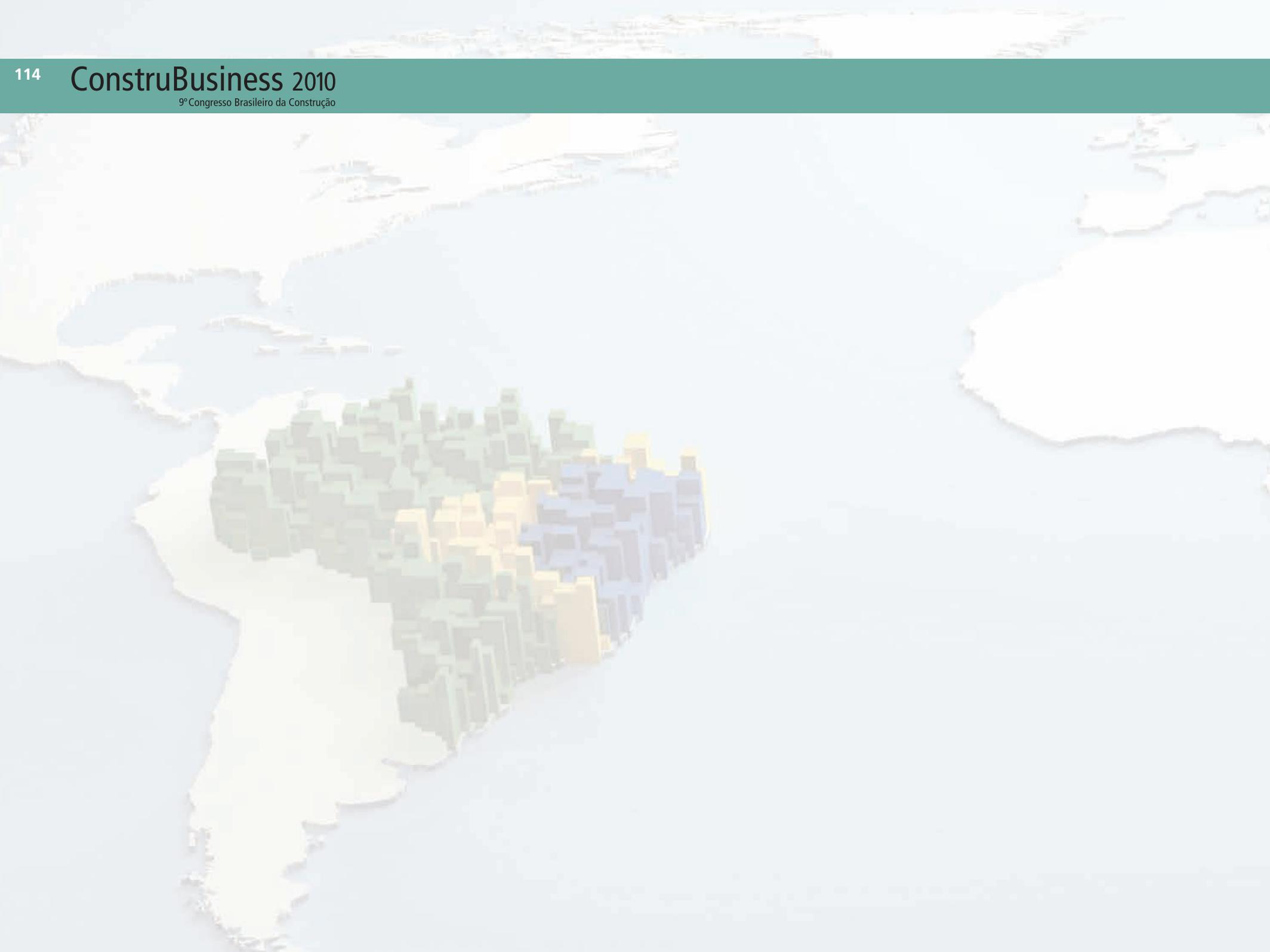


# ConstruBusiness 2010

9th Brazilian Construction Congress



Brazil 2022: plan, build, grow.





## Building the future

The Brazilian moment, more than ever, demands a positive look toward the future, and with that, responsible actions that will ensure a new benchmark for the development and for the living conditions of millions of Brazilians. This 9th ConstruBusiness aims to discuss and develop goals for 2022, the bicentenary of the independence of our Country. The meeting aims to prepare proposals to be adopted as state policy, aiming to place Brazil between the five countries with more efficient infrastructure in the ranking of the World Economic Forum, within 12 years. So, it is with great enthusiasm that we see this issue of ConstruBusiness, because this is a key theme for the development of Brazil. The construction industry has all the credentials to suggest the ways to achieve this goal, considering that it is going through an exceptional moment, responding vigorously to the measures we have adopted to promote economic growth.

Among the industrial activities that contribute to Brazilian GDP growth during last quarter, the civil construction showed the greater increase (16.4%), such a performance is due mostly to the expansion of directed credit. In addition to its significant contribution to the Brazilian GDP, it also stands out for its huge employment capacity. The number of formal jobs rose by no less than 15.9% in the construction sector over the past 12 months. The number of formal employees reached 2.85 million, a new record, according to research conducted by the Construction Union of the State of São Paulo and Fundação Getúlio Vargas.

In these last eight years, the Federal Government resumed its investment capacity and increased, more significantly, investments in housing, sanitation and infrastructure, highly necessary to a nation in growth. When the international crisis got worse in the end of 2008 and beginning of 2009, other countries had to mobilize public investment to generate jobs, but the Country's planned works were already in progress. Moreover, the Federal Government adopted a series of measures to stabilize the supply of credit as well as the counter-cyclical measures – the same way as with tax reductions, also on building materials – which aimed successfully to mitigate the effects of economic crisis.

The complexity and scale of the challenges that the sector had to face, were huge and demanded us to build the foundations to cope with it. Over the years, we encouraged the private and public investment in infrastructure construction and rehabilitation, which are the foundation for the growth of the country. In addition, we seek to balance and meet the housing needs with urbanization works and production of new units for low income families. These families have been able to access formal housing through improvements, such as; better income, economic stability and increased access to credit. Between 2006 and 2009, in the road and railway construction, the growth in the number of jobs generated, was six times higher than the average and in sanitation, five times higher.

The Growth Acceleration Program (PAC) and the Program My Home My Life (PMCMV), established new levels of public investment, improving the quality of life. These programs have eliminated a number of bottlenecks in planning and implementing major infrastructure and housing works and the housing production, especially, for the poorest population of the country. It also provided the supply of credit. These initiatives have created a reliable economic environment, with direct impact on the construction industry. PAC 2 further enhances the strategic role of housing and construction sector as agents of social inclusion and economic development of the country.

Due to all these achievements, we believe that it is essential to maintain a work schedule with the construction industry in order to consolidate and deepen this progress, but also to overcome the obstacles that still lie ahead. We need to increase our production capacity. The entrepreneurs, in particular, need to invest in industrial structure and advance the modernization and industrialization of the civil construction production chain to make housing production cheaper.

We built a very fruitful dialogue in a straightforward and objective way, with industries and a very promising scenario for us to continue growing. It is with this dynamics that we wish that the new government and entrepreneurs nurture this agenda. This path has proven to be right and represents the realization and the success of working within a perspective of long-term planning, investing in a model in which the country's economic development is achieved with income distribution and the social inclusion. I am convinced that Brazil will continue to generate sustainable economic growth, will expand investments and programs, and create new employment opportunities and income and to follow up the process of improving the income of the population.

*Luiz Inácio Lula da Silva*  
*President of the Republic of Brazil*





### **A confident look to the future**

The timing for public and private investment expansion, observed in the Construction sector stems from the history of their undeniable presence in all segments of society since the dawn of history. Equally unquestionable is its ability to overcome adversity in its various natures, as far as is relevant to their economic and social history in Brazil, as a source par excellence of investment, intensive hand labor and highly positive income effect.

During years of stability and stagnation in the productive chain with the lack of investments in housing and infrastructure, legal uncertainty and easiness in the search for new productive and industrial construction processes.

Far from conformism and despair, the productive chain of the construction industry continued to struggle for their proposals, modernization and growth. And, deserved to receive the full support of this House in the enactment of a proposed industrial policy for the sector, in line with the productive development policy launched by the Federal Government.

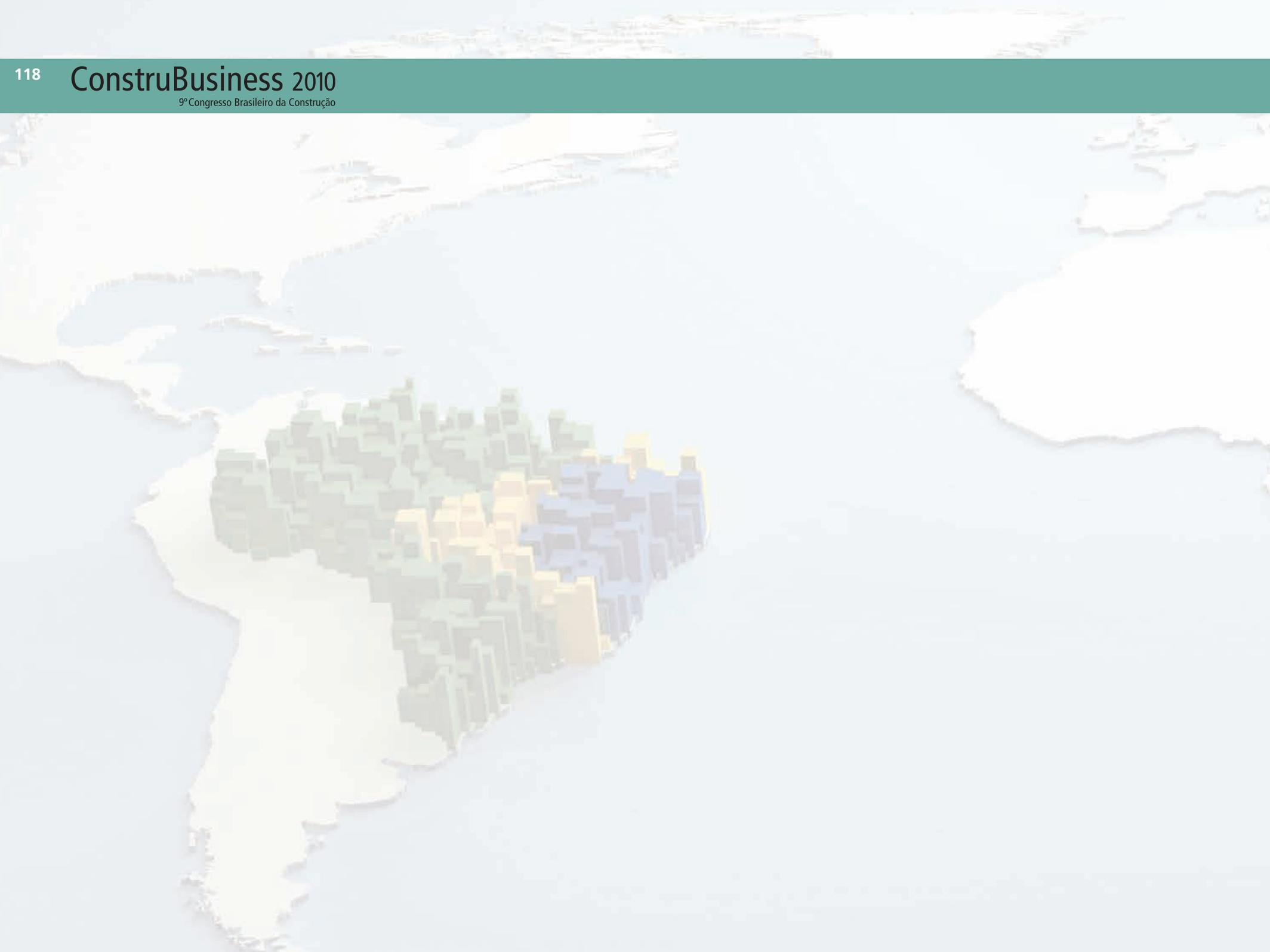
He also worked hard on proposals to overcome the effects of financial crisis, as presented and accepted by the Government during the 7th edition of Construbusiness, culminating with the program "My House, My Life" that has benefited thousands of Brazilian families.

