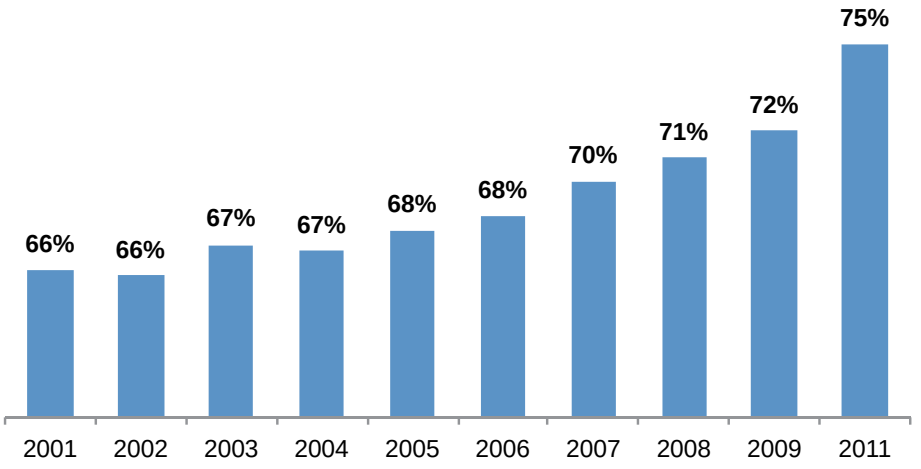
Chart 4. Distribution of households by income class.



Source: LCA Projection, based on IBGE data.

Additionally, the levels of formality have grown consistently, reaching 75% of total occupation in 2011(Chart 5).

Chart 5. Evolution of formal jobs in relation to the total number of jobs (%).



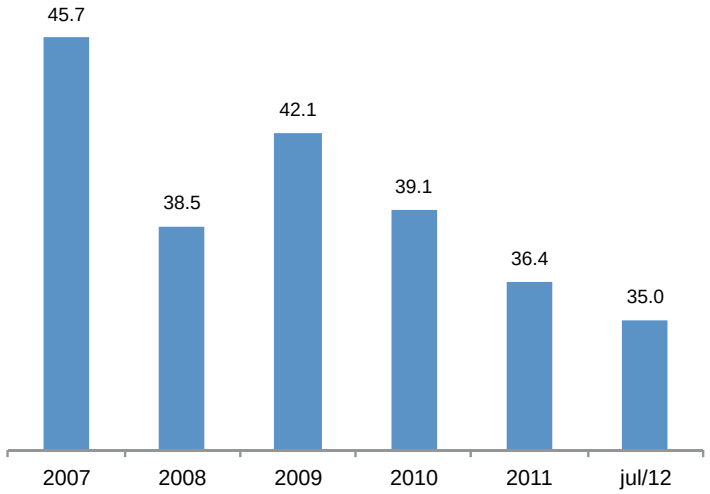
Source: LCA Projection, based on IBGE data.

The strengthening of the domestic market has been essential to maintain the expansion of the Brazilian economy in an international environment particularly negative in recent years. In fact, although the Brazilian economy is not immune to the crisis, it still shows greater resistance against the deterioration of the external scene. Post-crisis incentive policies have been considered essential for preserving the domestic labor market. These measures include, among others, reduction of Tax on Manufactured Products (IPI) of durable and capital goods and the lower payroll costs in the realm of the **Brasil Maior** plan.

It is worth noting that these actions were not taken to the detriment of

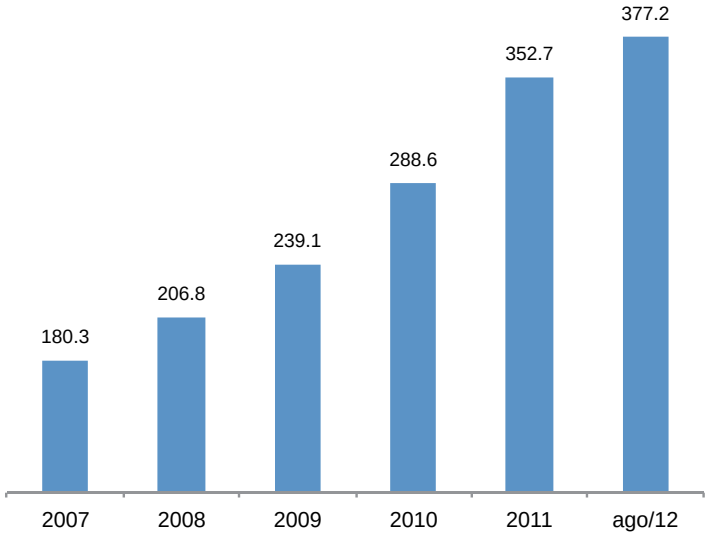
the soundness of public finances, because the net debt of the public sector continues on a downward trend accompanied by a steady increase in international reserves, as can be seen in the Charts 6 and 7.

Chart 6. Net debt of the public sector - annual average (%).



Source: LCA, based on BCB data.

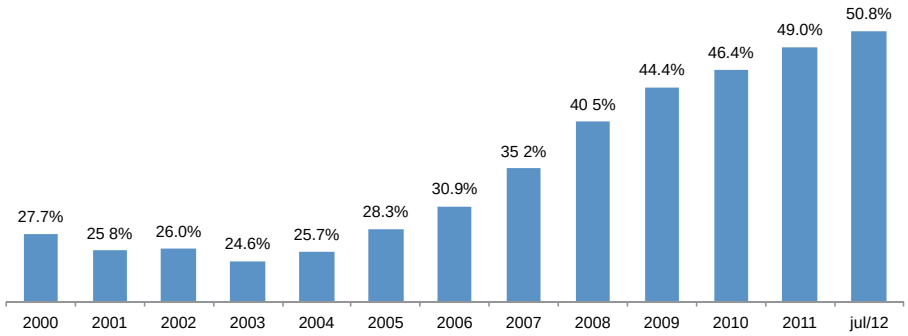
Chart 7. International reserves.



Source: LCA, based on BCB data.

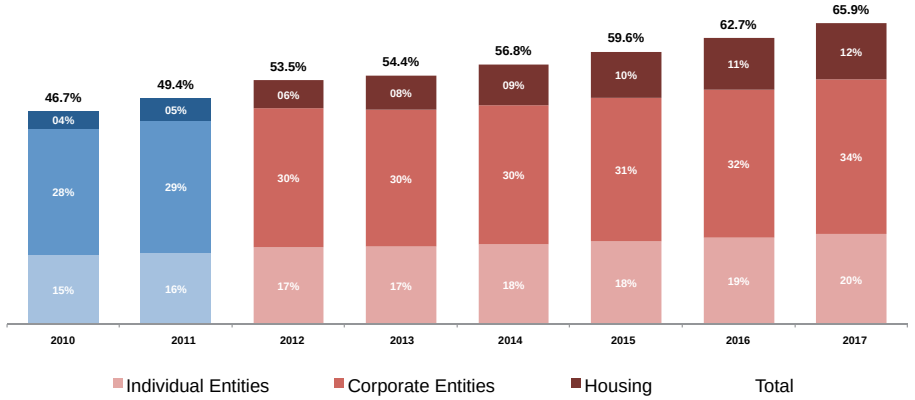
In the recent period a strong expansion of the credit market is also observed, with growth rates above the BDP. Chart 8 shows that in July 2012 the value of credit operations exceeded the equivalent to 50% of GDP.

Chart 8. Credit operations for the public and private sectors (% of GDP).



Source: LCA, based on BCB data.

Chart 9. Credit operations as a proportion of GDP: forecast 2017.

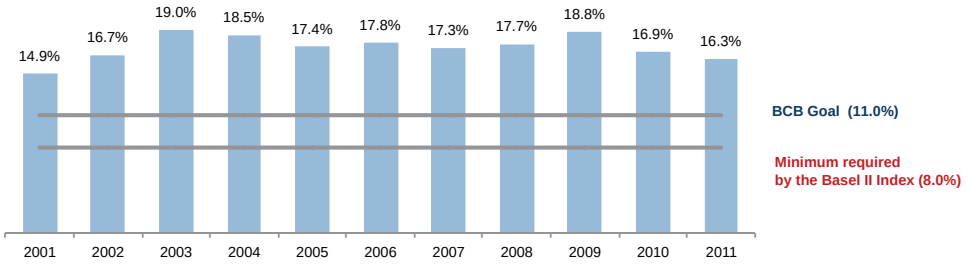


Source: LCA, based on BCB data.

This credit is expected to continue in its expansion trend, reaching the equivalent to 65.9% of GDP in 2017 (Chart 9).

This credit expansion over recent years took place in a very solid banking system. In recent years the Brazilian banks have presented a leverage limit higher than the minimum required by the Basel II Index, as shown in Chart 10.

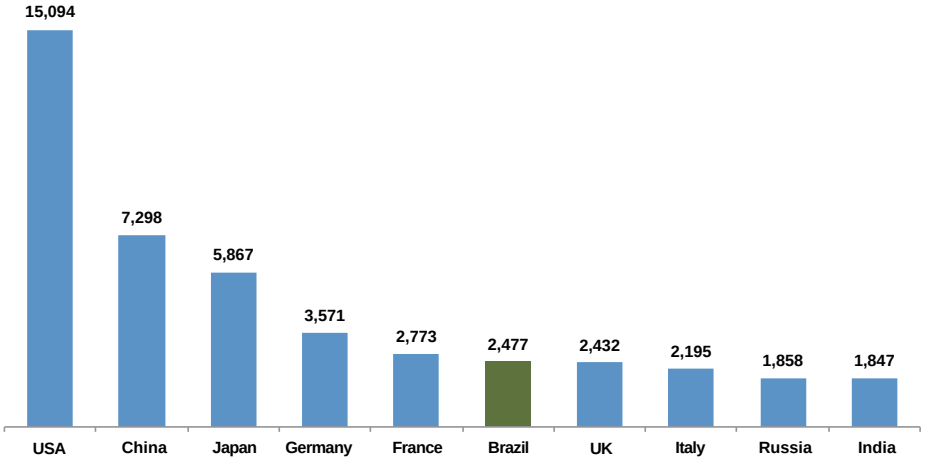
Chart 10. Basel Index of Brazilian banks – own capital as % of total loans (leverage).



Source: LCA, based on BCB data.

This combination of macroeconomic stability, strengthening of domestic market, resistance to the effects of the international crisis and soundness of the credit market has contributed for Brazil to surpass the United Kingdom in terms of GDP, becoming in 2011 the 6th largest economy in the world, as shown in Chart 11.

Chart 11. GDP of the world's 10 largest economies in US$ million, 2011.

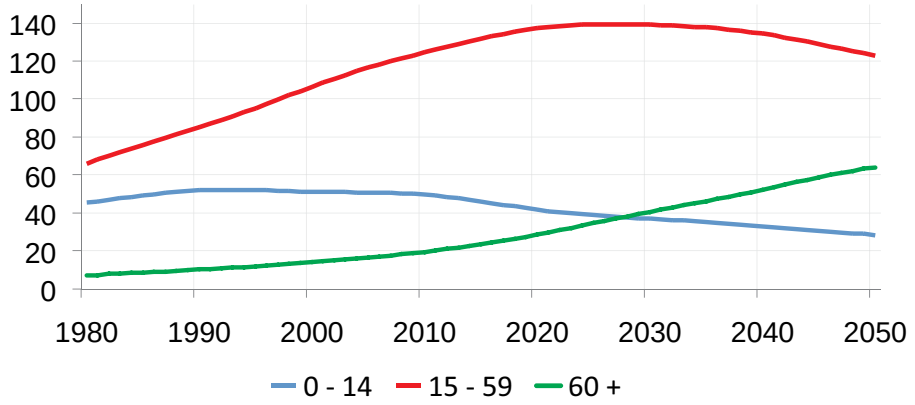


Source: LCA, based on World Bank data.

Life expectancy of Brazilians has also increased over time. This is reflected on the aging of the population, with the number of elderly people quickly growing in Brazil. At the same time, the birth rate in the country has been dropping. From 1980 to 2010, it has dropped from 32.13 to 15.2 live births per thousand inhabitants[5], so that the young population, up to 14 years of age, has decreased. These two trends are expected to intensify over the next few decades, as can be seen in Chart 12.

[5] *Source: LCA, based on IBGE data.*

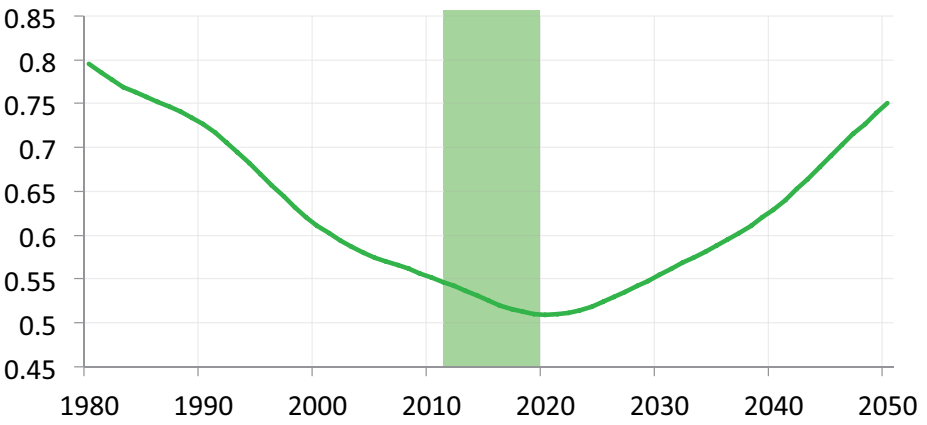
Chart 12. Evolution of population by age.



Source: LCA, based on IBGE data.

The drop in birth rates and the increase in life expectancy causes a change in the **dependency ratio**. This means that, in the future, each person of working age should be able to produce enough to sustain more people, culminating in the need to increase the productivity of workers from now, which can be achieved through the incorporation of new technologies, education, and higher professional qualification. The current opportunity window, where the dependency ratio still points to more people of working age in comparison to the number of children and elderly people, should not be wasted. Chart 13 shows the evolution of the dependency ratio, highlighting the opportunity window to improve the productivity of work in the country.

Chart 13. Evolution of dependency ratio – population aged from 0 to 14 and over 60, over the population aged between 15 and 59.



Source: LCA, based on IBGE data.

2. Construction Chain

2.1 The construction chain

The construction chain consists of heterogeneous activities that permeate various productive groups. These activities include mining clay and silicate, used especially in the coating ceramic industries, tiles, floor tiles, bathroom porcelain, roof tiles and bricks; and mining sand, gravel and limestone, used mainly in the manufacture of lime, cement, concrete, fiber cement and glass.

In addition to the manufacturing activities mentioned above, other activities are part of the **industry of materials**, such as products derived from chemicals and petrochemicals, products of ferrous and non ferrous metals, electric materials, and machinery and equipment. Part of this material is directed to **industrial systems**, while the other portion is sent to the wholesale and retail trade, responsible for directing the materials to **property construction** and **heavy construction (infrastructure)**, according to their demands. The industrial systems consist of the pre-manufacture of components of the work divided into modules, whose incorporation into the construction is carried out with a specific technique, composing **industrial construction**.

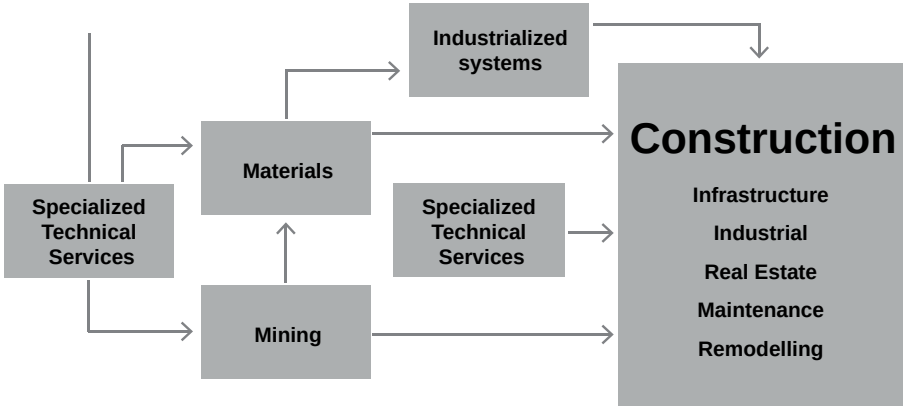
The **construction industry** then integrates with the sectors of real estate, **maintenance** and **remodeling** services. The real estate sector is responsible for selling the houses and buildings produced. The maintenance and the remodeling sectors, in turn, are responsible for expanding the life cycle of buildings. Finally, developments, demolitions and reconstructions occur that trigger again the whole construction chain.

Permeating the chain in its various stages is the need for labor at different levels, as well as specialized technical services, such as designers.

Analyzing the construction chain from the standpoint of sustainability, it is possible to establish the **specialized technical services** as the first agent in the chain, regardless of the stage of the life cycle in which the project is. The approach to sustainability requires that any activity performed in the construction chain should be preceded by comprehensive planning. The choice of the location of the project; the type, quantity and quality of the materials to be used; and the well-being of users, all of these are variables that should be considered, measured and validated before putting in motion another link of the chain. This work is done by engineers, architects, geologists, biologists, economists, among other professionals, who should work together to ensure that any initiative generates the best net effects, i.e., greatest benefit at the lowest cost and waste possible.

Still, the renewal of projects throughout the life cycle, whether through maintenance and remodeling or through development, demolition and reconstruction, also requires careful planning, so that the restart of the chain is also done through specialized technical services. The structure that emerges from these precepts, shown in Figure 1, maintains its cyclical nature, but always presents planning as a crucial element.

Figure 1. Construction chain.



Prepared by: LCA.

The following section is intended for analyzing the size and importance of the construction chain for the Brazilian economy.

2.2 Importance and performance of the construction chain

2.2.1 The importance of construction

To a greater or lesser degree all the sectors of economy require construction products: the agriculture and livestock raising sector, for example, requires warehouses; the service sector requires commercial buildings; the industrial sector requires factories, and for all of them, the existence of a quality infrastructure is essential. So **the construction sector is one of the main components of investment in the country, responsible for 42% of its gross composition of fixed capital**.

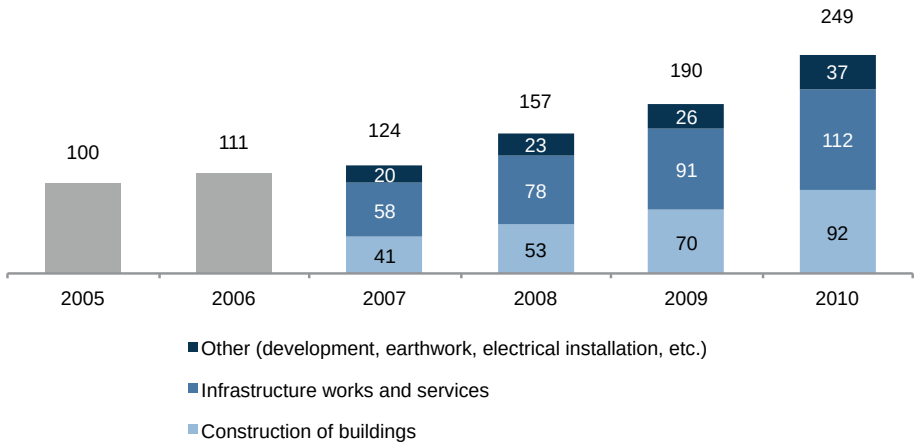
This great integration of the construction sector into the economy results in the following relationship: ´**for each BRL 1,00 produced in construction, BRL 1,88 are generated in the economy as a whole**, a value 88% higher than the original. This is a considerable multiplier, and explains the high generation of jobs triggered by this sector: **each BRL 1,00 produced in construction generates 70 jobs in the economy as a whole**[6].

2.2.2 Production and added value

The sustained advancement of Brazilian economy has boosted domestic construction in recent years, taking it to a new level of production. According to IBGE's Construction Industry Survey, the nominal value of works and services in the sector leaped from BRL 100 billion in 2005 to BRL 250 billion in 2010 – an average growth of 36% per year, as sown in Chart 14.

6 Source: LCA, based on IBGE data.

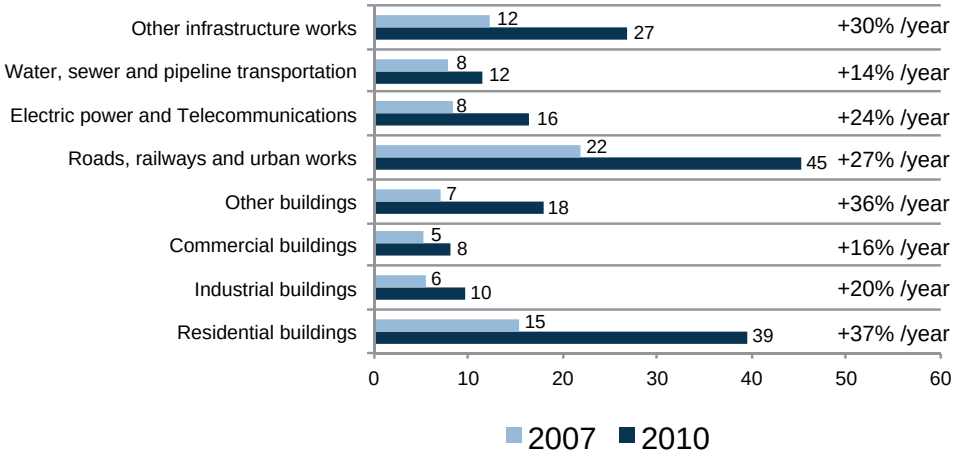
Chart 14. Value of construction works and services (BRL billions).