Meeting the challenges and seeking opportunities that arise in a resumption of growth, coupled with prospects of strong investment due to several large sporting events with dates and times set, the construction sector represented by its chain, presents this detailed technical study, its proposed routing solutions and sustainable development, now a vision of medium and long term that can ensure that Brazil, 2022, the year of the Bicentennial of Independence, the position of deserved great nation ranks among the top ranking economic competitiveness, equality of opportunity and social justice.

The Construction sector is the driving force of sustainable development in Brazil. This will be continued and pursued firmly, doing our part by contributing so that the sectors of infrastructure and housing can, effectively, meet the needs of the Brazilian population and their future generations.

*Paulo Skaf*

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





### **Brazil, the country that we desire and deserve !!!**

At thirteen years of outstanding contributions to economic and social development of the country, ConstruBusiness 2010 maintains this ninth edition, the successful format of Brazilian Construction Congress, thus allowing an open discussion with the entire Brazilian society of the Productive Chain of the Construction Industry. It also meets the demand of industry for its annual periodicity, a clear demonstration of recognizing the importance of this discussion Forum, which gathers more than a hundred organizations representing the Chain, all very active under the coordination of the Department of Industry and Construction - DECONCIC - FIESP.

In its traditional and consolidated working model shared and integrated among business leaders in the industry with key government representatives in its three spheres, ConstruBusiness this year broke new ground in its organizational structure, creating in addition to the Strategic Policy Committee, two Working Groups for specific issues of Housing and Infrastructure, and held weekly technical meetings that resulted in diagnostic criteria and feasible proposals to improve public policies in the sector, under a lot of hard work and technical competence of their representatives, organizations, governments, and invited experts, , expressed in this Positive Agenda.

The tireless work, assisted in an unprecedented way by two respected consulting firms, LCA Consultores and FGV Projetos, gives this publication the title of "special edition", to be constantly consulted over the twelve years that mark the projected timeline for a Brazil showcase as we want and not a window pane Brazil.

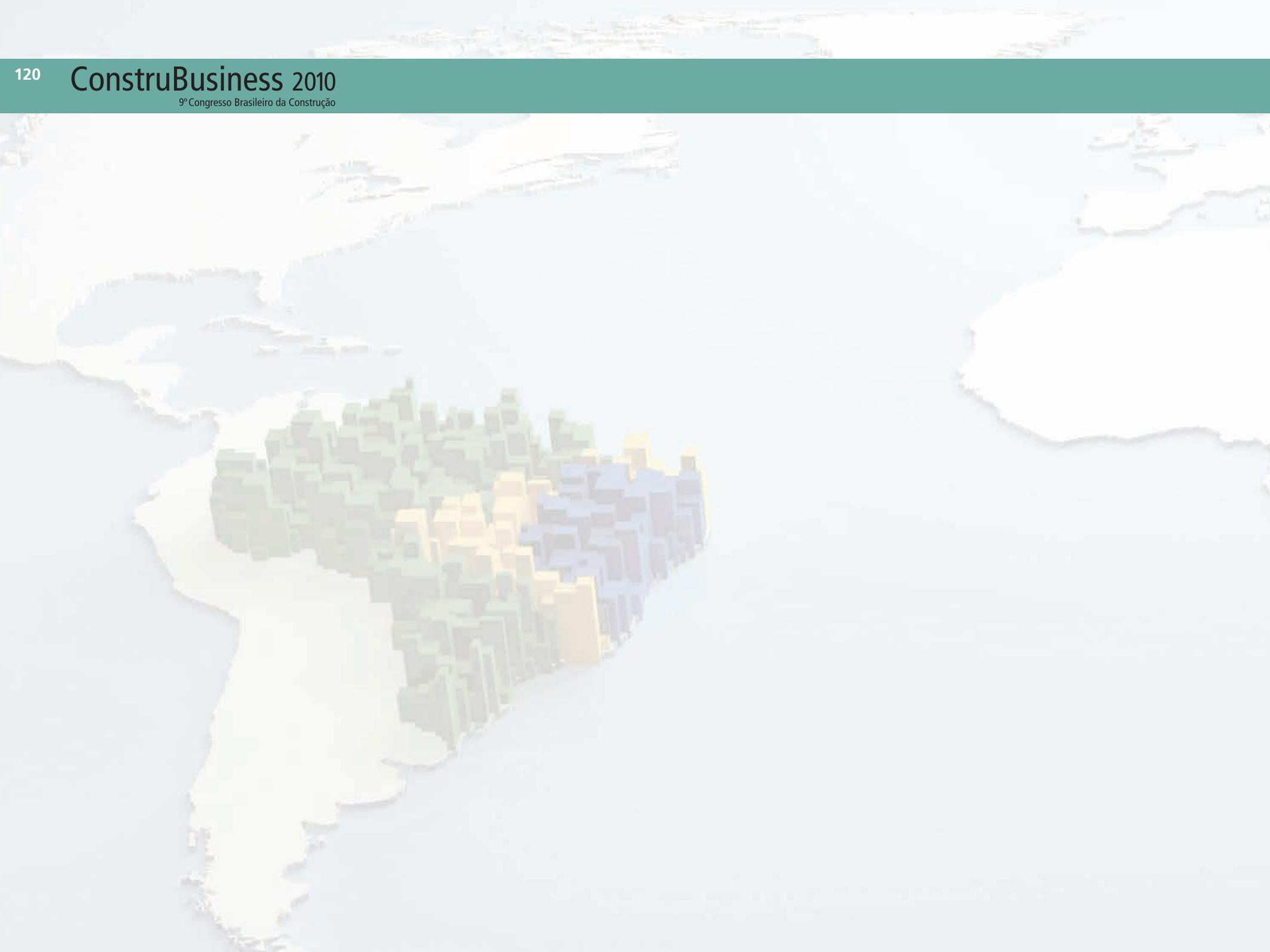
And what is this Brazil that we're talking about? It is Brazil 2022, commemorating the bicentennial year of Independence, which with competence and hard work will make real the great prospects for new investment due to mega sporting events such as the 2014 World Cup and the Olympics in 2016, associated with the virtuous cycle of sector and the country's growth, enabling sustainable development, which will give it a good place in the ranking of the World Economic Forum, harmonious with its call and proven strength.

Therefore, actions and propositions that the dear reader will appreciate in this paper, translated into sizeable public and private investment to come to R\$ 5 trillion by the year 2022, are facing a "State Plan", which should be strongly presented and discussed with the executive departments at Federal and State (São Paulo) and in the legislative power, certain to be able to overcome the challenges and consolidate the Brazil we want and deserve, having it implemented and monitored with transparency and ethics, covering the way proposed by the industry, namely: **Plan, Build, Grow.**

May the readers of this paper dedicate concentration, energy and time with the same enthusiasm that we had in working on it.

*José Carlos de Oliveira Lima*

*Vice President of FIESP, Vice President of High Council of Industry and Construction - CONSID  
and Director of Department of Industry and Construction - Deconcic*



## Introduction

Brazil is living a unique moment: continued growth with good prospects for new investment due to several large events like the World Cup in 2014 and the Olympics in 2016. As of this moment, Construbusiness makes a historical edition in 2010, contemplating a State agenda for the development of the civil construction chain by 2022, the Bicentennial of Independence. This is an agenda with long-term vision in order to **show sustained growth**.

The task of this Construbusiness is to diagnose and identify the main challenges for the infrastructure sectors, and from this diagnosis, targets and suggest a set of actions and proposals for public policies that may be adopted by the executive branch at the federal and State (São Paulo) scopes and the Legislature with a view to overcoming these challenges. The diagnoses and most of the propositions are specific to each of the sectors covered, although the way to go is the same: **plan, build, grow**.

For this task, **Fiesp**, through **Deconcic**, appointed two renowned consultancies, **LCA Consultores** and **FGV Projetos** to work closely in order to conduct a comprehensive review of major perspectives and challenges for the sector. FGV was responsible for examining the housing scenario, which involved designing the housing needs for the next 12 years, considering the main demographic variables and projections of economic growth, factors affecting the formation of families and therefore demand for housing.