Source: LCA, based on IBGE data.

All construction segments showed high growth rates during this period. Still according to IBGE data, the total value of infrastructure works and services advanced at an average rate of 25% per year between 2007 and 2010, driven both by the increase in public investments and in private companies. The total value of the buildings constructed, in turn, grew 30% per year, driven both by the demand for dwellings and the demand for other types of buildings (such as industrial and commercial buildings, hospitals, schools and stadiums), as shown in Chart 15.

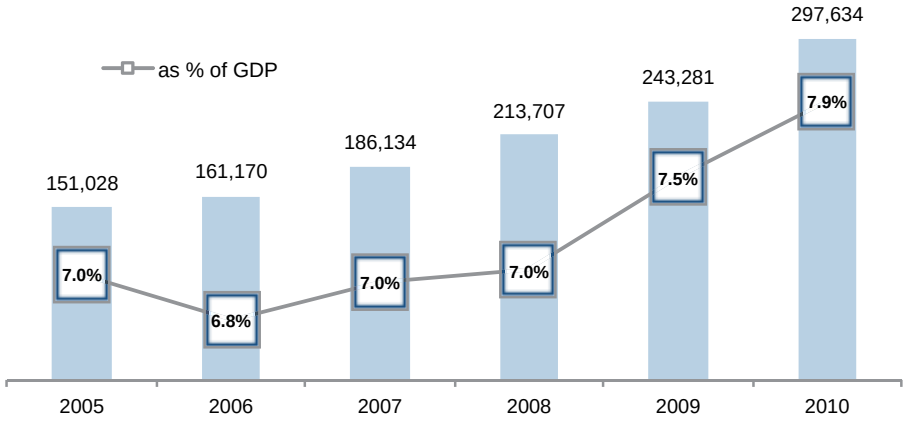
Chart 15. Total value of construction works and services* – BRL billions



Source: LCA, based on IBGE data.
*Companies with 30 or more employed.

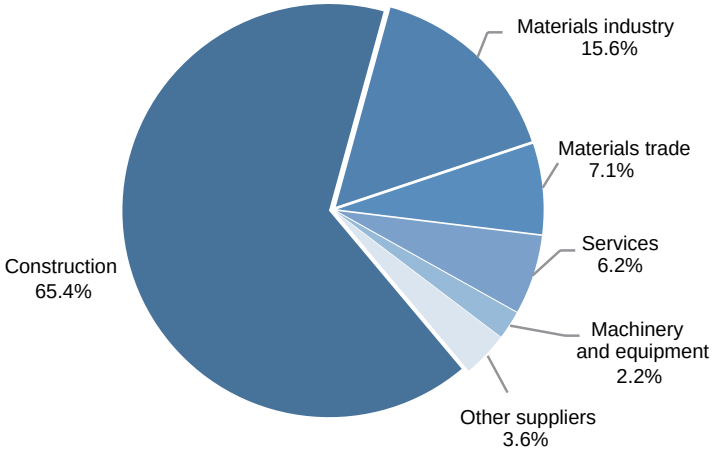
The added value of the productive construction chain practically doubled between 2005 and 2010, reaching approximately BRL 300 billion, or around 8% of Brazilian GDP (Chart 16).

Chart 16. Added value of construction chain – BRL millions.



Source: LCA, based on IBGE and Abramat-FGV data.

Chart 17. Composition of the added value of the construction chain – 2010.



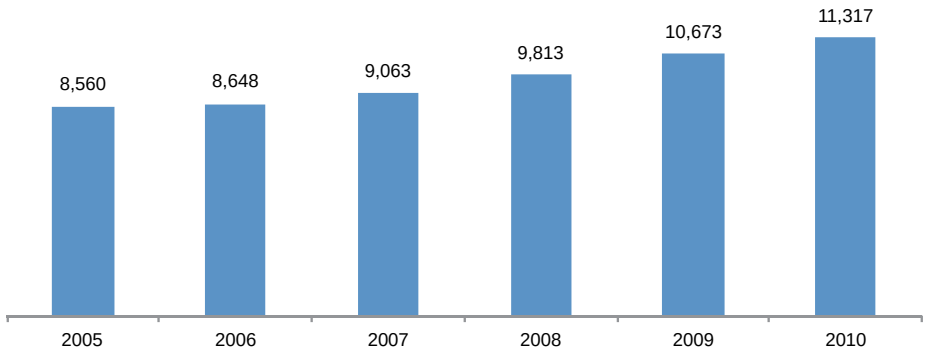
Source: LCA, based on Abramat-FGV data.

In 2010, approximately two thirds of the GDP of the construction chain (BRL 194 billion) were generated by the activities of the construction sector itself. The construction materials industry, which is the second largest link of the construction chain, generated BRL 46 billion in added value, or 15.6% of the total. The sales of construction materials (retail and wholesale) generated BRL 21 billion, accounting for 7.1% of the total generated in the chain. The service rendering activities (which include developments, purchase and sale of properties, rental of machinery and equipment, and professional technical services) totaled BRL 18 billion, or 6.2% of the chain's GDP (Chart 17).

2.2.3 Jobs and income generation

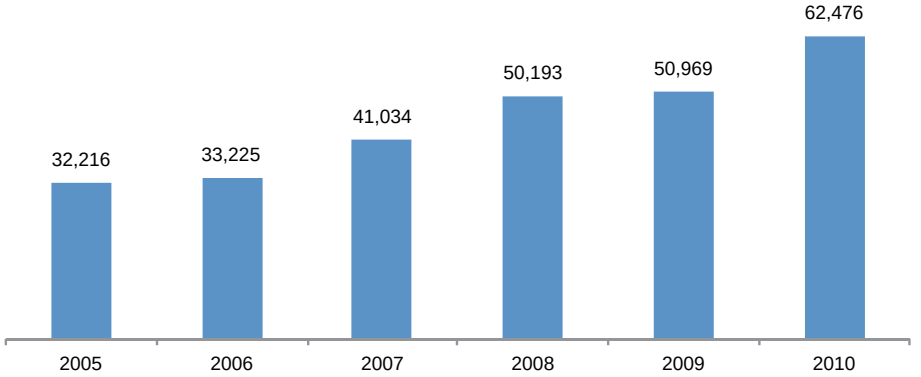
The number of people employed in the construction chain reached 11.3 million in 2010, accounting for 14% of the total number of people employed in economy. Between 2005 and 2010, the generation of jobs in the sector has grown at a rate of 5% per year (Chart 18).

Chart 18. People employed in the construction chain (thousands).



Source: LCA, based on Abramat-FGV data.

Chart 19. Tax collection in the construction chain (BRL million).



Source: LCA, based on Abramat-FGV data.

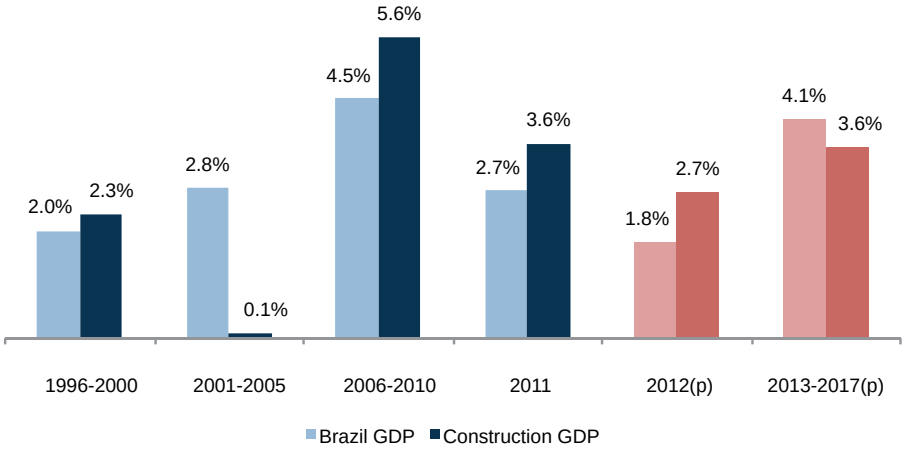
2.2.4 Tax collection

Tax revenues in the construction chain practically doubled in five years, reaching BRL 62 billion in 2010 – an average growth of 12% per year. This positive result in tax collection occurred even amidst exemption measures in the sector, such as reduction of the Tax on Manufactured Products for construction materials in the realm of the "Brasil Maior" plan (Chart 19).

2.2.5 Recent performance and prospects

The recent downturn in the Brazilian economy also had an impact on the construction activity. The loss of momentum of investments – strongly affected by the external uncertainties – resulted in a loss of momentum in the sector. In the first half of 2012, the construction GDP accumulated a growth of just over 2% against the same period of 2011 (Chart 20).

Chart 20. Prospects for construction GDP (annual average % variation).



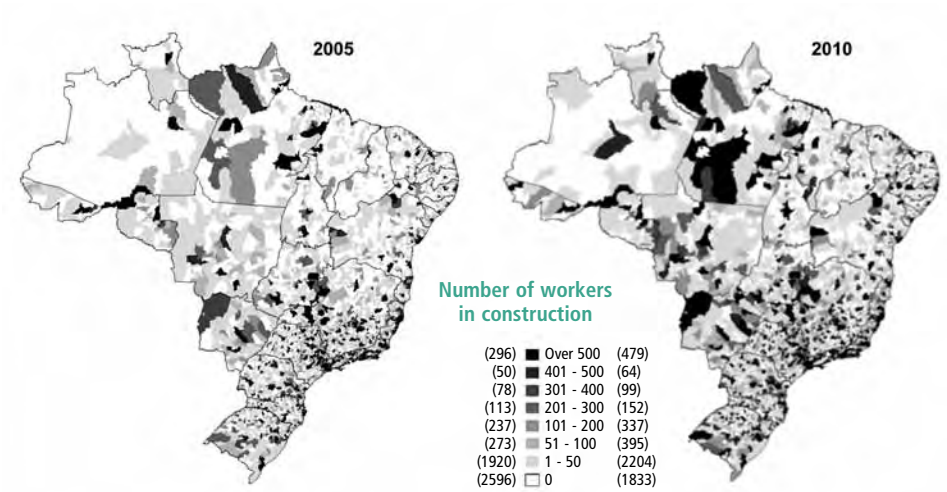
Source: LCA projection, based on IBGE data.

The outlook for the next few years is an accelerated growth of construction. Although the growth rate tends to be lower than that observed between 2006 and 2010, the construction chain should follow boosting the growth of Brazilian GDP, advancing both in the real estate segment and in infrastructure.

2.3 Labor

One of the great challenges of Brazil's competitiveness is the low productivity of its labor force. The construction industry, being a labor-intensive industry, is strongly affected by this low productivity, especially in light of the hiring boom that has occurred in recent years. Figure 2 illustrates this expansion, which involves both the number of workers and geographic dispersion, and which can be noticed by the areas darkened in several regions of the country. The darker the area, the greater the number of formal workers in the construction industry.

Figure 2. Number of formal workers in the construction industry, by municipality – 2005 and 2010.



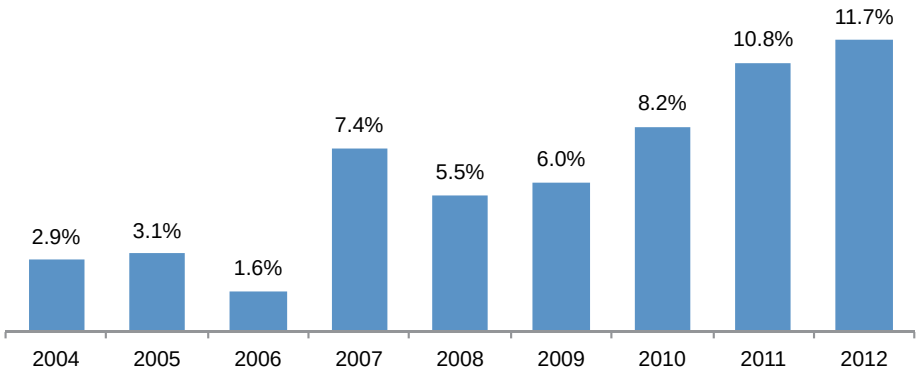
The number in parentheses represents the number of municipalities

Source: LCA, based on data from Relação Anual de Informações Sociais (RAIS) – (MTE).

In the year 2005, companies of the construction chain operated as employers in 2,967 municipalities[7]. In 2010, 3,730 municipalities had such companies, which was a reflection of the geographic expansion of the industry and of the economic growth of different regions of the country. During this period, there was a growth of 101% in the number of formal workers in the construction chain.

The high employment growth in the construction chain generates a relative shortage of labor, that has been driving up their salaries in relation to other industries as a way to attract workers. Chart 21 illustrates the growth of the percentage difference between salaries in construction and in other industries. These values were obtained through own econometric model, controled by education, gender and race.

Chart 21. Difference between salaries in construction and in other industries – %.

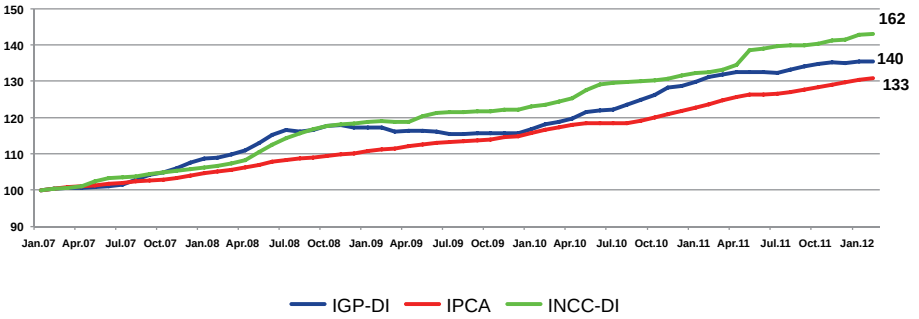


Source: Projection LCA, based on IBGE data.

[7] *According to definition of the activity of Construction given by CNAE 95: preparation of the land; construction of buildings and works; infrastructure of electric power, telecommunications; implementation work; finishing work;rental of equipment.*

This increase in construction wages is greater than the inflation measured by the IPCA and IGP-DI, with a growth higher than 20% compared to these indicators over a five-year period (Chart 22).

Chart 22. Labor cost in construction and inflation.



Source: LCA, based on IBGE and FVG data.

This increase in wages, however, is not accompanied by an equivalent increase in the productivity of labor.

The problem of lack of qualification for construction workers is extensive and permeates all levels of schooling. One of the first problems encountered is the poor quality of elementary education that results in functional illiteracy, i.e., workers who are unable to read and understand written instructions in a manual. Still, the low quality of the elementary teaching of mathematics and science entails workers with little skill in logical reasoning, abstract thinking and geometry basics.

Technical education for construction in Brazil has several centers of excellence, and the problem encountered at this teaching level is the small number of vacancies and graduated students in relation to the increasing demand. Moreover, most of these educational centers are located in large urban centers, while the demand for labor is increasingly pulverized in space. The lack of qualified workers and the high cost of labor are among the 5 main problems encountered by the construction industry in the 3rd quarter of 2012[8].

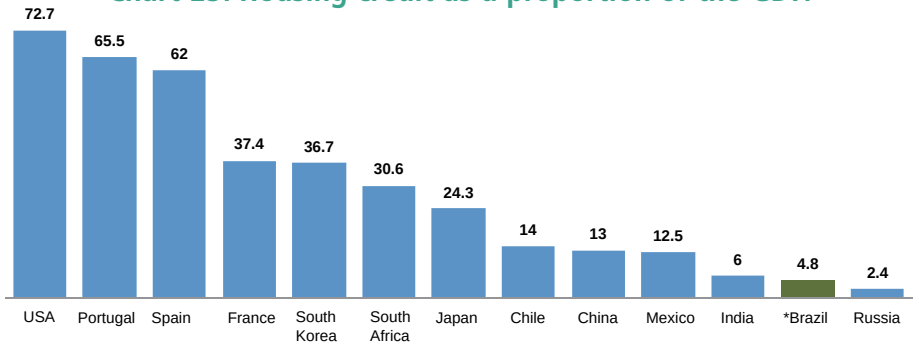
Despite the high salaries, civil construction workers are still very discriminated, which discourages potential candidates from entering this job.

Thus, the construction chain needs actions that enable to attract, qualify and retain its professionals, so as to increase work productivity and increase production by reducing costs.

2.4 Funding

As shown in Chart 9, credit in Brazil is expanding and housing credit is following this trend. However, it is still very retracted if compared to the total in other countries, as seen in Chart 23.

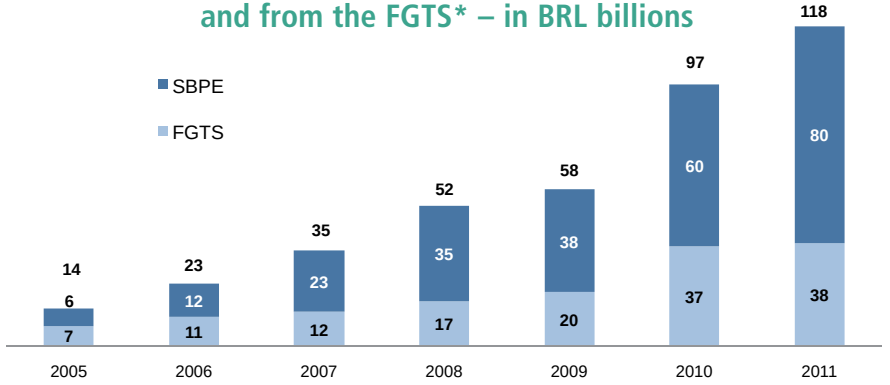
Chart 23. Housing credit as a proportion of the GDP.



Source: LCA, based on the presentation by the representative of the Department of Standards of the Financial System (Departamento de Normas do Sistema Financeiro – Denor) of the Central Bank of Brazil (BCB), during the 2nd National Congress of Credit Promotion on October 18, 2011. *Data for Brazil: BCB – Dec/2011.

Currently, housing credit in Brazil is concentrated mainly on resources from the Brazilian System of Savings and Loans (Sistema Brasileiro de Poupança e Empréstimo - SBPE) and from the Government Severance Indemnity Fund for Employees (Fundo de Garantia por Tempo de Serviço - FGTS), which together have totaled BRL 118 billion in 2011 (Chart 24).

Chart 24. Housing credit with resources from savings and from the FGTS* – in BRL billions



Sources: LCA, based on data from the BCB and CEF/FGTS.

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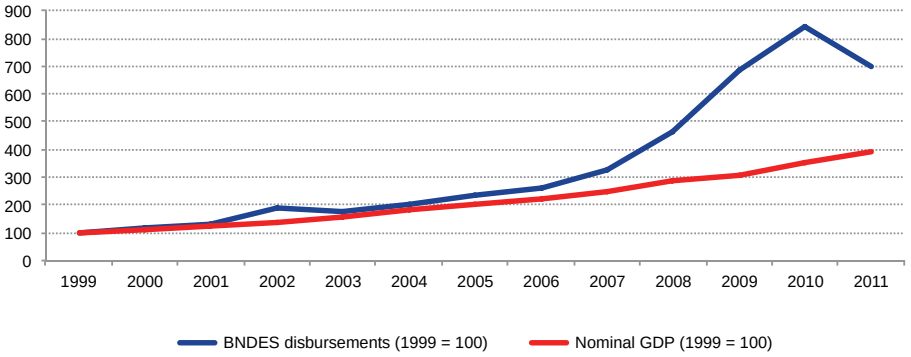
8 *Source: Construction Industry Survey, Year 3, No.9, September 2012. CNI.*

The infrastructure funding model in Brazil is still very much dependent on resources from the Brazilian Development Bank (BNDES) and there is already depletion in the institution's capacity to increase funding and to absorb risks. In addition, the increasing contributions of the National Treasury to the BNDES have a high tax cost to the country. **In 2011, the BNDES disbursed BRL 56.1 billion for infrastructure Works, more than the BRL 35.4 billion spent on that same year by the Growth Acceleration Program - PAC 2. The sums disbursed by the BNDES have increased considerably in the last decades, as shown in Chart 25.**

Chart 25. Disbursement by the BNDES and nominal GDP.



Source: LCA, based on BNDES and IBGE data.

2.5 Housing

The existence of inadequate dwellings is one of the major reflexes of social inequality, having also a negative influence over the health, the learning ability, the productivity and the general well-being of the people affected by this problem. Therefore, housing policies have become a priority in the Brazilian public agenda.

The housing deficit is composed by families who live in precarious dwellings, who are overburdened by the payment of rent[9], who live in a condition of excessive density of inhabitants per rented home and in dwellings that shelter more than one family with the intention that each family will obtain their own home (cohabitation)[10].

Table 1 shows housing figures calculated by the LCA for the years of 2009 and 2011, according to the methodology used by the João Pinheiro Foundation[11].

Table 1. Housing deficit (2009 and 2011).

Déficit	2009	2011	Difference %
Precarious dwellings	1,064,457	1,182,057	11.0%
Cohabitation	2,486,462	1,887,102	-24.1%
Excessive burden with rent	2,456,707	2,603,250	6.0%
Excessive density of inhabitants per rented dwellings	379,888	389,470	2.5%
TOTAL	6,387,514	6,061,879	-5.1%

Source: LCA, based on data from the Brazilian Institute of Geography and Statistics (IBGE).

9 Number of urban families with a Family income of up to three minimum salaries who live in a rented house or apartment (stable urban residences) and that spend 30% or more of their income with rent.
10 Definitions extracted from the document "Housing deficit 2008", published by the Ministry of Cities.
11 Housing deficit 2008, document published by the Ministry of Cities.

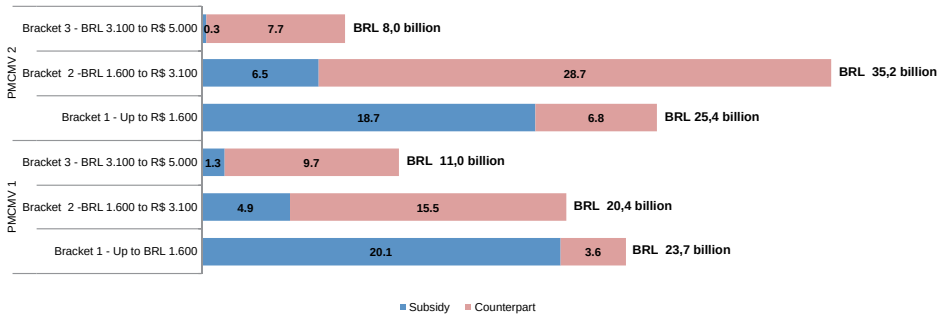
A 24.1% decrease in cohabitation has been observed. This is equivalent to over 590 thousand dwellings. However, this positive result was mitigated by the increase of other factors of the deficit, including the number of precarious dwellings, a category that is responsible for the greatest risks to the health and well-being of the population. Even so, the final result is positive, with a 5.1% decrease of the housing deficit between 2009 and 2011.

The decrease in the housing shortage is the focus of the Program "My Home, My Life" (*Programa Minha Casa, Minha Vida - PMCMV*), a housing project aimed at the population that is affected by the conditions described above (classes C D and E).

The PMCMV was launched in two phases and covers three income brackets. The first phase started in April 2009, with the procurement of 1,005,128 dwellings by December 2010. The second phase started in January 2011 and the procurement was of 967,441 dwellings by October 2012. The program encompasses three income brackets: Bracket 1 corresponds to families with a gross monthly income of less than BRL 1,600; Bracket 2 refers to families with a gross monthly income between BRL 1,600 and BRL 3,100; and Bracket 3 corresponds to families with a gross monthly income between BRL 3,100 and BRL 5,000. The State subsidizes part of the housing values for the three income brackets, with higher subsidy percentages for the brackets with lower incomes[12].

Chart 26 shows the PMCMV procurement figures in the two phases of the program, for the three income brackets, with the respective subsidy percentages.

Chart 26. PMCMV 1 and 2 procurement per income bracket (Oct/2012).



Source: LCA, based on CEF data.

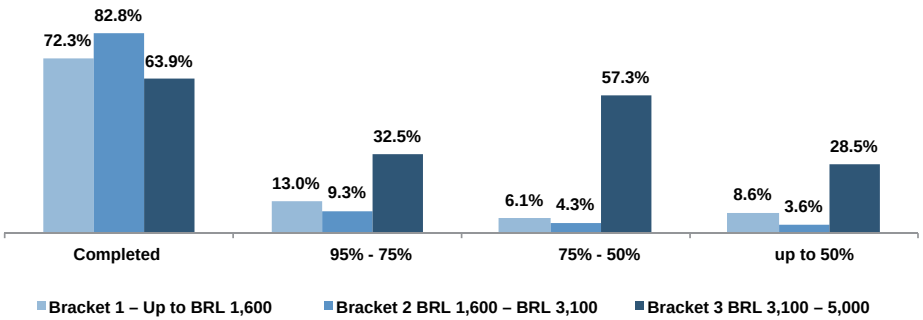
While PMCMV1 had a higher procurement for Bracket 1, PMCMV2 shows, so far, a higher value in procurement for Bracket 2. The latter showed a 72.5% increase in relation to phase 1, the equivalent to BRL 14.8 billion.

Also, it is possible to see that despite the increase of 7% in procurement amounts for Bracket 1 in relation to the first phase of the program, the subsidized percentage decreased from 85% to 73%.

Chart 27 shows the execution of PMCMV1, relative to the units procured by the program per income bracket up to December 2011.

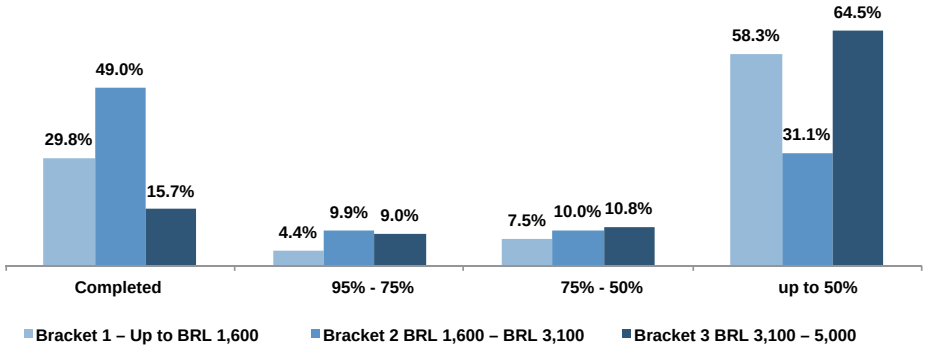
[12] *Source: Caixa Econômica Federal (CEF).*

Chart 27. Execution of PMCMV1 per income bracket (% of the number of procurements, Oct/2012).



Source: LCA, based on data from the CEF.

Chart 28. Execution of the PMCMV2 per income bracket (% of the number of procurements, Oct/2012).



Source: LCA, based on data from the CEF.

We can see that the income bracket whose construction works are more advanced is Bracket 2, and that the income bracket that shows the lowest percentage executed is Bracket 3, in which 28.5% of the projects still have not reached half of what was planned.

Chart 28 shows the execution of the PMCMV2, which is composed of projects procured from January 2011 to October 2012.

We can observe that Bracket 2, which leads the number of procurements in the second phase of the program, is the one showing the best execution, with 31.1% of the projects still with 50% of their predicted construction work to be completed[13].

Over 1.1 million new dwellings were completed in PMCMV until October 2012, and 872,150[14] dwellings are under construction. This is an important progress, but it is still not enough to cover the Brazilian housing shortage, which totaled over 6 million dwellings in 2011.

Moreover, the housing problem is not limited to the lack of dwellings, but it also includes residences that present inappropriate conditions, such as the excessive density of inhabitants per residence, lack of infrastructure services,

13 Since the second phase of the program is still accepting new contracts, it is not possible to evaluate if the execution of the construction works in an income bracket is more advanced in relation to the others, because there might be a bias in the procurement period so that the brackets with less executions are those that were procured last.

14 Source: CEF.

non-existence of an exclusive sanitary unit per residence, inappropriate roofing and irregular property situation, in which the dwellers own the house, but not the land[15].

Table 2 shows the calculation of the inappropriate situation of dwellings for the years of 2009 and 2011.

Table 2. Inappropriate dwelling conditions (2009 and 2011).

Inadequacy of households	2009	2011	Difference %
Excessive density of residents in own homes	1,534,993	1,418,971	-7.6%
Lack of infrastructure services (electricity, water supply, sewer, waste collection)	10,949,390	11,121,694	1.6%
Inadequacy of the use of urban soil	1,480,016	1,782,631	20.4%
Non-existence of an exclusive sanitary unit per residence	326,529	316,883	-3.0%
Inappropriate roofing	398,280	660,939	65.9%
TOTAL	14,689,208	15,301,118	4.2%

Source: LCA, based on data from the National Survey per Residence Sample (Pesquisa Nacional por Amostra de Domicílio - PNAD) for 2009 and 2011 of the IBGE.

The number of inappropriate dwellings has exceeded 15.3 million units in 2011, representing a 4.2% increase in relation to 2009.

The main driver of this retrocession was the inadequacy of the use of urban soil in which there was an increase of 302,615 dwellings in irregular situation if compared to 2009. Also, the number of dwellings with inappropriate roofing had a 65.9% increase in the period, exceeding 660 thousand. However, **the main source of inadequacy continues to be the lack of infrastructure, which affects over 11 million dwellings in Brazil**.

[15] *Definitions extracted from the document "Housing deficit 2008", published by the Ministry of Cities*

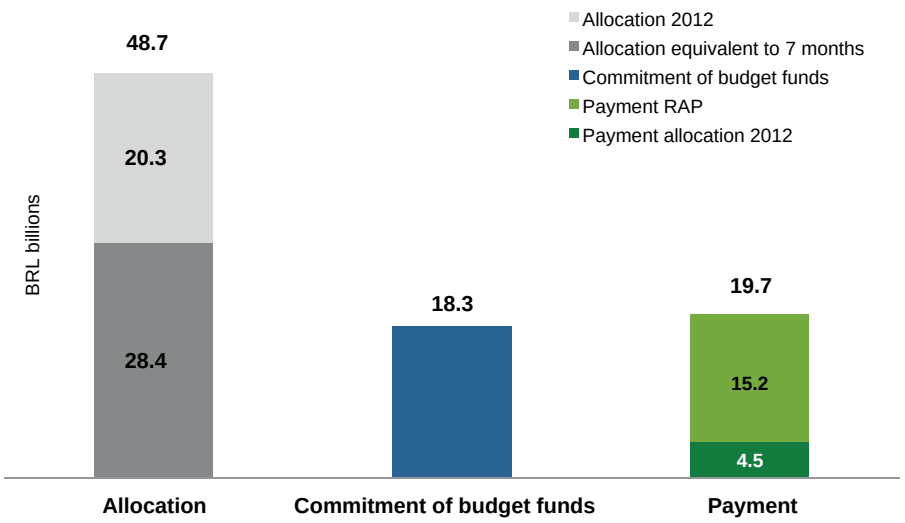
2.6 Infrastructure

The Growth Acceleration Program (*Programa de Aceleração do Crescimento - PAC*) has been an important driver for the development of investments in infrastructure in Brazil. PAC 1 was launched in January 2007, with a plan for investments in logistic infrastructure, electric power, social and urban projects, amounting to BRL 541.8 billion. The works should have been concluded in December 2010. The 4-year report of PAC 1 shows the conclusion of BRL 444 billion in construction works, the equivalent to 82% of the total.

PAC 2 was launched in March 2010, and the projects were divided into six axes: electric power, transportation, better city, citizen community, water and electricity for all, the sixth axis being the PMCMV2. PAC 2 foresees a total of BRL 955 billion in investments from 2011 to 2014 and the program's 4th balance indicates that BRL 324.3 billion out of the total amount have been executed up to June 2012, and BRL 211 billion refer to completed works. Therefore, PAC 2 has executed 34% of its budget in 35% of the expected time. However, it is not possible to state, based on these figures, that PAC 2 is up to date with its investment agenda, because there is no clear schedule that could serve as a parameter for this follow-up.

The budgetary execution of 2012, represented in Chart 29, indicates that out of the BRL 19.7 billion paid in 2012, 77% are relative to remaining balances due from other periods, and therefore only BRL 4.5 billion of the total BRL 18.3 billion allocated in 2012 have already been paid. Also, if the 2012 budget were being allocated in a linear manner, BRL 28.4 billion should already have been allocated, while only BRL 18.3 billion were actually allocated in this period.

Chart 29. Budget execution of PAC 2*.



Source: LCA, based on data from the 4th balance of the PAC by the Ministry of Planning.
*Up to July 23, 2012

The Pluriannual Plan (PPA) organized by the Federal Government and approved by Congress through a quadrennial law offers a forecast on how much will be invested in the various infrastructure sectors in the mid-term. This plan is drafted every four years, during the second year of the presidential term, so that the planning will cover one year of the following term.

In addition, some infrastructure areas have a sectorial long-term planning that establishes expansion and quality targets and the corresponding forecast of the resources necessary to achieve these targets.

The Energy Research Company (*Empresa de Pesquisa Energética - EPE*), for example, is responsible for the strategic planning of the sectors of **electric power, oil and gas** and, in this competence, it publishes on an annual basis the Decennial Plan for Energy Expansion (*Plano Decenal de Expansão de Energia - PDE*), which presents the energy planning for a ten-year period, the most recent one being the 2020 PDE, published in 2011.

The **logistics and transportation** sector also presents a long-term planning developed by the Ministry of Transportation in cooperation with the Ministry of Defense, – the National Plan of Logistics and Transportation (*Plano Nacional de Logística e Transportes - PNLT*). This plan was published in 2009 and presents the planning of the sector in three phases, from 2008 to 2011, from 2012 to 2015 and from 2015 to 2023. On August 15, 2012, the Logistics Investment Program (*Programa de Investimentos em Logística - PIL*) was launched, prioritizing some projects in the transportation area that are considered strategic by the federal government. These projects will be executed as Public-Private Partnerships and the investment predicted amounts to BRL 79.5 billion from 2013 to 2015, with a counterpart of BRL 53.5 billion from the private initiative in a 25 to 30-year period.

The National Plan for Basic Sanitation (*Plano Nacional de Saneamento Básico - Plansab*) estimates the investment amounts necessary to universalize basic sanitation in Brazil by 2030, with intermediate targets in 2015 and 2020.

Table 3 shows the LCA estimates based on the PPA and on the above-mentioned sectorial plans (PDE, PNLT and Plansab) for the amount of investment foreseen in these infrastructure sectors from 2013 to 2017. It can be observed that the total amount of BRL 931 billion imposes a significant challenge in terms of planning and management, so that the procurements can be made in a length of time and in conditions that are appropriate for the execution of the projects intended.

Table 3. Investments foreseen in infrastructure 2013-2017 (BRL billions in 2012).

Sector	BRL bilions
Sanitation	111
Eletric power	205
Oil, gas and biofuels	443
Transportation	172
TOTAL	931

Source: LCA, based on data from the PPA 2012-2015, from the Plansab, from PDE 2020 and PNLT.

3. Competitiveness and Sustainability

The essence of competitiveness is comparative, that is, in order to define if a country is competitive it is necessary to establish a direct comparison with other countries. It is important to observe that the competitiveness measurement is not only useful for markets having an international penetration. The comparison with other countries gives us a metric for how much can be improved in terms of production efficiency and cost reduction.

A new trend in competitiveness analyses, reflected on the 2012-2013 edition of the Global Competitiveness Report[16], is the integration of the concept of competitiveness with the concept of sustainability. This relationship reflects the importance of continuous development, because while the competitiveness rates reflect the present, the sustainability rates are an image of the future.

"Sustainable development is that which meets the needs of the present without compromising the possibility of future generations to meet their own needs."

This was the international consensus about sustainability reached by the World Commission about Environment and Development, created by the UN in 1987. This concept is still valid 25 years after it was established, but it is very broad and today it serves as the basis for a vast literature about sustainability. An extremely widespread current characterizes sustainability as a balance between three forces: **economic prosperity, social balance** and **environmental quality**[17].

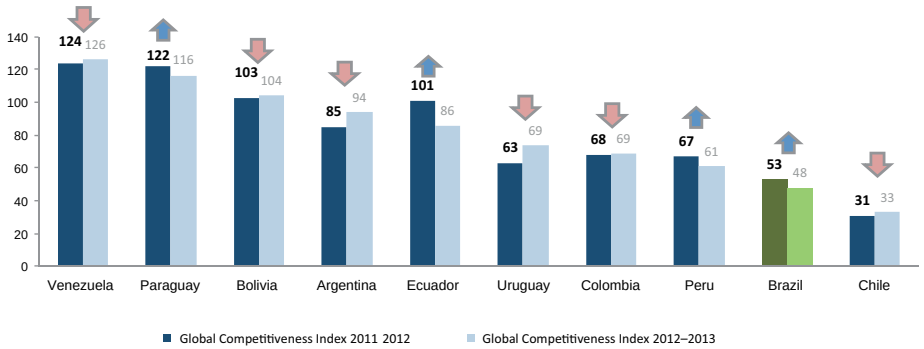
Economic prosperity is necessary to guarantee that the production growth is sufficient to satisfy the population's needs. Social balance encompasses the reduction of hunger and poverty as well the guarantee of basic education and quality health care services. Environmental quality is maintained as the third pillar, ensuring that the actions to achieve the first two pillars do not degrade the environment.

The Global Competitiveness Report 2011-2012 of the World Economic Forum placed Brazil on the 53rd position in relation to the global competitiveness index, among 144 countries around the world, analyzed according to various criteria, such as the quality of institutions, the quality of infrastructure, macroeconomic characteristics, education and health, market conditions for goods and services, efficiency of the labor market, sophistication and safety of the financial market, technology absorption and innovation. On the 2012-2013 edition of this same report, Brazil ranked 48th among 144 countries, going up 5 positions in the ranking (Chart 30).

[16] *The Global Competitiveness Report 2012–2013 (GCR) – World Economic Forum*

[17] *John Elkington, Cannibals with Forks: The Triple Bottom Line of 21st Century Business.*

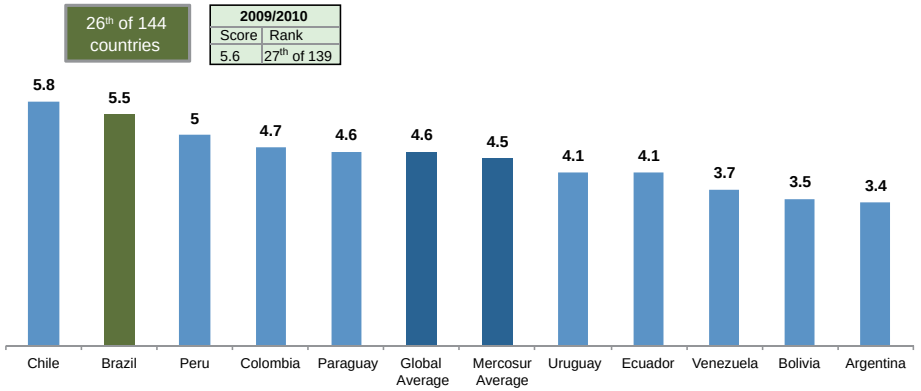
Chart 30. Global competitiveness index (relative position) – Mercosur member and associate countries (2012).



Source: LCA, based on data from GCR 2012-2013 – World Economic Forum.

Brazil has great availability of financial services, which places the country in the 26th position among 144 countries in this item, as shown in Chart 31.

Chart 31. Availability of financial services – Mercosur member and associate countries (2012).

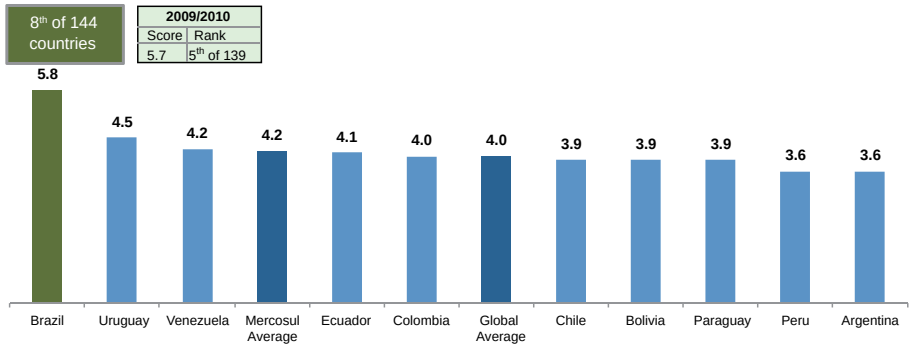


Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question: "Does the financial sector in your country offer a wide variety of financial products and services to companies?"
Answers: from 1 = does not offer to 7 = offers a wide variety.

In terms of the regulation of the stock exchange, the 2012 report of the World Economic Forum places Brazil in the 8th position, among 144 countries evaluated, with an increase from score 5.7 to 5.8 in relation to 2010, as seen in Chart 32.

Chart 32. Stock exchange regulation – Mercosur member and associate countries (2012).

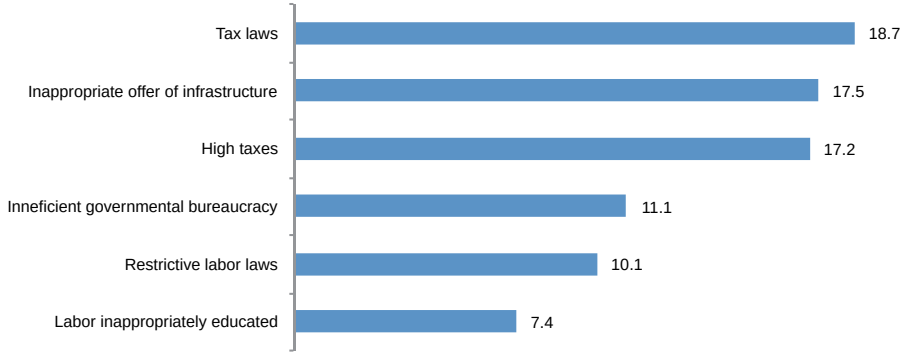


Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question: "How do you evaluate the regulation and the supervision of the stock exchange in your country?"
Answers: from 1 = ineffective to 7 = effective.