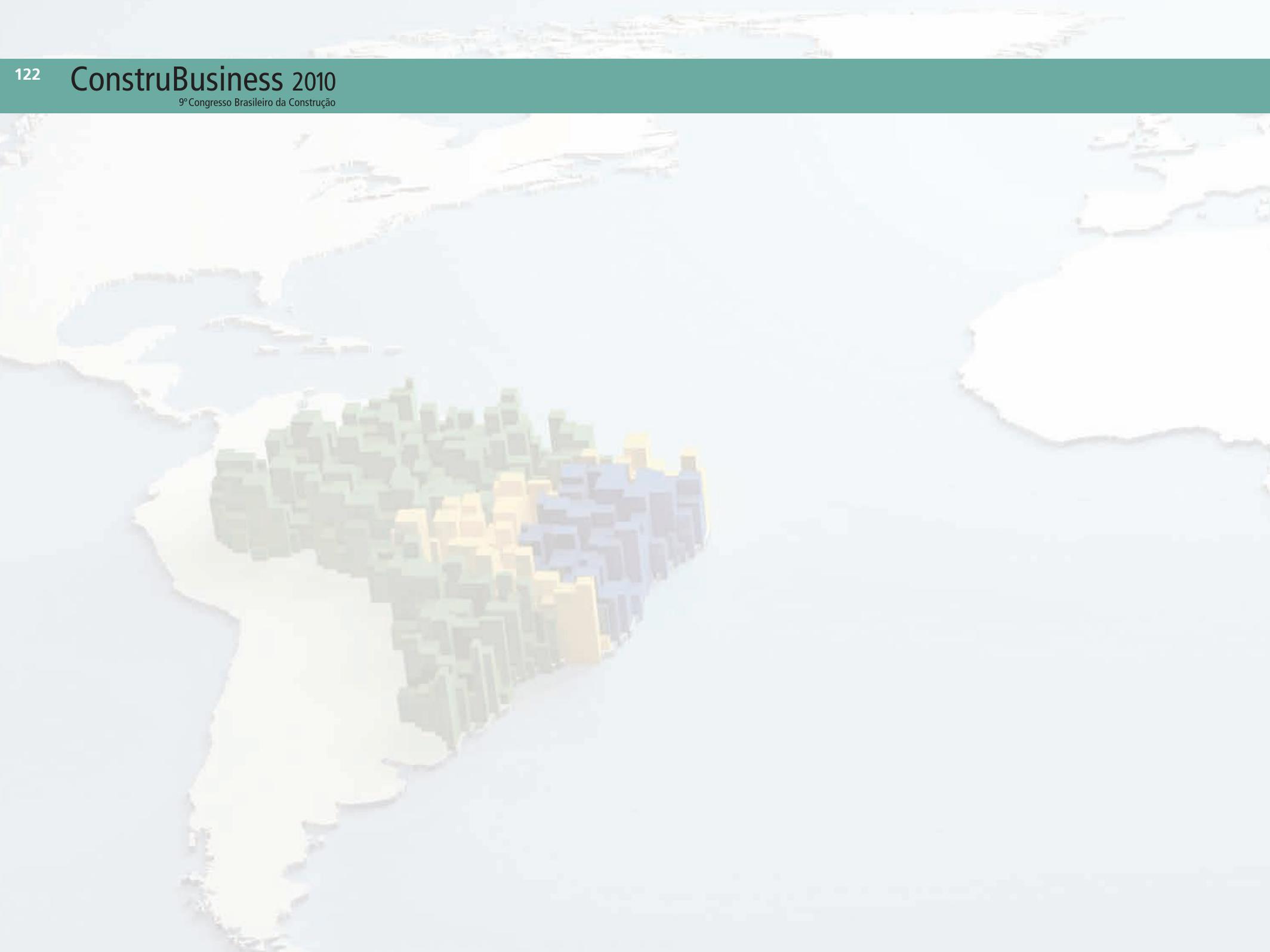
**LCA** was responsible for the analysis of the infrastructure. This year, the infrastructure sector has broadened the debate, subdivided in various sectors that are treated as appropriate: transport (road, rail, air transportation, water transportation - ports and waterways, and pipeline transportation), energy, telecommunications and sanitation. Both the diagnosis and the propositions of this work were done in conjunction with representatives of civil construction chain, at meetings of the Working Group

appointed by FIESP for this purpose. Therefore reflecting the vision and experience of the agents in the chain. Likewise, we seek to integrate this work to the vision of public officials directly involved in the issues addressed here. For that, we heard the following agents: regulatory agencies ANAC, Anatel, ANEEL, ANP, ANTAQ ANTT; Committees in the House of Representatives Financial Supervision and Control of Urban Development, Environment, Mines and Energy and Transportation; Committees of the Senate Environment, Regional Development and Infrastructure, and, finally, the Committees of the Legislative Assembly of the State of Transportation and Communications, of Environmental Defense, Public Works and Services, Metropolitan Affairs and Municipal Affairs.

In this paper, the current numbers of construction production chain will be initially presented, updated until 2009. Next, we present the analysis of the housing sector, which includes demographic and economic scenario of **FGV** to the proposals for the sector. It then develops the analysis with a diagnosis of infrastructure, performance targets and proposals for various sectors.

Finally, the document concludes with the analysis developed by **LCA** of the key elements needed for sustainable development towards 2022. The central pillars, valid both for housing and for infrastructure are: (i) promote the sustainable growth of long-term availability of resources (projects, inputs, capital, finance) and legal security are vital elements to ensure this growth; (ii) significantly improve the management in public and private fields, in order to broaden the ability to plan and execute and enable efficiencies and productivity, and (iii) ensure quality manpower for the whole chain.

*FGV Projetos e LCA Consultores*



# 1. Construction Productive Chain

In this section we present the major figures in the Brazilian civil construction chain, in order to contextualize their importance in the country's economic growth in recent years. Those statistics were taken as reference by the two consultant firms while developing their analysis<sup>1</sup>.

## Main figures

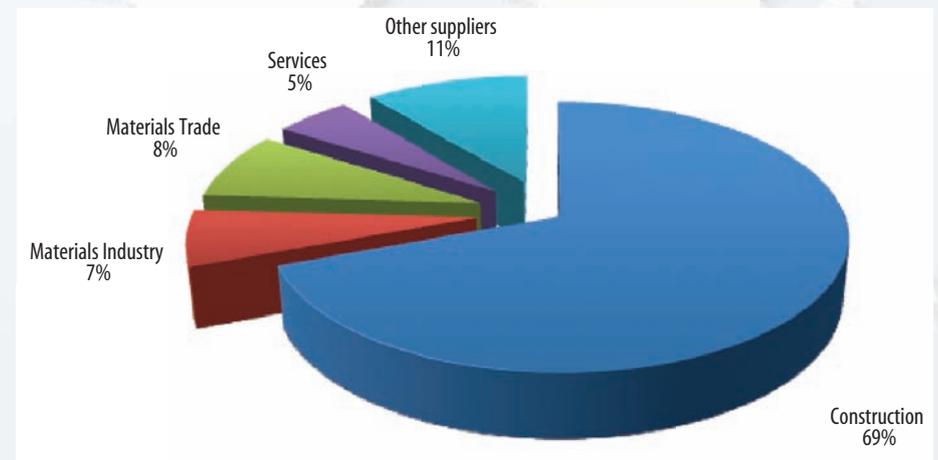
In 2009, expenditure on building products totaled U.S. \$ 244 billion. That means that in 2009, total investments in the country on roads, airports, sewage systems, and infrastructure on the whole, and also on schools, hospitals, homes and residential and commercial buildings, industries, construction and maintenance and rebuilding, was 46.4% of the total investment in the country or 9.2% of Brazilian GDP. With these investments, costs in construction products per capita reached R\$ 1,276.06.

It is also estimated that these costs have been responsible for an added value of R\$ 224 billion or 8.3% of the Brazilian GDP. On the other hand, the remuneration of the work amounted to R\$ 93.9 billion, or 42% of income generated in the chain. The gross operating surplus was R\$ 128.2 billion.

It came to a historic figure in terms of employment, because the activities of the construction chain gave work to 10 million people all over the country.

**Chart 1.1 - Pessoal ocupado na cadeia da construção, participação (%) no total, 2009**

Source: Abramam-FGV (2010).



The largest share of the income from the construction chain - 61% or R\$ 137.378 billion - was generated in the construction sector, formed by the segments of self-management and self-construction and by construction works or phases of the engineering work. This is the segment that determines the activity pace of the other links of the chain. Because it is hand labor intensive, the construction sector was responsible for the largest share, 69%, or 6.9 million of the employed in the chain as shown in Chart 1.1.

<sup>1</sup> The statistics are originally in the paper *The Productive Chain of Construction and the Effects of De-encumber*, September 2010, produced by FGV for Abramam.

The material goods industry is the second sector that most added value to the chain: it was R\$ 40.4 billion, or 18% of GDP of the chain generated by 616,000 people.

After civil construction, the marketing of building materials - represented by wholesale and retail trade - has the largest number of employed: 811.6 thousand people, which in 2009 generated an additional value of R\$ 20.503 billion or 9.1% of the total generated in the chain.

The service activities include the enterprises, the purchase and sale of real estate, renting of machinery and equipment and professional technical services, such as engineering and architectural projects. These activities generated R\$17.4 billion, or 7.7% of the GDP of the chain and were responsible for 5% of the people employed, or 505 thousand people.

**Table 1.1 - Construction chain production, income and occupation in the - 2009, in R\$ million**

|  | Production links   |   |               |                           | Total chain<br>(A+B+C+D) |
|--|--------------------|---|---------------|---------------------------|--------------------------|
|  | Other links<br>(A) | Indústria<br>of machinery and equipment (B) | materials (C) | Civil Construction<br>(D) |                          |
| Value added, GDP                         | 41.667             | 4.859                                       | 40393         | 137.378                   | 224.297                  |
| Remuneration                             | 24.371             | 2.290                                       | 15.253        | 51.967                    | 93.881                   |
| Gross operating surplus and mixed income | 16.314             | 2.508                                       | 24.434        | 84.901                    | 128.156                  |
| Other taxes on production and subsidies  | 982                | 61  | 706           | 510                       | 2.260                    |
| Intermediate consumption                 | 59.463             | 7.670                                       | 53.812        | 106.987                   | 227.932                  |
| Production Value                         | 101.131            | 12.529                                      | 94.204        | 244.365                   | 452.229                  |
| Factor work (occupations)                | 2.413.789          | 46.355                                      | 615.715       | 6.942.644                 | 10.018.503               |

Source: Abramat-FGV (2010).

Tax revenue coming from the chain activities totaled R\$ 45.9 billion in 2009, representing 20.5% of its GDP. Taxes on production totaled R\$ 18.3

billion and income taxes and property taxes, R\$ 27.6 billion. The construction sector accounted for 56.6% of the total, or R\$ 25.9 billion.

Table 1.2 - Tax burden in the construction chain, 2009 in R\$ million

|                                 | Production links   |                                |               |                           |        | Total chain<br>(A+B+C+D) |
|---------------------------------|--------------------|--------------------------------|---------------|---------------------------|--------|--------------------------|
|                                 | Other links<br>(A) | Industry                       |               | Civil Construction<br>(D) |        |                          |
|                                 |                    | of machinery and equipment (B) | materials (C) |                           |        |                          |
| Taxes on production and imports |                    | 2.569                          | 371           | 4.195                     | 11.166 | 18.301                   |
| Taxes on income and property    |                    | 5.283                          | 612           | 6.882                     | 14.833 | 27.610                   |
| Tax revenues                    |                    | 7.852                          | 983           | 11.076                    | 25.999 | 45.911                   |
| Tax burden on GDP               |                    | 18.8%                          | 20.2%         | 27.4%                     | 18.9%  | 20.5%                    |

Source: Abramat-FGV (2010).

## Growth route

The 2009 figures are the result of a growth cycle that started in 2005 and reached its peak in 2008. In 2009, the international financial crisis had a significant effect on the performance of the chain as a whole, but did not change the trajectory in the long-term. Between 2005 and 2009, investment in construction went from R\$167.7 billion to R\$244.4 billion, a cumulative growth of 46% (10.3% per year), representing an increase of 5.2% above the IGP-DI.

The GDP of the production chain, in turn, grew 48.5% during this period. The construction activities have grown even more: 52.3%, or 18.2% above the INCC.

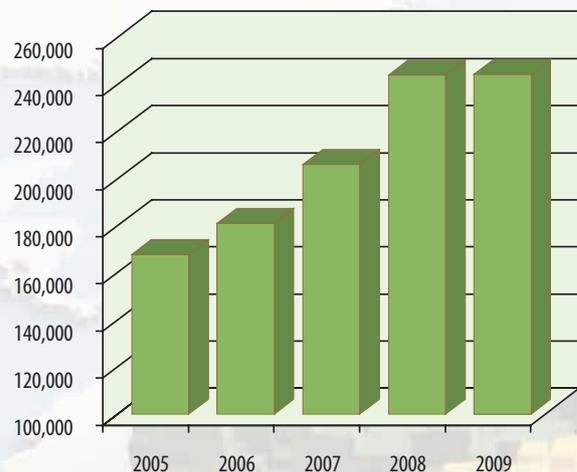
The significant growth of the chain resulted in more jobs. Between 2005 and 2009 were generated 1.46 million of new occupations. The construction

sector, being one of the most labor-intensive, accounted for 73% of the total. It is important to observe the growth of the work force took place along with a strong movement to formalize the activities, which resulted in significant increase in the number of employees in the formal sector. From December 2005 to December 2009, there was a growth of 45% meaning 10% yearly, in formal employment, in the construction sector.