On the other hand, Brazil ranks very badly in other factors, such as tax impact, inefficiency of bureaucracy, infrastructure and quality of education, which are the most problematic factors for Brazil's competitiveness, as seen in Chart 33.

Chart 33. Most problematic factors for competitiveness in Brazil in % of answers.



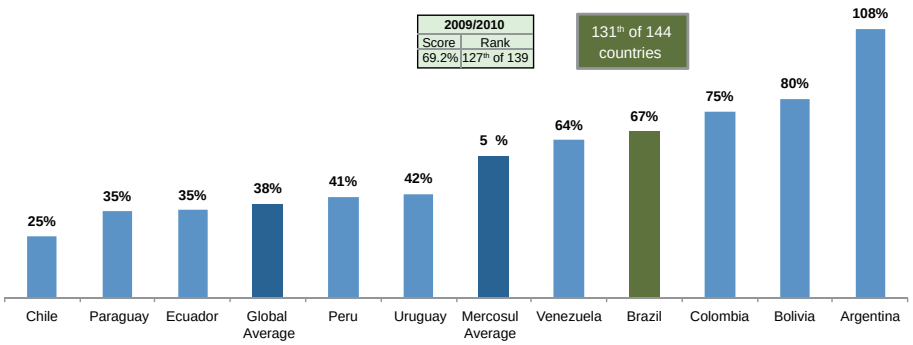
Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

This section is therefore dedicated to making a diagnosis of the factors that are the most jeopardizing for competitiveness in Brazil in the international scenario and the sustainability of the country's development, based on the comparative indicators of the *GCR 2012-2013 – World Economic Forum*. It is important to highlight that these indicators are based on samples, and are therefore subject to great variations depending on the respondents in each country. However, given the content of the questions and the possibility of having an international comparison due to the survey's reach, the analysis of these indicators provides valid references to this study.

3.1 Institutional aspects

As indicated above, one of the greatest challenges for competitiveness in Brazil is its tax system, which has two problems. The first problem is the rate of tax levied, which is equivalent to 67% of the profit obtained in the country, a figure that places Brazil in the 131th position among 141 countries (Chart 34).

Chart 34. Total tax rate – Mercosur member and associate countries (2012).

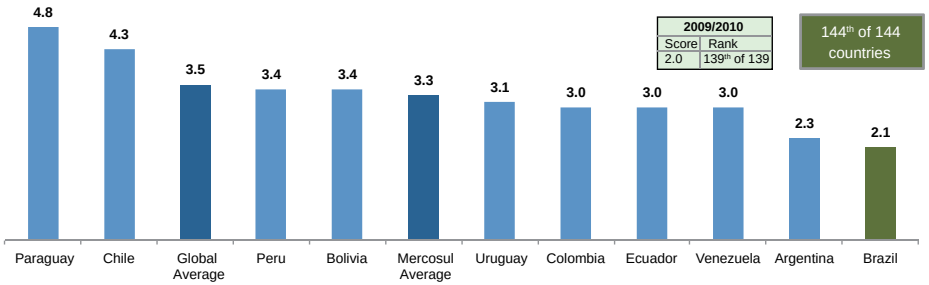


Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

This Chart is a combination of taxes on profit (% of profit), taxes on payroll (as a % of profits) and other taxes (as a % of profits).

The second problem refers to the complexity of the country's tax system. Companies are subject to an excessive number of taxes, with various options of tax systems, and different rules for calculation and collection, depending on the sphere of Government to which the tax applies. This configuration of the Brazilian tax system has placed Brazil in the last position among the countries evaluated as regards the items extension and effects of taxing, which measures the impact of tax regulation on incentives to work or invest in a country, as shown in Chart 35.

Chart 35. Extension and effects of taxing – Mercosur member and associate countries (2012).

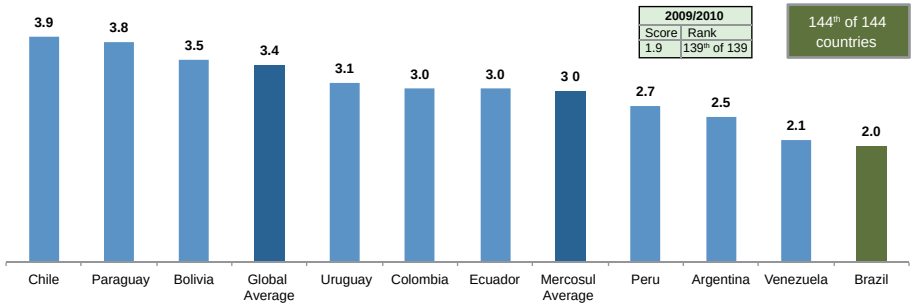


Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question: "What is the impact that the level of taxes in your country has on the incentives to work or invest?"
Answers: from 1 = significant limits to 7 = no impact.

The excess and complexity of rules are not limited, however, to taxing. Governmental administrative requirements are also considered a great burden, so that Brazil is consistently occupying the last position in terms of governmental regulation (Chart 36).

Chart 36. Burden of governmental regulations – Mercosur member and associate countries (2012).

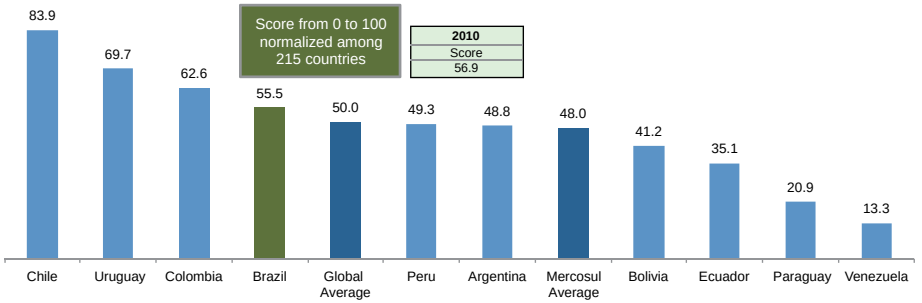


Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question: "How burdensome it is for companies in your country to comply with the government's administrative requirements?"
Answers: from 1 = extremely burdensome to 7 = not at all burdensome.

This administrative inefficiency is also perceived in the government's direct action as a formulator of public policies and a supplier of public services, which are characteristics evaluated in the indicator of government's efficiency calculated by the World Bank. Brazil has obtained 55.5 out of 100.0 points, which shows a retrocession in its score in relation to 2010, as shown in Chart 37.

Chart 37. Effectiveness of the Government – Mercosur member and associate countries (2011).

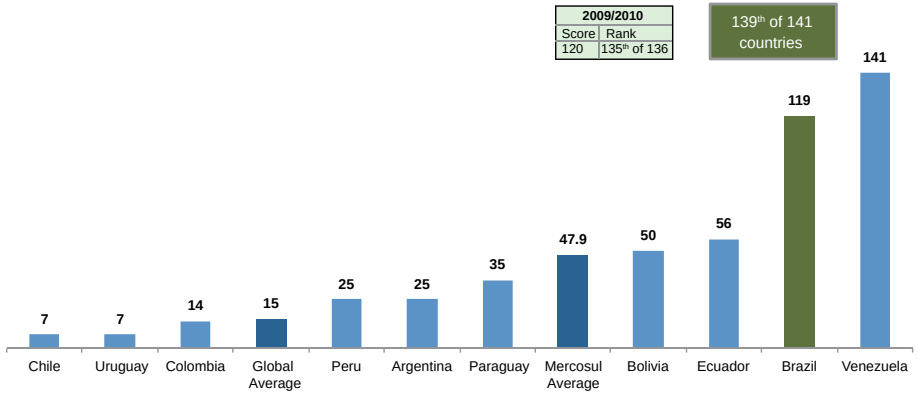


Source: LCA, based on data from the Worldwide Governance Indicators 2012 – World Bank.

This indicator captures the perception about the quality of public services, the independence of decisions on public policy, political pressures and the government's commitment with its policies.

Another factor that constitutes one of the greatest problems faced by companies that operate in Brazil is the excessive and inefficient bureaucracy, which creates unnecessary delays in any administrative process that requires governmental approval. One example of this fact is the **period of 119 days required to start a business, which places Brazil in 139th among 141 countries**, as shown in Chart 38.

Chart 38. Number of days required to start a business – Mercosur member and associate countries (2012).

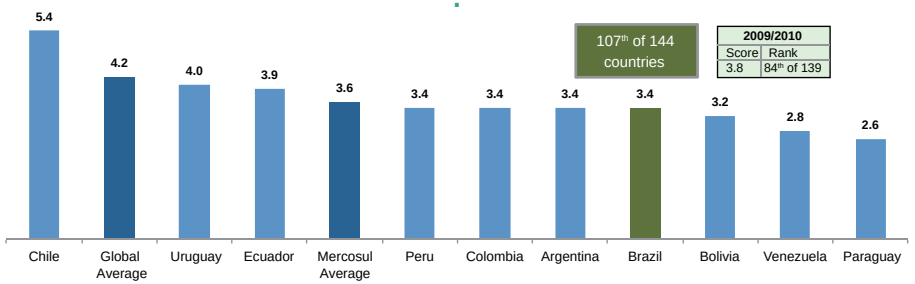


Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

3.2 Infrastructure

Inadequate infrastructure is one of the main barriers to the increase of competitiveness in Brazilian production. The infrastructure indicator of the World Economic Forum places Brazil as number 107 among 144 countries, with a score of 3.4. This represents a significant decrease in relation to 2010, when the Brazilian infrastructure had a score of 3.8 and ranked 84th among 139 countries (Chart 39).

Chart 39. Indicator of the quality of general infrastructure Mercosur member and associate countries (2012).



Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question: "How do you evaluate the general infrastructure (i.e. transportation, telephone services and electric power) in your country?".
Answers: from 1 = extremely underdeveloped to 7 = extensive and efficient according to international standards.

This lower score is mainly due to the inadequacy of the various transportation modes, which showed a regression of more than 10 positions in all categories. Below, an evaluation of the infrastructure of each transportation mode, of the electricity system and of telecommunications.

3.2.1 Transportation

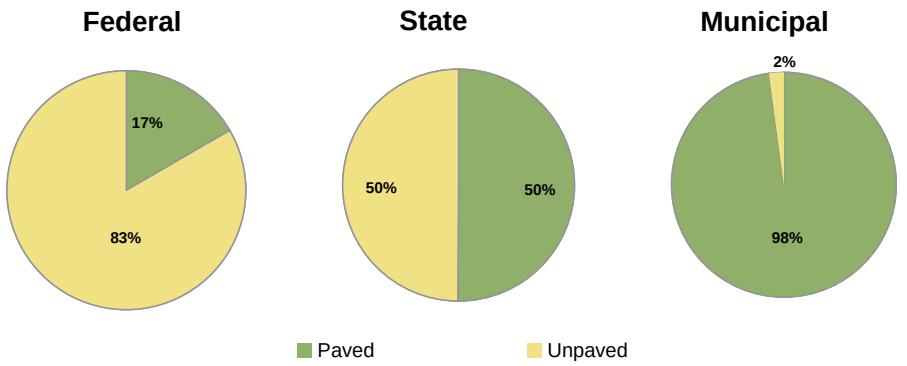
Brazil is a country with an extensive territory, with an intense inter-regional trade of goods and a significant productive interaction between the sectors of different regions. This means that there are products from one state that are used as raw-materials in another region and consumed in a third location, thus covering large distances in this process. Thus, the composition of the different transportation modes and their quality are determinant for the Brazilian competitiveness, because they directly affect productive costs.

A. Road transport

In Brazil, road transport is the predominant mode, being responsible for over 60% of freight transportation and around 40% of the interstate passenger transportation[18].

The Brazilian highway network is subdivided into three sections according to their jurisdiction sphere: federal, state and municipal. Federal and state highways are the most important in terms of raw material flow between productive centers. Federal highways represent 76,983 km, 83% of which are paved. State highways, on the other hand, represent 222,176 km, in that only 50% are paved. Municipal highways are responsible for the flow between smaller municipalities, more distant from urban centers. This is the largest highway network in Brazil, with 1,261,745 km, and the one presenting the worst traffic conditions since only 2% of its roads are paved. (Chart 40)[19].

Chart 40. Paved roads, per jurisdiction (2012).

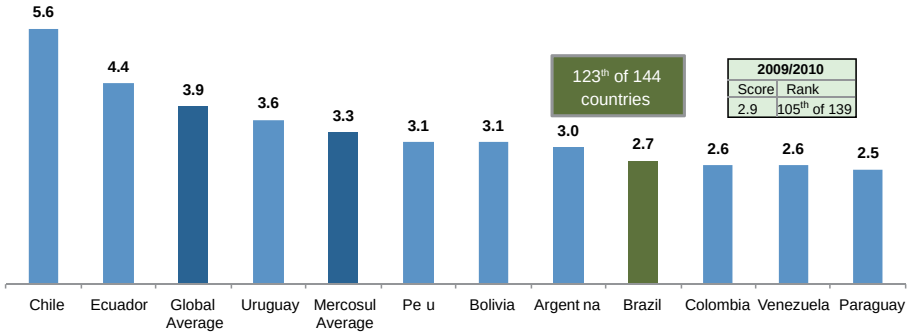


Source: LCA, based on data from the National Department of Transportation Infrastructure *(Departamento Nacional de Infraestrutura de Transportes - DNIT)*.

Brazil ranks 123th among 144 countries in the road quality index of the World Economic Forum, after other countries of the Mercosur, such as Peru and Bolivia. In 2010, the country ranked 105th among 136 countries. The score for this item therefore dropped from 2.9 to 2.7 (Chart 41).

18 *Statistic report of the National Confederation of Transportation of May 2012.*
19 *DNIT, highway network of the SNV, updated up to 06/20/2012.*

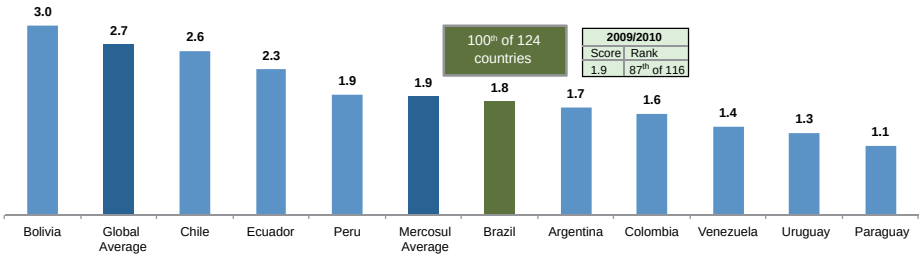
Chart 41. Road quality indicator – Mercosur member and associate countries (2012).



Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question: "How do you evaluate the roads in your country?".
Answer: from 1 = extremely underdeveloped to 7 = extensive and efficient according to international standards.

Chart 42. Railroad quality indicator – Mercosur member and associate countries (2012).



Fonte: LCA, com base em dados do GCR 2012-2013 – World Economic Forum.

Question: "How do you evaluate the railroad system in your country?".
Answer: from 1 = extremely underdeveloped to 7 = extensive and efficient according to international standards.

B. Rail transport

Currently, the Brazilian railroad system has 30,051 km, representing 20.7% of the country's freight transportation matrix[20]. The Investment and Logistics Program foresees the construction of 4,546 km of railroads by 2025, which will increase the rail transport mode to 35% of the Brazilian transportation matrix. On the railroad quality indicator of the World Economic Forum, Brazil currently ranks 100th among 144 countries, a position that is worse if compared to 2010, when the country ranked 83rd among 136 countries. The score for this item also dropped from 1.9 to 1.8, which indicated that the situation of railroads has not only worsened if compared to other countries, but also in relation to the situation in Brazil in 2010 (Chart 42).

C. Ports

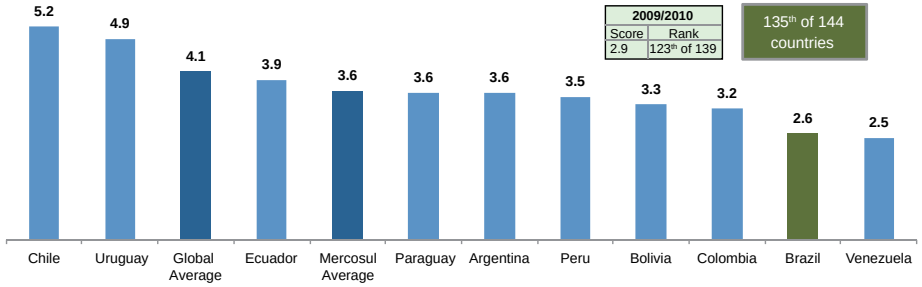
Brazil has an extensive coastline that has currently 34 organized ports and 103 Private Use Terminals (*Terminais de Uso Privativo - TUP*), which together were responsible for the flow of 94.4% of Brazilian exports in 2010[21].

The small quantity of ports in relation to the size of the Brazilian shore, in addition to the inadequacy of the existing ports – which have low depth and a bad system of connections with other transportation modes – have an influence on the low ranking of Brazil in the port quality indicator of the World Economic Forum (Chart 43).

20 Statistic report of the National Confederation of Transports, May 2012.

21 PPA 2012-2015, infrastructure.

Chart 43. Port quality indicator – Mercosur member and associate countries (2012).

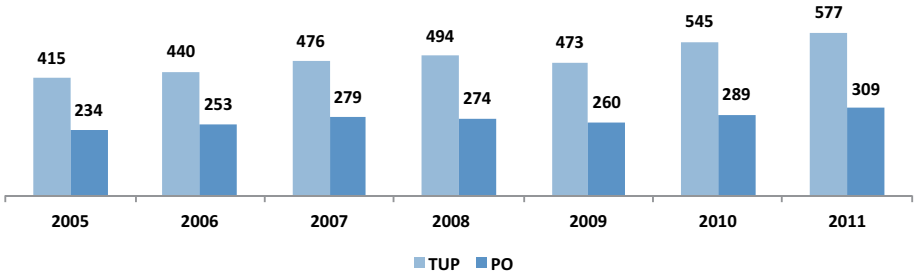


Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question: "How do you evaluate the port facilities in your country?".
Answers: from 1 = extremely underdeveloped to 7 = extensive and efficient according to international standards.
Countries with no access to the ocean answer, on the same scale, to "How accessible are port facilities?".

Today, Brazil ranks 135th among 144 countries. The country's score dropped from 2.9 in 2010 to 2.6 in 2012. During the same period, there was an increase in the amount of cargo dealings in port terminals. The amount of cargo dealings went from a total of 649.4 million tons in 2005 to 886.0 million tons in 2011, a 26.7% increase in six years (Chart 44).

Chart 44. Cargo dealings in Private Use Terminals and organized ports (millions of tons).

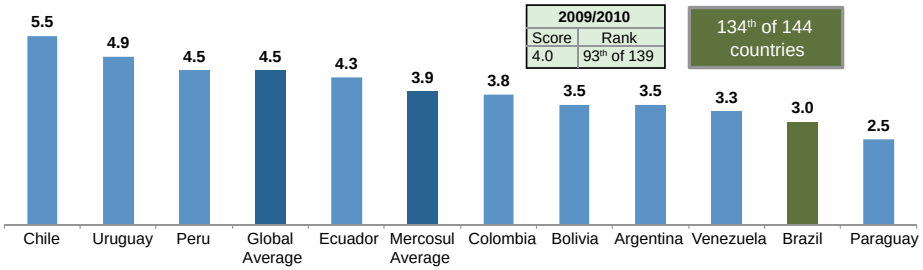


Source: LCA, based on data from the National Agency of Waterway Transportation (*Agência Nacional de Transportes Aquaviários - ANTAQ)*.

D. Airports

Brazil currently ranks 134th in terms of airport quality, out of 144 countries. Of all the transportation modes, this was the one with the most significant drop in score, having gone from 4.0 in 2010 to 3.0 in 2012. In relative terms, Brazil's position in the ranking also got worse, going from 93rd (out of 139 countries) in 2010 to 139th (among 144 countries) in 2012 (Chart 45).

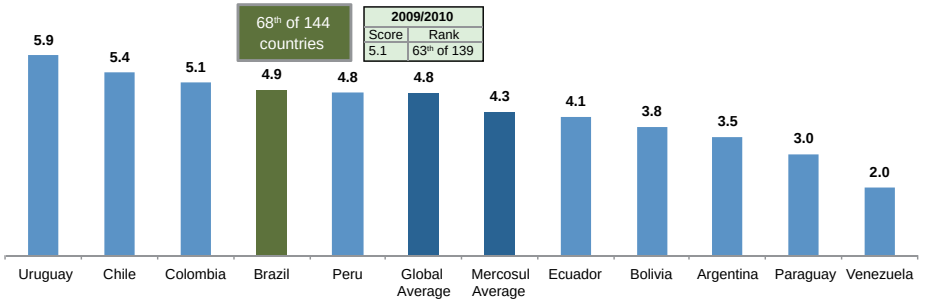
Chart 45. Airport quality indicator – Mercosur member and associate countries (2012).



Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question: "How do you evaluate the passenger air transport infrastructure in your country?".
Answers: from 1 = extremely underdeveloped to 7 = extensive and efficient according to international standards.