The exemption of taxes fulfilled the important function of reducing the cost of investment throughout this period, allowing existing resources to produce an even greater effect on the economy. Between 2005 and 2009, despite the effective tax exemption, the tax collection increased by 47.1% or 22.1% above the IGP-DI.

### Chart 1.2 - Investment in construction\*, R\$ million

(\*) Includes corporate capital goods and construction machinery and equipment.  
Source: Abramat-FGV (2010)



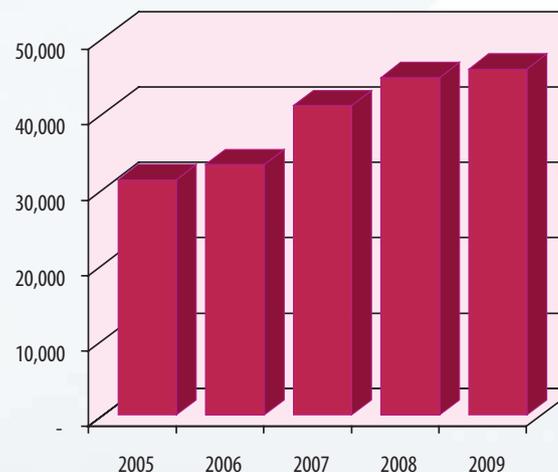
There were no changes in the international financial crisis, which had its most critical moment in September 2008. It started in 2005, causing only a transitory reduction in growth rate. During this period, the chain was called to participate actively in countercyclic policy created to recover the path of growth throughout the economy. Thus, the creation of the My Home My Life, which was added to the Program to Accelerate Growth and decrease the load on construction materials, contributed effectively to generate income and employment in the economy.

In 2009, construction activities were responsible for the creation of 154,000 formal jobs. While the GDP of the economy remained stagnant at almost the same levels as in 2008, the construction sector grew by 3.8 percentage points above the INCC. Yet some parts of the chain, as industry and

trade registered a sharp fall in the year. While retail trade declined by 3.43% in sales, in the industry, actual revenues fell by 12%.

### Chart 1.3 - Tax Collection, R\$ million

Source: Abramat/FGV



### The recovery in 2010

The construction chain should register growth rates of two digits in 2010, which can not be called Chinese growth for it will surely overcome the recent growth rates in that country. It is worth noticing that until July, the construction chain, as a whole, had regained the losses seen since the end of 2008.

The counter-cyclic measures taken by the government in 2009 gave new stimulus to investment. The expansion of mortgage lending, which was crucial to insure the housing investment in 2009, continued to grow at a significant rate throughout 2010. In turn, BNDES funds remained the main source in the

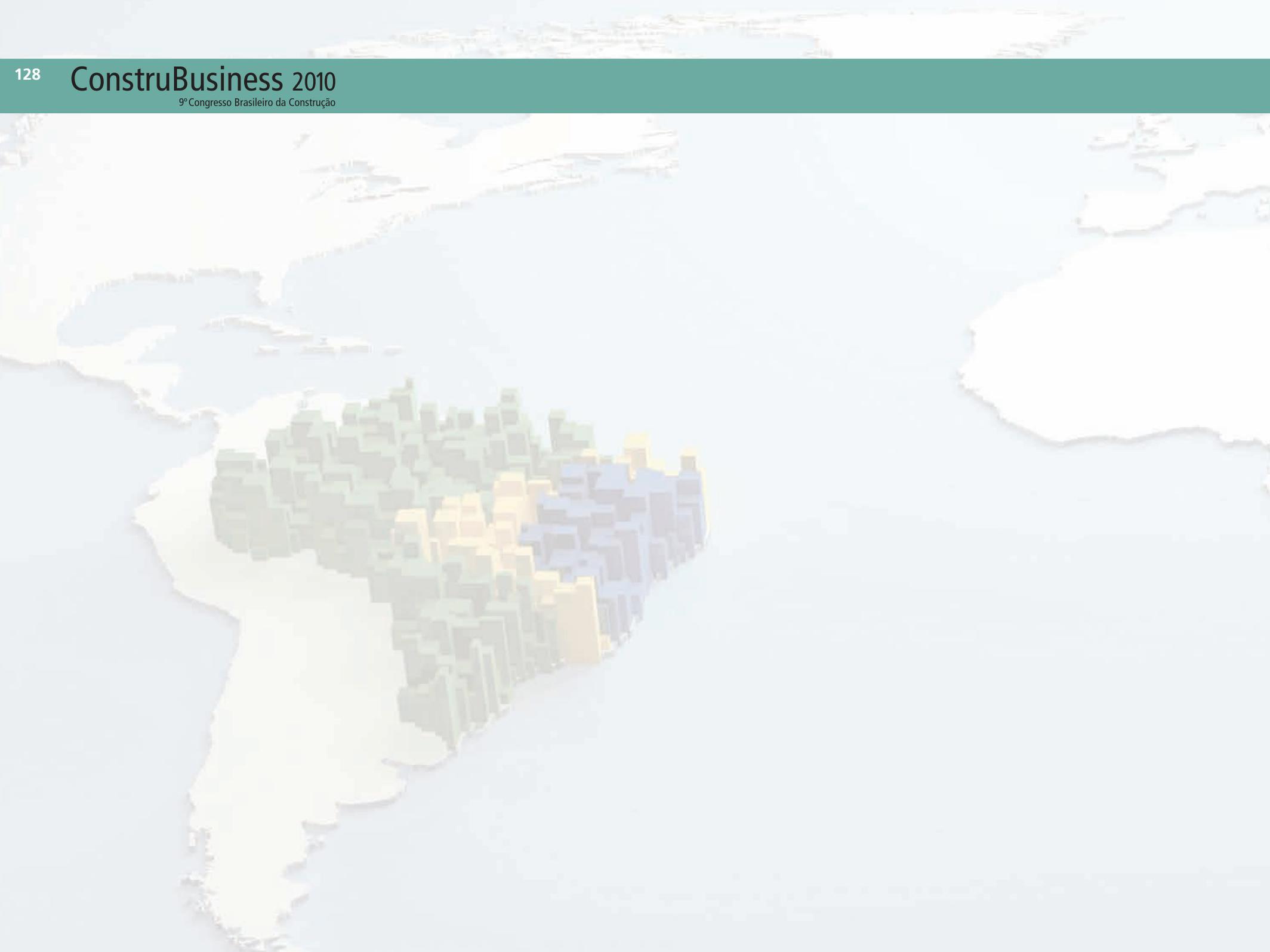
infrastructure area, ensuring the completion of important projects.

GDP had recorded an increase of 19% above INCC in the first six months of the year, in comparison with the first half of 2009. During this period, 333.000 jobs were generated in registered jobs, of which 146,700 in real estate and 61,800 in infrastructure. Financing contracts funded through savings, increased by 77% over the same period in 2009.

Thus, GDP in the construction sector is estimated to register a growth of

11% in 2010. Similar to the rate that should be registered with the trade of materials. The materials industry, which suffered the greatest decline in 2009, should show even more meaningful growth rates, over 15%.

The numbers speak for themselves: the chain already has recovered the growth that began in 2005. But this route is just starting. In the path towards 2022, there are great challenges that will require a deep involvement of the government officials and entrepreneurs throughout the chain.



## 2. Housing

# Brazil on course to 2022

### Development context

To analyze housing for the coming years, the scenario outlined by **FGV**, for the Brazilian economy, in reference to 2022 must be discussed first. 2022 is the Bicentennial of the Independence of Brazil. The model adopted to build this scenario considers the consistency of macroeconomic variables and projected the country's insertion in the global context. It also includes investment figures required to meet the goals of housing supply as well as an expansion of infrastructure compatible with the projected growth for the country over the period. Thus, the projected values for the economy as a whole and for the construction industry are those that rise from the conjunction of a set of macroeconomic conditions with the given set of investments needed to meet the social and economic goals.

The main finding is quite positive, because it turns out that the Country has the ability to expand its GDP at an average annual rate of 5%, considering that institutional improvements and adjustments will be made in the economic policy, consolidating the growth in recent years, ensuring the amount of investments required. Although further work is required, those are improvements and not a radical change in the route that will be followed. Thus, it is important to signal a horizon of **continuity, competitiveness and sustainability**, with the Brazilian economic growth already underway in those recent years. The overall analysis is to broaden the discussion on the construction chain, a key element necessary to base investments in the coming years.

### Continuity, competitiveness and sustainability

Brazil is already along the development route and it is realistic to anticipate a progressively more qualified participation in the global comprehensive plan until the Bicentennial of Independence. More than a wish, it is a result of gains recorded, especially since the 1990s, when the performance of the State in the economy was gradually being redesigned, allowing, in recent years, significant advances in growth and income distribution. Thus, it is important to question whether Brazil will grow well, that is, using the maximum, but without excess, of its potential in a sustainable way expanding markets and business - a point that is particularly important to the civil construction chain at this moment.

With regard to **continuity**, it is fundamentally important to carry forward the work planned in the Growth Acceleration Program (PAC) and the continuity for a longer period of time, of the social housing program policy established by the My Home, My Life. Both programs, if properly implemented, represent the commitment of the Brazilian state with a future capable of solving the limiting factors of growth, social inequality and the challenges for future generations in terms of spending on Social Security and Health, considering that the Brazilian population is in the process of aging.

The issue of **competitiveness** is referent to issues related to the insertion of Brazil in the market worldwide and also aspects of implementation of new

technologies and productive processes in the domestic planning. On the one hand, domestic industry can not be exposed to unfair competition practices and subject to internationally unrealistic tax burdens. On the other hand, rational construction industry taxation processes implementation is absolutely vital for the expansion of the sector, at the needed speed.

Regarding **sustainability**, the rational use of resources is thought to be used at the expense of less expensive technologies and forms of production, however polluting. At the same time, it expresses the concept that growth is sustained over time, being a smooth path, able to ensure a rate of increase in welfare over the years. Importantly, the vigorous growth of the Country requires skill and agility in the reallocation and qualification of labor, which involves pressing issues and thorough coordination of public and private sectors, especially in investment on education.

Brazil needs more than simple growth, it requires development. The concept of development was, decades ago, set out as a qualified economic growth that is reflected in improvements in quality of life, which implies a good level of income distribution and opportunities for social improvements. More recently, theorists, particularly the economist Amartya Sen, began to emphasize the importance of changes in income, education and quality of life in general so that even higher and sustainable growth rates can be achieved. Thus, human development in its broadest sense is not just a product, but a prerequisite of development. At the same time, the use of non-predatory natural resources includes a set of factors that characterize the sustainable development of the environmental perspective.

Rather than growing, Brazil needs simply to grow well. That means, significant progress in human development, creating qualifying opportunities for

the Brazilian population and in addressing energetic and environmental issues. In the construction sector, this means a growth path with institutional improvements, especially on tax rationality, efficiency of procedures and processes and expansion of investments in order to avoid bottlenecks that impede the continuity of projects.

## Global growth

The scenario presented here was based on a set of indicators referent to the last six decades, in a universe of a hundred countries, based on official statistics. These indicators refer to economy in a broad manner, also considering the demographic dynamics, quality of life and human and natural resources.

The in-depth view of the behavior of the main factors of the global scenario is, as is known, a requirement for valid forecasts of growth in Brazil. Based on historical series of interdependent variables and a set of assumptions, one can predict how the important elements of reality will behave, if no major changes occur unexpectedly. The critical factors are considered intervening in these projections and, therefore, providing implicitly a notion of risks and potentials.

A key factor in the scenario of global growth for the next years is prominently above the pace of growth in Asian and Latin American in reference to developed countries. Table 2.1 presents the estimates of economic growth in the European Union, the NAFTA countries, Central America and the Caribbean, South America, Asia and Oceania, Africa and the Middle East, as well as some selected countries and balanced economic growth of economies, which have been designated as the World.

**Table 2.1 - Global growth 1989-2009 and 2009-2022**

|                               | GDP Growth* (% p.a.) |           |
|-------------------------------|----------------------|-----------|
|                               | 1989-2009            | 2009-2022 |
| Europe                        | 2.0%                 | 1.1%      |
| Great-Britain                 | 2.2%                 | 0.6%      |
| France                        | 1.9%                 | 0.8%      |
| Portugal                      | 1.9%                 | 0.5%      |
| Spain                         | 2.9%                 | 0.6%      |
| Germany                       | 1.8%                 | 0.8%      |
| Russia                        | 0.2%                 | 0.9%      |
| NAFTA                         | 2.7%                 | 1.5%      |
| USA                           | 2.7%                 | 1.4%      |
| Mexico                        | 3.2%                 | 3.0%      |
| Central America and Caribbean | 3.3%                 | 3.0%      |
| South America                 | 3.0%                 | 3.9%      |
| Argentina                     | 3.5%                 | 1.5%      |
| Brazil                        | 2.5%                 | 5.0%      |
| Chile                         | 5.1%                 | 3.2%      |
| Venezuela                     | 2.9%                 | 0.9%      |
| Asia and Oceania              | 3.9%                 | 3.5%      |
| Japan                         | 1.4%                 | 0.4%      |
| China                         | 9.8%                 | 6.9%      |
| Korea                         | 5.5%                 | 3.1%      |
| India                         | 5.9%                 | 3.4%      |
| Australia                     | 3.1%                 | 2.2%      |
| Sub-Saharan Africa            | 2.9%                 | 3.5%      |
| Middle East and North Africa  | 4.4%                 | 2.4%      |
| World                         | 2.7%                 | 2.1%      |

Source: FGV. (\*)GDP adjusted for purchasing power parity of the currency.

The world economy growth projection is 2.1% per annum until 2022 - significantly lower rates than during the period 1989-2009, of 2.7%. This deceleration reflects a slower pace of growth in the United States, Europe and to a lesser extent, China and Asian countries. That was expected historically, as it expresses fewer opportunities for productive investment and expansion of those economies, but which was intensified by the 2008 global crisis.

The United States have suffered and still suffer the consequences of the crisis, especially with the inability to consider a framework of unemployment much higher than its historical average. But the characteristic dynamics of this economy will result in an average growth of 1.4% annually between 2010 and 2022, a higher percentage than the European average of 1.1% and significantly above the average of countries like Britain (0.6 %) and Germany (0.8%).

There is a significant slowdown in Asia, that is, in India and Korea, a little above 3%. China, after a long-term average growth rates of around 10%, in the coming years will present the highest growth of all major economies, approximately 7%.

South America, after years of quiet performance, will have a standout performance, with an average change in GDP of 4% per annum. The projected growth between 2010 and 2022 close to 5% per year in the Brazilian case is sustained on account of the fundamentals of the Brazilian economy, increasing the purchasing power and quality of life, as the consolidation of the country's financial center region and investment opportunities in energy, transport infrastructure and communication as well as the agenda of major sports events (2014 World Cup and 2016 Olympics).

It is important to emphasize that this Brazilian growth potential will not take place automatically. For that to take place, it is necessary, as seen earlier, that the country should continue growing with social inclusion and enhancements in favor of continuous consolidated competitiveness and sustainability. This involves

addressing institutional and tax issues and educating manpower, points of vital importance for the construction industry.

## Brazilian growth

In Brazil, the process of social ascent of a significant portion of low-income population is a great potential of the internal market, which will enable the country to offset a less vigorous external demand. The projection of Brazilian GDP growth takes into account a scenario of rising prices of electricity, due to high demand and also by characteristics of the pricing of this input in the Country<sup>2</sup>.

Growth in recent years allows a gradual upward mobility of families with a lower income level. It is important to note that mobility is a consequence of the globalization of education, employment opportunities, increasing productivity of labor and the maturing of family age structure. According to economist **FGVs** Marcelo Neri's calculations, 35.7 million Brazilians were added in the sum of economic excerpt synthesized in the ABC middle and upper classes, between 2003 and 2009, or roughly, the population of Argentina.

The Brazilian GDP growth at a yearly 5% will require a major expansion of employment. Table 2.2 shows an average annual rate of employment growth of 1.9% in the period between 2009 and 2022. This rate means a cumulative growth of almost 28% for the period as a whole, increasing the employment figures in the country from 96.8 million in 2009 to about 123.6 million in 2022.

<sup>2</sup> The derivation, in order to make energy prices more competitive in Brazil raise potential GDP growth by almost one percentage point per year on average until 2022, but it is not dealt with in this scenario.

**Table 2.2**  
**Forecasts for the Brazilian economy, 2009-2022 (% pa)**

| Labor Market                           |        |
|--|--------|
| Working age population (PIA)*          | 1.1%   |
| Economically Active Population (PEA)** | 1.8%   |
| Employed Population                    | 1.9%   |
| Inflation and Interest                 |        |
| Exchange rate R\$/US\$***              | 225.7% |
| IPC                                    | 4.3%   |
| IGP                                    | 5.1%   |
| TJLP                                   | 5.8%   |
| Foreign trade                          |        |
| Export                                 | 4,3%   |
| Import                                 | 6,7%   |

Source: FGV. (\*)people aged between 15 and 64;(\*\*) job seekers; (\*\*\*) average in the period.

It is important to point out that this occupation expansion rate requires major advances in terms of increased productivity, if not the GDP's growth will become unsustainable. This is because the current level of unemployment in the Brazilian economy and the prospects of population growth will narrow the supply of labor in reference to the future demands, imposing severe educational and technological challenges to Brazilian society.

The working age population (PIA) was 130.3 million people in 2009. The tendency of population growth of the country will mean a rise of 1.1% per year between 2009 and 2022, which limits the expansion of PIA to 19.8 million people. It is estimated that the economically active population (PEA), which is



formed by the group of people willing to work, will go from 101 million people in 2009 to 128 million people in 2022, an increase of 1.8% per year term. This presupposes a considerable increase in the ratio of PIA / PEA, which should exceed 78% in 2009 to 85% in 2022.

The inflow of 27 million people in the labor force, combined with a gradual reduction in unemployment to 3.4% of the PEA in 2022 - something not seen in the country since the external debt crisis - will allow the growth of the average occupation annually by 1.9% per annum in the term, implying the inclusion of 26.8 million new workers by 2022. It is worth mentioning that today the vast majority of workers who will enter the labor force by 2022 are above 15 years of age. That labor force is a group of people who are already undergoing training at schools structured to give strict qualitative restrictions.

GDP's growth rate averaged 5% per annum and the expansion of employment at an average rate of 1.9% per year shows the need for major advances in productivity. The scenario considered in this paper foresees an average growth of 3% per annum on labor productivity (value added per worker). To make this possible, the technological base of the country must change and workforce qualification should be expanded significantly. Therefore, to create capacitating conditions for that amount of workers and technological change is one of the major challenges for Brazilian society in the course towards 2022.

The projected economic growth implies significant wage gains during the period, which will be reflected in the growth of wages and the expansion of consumption and household savings. The actual gain in average earnings should exceed the increase in productivity by at least one percentage point, that is, the average wage is expected to grow at a rate of 4% per annum in the period. This is expected because of unemployment reduction, which impacts directly on the wage level. Thus, considering the increase of

employment by 1.9% per year, the country's overall wages will grow 6% annually in real terms (above the INPC), surpassing the growth of the GDP.

The growth of Brazilian economy and earnings do not imply on uncontrolled general price levels. The Consumer Price Index (IPC-Fipe) should be around 4.3% annually over the 12 years under consideration and the General Price Index (IGP-FGV), at 5.1%. The long-term interest rate (TJLP), considering the projections, will stay within the average of 5.8% per year. These price tracks will be sustained in a realistic and conservative monetary policy.

Given the persistence of Brazil's role in world trade, the projections show a clear warning of trade imbalance. Exports will grow at a pace significantly below importation - while the first will have an average growth rate of 4.3% per year in the term 2009-2020, the latter ones will grow 6.7% annually. In other words, while exports will grow 59% in the period, imports will more than double. In this scenario, the Brazilian balance of trade must move from a surplus of US\$ 25.3 billion to a deficit of US\$ 15.9 billion at 2009 prices. These projections already take into account the positive effect of oil exports from the pre-salt layer, which can reach US\$ 64.5 billion in 2022. Without it, the trade deficit would be US\$ 80.4 billion.

The warning of the trade balance is particularly important for the building materials industry. If industry stimulating measures - in the fiscal area, in protection against unfair competition in the competitive supply of energy - are not taken, there will certainly occur a process of deindustrialization, with broad import of products to meet the needs of the domestic market - especially civil construction, which will rise above the national average. Industry competitiveness is not limited to the chain of civil construction and solution of this problem must be considered within an overall strategy of the Brazilian State, intended to define the Brazilian position in international trade, using innovation and competitiveness in a strategic manner.

## Sectors

Table 2.3 presents the value added growth rates of major sectors of economic activity. Those rates were estimated within the aggregated simulation model, so as to be compatible with the projected growth rates for the Brazilian economy as a whole in the periods considered.

**Table 2.3**  
**Forecasts for major sectors of the Brazilian economy,**  
**2009-2022 (% pa)**

| Sectors                                 | (%)         |
|---|-------------|
| Agriculture                             | 4.1%        |
| Quarrying                               | 5.7%        |
| Refined petroleum                       | 4.5%        |
| Non-metallic mineral products           | 6.7%        |
| Steel                                   | 4.1%        |
| Non-ferrous metallurgy                  | 4.0%        |
| Pulp and paper products                 | 5.1%        |
| Other manufacturing industries          | 5.0%        |
| Industrial services of public utilities | 6.7%        |
| Construction                            | 6.1%        |
| Trade                                   | 3.5%        |
| Services                                | 5.2%        |
| <b>Total</b>                            | <b>5,0%</b> |

Source: FGV

It is noted that the sectors that present the highest growth rates in the period 2009-2022 are non-metallic mineral products and public utility industrial services (6.7% per annum), civil construction (6.1%) and extractive activities (5.7%) - where weighs the oil. Trade will have a relatively modest growth (3.5%) compared with services (5.2%), which should expand due to the great tourism events (hotel activity, for example).