Chart 46. Electric Power quality indicator – Mercosur member and associate countries (2012).



Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question: "How do you evaluate the quality of the electric power supply in your country (number of interruptions and number of voltage fluctuations)?".
Answers: from 1 = insufficient and undergoes frequent interruptions to 7 = sufficient and reliable.

3.2.2 Electric power

The classification of the electric power quality indicator of the World Economic Forum is better than that of transport, and has remained practically constant in terms of score from 2010 to 2012, dropping from 5.0 to 4.9 (Chart 46).

It is worth noting that, in addition to the perceived quality of the service, measured in this indicator as the number of interruptions and the number of voltage fluctuations, electricity cost is a relevant item for the national industry. Gas, for instance, has had an increase of 184% since 2007[22].

According to the Brazilian Association of Ceramic Tile Manufacturers (ANFACER), natural gas accounts for 25% of the final cost of ceramic coating[23].

Tables 4 and 5 compare the prices of natural gas charged in Brazil in relation to the BRICs (Brazil, Russia, India and China) and in relation to Brazil's main commercial partners. It should be noted that Brazilian prices are always above the average, which negatively affects national competitiveness.

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22 Source: http://clippingmp.planejamento.gov.br/cadastros/noticias/2012/10/17/preco-do-gas-inviabiliza-o-uso-industrial/?searchterm=Pre%C3%A7o%20alto%20faz%20consumo%20industrial%20de%20g%C3%A1s%20estagnar, accessed on 13 November, 2012.

23 Source: http://www.anfacer.org.br/site/default.aspx?idConteudo=2234&n=ANFACER-PARTICIPA-DO-13%C2%BA-ENCONTRO-INTERNACIONAL-DE-ENERGIA. Accessed on 13 November, 2012.

Table 4. Prices of BRICs' industrial natural gas (US$/MMBtu).

Countries	Average Price (US$/MMBtu)
Brazil	16.84
China	13.52
India	5.23
Russia	2.99
"RIC" average (Russia, India, China)	7.24

Source: LCA, based on *Estudos para o Desenvolvimento do Estado do Rio de Janeiro: "Quanto Custa o Gás Natural Para a Indústria no Brasil?"* from the FIRJAN System – Dec/2011.

Table 5. Prices of industrial natural gas: Brazil and commercial partners (US$/MMBtu).

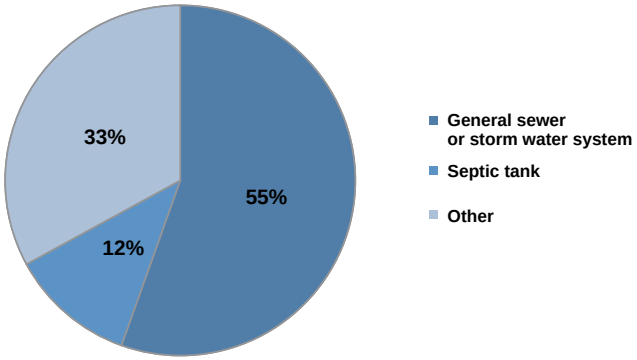
Countries	Average Price (US$/MMBtu)
Brazil	16.84
USA	5.09
China	13.52
Germany	20.59
Commercial partners' average	13.07

Source: LCA, based on *Estudos para o Desenvolvimento do Estado do Rio de Janeiro: "Quanto Custa o Gás Natural Para a Indústria no Brasil?"* from the FIRJAN System – Dec/2011.

3.2.3 Sanitation

In Brazil, 32.9% of the permanent households don't have an appropriate destination for their sanitary waste, i.e., no general sewer system or septic tank, as can be seen in Chart 47. This brings very negative effects both to the population's health and the environment quality.

Chart 47. Type of sewer.



Source: LCA, based on IBGE data.

The lack of appropriate sewer treatment can contaminate drinking water, so the lack of sanitation is related to a greater incidence of infectious parasitic diseases like schistosomiasis, cholera and diarrhea, the latter a major cause of infant mortality.

Given this relevance of the sanitation service, it is crucial that its expansion occurs in a way to solve the current deficit and in conditions to maintain the growth rate in line with the increase in the demand for the service.

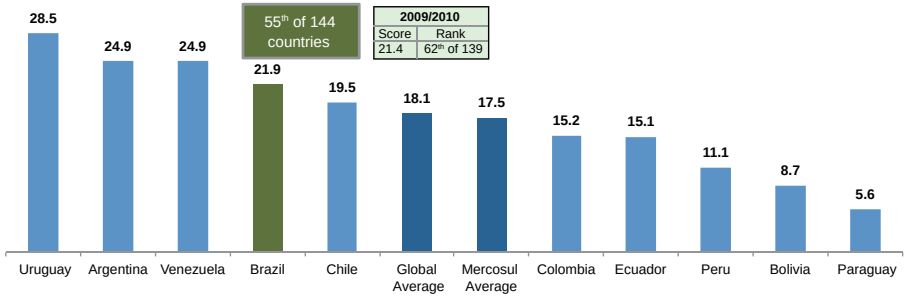
Thus, as can be seen in chapter 4, which proposes actions for the Program Compete Brazil, the focus for sanitation is Planning and Management (item 4.1), since there are resources available for the sector, though they cannot be captured by the operators due to administrative, financial and technical difficulties.

3.2.4 Telecommunications

The telecommunications sector is extremely important to the country's competitiveness, since the ability to transmit and receive information is today one of the most important determinants of market positioning for companies in various industries.

Telecommunication indicators are the only infrastructure indicators in which Brazil improved its ranking from 2010 to 2012. As regards fixed telephone systems, the country went from 62nd place among 136 countries in 2010 to 55th among 144 countries in 2012, reflecting the increase of 21.42 to 21.9 telephone lines for every 100 inhabitants (Chart 48).

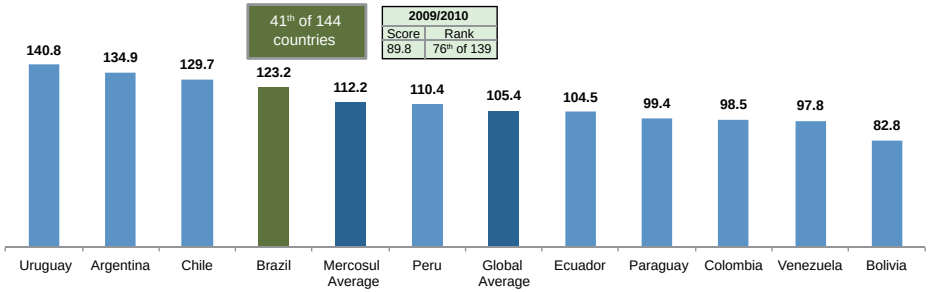
Chart 48. Fixed telephone lines per 100 inhabitants – Mercosur member and associate countries (2012).



Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

As regards mobile telephone systems, Brazil rose from 76th in 2010 to 41st in 2012, reflecting the huge leap from 89.8 mobile lines to 123.2 per 100 inhabitants in a two-year period (Chart 49).

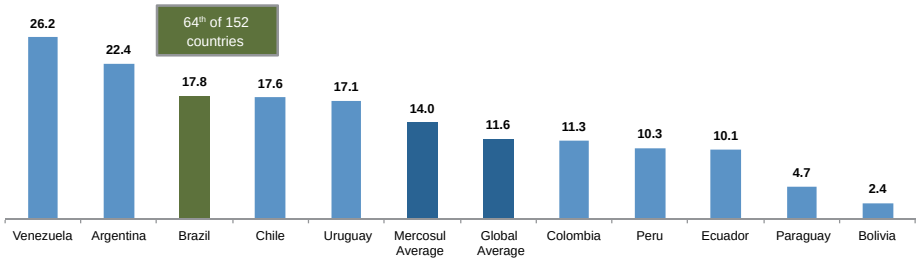
Chart 49. Mobile telephone lines per 100 inhabitants – Mercosur member and associate countries (2012).



Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

To compensate the lack of internet access indicators in the World Economic Forum report, we sought data on fixed and mobile broadband subscriptions for every 100 inhabitants, in the International Telecommunications Union (UIT). The most recent classification available is from 2010, when Brazil ranked 64th among 152 countries, with 17.8 broadband subscriptions for every 100 inhabitants (Chart 50).

Chart 50. Broadband Subscriptions (fixed and mobile) per 100 inhabitants – Mercosur member and associate countries (2010).



Source: LCA, based on UIT data.

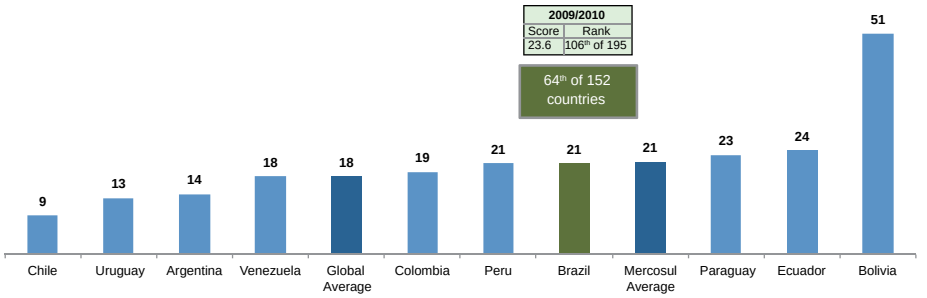
It is known that Brazil started to present, as from July 2012, 40.6 accesses for every 100 inhabitants, an expressive increase of 128%[24].

3.3 Social and environmental aspects

One of the most important aspects for the competitiveness of a country is the productivity of its labor force. Various factors have influenced this productivity, the most relevant of which include workers' health, the technology used in production, and the workers' education and qualification. These factors are strongly correlated with the aspect of social balance of sustainability, because in addition to health and education being rights constitutionally guaranteed in Brazil, the increase in productivity results in higher salaries and more welfare for the population.

The quality indicators of healthcare services best computed and most disseminated are those used in the calculation of the Human Development Index (HDI), infant mortality and life expectancy of the population. These variables are represented in Chart 51 and Chart 52, showing Brazil's position in relation to other Mercosur countries.

Chart 51. Mortality rate of children under five (per thousand live births) – Mercosur member and associate countries (2011).

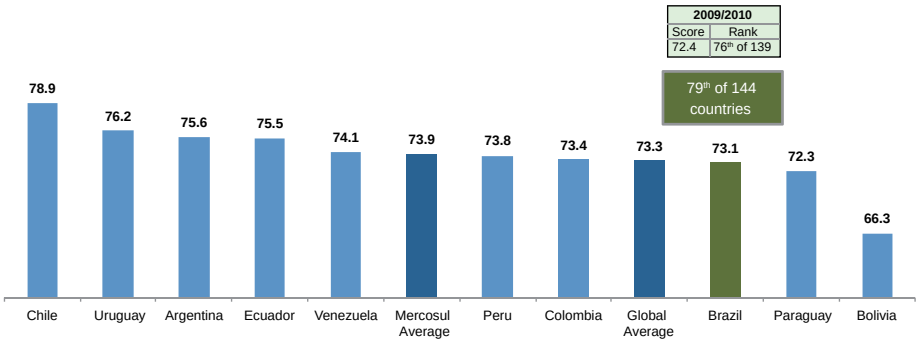


Source: LCA, based on data from *Relatório do Desenvolvimento Humano 2011*.

The infant mortality rate decreased in Brazil in relation to 2010. This is due to various factors, including the introduction of vaccines against infectious diseases, increased prenatal care, which is responsible for reducing neonatal mortality, higher education of mothers and poverty reduction, which leads to greater care with nutrition and improved sanitation, reducing mortality from malnutrition and diarrhea. However, the death of 21 children of up to five years of age for every thousand live births is still very high, placing Brazil in 84th place among 187 countries, behind neighboring countries with lower income, such as Colombia and Venezuela.

24 Source: LCA, based on data from Telebrasil and IBGE.

Chart 52. Life expectancy in years – Mercosur member and associate countries (2012).

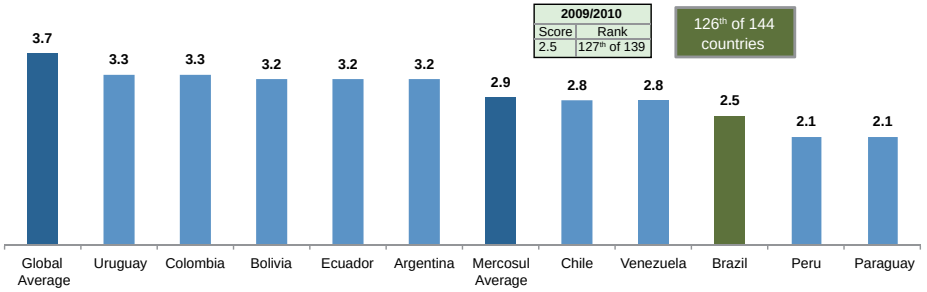


Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

The life expectancy of Brazilians increased from 2010 to 2012, ensuring the 79th position among 144 countries, which is not considered a relative advance, given that Brazil ranked 76th in 2010.

Education, however, maintained its constant score and/or receded from 2010 to 2012. Brazil ranks 126th in the primary education quality index, having maintained its score from 2010 to 2012 (Chart 53).

Chart 53. Quality of Elementary Education – Mercosur member and associate countries (2012).

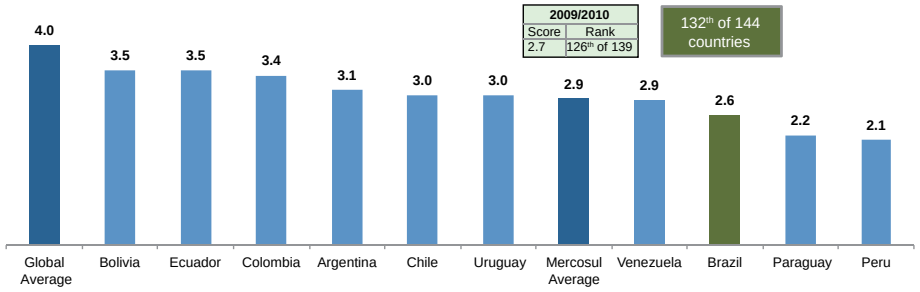


Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question "How do you evaluate the quality of primary schools in your country?".
Answers: from 1 = bad to 7 = excellent.

Teaching of math and science had its score reduced and lost more than 10 positions in the ranking from 2010 to 2012, ranking 132nd among 144 countries, as can be seen in Chart 54.

Chart 54. Quality of teaching of math and science – Mercosur member and associate countries (2012).

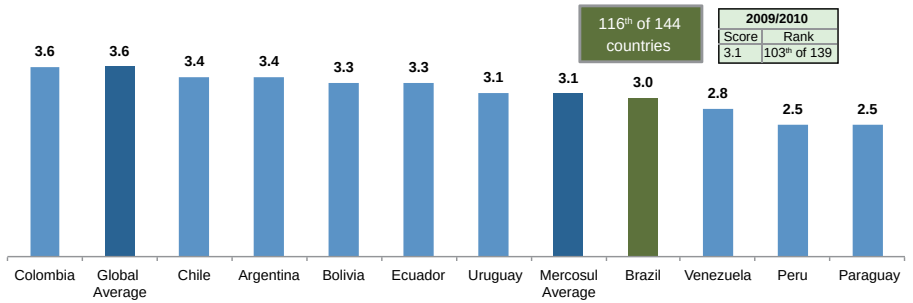


Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question "How do you evaluate the quality of teaching of math and science in the schools of your country?"
Answers: from 1 = bad to 7 = excellent.

Besides not having the desired quality, formal learning seems detached from the education and qualification required by the work market. In the educational system quality indicator, Brazil ranks 116th among 144 countries, dropping in score and losing more than ten positions compared to 2010 (Chart 55).

Chart 55. Quality of educational system – Mercosur member and associate countries (2012).

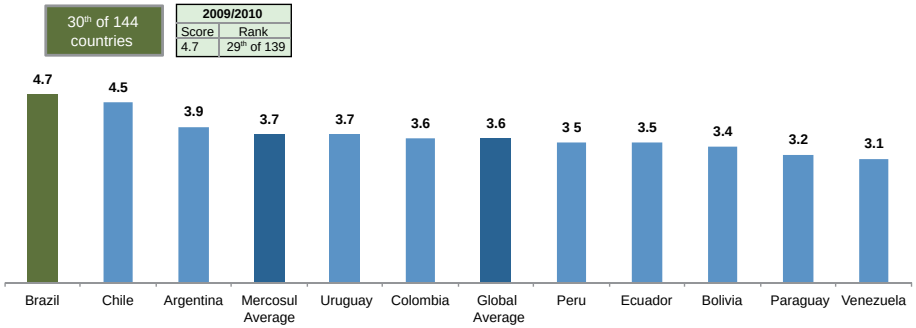


Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question: "How well does the educational system in your country meet the needs of a competitive economy?"
Answers: from 1 = not well at all 7 = very well.

Brazil, however, has a high level of sophistication of production, ranking 30th among 144 countries, having maintained its score from 2010 to 2012, as can be seen in Chart 56.

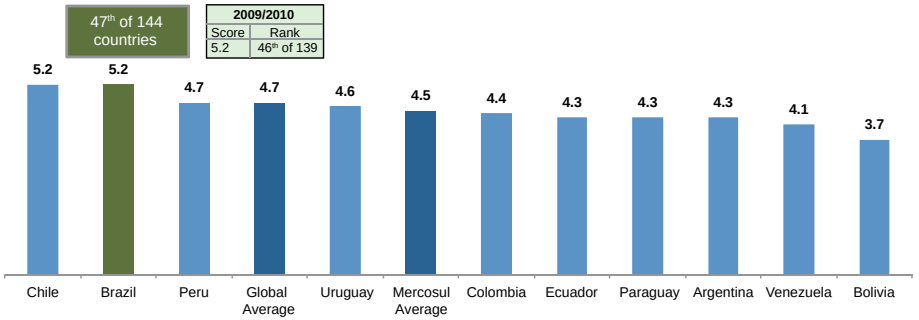
Chart 56. Production sophistication indicator – Mercosur member and associate countries (2012).



Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question: "In your country, how sophisticated are the production processes?".
Answers: from 1 = not at all sophisticated to 7 = highly sophisticated.

Chart 57. Rate of absorption of new technologies – Mercosur members and associate countries.



Source: LCA, based on data from the GCR 2012-2013 – World Economic Forum.

Question: "How well do the companies in your country absorb new technologies?".
Answers: from 1 = do not absorb at all to 7 = absorb a lot.

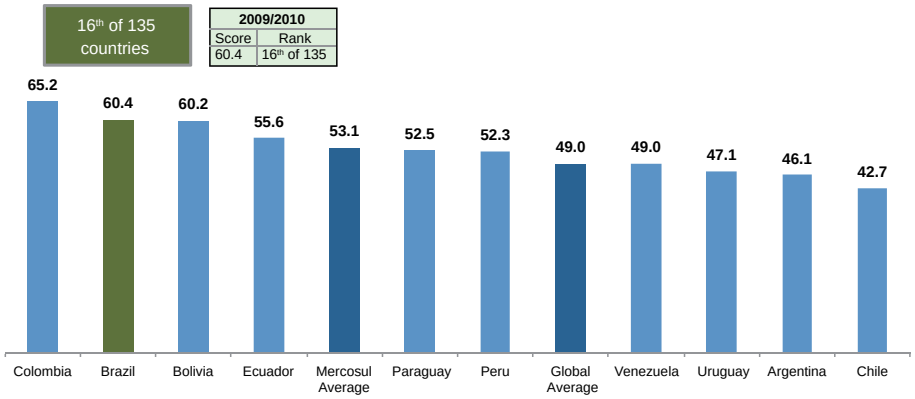
As Brazilian industries find it easy to absorb new technologies, Brazil ranked 47th in 2012 in the World Economic Forum index, which assesses this requisite, indicating that Brazilian companies pursue the technological frontier in order to improve their competitiveness and incorporate sustainable production technologies (Chart 57).

The low rank of the Brazilian educational system indicates low productivity of labor, so most of the growth of production in Brazil is due to the growth of the working age population and the reduction of unemployment. The reversal of the dependency rate, discussed in Chapter 1, shows that it is necessary to quickly improve labor productivity in Brazil. The high degree of sophistication of the production process and the ease in absorbing new technologies suggest that improvement in labor qualification will generate a quick improvement in productivity, since there are technologies available that are not used due to lack of qualified labor.

The environmental issue has two important aspects. The first one is related to the depletion of non-renewable resources, to the reduction of

biodiversity and to the climate changes generated by human activity. The second aspect is related to the impacts of environmental degradation on human health. These two aspects are well captured in the environmental health and ecosystem vitality indicators, calculated by the Yale Center for Environmental Law and Policy (Chart 58).

Chart 58. Ecosystem vitality indicator – Mercosur members and associate countries.

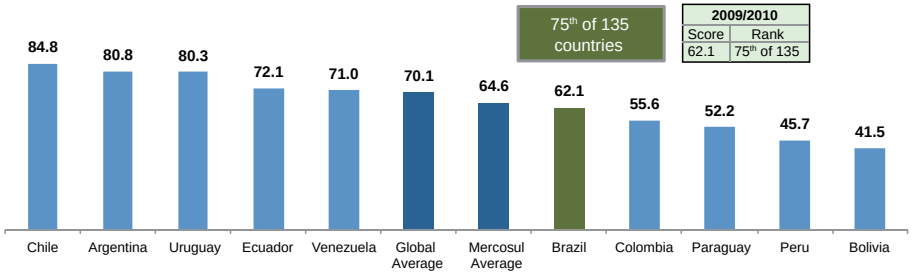


Source: LCA, based on data from the Yale Center for Environmental Law and Policy.