Considering the assumptions of the scenario that will occur in the favorable improvements to **continuity** to **competitiveness** and **sustainability**, the construction chain will jump from a national GDP share of 8.3% in 2009 to 9.5% in 2022. This evolution illustrates once again the strategic importance of the sector for Brazilian growth.

This growth, however, also imposes challenges in terms of increased productivity for the construction chain. The 6.1% GDP yearly construction growth requires the expansion of employment in a more scarce global labor market and with rising earnings. To match the average standard of economy, construction must have productivity gains of 3% per annum in the labor force. In this case, the wages paid would be enough to lure young people into construction jobs. The construction workers are expected to grow 3.1% annually between 2009 and 2022, involving the opening of 3.3 million new jobs - the occupation in civil construction should go from 6.9 million people in 2009 to 10.2 million people in 2022.

To ensure increased productivity, the construction chain should (i) promote technological change in construction processes and materials, (ii) increase the use of machinery and equipment, and (iii) qualify the workforce, that is entering the market. That means a big change in the trend of the last five years, during which the growth of construction activities was accompanied by an expansion of employment of the same magnitude without increased productivity gains on labor.

To grow in order to face the challenges that rise now and in the next few decades, Brazil needs infrastructure and housing. This is a must that can no longer be ignored, otherwise present opportunities would be wasted. To grow at a strong pace today it is imperative to include and overcome inequality. But this same growth is a necessity for the country to become viable for future

generations. These will face a more mature age structure, with a considerable number of retirees and people with more qualified health needs. The dilemma that arises for this and future generations is growing or becoming poorer. In recent years the Country has adopted the option to develop - it is now time to perfect it.

## 2.1. Housing needs

### Definition of needs

In the Brazilian public housing project policies, it is essential to analyze the demographic and socioeconomic dynamics that influence the family settlements and therefore the needs of housing. These needs rise from three main processes:

- **family dynamics:** The process of constituting new families, which is influenced by population growth and economic evolution of the population;
- **housing deficit:** liabilities of households resulting from not covering the needs over the years, and;
- **depreciation:** the need for replacement of the housing stock worn by use.

Family dynamics is characterized by the process of forming new families. In quantitative terms, it is the main component of the housing needs of Brazil. The rate of household formation is influenced by two factors: population growth and changes in income.

Population growth is determined by the fecundity of the population, their mortality and migration. But there are two equally important aspects of the issue: the process of urbanization and changes in age structure. Moving from the countryside to the city brings a new housing need alone, and it also implies in making cultural changes, among which the reduction on the number of children is outstanding. The maturing of the population changes the housing

needs configuration. After a certain age, young people form their own families and wish to have their own homes. Couples, in their 40s usually look for a new home, preferably larger. The elderly, in turn, require smaller homes.

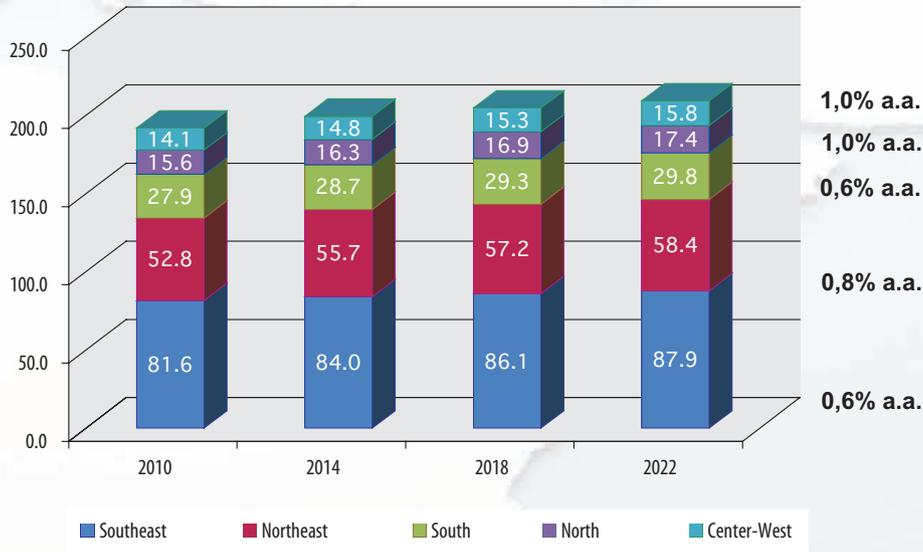
The number of families may also be higher or lower because of economic conditions. There is some proportionality between the number of adults in certain population and households formed, but this relationship will change when the economic situation favors the formation of families and early anticipation of the decision of having children. The movements in Chile during the 1990s illustrate the theme: economic growth has led to the early formation of families, implying a momentary reversal in the trend of decline in the number of children.

### The demographic scenario

Over the past 12 years, the Brazilian population grew at an average rate of 1.3% per year, from 166 million in 1998 to over 193 million in 2010. The expectation for the next 12 years is that the rate decline even further, reaching 0.5% per year in 2022. Thus, the population will reach 209 million in 2022, with an average population growth of 0.6% per year. This decrease in the growth rate is linked largely to rising incomes and falling birth rate. Chart 2.1.1 provides the trajectory of the population in the period 2010 to 2022, by geographic region.

**Chart 2.1.1. - Population in million inhabitants**

Source: IBGE.



The southern and southeastern regions have rates of population growth of 0.6% per year between 2010 and 2022 and the North and Midwest, 1% a year. The states of Amapa and Amazonas have annual growth rates above the national average of 1.4% in the period. The Federal District also shows a higher rate of population growth of 1.3% per year between 2010 and 2022. The projection of population growth of São Paulo is very similar to the national average – it is expected to expand 0.6% annually between 2010 and 2022. Rio Grande do Sul is the one with the lowest growth rate at 0.4% per year.

Table 2.1.1 Population by State, Brazil

|                     | 2010               | 2014               | 2018               | 2022               | (%) ao ano   |
|---------------------|--------------------|--------------------|--------------------|--------------------|--------------|
| Rondônia            | 1.513.758          | 1.548.375          | 1.577.598          | 1.603.230          | 0,48%        |
| Acre                | 701.623            | 738.567            | 769.755            | 797.111            | 1,07%        |
| Amazonas            | 3.442.959          | 3.617.583          | 3.764.998          | 3.894.301          | 1,03%        |
| Roraima             | 429.767            | 458.884            | 483.464            | 505.024            | 1,35%        |
| Pará                | 7.534.925          | 7.900.816          | 8.209.696          | 8.480.623          | 0,99%        |
| Amapá               | 639.363            | 684.276            | 722.191            | 755.448            | 1,40%        |
| Tocantins           | 1.303.001          | 1.341.561          | 1.374.112          | 1.402.664          | 0,62%        |
| Maranhão            | 6.425.576          | 6.631.362          | 6.805.083          | 6.957.458          | 0,66%        |
| Piauí               | 3.169.638          | 3.255.254          | 3.327.530          | 3.390.925          | 0,56%        |
| Ceará               | 8.640.099          | 8.965.090          | 9.239.441          | 9.480.083          | 0,78%        |
| Rio Grande do Norte | 3.167.054          | 3.270.984          | 3.358.720          | 3.435.676          | 0,68%        |
| Paraíba             | 3.795.943          | 3.887.382          | 3.964.572          | 4.032.279          | 0,50%        |
| Pernambuco          | 8.882.415          | 9.136.517          | 9.351.026          | 9.539.178          | 0,60%        |
| Alagoas             | 3.183.194          | 3.278.574          | 3.359.093          | 3.429.718          | 0,62%        |
| Sergipe             | 2.038.941          | 2.106.772          | 2.164.033          | 2.214.259          | 0,69%        |
| Bahia               | 14.765.239         | 15.215.536         | 15.595.669         | 15.929.096         | 0,63%        |
| Minas Gerais        | 20.207.839         | 20.821.177         | 21.338.946         | 21.793.097         | 0,63%        |
| Espírito Santo      | 3.519.028          | 3.631.113          | 3.725.733          | 3.808.727          | 0,66%        |
| Rio de Janeiro      | 16.141.412         | 16.602.656         | 16.992.030         | 17.333.562         | 0,60%        |
| São Paulo           | 41.737.337         | 42.981.429         | 44.031.674         | 44.952.873         | 0,62%        |
| Paraná              | 10.777.396         | 11.098.366         | 11.369.324         | 11.606.990         | 0,62%        |
| Santa Catarina      | 6.181.506          | 6.402.520          | 6.589.095          | 6.752.746          | 0,74%        |
| Rio Grande do Sul   | 10.970.021         | 11.166.842         | 11.332.996         | 11.478.734         | 0,38%        |
| Mato Grosso do Sul  | 2.383.684          | 2.465.329          | 2.534.252          | 2.594.707          | 0,71%        |
| Mato Grosso         | 3.043.396          | 3.190.251          | 3.314.224          | 3.422.964          | 0,98%        |
| Goiás               | 6.003.431          | 6.275.039          | 6.504.325          | 6.705.440          | 0,93%        |
| Distrito Federal    | 2.654.059          | 2.820.178          | 2.960.413          | 3.083.417          | 1,26%        |
| <b>Brazil</b>       | <b>193.252.604</b> | <b>199.492.433</b> | <b>204.759.993</b> | <b>209.380.330</b> | <b>0,67%</b> |

Source: IBGE.

It is estimated that the distribution of the population by age group change a lot until 2022. According to Figure 2.1.2, the population of 2010 is more concentrated in the bands young: about 45% of the population is younger than 25 years. The population over 26 years of age represents 55% of the total. In 2022, the population in this age group will reach 63% of the population and children and young people will reduce their share in total population to 37%.

This shift in age distribution affects the dynamics of family formation, because there is more age people to form families.

Table 2.1.2 shows the population by age and for four years. Observe that the number of children is decreasing in absolute terms over time, which shows that families are getting smaller. The number of elderly on the other hand, is increasing in an aging population.