This indicator comprises several data on ecosystem vitality according to the methodology used in the Yale Center for Environmental Law and Policy.

Brazil is very well positioned in the ecosystem vitality indicator, and ranks 16th in the world among 135 countries. The country owes this position to its policy of preserving habitats at risk, its production of low-polluting electricity and its indicators of air pollution, lower than those of other countries (Chart 59).

Chart 59. Environmental health index – Mercosur member and associate countries (2012).



Source: LCA, based on data from the Yale Center for Environmental Law and Policy.

This indicator comprises several health data related to the environment and compiled according to the methodology used in the Yale Center for Environmental Law and Policy.

Brazil's position in the environmental health indicator is significantly lower, as the country ranks 75th among 135 countries, which indicates that the environmental policies adopted have achieved better results in species preservation and maintenance of biomes rather than mitigating adverse effects of water and air pollution on human health.

This poor position in environmental health stems from factors such as inappropriate destination for waste, lack of drinking water supply and lack of sanitation. In Brazil, 12.2% of permanent private households with regular urban planning are close to open sewers. Of the waste generated by these households, 12.6% are not collected, being burned in the properties, carried by storm water, or even abandoned in public spaces, and this results in 5.3% of households being near places with waste accumulated. Water supply is still not adequate, because 14.7% of permanent households are supplied from alternative sources rather than the general water network, and this facilitates contamination due to the lack of appropriate treatment[25].

[25] *Source: LCA, based on IBGE data.*

4. Program Compete Brazil – Set of Actions

The favorable macroeconomic situation needs to be converted into new investments, since great challenges are looming ahead for the Brazilian economy in the next few years. In addition to the quantitative aspects translated, for example, into the estimates of the Pluriannual Plan (PPA), which show an increasing need for funding for projects, there are relevant qualitative aspects for the business environment, infrastructure quality and socioeconomic conditions reflected on the relative low position of Brazil in international comparisons. The following set of actions aims to list priorities so that the necessary resources are made available and converted into productive projects, meeting the sustainability requirements: social balance, economic prosperity and environmental quality.

The proposed actions are included in a program aimed at increasing the competitiveness of the construction sector, named **Program Compete Brazil**. It should be emphasized that if these actions are individually implemented this will produce limited effects in the construction sector, so all actions of the program should be put into practice in order to obtain the desired advancements. The weight of the construction chain in the Brazilian economy makes the positive effects of these actions to overflow to other sectors, boosting the competitiveness of Brazil.

The actions comprised in the Program Compete Brazil are divided into the following topics: **planning and management, institutional aspects and legal security**; funding; labor; tax impacts and production costs; and sustainability.

The actions involving planning and management, institutional aspects and legal security are intended to ensure greater security for investments and reduce the risk of interrupting the work. The interruption of any work, especially for environmental reasons, expropriations and actions of control agencies, generates uncertainties for the contracts and increases the cost of projects, whether due to investors' perception of the risk or for the interruption itself. The concept of legal security is related to stability, calculability, predictability and trust[26].

Companies working with public contracts have suffered the consequences in a business environment with successive interruptions of construction work. As an example, according to a study released by the National Association of Road Works (ANEOR)[27], the net profit of construction companies has decreased in recent years. In 2004, the net profit of a group of companies surveyed was 7.21% in relation to revenue, and in 2011 this (ratio) was 3.06%[28].

Actions of **funding** are focused primarily on diversification of funding sources, which are currently largely concentrated in resources from the FGTS and SBPE for housing and BNDES for infrastructure.

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[26] The concepts of predictability and calculability are associated with the possibility of prior calculation of the actions or conduct of public administration, i.e., expectation that the rules established will be maintained. Stability, here, means continuity, permanence and regularity of the situations and legal relationships. Finally, confidence is related to the good faith of individuals in relation to the actions of Administration, as they believe and expect such actions to be licit. Botilho, M. T. (Org). Segurança Jurídica no Brasil, São Paulo: RG Editores 2012, 205 p. – book published in conjunction with the Union of Heavy Construction Industry of the State of São Paulo (Sinicesp).

[27] Source: http://www.valor.com.br/empresas/2879174/reducao-de-obra-publica-compromete-empreiteiras. Access on October 31, 2012.

[28] The sample of the study includes 40 publicly traded and privately held companies with sales between BRL 80 million and BRL 8.5 billion per year.

Regarding **labor**, the actions of the Program Compete Brazil are intended to attract, qualify and retain professionals for the construction industry. Considering only technical-level labor, a SENAI survey estimates a current shortage of 16 thousand professionals for the construction industry[29]. With construction wages above the average wage of other industries, as shown before, and with the shortage of labor, the construction industry needs to increase its productivity so that the expansion of projects takes place in the time and with the quality required.

Another topic of the program, **tax impacts** and **production costs**, focuses on actions that reduce the burden on production costs to promote efficiency and increase production.

Thus, the actions of the Program Compete Brazil meet the concept of sustainability, promoting balance between the tripod economic prosperity, social balance and environmental quality.

4.1 Planning and management

As shown in chapter 2, **planning** should be the beginning of any project in the construction chain. The quality of a project before contracting, reduces the perception of risk on the part of investors, and consequently, the cost of the project. It facilitates the construction of metrics for monitoring the project, preventing the interruption of work. This allows planning to be performed carefully, since only efficient **management** ensures the completion of what had been previously established.

To achieve that objective, it is necessary to have **rules and procedures in the preparation and monitoring of the clearer and more uniform projects**. Moreover, such rules and procedures should be published and easily accessible, so that they can be followed by companies and by the governmental departments and agencies responsible for hiring, monitoring and controlling projects.

In this respect, a positive highlight is the creation of the **Special Study Commission for Budgeting and Pricing Infrastructure and Building Projects** (ABNT/CEE-162), which congregates public and private agents operating in the various stages of the implementation of a project. The Commission consists of representatives of public and private companies, regulatory agencies, private entities and control agencies, which include the Brazilian Association of Technical Standards (ABNT), the Brazilian Association of Engineering Consultants (ABCE), National Association of Road Works (ANEOR), National Union of Architecture and Engineering Consultancy Companies (SINAENCO), São Paulo Association of Public Works Contractors (APEOP), Union of Heavy Construction Industry of the State of São Paulo (SINICESP), Union of Civil Construction Industry (SINDUSCON), National Association of Heavy Construction Industry (SINICON), Infraero, Caixa Economica Federal, Federal Police, Federal Accounting Office (TCU), Public Prosecutor's Office, Office of Planning and Strategic Investments, among others.

The objective of the Commission is to create a norm for budgeting and pricing infrastructure and building projects, as concerns terminology, requirements and methodology. The adoption of such norm will enable a greater uniformity of methodologies, criteria and concepts, used for the pricing of all work stages related to the implementation of a project; the appropriate valuation of initial services – planning, preparation of studies and projects – should lead to the enhancement of these technical documents, which are essential tools for the management and execution of the work, and consequently, will reduce the risk of projects unfinished or below the expected quality and usefulness.

It is suggested that the work of this Commission should be prioritized, so that its effects can be felt quickly in the market.

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29 *http://www.sinaprocim.com.br/BomDia11.asp?RSI=2874*

In order to expedite the dissemination of the results of this Commission, it is suggested that the Federal Government should prepare promotional material contemplating the products of the above mentioned Commission, that can be sent to state and municipal procurement and control agencies, listing principles and methods that should be observed in the preparation and monitoring of a project, considering specific aspects regarding size and nature of each project. That is, it is not standardization, since this is not possible because each project is unique, but a lead to greater uniformity of the criteria that should be observed in the design, contracting and monitoring of a project.

This procedure aims to **facilitate and expedite** the development of projects, **to technically level the preparation of proposals**, making them easily comparable, to **avoid the need for contractual amendments due to project failures**, and ensure the best planning possible, **preventing unnecessary interruptions** in the construction works.

An expanded planning vision is greatly important for sustainability, seeking coherence of public policies and ensuring the contour conditions for their feasibility. As regards occupation and use of territory, for example, before starting a project it is important to choose the best socio-economic-environmental guidelines of both the project and the building process, and complete design before beginning to prepare the worksite, including legal aspects regarding availability of all specifications and have all the interferences resolved, such as expropriations, without the risk of interrupting the construction work.

For the private agents to be able to better plan their production capacity, it is important to have greater predictability in the flow of public contracts.

Government has already signaled the intention of maintaining investment levels in PPA 2012-2015. However, this cannot be done by just making available an **execution schedule** or **verifiable goals and metrics** for monitoring its implementation. It is necessary to list **priorities** and increase **transparency** in medium- and long-term government planning. Furthermore, it is necessary to ensure greater adherence of the Budget Guidelines Law (LDO) to the PPA, so that the planning established for four years is converted into budget availability, the effective resources of which will be released year by year, an essential condition to accomplish the projects. Also, in case the disbursement planned has not been effected, it is important that the public agencies clarify and publish the reasons for such discrepancy, imparting more transparency and effectiveness to planning and execution.

In this respect, special attention should be given to the sanitation sector, given the undeniable delay in the universalization goals, which, as will be seen later in detail, proposes to set a new term, but with a more effective monitoring and control of application of resources and investments, so that the deadlines are achieved. It is important that the municipal plans for water and sewer systems are completed by 2014.

The elements above together – the **Special Study Commission for Budgeting and Pricing Infrastructure and Building Projects** (ABNT/CEE-162) is the greatest adherence between PPA and LDO – they favor the creation of a **project database** that should be available to the public, materializing the goals and metrics established in the planning into schedules for hiring and executing work. The project database becomes essential in that it promotes greater **predictability and security** for the investor

The project database should contain plans for future **Public-Private Partnerships (PPP)**, contemplating contracts for public service rendering (administrative PPP) as well as for maintenance work; modernization and revitalization of existing buildings, and not only new works. This can increase the activity of small and medium companies. In the case of roads, for example, individual contracts could be considered for signage, restoration, customer service and road maintenance.

Another important action is the promotion of **transparency in the disclosure of Procedures to Manifest Interest (PMI) on the part of States**, with information centralized in a single electronic domain. This action is necessary because some States keep the information of their PMIs in distinct electronic domains, and others only release it in their Official Journal, where information is more difficult to access because of the deficient search mechanisms. Moreover, **partial manifestation** should be allowed, so that specialist in a given area manifest only in their field of expertise, if they wish[30].

The participation of a control agency as the Federal Accounting Office (TCU), in the design of the projects and not only in the execution phase, so that there is a broad understanding of the project and of its specificities, may reduce the interruption of construction work because it provides a better understanding of the projects from their design, reducing questionings during the execution phase. Additionally, it is necessary to **enhance the reference prices** used by these control agencies, such as the National System for Cost Research and Civil Construction Indices (SINAPI) and the Road Cost System (SICRO), adjusting them to the regional realities, as the price of the same input in one state may be very different if compared to another one.

The difference in price between regions may occur, for example, because of a relative shortage of products and because of higher transportation costs. In addition, a greater **price differentiation by sectors** is required, because the existing table is excessively clustered, considering materials and inputs of different applications as the same product. Therefore, it is recommended that SINAPI and SICRO should have regional and sectorial references.

Housing projects should be accompanied by an **urban planning** that ensures access to the basic infrastructure of piped water, sewer system, access to electricity, public lighting and access to good public transportation, so that the expansion of the cities will not occur at the expense of the quality of life of its inhabitants.

In order to coordinate this integrated planning, one could **stimulate initiatives like the Planning and Logistics Company**, responsible for the management of logistics projects and the intermodal transportation planning, aimed at the long term. A sector that would benefit from such integrated planning is the sanitation sector, whose decentralized planning as well as the serious management problems of current companies, delay and sometimes prevent the use of resources already available for the industry. In this respect, the suggestion is to **create a Sanitation Planning Company (EPS)**, whose function would be to assist in the recovery of sanitation service operators in poor administrative, financial and technical condition. Thus, municipal agents may be in better conditions to capture public resources that are already available for the sector but are not used, because the sanitation companies are not in condition to capture these resources, as they require a management adjustment. In terms of regulation, EPS can provide specific regulatory solutions to municipal entities, as a way to comply with the new regulatory mark for the industry. Moreover, EPS could also assist municipalities in preparing projects and implementation and management plans, establishing **new deadlines for the universalization of access to water and sanitation**, and **with effective monitoring of the implementation of these municipal plans**.

Currently, about BRL 2 billion are collected per year by the sanitation sector through the Social Integration Program (PIS) and the Contribution to Social Security Financing (COFINS). **ESP could be feasible with these resources, ensuring its return to the sector itself**.

The year 2030 should be adopted as the new deadline for the universalization of access to water and sanitation with quality, maintaining 2022

[30] *Procedure to Manifest Interest in the States – Report on PPP projects in the process of being structured via PMI.*

as an intermediate goal, according to the recommendations of the WATER sector in the last United Nations Conference on Sustainable Development – Rio +20. It is estimated that water and sanitation alone will need BRL 320 billion by 2030.

It is necessary to create a permanent work group to monitor these activities, with participation of private initiative, along with Federal, State and Municipal Governments.

As a result of this group, proposals should be developed so that resources are available for recovery and improvement of the management of state operating companies, as the FI-FGTS itself. As consideration for the receipt of these funds, the operating companies have to prepare and implement an effective program to reduce billing losses, developed together with the State Sanitation Companies Association (AESBE), Municipal Sanitation Services Association (ASSEMAE) and Brazilian Private Sanitation Concessionaires Association (ABCON), for instance, creating ways of immediate application of resources already provided for in PAC 2 for this purpose (approximately BRL 2 billion).

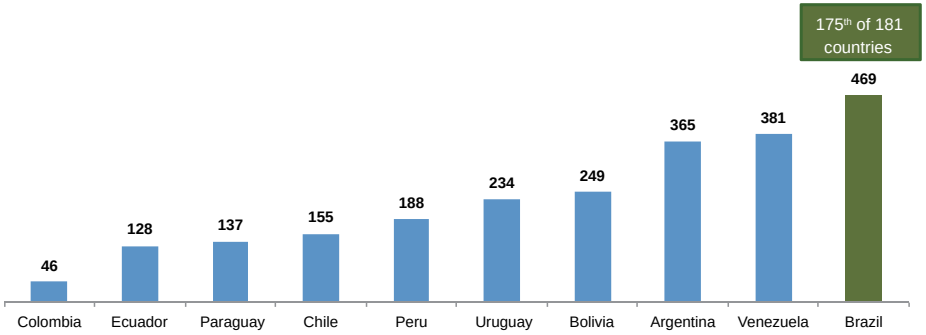
Successful cases can be used as a reference. SABESP, for instance, has reduced its billing losses from 34% to 26% in 8 years, and must get below 15% by 2020.

4.2 Institutional aspects and legal security

As pointed out in chapter 3, there are several institutional issues that hinder Brazil's competitiveness. The excessive bureaucracy and the complex tax system are among the most problematic for competitiveness in the country.

The construction industry is particularly held hostage to some of these problems. Brazil ranks 175th among 181 countries in the item days spent to get permission to build, according to the report *Doing Business 2012*, as shown in Chart 60.

Chart 60. Days spent to get permission to build – Mercosur member and associate countries (2012).



Source: LCA, based on data from Doing Business 2012.

This excessive delay extends to all administrative procedures to complete any construction work in Brazil. One of the greatest problems is the **slowness and inefficiency of the real estate registry offices in some regions of the country** where there is still no computerized data and documents, and employees are poorly qualified.

As registry offices are delegated public services, it is the responsibility of the government **to require minimum levels of quality and agility in the services rendered**. For this reason, it is necessary to **rank the real estate registry offices** in terms of efficiency and use the **best ranked as a parameter** for the others. An example of requirement that may be applied is that all registry offices should attain 70% of the efficiency of the one ranking first, being subject to fines and, ultimately, to the loss of ownership of the registry office. Furthermore, it is crucial to set **deadlines for the computerization of all registry offices**, as this will ensure more agility in compliance with requirements.

It is important to advance in procedures for greater agility, such as **reducing bureaucracy and simplifying property registration**. The suggestion is to include all information on the property in its registration number: facts, rights, public or private liabilities bearing any relation with the property registered. All the rights and obligations that may have legal consequences with the property registered, should be contained in the registration certificate. This ensures simplification in the negotiation of properties, more agility in concession of housing credits, reduction in transaction costs, less bureaucracy, greater legal security.

As regards the work market, an issue that has generated insecurity in the construction chain in Brazil is how the legislation regarding the quota for people with disabilities is being applied in the industry the (Law No. 8231, of 1991). As shown in chapter 2, the construction industry has shown a rapid geographic expansion, which has led large developments to move to locations away from more developed and populated centers in the country. This entails problems to comply with the quotas established by law, quite often for lack of a minimum contingent of workers in these conditions, subjecting companies to receive fines without there being any concrete actions they could adopt to mitigate this risk.

This legal uncertainty of being subject to a fine due to the insurmountable difficulty in filling quotas can be mitigated if there is flexibility for **regional compensation**, i.e., developments located in major urban centers with a greater offer of jobs for people with disabilities would compensate the hiring deficit of projects in municipalities without applicants for jobs. Still, a protocol can be created **for disseminating the vacancies available**, with minimum exposure time and characterization of the means of communication used to disseminate announce the vacancies, so that if the company follows the established protocol but cannot find suitable applicants to fill the positions available, it will be exempt from fines.

This lack of flexibility has also manifested itself as a problem in relation to quotas for apprentices, which quite often are not filled for lack of applicants. The solution is similar to the one previously described regarding quotas for people with disabilities, regional compensation and protocol for dissemination of vacancies, which, if followed, exempts the company of a fine, as it doesn't find candidates.

Another hindrance to agility in the execution of construction work in Brazil is the slowness in conflict resolution by arbitration or court proceedings. A measure adopted abroad to minimize the development of conflicts or promote their resolution before they are taken to Court, is the establishment of dispute boards in the projects.

Dispute board is a **committee of experienced and impartial professionals,** with great renown in the market, who are hired to follow up on a major undertaking from planning to delivery. Usually these committees are

composed of two engineers and a lawyer, who meet at the project site every 90 or 120 days to listen to all questions related to the project that may cause a dispute between the parties. Thus, this committee **issues reports and opinions**, stimulating dialog between the parties and preventing misunderstandings to become a legal dispute.

This committee is successful in the resolution of conflicts because it is involved in the project since the design phase, following up on it periodically, which allows a greater interaction with the parties and a better understanding of the friction between the agents involved. The conciliation function of the dispute board is to identify problems in their initial phase, issuing reports and opinions that tend to be accepted in view of the experience and impartiality of the board members, as well as to make the parties aware of the costs of pursuing their case in court

In addition, the cost of hiring the dispute board is low if compared to the reduction in the quantity of actions brought to the appreciation of the Judiciary, and especially, the considerable reduction in the interruption of construction work because of conflict between the parties.

4.3 Funding

As pointed out in chapter 2, **housing** building has grown significantly in recent years due to the economic growth and the PMCMV, and this scenario led to a **rapid expansion of investments** in the sector, but further growth is necessary to eliminate the housing shortage and the number of inadequate households.

The solution to the housing shortage requires the construction of new dwellings, which involves expanding the construction capacity of companies and payment capacity of households. The latter factor is limited by the amount of funding available, as it is still very concentrated in the **Housing Financial System (SFH)**, whose resources come from the Brazilian System of Savings and Loans (Sistema Brasileiro de Poupança e Empréstimo - SBPE) and from the Severance Indemnity Fund for Employees (Fundo de Garantia por Tempo de Serviço - FGTS). The problem with this configuration is that the Housing Financial System (SFH) has a social purpose, and therefore, it establishes restrictive rules with maximum value of BRL 500 thousand for a property. The need was identified to **diversify the sources of investment** in order to ensure the capacity of expansion of housing loans in the country.

In order to meet this demand, the **Real Estate Financing System (SFI)** was created by Law No. 9514, of November 20, 1997, to complement the SFH, presenting essential differences in its constitution. The main difference is that the SFI is governed by market rules, so there is no upper limit for the value of properties and interest rates; this system allows mortgage of the properties, so that when the borrower obtains a loan, he/she obtains the possession of the property, but not its title, because the property is registered in the name of the financing entity until the debt is paid off.

The same law that created the SFI has also created the **Real Estate Receivables Certificate (CRI)**, a credit instrument backed by real estate credits that constitutes a promise of payment in cash. The issuance of this instrument is restricted to the Real Estate Securitization Companies, non-financial institutions that purchase the mortgages from lenders and securitize them, issuing the security as a product of this operation. This device enables to take a medium- and long-term flow of receivables and convert them into a cash-payable asset.

Law No. 10931, of August 02, 2004, created other real estate securities with different characteristics from the CRI, the **Real Estate Credit Note (CCI)** and the **Real Estate Credit Bill (LCI**).