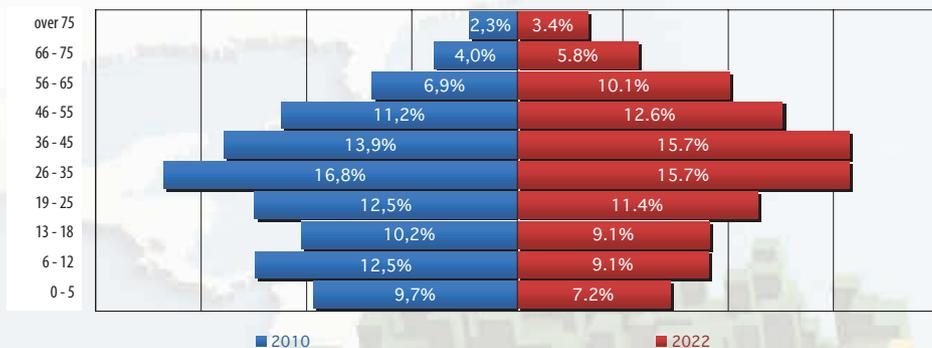
**Table 2.1.2. Population by age group, Brazil**

| Age          | 2010               | 2014               | 2018               | 2022               | (%) per annum |
|--------------|--------------------|--------------------|--------------------|--------------------|---------------|
| 0 - 5        | 18.692.240         | 16.848.311         | 15.660.223         | 15.117.882         | -1,75%        |
| 6 - 12       | 24.066.846         | 23.046.013         | 20.897.832         | 19.010.465         | -1,95%        |
| 13 - 18      | 19.795.674         | 20.410.119         | 20.508.295         | 19.070.241         | -0,31%        |
| 19 - 25      | 24.116.789         | 23.085.234         | 23.172.977         | 23.835.572         | -0,10%        |
| 26 - 35      | 32.493.149         | 34.330.450         | 34.076.334         | 32.935.494         | 0,11%         |
| 36 - 45      | 26.916.126         | 28.098.744         | 30.407.045         | 32.956.072         | 1,70%         |
| 46 - 55      | 21.679.636         | 24.024.000         | 25.367.271         | 26.300.278         | 1,62%         |
| 56 - 65      | 13.318.213         | 15.696.741         | 18.450.396         | 21.084.517         | 3,90%         |
| 66 - 75      | 7.711.672          | 8.692.051          | 10.112.635         | 12.042.601         | 3,78%         |
| over 75      | 4.462.259          | 5.260.770          | 6.106.985          | 7.027.209          | 3,86%         |
| <b>Total</b> | <b>193.252.604</b> | <b>199.492.433</b> | <b>204.759.993</b> | <b>209.380.331</b> | <b>0,67%</b>  |

Source: IBGE.

Chart 2.1.2. Age pyramid, Brazil, 2010 and 2022

Source: IBGE.



## The rate of household formation

The demographic dynamics and economic growth scenario with social mobility determine a strong expansion in the number of households between 2010 and 2022, as shown in Table 2.1.3. The rate of growth in the number of households, from 1.88% a year, is nearly three times the pace of demographic expansion. Thus, families must spend 63.6 million to 79.6 million, with the formation of nearly 16 million households in 12 years - or, 1.33 million new households per year<sup>3</sup>. It is also hoped a gradual aging of the heads of families, expressed by a decrease of 30% to 24% of household heads under 30 years of age.

<sup>3</sup> Vale notar que quando a referência é 2009 e se incorpora as novas famílias que surgem em 2010, tem-se a formação de 17,2 milhões de famílias.

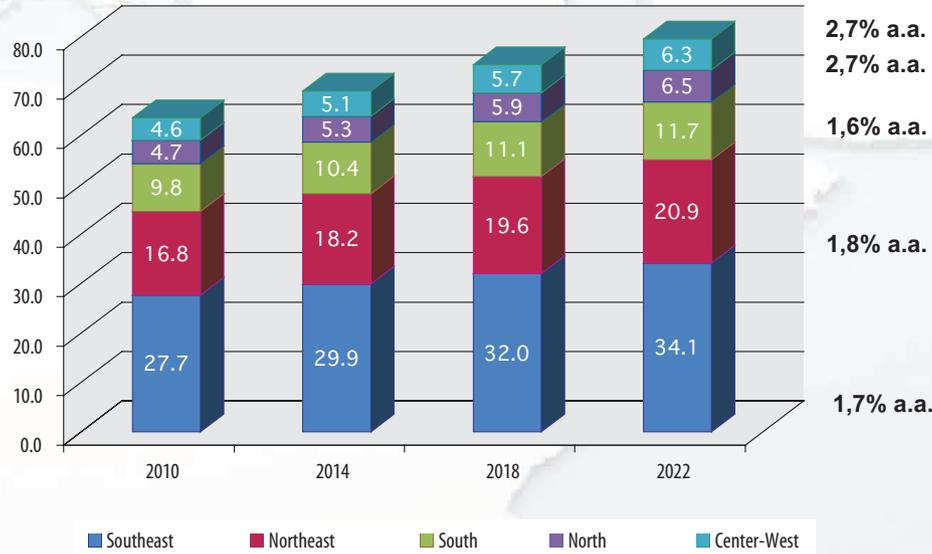
Table 2.1.3. Households by age of the head of the family, Brazil

| Age          | 2010              | 2014              | 2018              | 2022              | (%) per annum |
|--------------|-------------------|-------------------|-------------------|-------------------|---------------|
| 13 - 18      | 372.881           | 384.199           | 385.715           | 358.727           | -0,32%        |
| 19 - 25      | 4.867.443         | 4.663.209         | 4.685.762         | 4.822.759         | -0,08%        |
| 26 - 35      | 14.028.254        | 14.826.097        | 14.726.879        | 14.247.737        | 0,13%         |
| 36 - 45      | 14.623.904        | 15.298.703        | 16.567.884        | 17.965.428        | 1,73%         |
| 46 - 55      | 12.941.619        | 14.360.689        | 15.208.243        | 15.816.203        | 1,69%         |
| 56 - 65      | 8.532.123         | 10.043.109        | 11.796.838        | 13.489.557        | 3,89%         |
| 66 - 75      | 5.293.098         | 5.956.787         | 6.922.729         | 8.235.719         | 3,75%         |
| over 75      | 2.974.717         | 3.500.445         | 4.052.750         | 4.650.289         | 3,79%         |
| <b>Total</b> | <b>63.634.038</b> | <b>69.033.238</b> | <b>74.346.800</b> | <b>79.586.419</b> | <b>1,88%</b>  |

Source: FGV.

**Figure 2.1.3. Families by region, in millions**

Source: FGV.



Following demographic trends, the South and Southeast are the ones with the smallest prospect of expanding the number of households: 1.6% pa and 1.7% per year, respectively. In contrast there are the North and Midwest regions, with a growth rate of the number of households of 2.7% per year between 2010 and 2022. The northern states have annual growth rates of the higher number of families. Brazilia also present high rate, leading to the creation of 435 new households by 2022. The projected growth in the number of families to Sao Paulo is 1.75% per annum between 2010 and 2022. Rio Grande do Sul is the one with the lowest rate of household formation of 1.1% per year.

Table 2.1.4 Households by state

|                     | 2010              | 2014              | 2018              | 2022              | (%) ao ano   |
|---------------------|-------------------|-------------------|-------------------|-------------------|--------------|
| Rondônia            | 482.466           | 512.818           | 540.951           | 567.003           | 1,35%        |
| Acre                | 212.227           | 240.673           | 270.865           | 302.908           | 3,01%        |
| Amazonas            | 926.881           | 1.046.863         | 1.173.422         | 1.306.926         | 2,90%        |
| Roraima             | 129.015           | 150.904           | 175.170           | 202.046           | 3,81%        |
| Pará                | 2.242.675         | 2.521.488         | 2.813.495         | 3.119.376         | 2,79%        |
| Amapá               | 178.776           | 210.156           | 245.173           | 284.208           | 3,94%        |
| Tocantins           | 416.671           | 449.615           | 481.490           | 512.350           | 1,74%        |
| Maranhão            | 1.854.581         | 2.012.028         | 2.166.313         | 2.317.611         | 1,87%        |
| Piauí               | 991.726           | 1.063.993         | 1.132.882         | 1.198.569         | 1,59%        |
| Ceará               | 2.651.535         | 2.912.076         | 3.173.999         | 3.437.504         | 2,19%        |
| Rio Grande do Norte | 1.025.598         | 1.114.608         | 1.202.169         | 1.288.373         | 1,92%        |
| Paraíba             | 1.202.039         | 1.281.188         | 1.355.209         | 1.424.399         | 1,42%        |
| Pernambuco          | 2.768.307         | 2.980.640         | 3.184.956         | 3.381.658         | 1,68%        |
| Alagoas             | 971.531           | 1.049.209         | 1.124.518         | 1.197.576         | 1,76%        |
| Sergipe             | 638.675           | 694.795           | 750.122           | 804.711           | 1,94%        |
| Bahia               | 4.756.963         | 5.143.387         | 5.519.089         | 5.884.612         | 1,79%        |
| Minas Gerais        | 6.738.680         | 7.283.733         | 7.813.253         | 8.328.027         | 1,78%        |
| Espírito Santo      | 1.153.460         | 1.250.901         | 1.346.302         | 1.439.773         | 1,86%        |
| Rio de Janeiro      | 5.712.928         | 6.150.676         | 6.571.821         | 6.977.195         | 1,68%        |
| São Paulo           | 14.120.853        | 15.244.598        | 16.333.141        | 17.388.247        | 1,75%        |
| Paraná              | 3.642.298         | 3.931.928         | 4.212.446         | 4.484.308         | 1,75%        |
| Santa Catarina      | 2.129.881         | 2.329.698         | 2.528.964         | 2.727.835         | 2,08%        |
| Rio Grande do Sul   | 3.987.500         | 4.191.010         | 4.371.550         | 4.530.901         | 1,07%        |
| Mato Grosso do Sul  | 815.288           | 888.846           | 961.703           | 1.033.921         | 2,00%        |
| Mato Grosso         | 1.012.096         | 1.137.187         | 1.268.062         | 1.405.017         | 2,77%        |
| Goiás               | 2.031.726         | 2.268.298         | 2.513.238         | 2.766.939         | 2,61%        |
| Distrito Federal    | 839.665           | 971.924           | 1.116.496         | 1.274.426         | 3,54%        |
| <b>Brazil</b>       | <b>63.634.038</b> | <b>69.033.238</b> | <b>74.346.800</b> | <b>79.586.419</b> | <b>1,88%</b> |

Source: FGV.

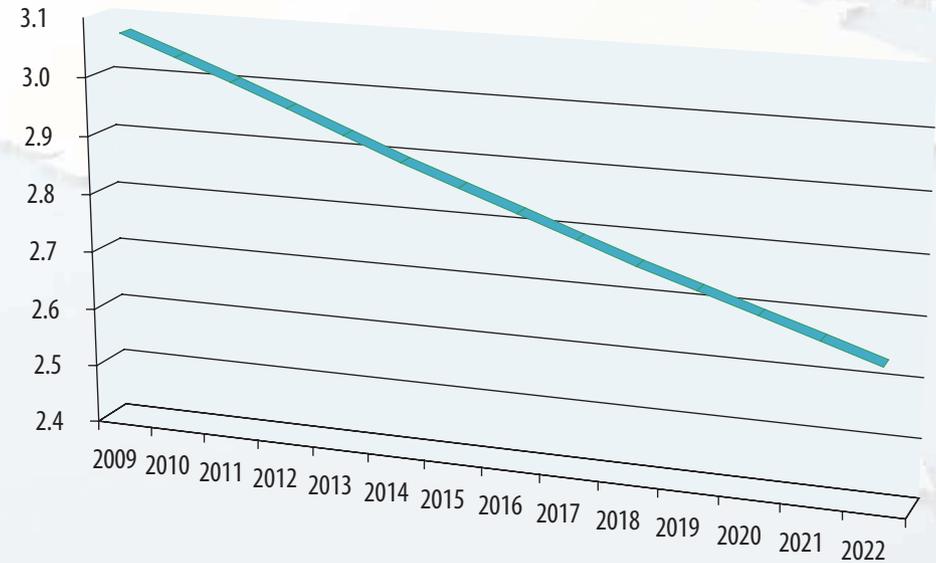
The relative growth is stronger in the North and Midwest, but in absolute terms, most of the growth comes from the Southeast. Of the total 16 million new households that will arise in the period 2010 to 2022, 40% occur in the Southeast, which amounts to 6.4 million new households. São Paulo alone accounts for 20.5% of this expansion, which corresponds to 3.3 million new households.