CCI is a bond issued directly by the creditor of the housing credit, being related to the total or partial value of a single development. This bond is meant to facilitate the assignment of real estate credit because, like the CRI, it allows medium- and long-term receivables to be paid cash.

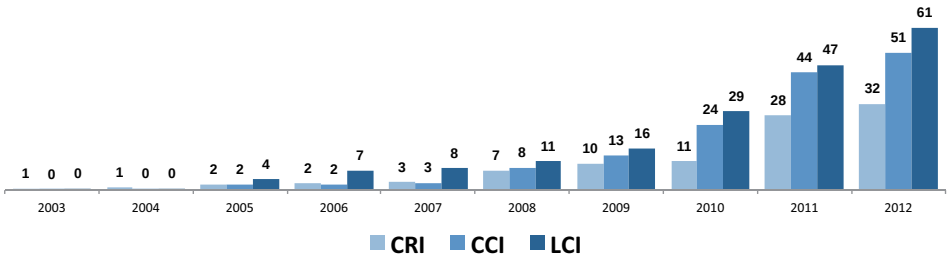
LCI, in turn, is a bond backed by real estate credit that is guaranteed by mortgage or chattel mortgage, and like the CCI, is issued directly by the lender of real estate credit, but the LCI is different because it can be composed of several real estate credits and must necessarily contain the total value of the credits that it comprises.

As can be seen in Chart 61, there was a growth of the stock of the three types of securities during the last decade. CCI and LCI have shown higher growth and higher value since their creation.

CCI and LCI bonds have shown strong growth in recent months, from January 2011 to October 31, 2012, the stock of CCI grew 17.0% and the stock of LCI, 29.5%. However, these bonds still lack a mechanism to protect investors in case of insolvency of the issuer, and a secondary market more developed, which would increase the liquidity of the bonds

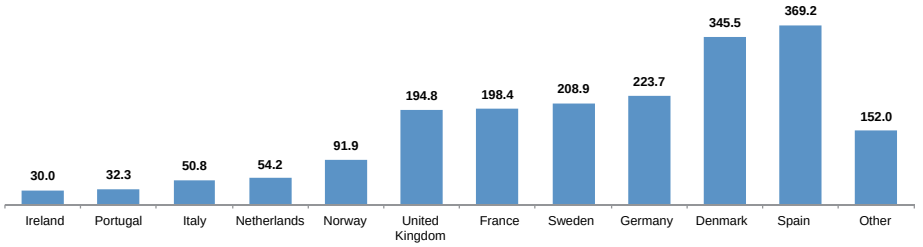
A way to increase the guarantee of these bonds is to establish a special regimen in case of insolvency of the issuer, so in case the issuer of the bond goes bankrupt and needs to sell its assets, including the set of assets to which the bonds are linked, the buyers of the bonds would have first priority for payment. This is the main point of difference of the bonds known as **Covered Bonds,** source of real estate financing extremely widespread in Europe, as can be seen in Chart 62. These credits represent considerable percentages in the total amount of credits backed by mortgages in European countries, reaching 28.2% in Norway, as shown in Chart 63.

Chart 61. Stock of CRI, CCI and LCI securities on the last working day of each year* (BRL billions).



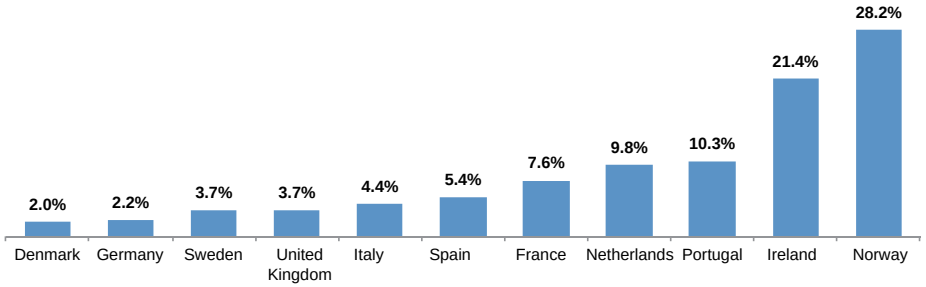
Source: LCA, based on Cetip data.
*In 2012 the stock refers to October 31, 2012.

Chart 62. Value of stock of Covered Bonds backed by mortgages in 2011 (€ billions).



Source: LCA, based on data from the *European Covered Bond Council (ECBC)*.

Chart 63. Percentage of Covered Bonds in mortgage debts incurred in 2010.



Source: LCA, based on data from the *European Mortgage Federation.*

The covered bonds traded in Europe in 2011 totaled € 1,951.6 billion. The value of these bonds traded in highly populated countries, such as Germany, France and UK, was € 223.7 billion, € 198.4 billion and € 194.8 billion, respectively, and compared to the total value of Brazilian securities during the same year, BRL 119 billion, shows that there is still much room for expansion for securities backed by mortgages in Brazil. **The introduction of a security with a regimen prioritizing its holders in the event of insolvency of the issuer is an important step for a greater dissemination of securities backed by real estate debts**, diversifying the source of real estate financing in Brazil.

In parallel with the need for funding for real estate construction, the great **expansion of infrastructure investment** through the two phases of PAC also requires a great volume of investment, whose funding faces a problem similar to that of housing, with great concentration in a single source, the BNDES.

A way to mitigate this problem is to create an **infrastructure investment fund linked to receivables from judicial orders of cash release** (*precatórios*). The list of these receivables is composed of debts of governmental entities, including municipal, state and federal governments, finally adjudged by Courts, without the right of appeal. These debts can refer to child support, related to labor lawsuits and various indemnifications, or others, involving expropriation, breach of contract and tort committed by public officials, among others. When those receivables are judicially adjudged, they are included in the budget of the paying entity, for payment in the following year.

However, payment will not be effected in this manner, because various federative entities, particularly states and municipalities, have debts higher than their ability to pay each period, so a list of pending payments is formed. Payment is effected according to two waiting lists, the first one is a priority list, that includes elderly people (above 60 years of age), or people suffering from serious, chronic or perennial disease; the second list is paid off after the payment of priority creditors, with child support debts being prioritized.

According to the National Council of Justice, until the first half of 2012, the debt of states and municipalities in the form of judicial orders of cash release totaled **BRL 94 billion**. This amount constitutes medium-term receivables that can be transformed into securities and paid cash. To this end, it would be necessary for the Federal Government to participate as a guarantor of the securities related to the infrastructure investment fund and liquidity provider, i.e., the National Treasury could bring the judicial orders of cash release to current value, creating an **infrastructure investment fund**, so the creditors of the federative entities in the list of judicial orders of cash release would have the option to exchange their receivables with securities of this fund, that could be traded in the secondary market. Thus, the National Treasury would take over the receivable from the owing federative entities and would restore its equity at the time of payment of the judicial orders of cash release.

This way, the people and companies favored by judicial decisions

could have quick access to the amount due and the BRL 94 billion judicial orders of cash release could be converted into infrastructure financing.

Another way to diversify infrastructure financing is through the **proceeds from the renegotiation of state debts in the discussions about the Federative Pact**.

The federative model was introduced in Brazil in the 1891 Constitution and was maintained in the drafting of the 1988 Constitution, which determines that the Brazilian State is composed of four types of federative entities with autonomy: the Union, states, municipalities and the Federal District. These federative entities have competences of their own, in private or shared with other entities of the federation, and the attributions are established in the Constitution itself.

The current format of this division of competences has generated tension in the relationship among the entities of the federation, especially with regard to the decisions on tax revenue and division through the Participation Fund of the States (FPE). One of the most discussed topics is the tax war between the states, which consists in reducing state taxes to attract projects to the detriment of other states; the states' debts with the Union; the lack of consensus about how the FPE resources should be distributed, and the lack of agreement about how royalties for ores and oil should be distributed.

This configuration generates a movement for the rediscussion of the Federative Pact, in order to resolve or minimize these deadlocks, restoring the fiscal health of the states.

A possible solution to a part of the problems faced, is for the Union to renegotiate the criteria for adjusting debt for inflation in states and municipalities, linking part of their receivables to direct investments in infrastructure in their own seats, provided it is in accordance with the central development project, such as the one that has been established in PAC[31]. Thus, states benefit from renegotiating their debt, resulting in a lower debt maintenance value and improvement in their infrastructure, promoting greater economic development and competitiveness. The Federal Government, in turn, releases funds that were linked to these investment plans, having more funds available to expand investments in infrastructure where it is more necessary according to their strategic diagnosis and where there are more funds, promoting greater balance in the development of infrastructure in various locations in Brazil.

Another way to diversify funds available for investment in infrastructure is expanding the scope of Law 12431/11. One of the objectives of this law was to reduce the cost of the financing of infrastructure works by reducing the rate of income tax, including for income earned on securities issued by companies not classified as financial institutions, **when paid to a beneficiary residing abroad**. The benefit is extended to shares of investment funds exclusive for non-resident investors who own a minimum of 85% of the net equity value of the fund invested in these securities.

However, despite these incentive measures, the said law does not reach other sources of funding, such as bank loans, and especially resources from **pension funds and supplementary retirement funds**, which have a long-term investment profile.

So they suggest to increase the volume of loans with market resources for infrastructure works, as well as ways to reduce the cost of this credit by creating some funding mechanisms.

- **Bank Loan**: creation of financial instruments exempt of income tax for

[31] *These debts totalized, in March 2012, BRL 432 billion, according to data published on the electronic domain of the House of Representatives on October 31, 2012.*

individuals and 15% for corporate entities, that should be used exclusively as funding for financing the infrastructure sector;

- **Investment Funds**: extension of tax incentive provided for in Law 12431/11 for all investment funds that had in their portfolio securities linked to infrastructure financing, and not only to funds largely backed by incentivized debentures. The benefit would be proportional to the participation of infrastructure securities in the total portfolio of the fund;
- **Pension Funds**: extension of tax incentive provided for in Law 12431/11 for pension funds. The instrument would provide the creation of a mechanism to accumulate and transfer to individuals or corporations, tax credits for pension funds based on income from securities linked to infrastructure;
- **Direct benefit to the borrower**: this instrument would have as its main mechanism the accumulation of tax credits generated from debentures issued directly by Specific Purpose Societies (SPE) to finance projects that are considered a priority for the government. Tax credit would be defined as a percentage of the difference between the market interest rate and the long-term interest rate (TJLP), which would be periodically applied over the balance of the loan without incidence of spread risk and could be offset by any federal tax.

The main effect resulting from the creation of instruments is the **increase of funding with market resources for infrastructure projects**. As an immediate consequence of the proposed mechanisms, there would be less dependence on BNDES.

The great increase in infrastructure investments in recent years has increased the activity of the country's heavy construction industry, which has increasingly participated as infrastructure investors and operators, and not only as constructors. This increase in activity is accompanied by an increasing need for funding in substantial volume, in order to facilitate the participation of these companies as entrepreneurs of large infrastructure projects in the country.

On the other hand, the financing of these projects has relied heavily on the balance sheets and on the financial capacity of the companies to guarantee payment of the principal and interest. This is because in Brazil, the guarantees required for infrastructure funding are mainly based on the corporate balance sheets of the investing companies or their Holdings, at least during the construction phase – which, in the infrastructure projects, take two to five years to become operational, depending on the complexity of the project. This compromises the investment capacity of these companies during the construction period, until the project in question is actually generating revenue as expected.

Thus, especially when the cost of the projects is very high, the company(s) is(are) unable to show sufficient assets and/or revenues to contract new loans, while the loans previously obtained are guaranteed by current assets and revenues – i.e., during all the construction period of the project until the disencumbering of the balances given as guarantee.

An alternative to this model is the use of **surety bonds**, which consist in the acceptance of surety bond policies (Performance Bonds associated with engineering insurance) issued by insurance companies, which evaluate the risk of an infrastructure project based on the characteristics of the project, on the quality of the project and on the history of operation of the company responsible for the project (track record).

The use of these instruments is very incipient in Brazil basically because of the generalized use of corporate or bank guarantees, which are considered more secure. On the one hand, surety bonds are in fact less risky, considering the low default rates in the BNDES portfolio, for instance. On the other hand, the limits of this pattern of financing are becoming clearer due to the unavailability in

balance sheets to cope with the bulky volume of Investments planned for the coming years, whether to guarantee a new round of funding, or to enable companies to obtain in the market the equity required as counterpart to the funding received.

The Federal Government has already indicated its willingness to participate in this market by creating the **Infrastructure Guarantee Fund (FGIE) and the Brazilian Fund and Guarantee Management Agency (ABGF)**. Both the FGIE and ABGF were created with the enactment of Law 12.712/2012, but they are still in discussion phase and deciding upon the Bylaws, which must define points like composition, functioning, attributions and term of office of their members.

Since the law that created the ABGF and FGIE has a general text, **the next phases must specify their scope and the limits of their operation, in order to complement the insurance market in the task of offering alternative guarantees for the funding of national infrastructure. By alternative guarantees it is meant to create safe mechanisms for adoption of non recourse Project Finance, instead of corporate finance**.

Finally, **the scope of the fund should be extended to offer guarantees for industrial facilities dedicated to the production of materials, components and equipment necessary to ensure supply for infrastructure projects**, in order to prevent bottlenecks for lack of inputs or equipment.

4.4 Labor

The low productivity of labor in Brazil has negatively affected the construction chain, which has been facing a growing need for labor and applicants with adequate qualifications for the job openings available. Thus, the challenge of companies has been to attract workers, train them and retain them, reducing evasion to other sectors of the economy.

A. Technical education – education in the working environment

The fast growth of construction has generated greater dispersion of activities in the country, creating the need to educate and train the workforce in these locations. The need for readiness in the education and training of that personnel, leads the companies to train and qualify their own employees.

The companies know where their operations will require more employees and what qualifications are required to fill the job openings available. Several construction companies are already engaged in educating and training workforce in the locations of their projects, paying the equivalent costs.

The education and training of these workers, however, is a social gain, because the company has no guarantee that that worker will remain as their employee after the education and training period, and generates social benefits that exceed the worker's greater productivity at work.

A possible solution to motivate and further enable these initiatives of the companies themselves training their employees is the **granting of tax credits to be applied for this training**, in the form of income tax exemption for companies (that operate under presumed profit and real profit regimes).

In Canada, for instance, there is the Program Learning in the Workplace, where the worker is hired as an apprentice for a period of 12 to 24 months, during which the company receives tax credit.

These credits can be higher if the training occurs in **groups of interest or ones requiring specialized or more intense training**, such as people with disabilities, people in a situation of violence (assisted in social assistance centers of the government), ex-convicts, and recipients of unemployment insurance and family allowance program who stop receiving the benefit as they get a job. In the United States, there is a work opportunity tax credit designed for groups of interest, such as people with disabilities, war veterans, ex-convicts, etc. In France,

there is a tax credit for learning, which is proportional to the number of non-qualified workers hired by the company as apprentices, with the possibility of a higher credit if the worker is physically disabled, for the whole period of training.

B. College education

The Engineering and Architecture courses should be brought closer to the construction labor market. To do this, a greater integration between educational institutions and companies is essential, which can be made possible through partnerships targeted for insertion of students via internships, greater cooperation of companies with academic research focused on the construction chain, such as development of new production and material techniques. Also, it is necessary to insert the technology currently used in the construction chain into the college subjects, exposing the students to the production methods they will use in their professional practice.

Additionally, it is crucial to adapt the curriculum of the Engineering and Architecture courses to the current needs of the work market, including more practical subjects in the final periods of the courses. Finally, it is essential to review the rules that enable to obtain credits in contents not related to the Engineering and Architecture courses, **reducing the maximum workload for complementary activities, or limiting the scope of what can be considered a "complementary activity" focusing on the student's education**.

C. Institutional aspects

It is necessary to make the occupation in civil construction more attractive besides the high wages that are currently being paid. For this, **the change of image of the construction worker** could contribute to the attractiveness of the sector. An important step in this direction is to change in the **Brazilian Classification of Occupations**, job titles like bricklayers, which are already stigmatized as people with low educational level, low income and low social value; all of this discourages those ingressing the job of construction worker, besides leading those currently employed in this industry to seek other occupations.

Another institutional aspect essential in construction is the need to **reduce the dissociation between supply and demand of work in construction**, especially in temporary functions. This dissociation is a consequence mainly of the lack of systematic information, i.e., the absence of a unified database. Qualified workers don't know where the job opportunities are located, and companies don't know how many and where qualified workers are available in the market.

A solution is the use of a web portal that facilitates contact between workers and companies, fed by both sides of the market, i.e., the workers register their resumes on-line, including their educational background and municipality of residence, and the companies post their needs for workers by municipality, with descriptions of the functions to be performed and the qualifications required.

It is interesting that construction companies should announce job openings in advance, during the planning phase of the projects, because this gives prospective employees time to seek the training required to fill those positions. The web portal should also keep updated the education and training courses available in each municipality and have a section for manifestation of interest in training courses, so that when there is a critical mass of people interested in the course, the government can take action quickly to meet that specific need for training in the location where it is needed.

A first experience with this portal will be made by FIESP, using the already existing Observatory.

4.5 Tax impacts and production cost

As discussed in chapter 3, the high value of taxes and the complexity of the tax system are extremely harmful to Brazilian competitiveness. The complexity of the tax system generates adverse distortions in some markets that can only be definitely corrected with a **comprehensive tax reform**. However, some palliative measures can be taken right now.

Moreover, besides the excessive tax burden, the construction chain is burdened with the cumulativeness of taxes. A tax is considered cumulative when it is paid in a stage of the production chain and doesn't generate credit for the next stages. This is the so-called "hidden tax", which corresponds to the portion of tax accumulated in the chain that is not used as credit for reduction of payment in the sector. An ongoing study on the Movement Competitive Brazil estimates that the effect of "hidden tax" in the productive chains can generate an impact of 9% to 15% on the final price of construction products, cars, machinery and equipment.

Ceramic and glass industries are heavily burdened by the **high cost of natural gas** in Brazil, a factor that negatively affects its competitiveness in relation to imported products. It is essential to reduce the cost of natural gas to regain the competitiveness of the Brazilian industry, and some measures should be adopted for this purpose, among which the **reformulation of the pricing policy of natural gas** in Brazil, with dissociation of the variable portion of the oil basket and **greater proximity to international prices**, negotiations between the Federal government and the States for **reduction of the ICMS (value-added tax) rate** and a **long-term planning for the gas sector** aiming to raise domestic production and facilitate the import of gas, **increasing the supply of gas and pushing prices down**.

Construction companies face distortion in determining **Work Accident Insurance (SAT) and Work Environmental Risk (RAT)**. These contributions, related to the safety of workers, are calculated homogeneously for any worker involved in construction, with no difference between riskier functions with more field work and administrative functions in an office, where the risk is significantly smaller. To correct this situation, it is essential to **adopt the differentiation of these contributions by function within construction**, which will reduce labor cost, eliminating a distortion that impacts cost with no benefit in return.

The recent measures of the federal government to reduce IPI (Tax on Manufactured Products) for construction materials brought benefits to the sector and to the entire economy by stimulating consumption, and consequently, national production. The reduction in the IPI tax should be broadened to allow greater competitiveness, equivalence with products with a lower tax burden, and fight informality. At the same time, actions to counter informal jobs in all links of the construction chain should be strengthened. Formalization could be increased by extending the term of payment of taxes to terms compatible with those when companies receive the payment of their sales.

The adoption of industrialized solutions enables the achievement of economies of scale in production, contributing to the reduction of production costs and increase of productivity. There is evidence indicating a consistent relationship between industrialization, increased productivity and economic growth[32].

Thus, to stimulate industrialization, it is fundamental to give the industrialized construction systems equivalence in terms of tax burden in relation to conventional construction, which involves taxes such as PIS/COFINS at the federal level and ICMS and ISS at the state and municipal level. This tax equality should be granted to the industrialized solutions identified via a certification

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32 SWANN, P. The economics of standardization: an update. Report for the UK Department of Business, Innovation and Skills (BIS) – May, 2010.

process that ensures compliance with technical and formal requirements governing the construction chain.

Still in relation to sustainability, it is possible to **stimulate the consumption of recycled materials through presumed credit of ICMS** for the companies that acquire them, reducing the need for mining virgin materials and the volume of solid waste discarded in nature, provided that such recycled materials are also in technical compliance, as will be discussed in detail later, complying with the Brazilian standards issued by the Brazilian Association of Technical Standards – ABNT, remaining qualified in the Brazilian Program for Quality and Productivity of Habitat (PBQP-H), or certified by a Product Certification Agency (OCP) accredited by INMETRO under the Brazilian System of Compliance Assessment (SBAC).

4.6 Sustainability

The Program Compete Brazil rests on the three pillars of sustainability, namely, social balance, economic prosperity and environmental quality. What distinguishes sustainable construction from ordinary construction is the careful and **rational planning** that prioritizes the **efficiency and durability** of the projects, to achieve the desired **performance**, facilitating the **adaptability** of the constructions to different functionalities.

The low quality of products is a key component in the occurrence of waste in construction, both in the phase of execution and operation, causing damage to final users and to the companies involved with different types of projects – housing, urban infrastructure, transportation, sanitation, etc.

The materials, components and systems that do not present adequate performance and durability are eventually replaced, generating costs and waste. The ABNT technical standards define the minimum criteria for product quality, considering structural and fire safety requirements, comfort, hygiene, durability and useful life, among others.

The sectors of manufacturers of construction materials and components have developed for over 15 years the Sectorial Quality Programs (PSQ), in partnership with the Federal Government, within the PBQP-H/Ministry of Cities. The main purpose of the PSQs is to promote the improvement of the quality of construction products by implementing effective actions to reduce the technical non-compliance of products with the ABNT standards, involving the improvement of the national technical standardization, the implementation of permanent and intensive programs for the assessment of product compliance, and working together with public and private entities in order to protect the end user and establish a sectorial environment of competitive equality.

Manufacturers of materials, components and building systems designed for civil construction should comply with the Brazilian standards by the Brazilian Association of Technical Standards – ABNT[33], remaining qualified in the Brazilian Program for Quality and Productivity of Habitat (PBQP-H), or certified by a Product Certification Agency (OCP) accredited by INMETRO under the Brazilian System of Compliance Assessment (SBAC). Also, the products composed of recycled materials should be validated by these regulatory agencies, ensuring the equalization of their performance compared to products whose raw materials are not recycled.

Products composed of recycled materials also need to be validated by these regulatory agencies. The list of non-complying products and materials is

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33 According to Dr. Carlos Del Mar, in his book FALHAS, RESPONSABILIDADES E GARANTIAS NA CONSTRUÇÃO CIVIL, "standards prescribe procedures, care, techniques that are validated and certified by the competent agency and constitute the extract of requirements for a product or service of good quality". Still according to the author, "However, although they are not laws, technical standards are binding, as discussed below. It is important to distinguish the voluntary character, which exists in the initiative and in the process of drafting technical standards, from the obligation of complying with them, when in effect. The initiative of drafting standards can be voluntary, as it depends on companies or entities organizing themselves to propose their drafting, but the compliance with standards, after they are approved, is mandatory".

available on the website of PBQP-H, while the list of certified producers is available on the website of INMETRO.

Such measures, however, cannot be translated into loss of competitiveness of the national product. Especially in the current situation in which, on the domestic front, the negative effects of the tax burden and the high costs of electricity stand out. In the foreign market, the most significant effects result from the persistence of low demand growth, which cause depressed prices and trade diversion benefiting mainly countries that grant subsidies and/or keep the exchange rate artificially undervalued. The impacts of this situation on our industry are translated into loss in competitiveness and reduction of margins of companies, due to the increasing competition of imports, losses in exports and lower use of the production capacity. In view of this situation, meeting the technical compliance parameters should not be a negative pressure on competitiveness. Measures to promote domestic market growth and increase the mechanisms to stimulate the purchase of domestic products, are essential.

The local content represents the commitment to acquire domestic goods and services on a competitive basis, aiming at the development of local industry, technological innovation, creation of jobs, and the development of economy.

What is defended is the **application of mechanisms with minimum domestic content to the projects/products that receive tax incentives and/or loans from official banks** (PAC, "Minha Casa, Minha Vida", infrastructure, among others).

Similar to the one adopted by the BNDES with regard to the rules of the BNDES card operations[34]:

> *5.1.3 Keep the products that are displayed and offered on the PORTAL OF OPERATIONS OF THE BNDES CARD compliant with the Brazilian standards issued by the Brazilian Association of Technical Standards – ABNT, as well as any other public or private inspection and standardization entities, as applicable.*
>
> *5.1.4 Ensure, in the case of suppliers of products whose certification is compulsory, that the said products remain duly certified by the competent agency.*
>
> *(...)*
>
> *5.1.7 In the case of suppliers of building materials, keep components and systems designed for civil construction, qualified in the Brazilian Program for Quality and Productivity of Habitat (PBQP-H), or certified by a Product Certification Agency (OCP) accredited by INMETRO under the Brazilian System of Compliance Assessment (SBAC).*

In parallel with this, it is important to intensify the inspection actions on imported goods in order to avoid fraudulent importation, or importation of products non-compliant with the technical standards required for the domestic product.

Providing conditions for the dwellings to have their useful life preserved and/or extended also meets the principles of sustainability; or optimizing the use of the properties, without wasting materials or generating waste. In this respect, it is important to offer through public housing loan agencies, **credit lines for remodeling and extension**, which should include both the cost of labor and the purchase of materials. Without contemplating the remodeling in the full sense (labor and materials), the access becomes more restricted, without reaching income brackets where the housing deficit is more expressive and where sometimes with remodeling, it is possible to meet the housing needs without the use of new units. So it is suggested that credit lines should be created for remodeling and extensions for lower-income households with

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34 Source: https://www.cartaobndes.gov.br/cartaobndes/Tutorial/Aditivo2Normas.pdf, accessed on November 02, 2012.

interest rates and payment terms closer to those of the PMCMV loans, in that these interventions also contribute to reducing the housing deficit in the country.

The sectorial organization environment for improving product quality – a basic condition for sustainable construction – is propitious for addressing other topics that interfere with sustainable development. Topics like water and electric power preservation, reduction and utilization of construction waste, increase in productivity, Greenhouse Gas emission (GEE), among others, can be studied and implemented evolutively under the PSQs of the PBQP-H.

The proposal would be to define a program of actions to promote the evolutionary treatment of themes of sustainability in construction under the PSQs, of the PBQP-H, to support public Construction policies, in line with the international experience.

The government of Singapore, for instance, launched in 2005 a sustainable construction program that determined levels of sustainability based on criteria like reuse of water, use of renewable energy, exploration of natural illumination, among others. As a first step, the government stimulated research and development and conducted awareness campaigns on the adjustment of companies to sustainability standards. The second step was to create certifications of sustainability for projects, making mandatory the certification of minimum sustainability, which could be achieved on account of the previous adaptation of companies to meet public demands.

Next, the government created a fund whose resources are allocated to cash payments for companies whose projects have obtained certifications above the minimum, with 50% of the amount paid at the time of certification of the project and the remaining 50% after validation, which occurs within one year of the end of construction. Finally, the minimum limits of sustainability for certifications are intended to be gradually increased[35].

In this respect, it is also important that Brazilian technical standards should also include requirements from foreign technical standards, so that a domestic product, once manufactured in compliance with these standards, has conditions to overcome the competition of an imported item. Thus, the domestic item will become stronger, increasing its competitiveness and consolidating itself in foreign markets.

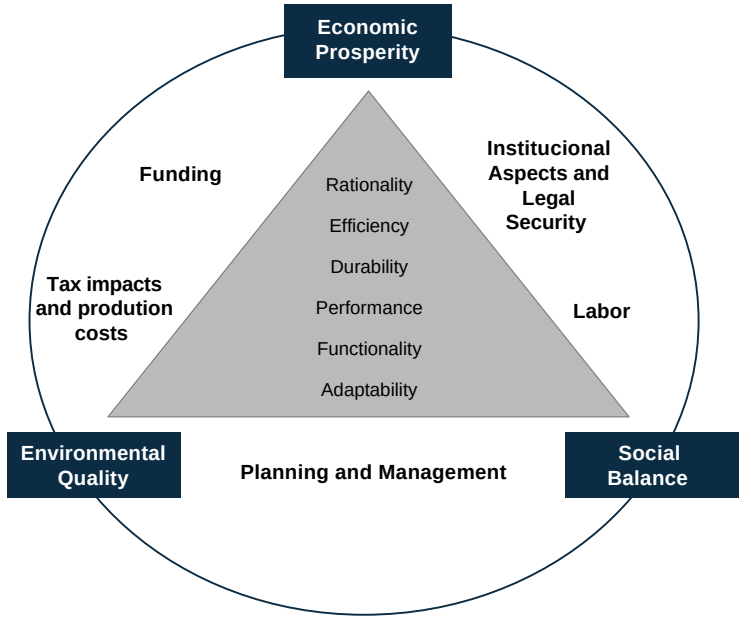
35 *Source: http://www.bca.gov.sg/GreenMark/gmis.html. Access on November 09, 2012.*

Program Compete Brazil: Sustainable Competitiveness in the Construction Chain

All the actions proposed in the Program Compete Brazil integrate with sustainability, ensuring the economic feasibility of the projects through appropriate planning and management, creating mechanisms that guarantee sufficient long-term funding, facilitating conflict resolution, pursuing social inclusion in construction, and pointing to solutions to eliminate tax distortions that restrict the use of building methods and more efficient materials.

Figure 3 summarizes this synergy of the actions proposed, supported by the tripod of sustainability, which, to have the expected impact, must take place in full and not in an isolated way.

Figure 3. Program Compete Brazil – Sustainability in the construction chain.



Source: LCA Draft.

Cadeia Produtiva da Construção/Productive Construction Chain

Sindicatos/Labor Unions

Sindicato da Indústria da Cerâmica da Louça de Pó de Pedra da Porcelana e da Louça de Barro no Estado de São Paulo – **SINDILOUÇA**, Sindicato da Indústria da Cerâmica para Construção do Estado de São Paulo – **SINDICERCON**, Sindicato da Indústria da Construção Civil do Estado de São Paulo – **SINDUSCON-SP**, Sindicato da Indústria da Construção e do Mobiliário de Leme – **SINDILEME**, Sindicato da Indústria da Construção Pesada do Estado de São Paulo – **SINICESP**, Sindicato das Indústrias da Construção, do Mobiliário e de Cerâmicas de Santa Gertrudes – **SINCER**, Sindicato da Indústria da Extração de Minerais Não Metálicos do Estado de São Paulo – **SINDEXMIN**, Sindicato da Indústria de Aparelhos Elétricos Eletrônicos e Similares do Estado de São Paulo – **SINAEES**, Sindicato da Indústria de Artefatos de Ferro, Metais e Ferramentas em Geral no Estado de São Paulo – **SINAFER**, Sindicato da Indústria de Artefatos de Metais Não Ferrosos no Estado de São Paulo – **SIAMFESP**, Sindicato da Indústria de Chapas de Fibra e Aglomerados de Madeira do Estado de São Paulo – **SINDIFIBRA**, Sindicato da Indústria de Esquadrias e Construções Metálicas do Estado de São Paulo – **SIESCOMET**, Sindicato da Indústria de Instalações Elétricas, Gás, Hidráulicas e Sanitárias do Estado de São Paulo – **SINDINSTALAÇÃO**, Sindicato da Indústria de Lâmpadas e Aparelhos Elétricos de Iluminação no Estado de São Paulo – **SINDILUX**, Sindicato da Indústria de Mármores e Granitos do Estado de São Paulo – **SIMAGRAN**, Sindicato da Indústria de Material Plástico do Estado de São Paulo – **SINDIPLAST**, Sindicato da Indústria de Mineração de Pedra Britada do Estado de São Paulo – **SINDIPEDRAS**, Sindicato da Indústria de Móveis de Junco e Vime e Vassouras e de Escovas e Pincéis do Estado de São Paulo – **SIMVEP**, Sindicato da Indústria de Pinturas, Gesso e Decorações do Estado de São Paulo – **SIPIGEDESP**, Sindicato da Indústria de Produtos de Cimento do Estado de São Paulo – **SINPROCIM**, Sindicato da Indústria de Proteção, Tratamento e Transformação de Superfícies do Estado de São Paulo – **SINDISUPER**, Sindicato da Indústria de Tintas e Vernizes do Estado de São Paulo – **SITIVESP**, Sindicato da Indústria de Vidros e Cristais Planos e Ocos no Estado de São Paulo – **SINDIVIDRO**, Sindicato das Empresas de Compra, Venda, Locação e Administração de Imóveis e dos Condomínios Residenciais e Comerciais em todo o Estado do Rio de Janeiro – **SECOVI-RIO**, Sindicato das Empresas de Compra, Venda, Locação e Administração de Imóveis Residenciais e Comerciais de São Paulo – **SECOVI-SP**, Sindicato das Indústrias de Beneficiamento e Transformação de Vidros e Cristais Planos do Estado de São Paulo – **SINBEVIDROS**, Sindicato das Indústrias de Calcário e Derivados para Uso Agrícola do Estado de São Paulo – **SINDICAL**, Sindicato das Indústrias de Cerâmica Sanitária do Estado de São Paulo – **SINDICERAMICA**, Sindicato da Indústria de Condutores Elétricos, Trefilação e Laminação de Metais Não Ferrosos do Estado de São Paulo – **SINDICEL**, Sindicato das Indústrias de Extração de Areia do Estado de São Paulo – **SINDAREIA**, Sindicato da Indústria de Serrarias, Carpintarias, Tanoarias, Madeiras Compensadas e Laminadas no Estado de São Paulo – **SINDIMAD**, Sindicato das Indústrias de Produtos Cerâmicos de Louça de Pó, de Pedra, Porcelana e da Louça de Barro de Porto Ferreira – **SINDICER**, Sindicato Nacional da Indústria de Máquinas – **SINDIMAQ**, Sindicato Nacional da Indústria de Produtos de Cimento – **SINAPROCIM**, Sindicato Nacional das Indústrias de Trefilação e Laminação de Metais Ferrosos – **SICETEL**, Sindicato Nacional da Indústria do Cimento – **SNIC**, Sindicato Nacional das Empresas de Arquitetura e Engenharia Consultiva – **SINAENCO**, Sindicato Nacional das Indústrias Siderúrgicas – **SNIS**.

Entidades/Entities

Associação Brasileira da Construção Industrializada de Concreto – **ABCIC**, Associação Brasileira da Construção Metálica – **ABCEM**, Associação Brasileira da Indústria Produtora de Laminados Decorativos de Alta Resistência – **ABRIPLA**, Associação Brasileira da Indústria de Blocos de Concreto – **BLOCOBRASIL**, Associação Brasileira da Indústria de Iluminação – **ABILUX**, Associação Brasileira da Indústria de Lajes – **ABILAJE**, Associação Brasileira da Indústria de Materiais de Construção – **ABRAMAT**, Associação Brasileira da Indústria de Painéis de Madeira – **ABIPA**, Associação Brasileira da Indústria de Piso Laminado de Alta Resistência – **ABIPLAR**, Associação Brasileira da Indústria de Rochas Ornamentais – **ABIROCHAS**, Associação Brasileira da Indústria do Plástico – **ABIPLAST**, Associação Brasileira da Indústria Elétrica e Eletrônica – **ABINEE**, Associação Brasileira da Indústria Ferroviária – **ABIFER**, Associação Brasileira da Infraestrutura e Indústrias de Base – **ABDIB**, Associação Brasileira das Concessionárias Privadas de Serviços Públicos de Água e Esgoto – **ABCON**, Associação Brasileira das Empresas de Engenharia de Manutenção Predial e Industrial – **ABEMPI**, Associação Brasileira das Empresas de Serviços de Concretagem – **ABESC**, Associação Brasileira das Empresas de Serviços de Conservação de Energia – **ABESCO**, Associação Brasileira das Empresas Distribuidoras de Asfaltos – **ABEDA**, Associação Brasileira das Entidades de Crédito Imobiliário e Poupança – **ABECIP**, Associação Brasileira das Indústrias de Equipamentos Contra Incêndio e Cilindros de Alta Pressão – **ABIEX**, Associação Brasileira das Indústrias de Máquinas e Equipamentos – **ABIMAQ**, Associação Brasileira das Indústrias e Distribuidores de Produtos de Fibrocimento – **ABIFIBRO**, Associação Brasileira de Cerâmica – **ABC**, Associação Brasileira de Cimento Portland – **ABCP**, Associação Brasileira do Cobre – **ABCOBRE**, Associação Brasileira de Concessionárias de Rodovias – **ABCR**, Associação Brasileira de Distribuidores e Processadores de Vidros Planos – **ABRAVIDRO**, Associação Brasileira de Engenharia e Consultoria Estrutural – **ABECE**, Associação Brasileira de Engenharia Industrial – **ABEMI**, Associação Brasileira de Engenheiros Civis – **ABENC**, Associação Brasileira de Normas Técnicas – **ABNT**, Associação Brasileira de Tecnologia para Equipamentos e Manutenção – **SOBRATEMA**, Associação Brasileira dos Escritórios de Arquitetura – **ASBEA**, Associação Brasileira dos Fabricantes de Chapas para Drywall – **DRYWALL**, Associação Brasileira dos Fabricantes de Materiais para Saneamento – **ASFAMAS**, Associação Brasileira dos Fabricantes de Tintas – **ABRAFATI**, Associação Brasileira dos Fabricantes de Tubos de Concreto – **ABTC**, Associação Brasileira dos Produtores de Cal – **ABPC**, Associação Brasileira pela Conformidade e Eficiência de Instalações – **ABRINSTAL**, Associação Comercial de São Paulo – **ACSP**, Associação das Construtoras do Vale do Paraíba – **ACONVAP**, Associação Nacional da Indústria Cerâmica – **ANICER**, Associação Nacional das Empresas de Obras Rodoviárias – **ANEOR**, Associação Nacional das Entidades de Produtores de Agregados para Construção Civil – **ANEPAC**, Associação Nacional dos Fabricantes de Esquadrias de Aço – **AFEAÇO**, Associação Nacional dos Comerciantes de Material de Construção – **ANAMACO**, Associação Nacional dos Fabricantes de Cerâmica para Revestimentos, Louças Sanitárias e Congêneres – **ANFACER**, Associação Nacional de Fabricantes de Esquadrias de Alumínio – **AFEAL**, Associação Paulista das Cerâmicas de Revestimento – **ASPACER**, Associação Paulista de Empresários de Obras Públicas – **APEOP**, Associação Regional da Habitação de Campinas – **HABICAMP**, Câmara Brasileira da Indústria da Construção – **CBIC**, Centro Brasileiro da Construção em Aço – **CBCA**, Centro Cerâmico do Brasil – **CCB**, Comitê Brasileiro de Construção Civil – **COBRACON**, Comitê da Cadeia Produtiva da Mineração – **COMIN**, Comitê de Usuários dos Portos e Aeroportos do Estado de São Paulo – **COMUS**, Conselho de Arquitetura e Urbanismo de São Paulo – **CAU/SP**, Conselho Brasileiro de Construção Sustentável – **CBCS**, Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável – **CEBDS**, Conselho Regional de Engenharia e Agronomia do Estado de São Paulo – **CREA-SP**, Escola Politécnica da Universidade de São Paulo – **POLI/USP**, Federação do Comércio de Bens, Serviços e Turismo do Estado de São Paulo – **FECOMERCIO**, Federação Internacional das Profissões Imobiliárias – **FIABCI/BRASIL**, Fundação Carlos Alberto Vanzolini – **FCAV**, Instituto Aço Brasil – **IABr**, Instituto de Arquitetos do Brasil – Departamento de São Paulo – **IAB/SP**, Instituto Brasileiro do Concreto – **IBRACON**, Instituto Brasileiro do Crisotila – **CRISOTILA**, Instituto Brasileiro de Desenvolvimento da Arquitetura – **IBDA**, Instituto Brasileiro de Direito da Construção – **IBDIC**, Instituto de Engenharia – **IE**, Instituto de Orientação às Cooperativas Habitacionais de São Paulo – **INOCOOP-SP**, Instituto de Pesquisas Tecnológicas – **IPT**, Instituto de Registro Imobiliário do Brasil – **IRIB**, Instituto do PVC, Instituto Falcão Bauer da Qualidade – **IFBQ**, Serviço Nacional de Aprendizagem Industrial – **SENAI**, Serviço Social da Construção Civil do Estado de São Paulo – **SECONCI-SP**.

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ANALISTA PLENO/FULL ANALYST: Renata Hoelz de Oliveira Barros
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ASSISTENTE ESPECIALIZADO/SPECIALIST ASSISTANT: Karina Poschen Bianco
ASSISTENTE/ASSISTANT: Silvia de Souza Patez

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Carlos Eduardo Pedrosa Auricchio – Coordenador/Coordinator

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Participações Especiais/Special Participation

Pesquisa e Análise/Research and Analysis
LCA Consultores
Fernando Camargo – Sócio-diretor da LCA/ Managing Partner LCA
Carlos Urso – Diretor de Macroeconomia/ Director – Macroeconomics
Cláudia Viegas – Diretora de Regulação Econômica/ Director – Economic Regulation
Douglas Uemura – Gerente de Projetos/Project Manager – Ricardo Sakamoto – Coordenador de Projetos/Project Coordinator
Ederson Lima – Maria Carolina Marques – Patrícia Ravaioli – Paulo Neves – Thovan Caetano – Economistas/Economists

Projeto Gráfico/Graphic Design
Assessoria de Eventos - FIESP/Event Services - FIESP

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e8 Comunicação

Versão Traduzida/Translated Version
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Revisão/Proofreading
Karina Andrea Cornacioni Savio

São Paulo – 03 de Dezembro de 2012/São Paulo – December 3, 2012

Agradecimentos/Acknowledgments
O Departamento da Indústria da Construção – DECONCIC/FIESP agradece a colaboração das entidades e empresas patrocinadoras para a realização do evento e impressão da publicação Construbusiness 2012. Essa iniciativa possibilita que os dados, levantados em abrangente pesquisa, sirvam de subsídio para decisões que reativem a economia e contribuam para as soluções dos problemas brasileiros. The Department of the Construction Industry – DECONCIC/FIESP wishes to thank the cooperation of the sponsoring entities and companies for the holding of the event and printing of the Construbusiness 2012 publication. This initiative will enable the data collected in a comprehensive study to serve as subsidy for making decisions that will boost the economy and contribute to finding solutions for Brazilian problems.

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