Between 2010 and 2022, the number of families in the country is rising by almost 16 million units, equivalent to an average of 1.33 million new households per year over the next 12 years. It is important to note that over the next four years, the annual flow of new households (1.35 million new households) is higher than the average for the entire period, which raises the most immediate needs. Gradually, the pace slows down, as if to accommodate population growth rate.

As shown in Chart 2.1.4, the average number of persons per household is expected to decrease significantly in those 12 years, from 3.1 in 2010 to 2.6 in 2022. The decrease is stronger in some states - Amapá, Roraima, Acre and the Federal District - because of deeper changes in the age profile.

### Chart 2.1.4. Persons per household

Fonte: FGV.



### Brazilian housing deficit

The other determinant of housing needs is the housing deficit, which corresponds to passive missed in the past. The reduction of the liability, and objective of housing policy, brings significant gains from the social point of view, since it is concentrated on the lower income population.

Table 2.1.5. Number of households in housing deficit according to different methodologies, 2009

| Units of the Federation | Inadequacy or increase of inventory** |           | Cohabitation FJP | Families cohabiting* | Déficit (new methodology) |           |
|-------------------------|---------------------------------------|-----------|------------------|----------------------|---------------------------|-----------|
|                         | Sinduscon-SP                          | FJP       |                  |                      | Sinduscon-SP              | FJP***    |
| Rondônia                | 40.293                                | 49.224    | 17.375           | 16.427               | 56.720                    | 65.413    |
| Acre                    | 13.479                                | 10.863    | 13.736           | 12.136               | 25.615                    | 24.016    |
| Amazonas                | 155.475                               | 76.175    | 102.409          | 95.929               | 251.404                   | 173.745   |
| Roraima                 | 7.658                                 | 12.784    | 5.709            | 5.542                | 13.200                    | 18.159    |
| Pará                    | 366.895                               | 122.960   | 155.948          | 142.884              | 509.779                   | 273.707   |
| Amapá                   | 3.662                                 | 7.933     | 19.359           | 18.048               | 21.710                    | 26.751    |
| Tocantins               | 24.125                                | 30.216    | 16.909           | 16.008               | 40.133                    | 46.223    |
| Maranhão                | 308.101                               | 301.834   | 129.868          | 120.910              | 429.011                   | 418.268   |
| Piauí                   | 120.649                               | 81.344    | 44.222           | 43.130               | 163.779                   | 123.383   |
| Ceará                   | 217.113                               | 176.906   | 138.326          | 135.748              | 352.861                   | 313.324   |
| Rio Grande do Norte     | 17.123                                | 57.251    | 66.544           | 66.055               | 83.178                    | 121.348   |
| Paraíba                 | 75.290                                | 60.734    | 50.697           | 48.689               | 123.979                   | 108.420   |
| Pernambuco              | 153.999                               | 170.437   | 123.118          | 119.817              | 273.816                   | 290.743   |
| Alagoas                 | 53.044                                | 70.182    | 51.969           | 50.899               | 103.943                   | 121.079   |
| Sergipe                 | 29.579                                | 38.079    | 36.376           | 36.036               | 65.615                    | 74.115    |
| Bahia                   | 213.013                               | 240.896   | 210.396          | 197.687              | 410.700                   | 446.963   |
| Minas Gerais            | 206.825                               | 291.948   | 255.993          | 237.384              | 444.209                   | 542.044   |
| Espírito Santo          | 36.587                                | 61.912    | 42.220           | 41.282               | 77.869                    | 101.787   |
| Rio de Janeiro          | 442.975                               | 285.126   | 106.744          | 94.720               | 537.695                   | 390.126   |
| São Paulo               | 746.098                               | 845.145   | 405.695          | 380.998              | 1.127.096                 | 1.230.795 |
| Paraná                  | 44.993                                | 151.251   | 84.300           | 82.063               | 127.056                   | 233.482   |
| Santa Catarina          | 29.253                                | 78.806    | 47.164           | 45.970               | 75.223                    | 125.373   |
| Rio Grande do Sul       | 108.899                               | 128.880   | 98.899           | 96.492               | 205.391                   | 226.505   |
| Mato Grosso do Sul      | 15.930                                | 43.811    | 36.146           | 33.083               | 49.013                    | 79.957    |
| Mato Grosso             | 41.097                                | 53.737    | 48.993           | 43.461               | 84.558                    | 101.544   |
| Goiás                   | 38.736                                | 102.104   | 77.120           | 58.808               | 97.544                    | 177.815   |
| Distrito Federal        | 20.198                                | 76.746    | 43.984           | 37.252               | 57.450                    | 119.158   |
| Brazil                  | 3.531.089                             | 3.627.284 | 2.430.219        | 2.277.458            | 5.808.547                 | 5.974.243 |

Source: FGV based on Pnad 2009. (\*) corresponds to cohabitation cohabiting families in the concepts of Sinduscon-SP. (\*\*) Are considered to derou, for simplicity's sake, need to expand the inventory as the sum of inventory replenishment and increased inventory. (\*\*\*) Does not represent the simple sum of two components. See methodology in Annex

Table 2.1.5 shows the number of families in the housing deficit for the two methodologies most frequently employed: the João Pinheiro Foundation (FJP) and Sinduscon-SP. In 2009, the number of families in the housing deficit was 5.8 million according to the methodology of Sinduscon-SP and 5.9 million, according to the methodology of FJP. The inadequacy of housing, or the need for expansion of stock, representing approximately 60% of the total deficit for the two methodologies. In Sao Paulo, the housing deficit was 1.1 million households according to the Sinduscon-SP and 1.2 million according to FJP.

Families who live in precarious homes are concentrated in lower income ranges. In 2009, 93.6% of households living in poor housing had an income of up to three minimum wages according to the methodology of FJP. For Sinduscon-SP, this percentage was slightly lower, 77.7%. The families living with intention to provide home ownership are concentrated in family income ranges between 2 and 6 minimum salaries (72% of total).

Table 2.1.6 provides the latest developments in the housing deficit according to different methodologies. There is a decrease of the total deficit between 2007 and 2009 of 1.9%, according to the methodology of FJP, and 0.3%, according to the methodology of Sinduscon-SP. This decrease in the total deficit is linked largely to the reduction of households living in precarious homes. The rate of fall of the inadequacy or the need to expand the inventory was 4.1%, according to the methodology of FJP, and 5.3%, according to Sinduscon-SP.

With respect to families living with intention to change, there is an accumulated growth of 0.6% between 2007 and 2009. From 2008 to 2009, the growth of families living with intention to change was much greater, 12.8%, from 2.0 million to 2.3 million. This increase can be explained by the policies of credit and housing subsidy, which facilitated access to homeownership and fueled the desire to establish his own domicile.

**Table 2.1.6. Number of households in housing deficit according to different methodologies, from 2007 to 2009**

| Units of the Federation | Inadequacy or increase of inventory** |           | Cohabitation FJP | Families cohabiting* | Déficit (new methodology) |           |
|-------------------------|---------------------------------------|-----------|------------------|----------------------|---------------------------|-----------|
|                         | Sinduscon-SP                          | FJP       |                  |                      | Sinduscon-SP              | FJP***    |
| 2007                    | 3.730.220                             | 3.780.932 | 2.409.022        | 2.264.553            | 5.994.773                 | 6.090.614 |
| 2008                    | 3.780.113                             | 3.590.900 | 2.153.911        | 2.019.746            | 5.799.859                 | 5.650.756 |
| 2009                    | 3.531.089                             | 3.627.284 | 2.430.219        | 2.277.458            | 5.808.547                 | 5.974.243 |

Source: FGV based on National Household Survey. (\*) correspond to families living together in the concept of cohabitation Sinduscon-SP. (\*\*) Was considered, for simplicity's sake, need to expand the inventory as the sum of inventory replenishment and increased inventory. (\*\*\*) Does not represent the simple sum of two components. See methodology in the annex.o.

### Chart 2.1.5 Number of families in the housing deficit<sup>4</sup> from 2001 to 2009

<sup>4</sup> The housing deficit estimated in this chart considers the total number of families in housing deficit.  
Source: FGV based on the PNADs.

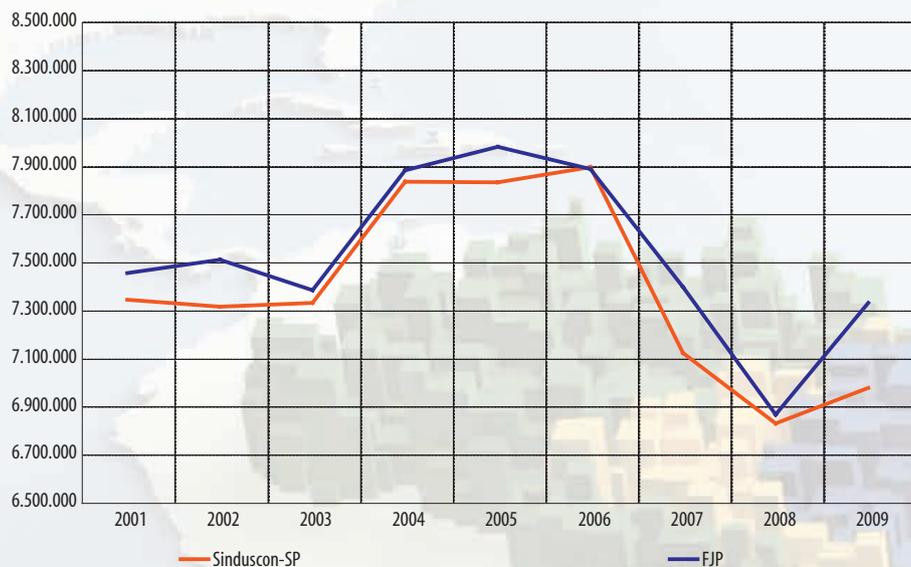


Chart 2.1.5 shows the recent trend in the housing deficit for the two methodologies. To enable comparison with the beginning of the decade, we adopted the old way of calculating the housing deficit, which considers the total number of families living together, not just those who intend to establish a new domicile. There is a very similar trend over time for both methodologies. Between 2003 and 2005, housing deficit grows, followed by a decrease between 2006 and 2008. However, in 2009, the deficit continued to grow due to cohabitation, as already mentioned.

### New housings

The Brazilian housing policy should aim for the production of housing for families that will emerge in the coming years and for those who are now in the housing deficit. This goal will meet the future housing needs while it rescues the social liabilities of the deficit, reducing it to an acceptable standard by 2022.

As seen, the pace of population growth and economic trajectory of the country lead to the formation of 1.326 million new households per year on average over the period 2010-2022. Furthermore, to eliminate substandard housing, estimated at 3.627 million in 2009, you need to build 279,000 houses per year until 2022. Added to that amount, the construction of over 203 000 homes per year to eliminate unwanted cohabitation until 2022. Table 2.1.7 brings these data every year, considering the premise that the targets for reduction of insecurity and cohabitation are raised gradually. It is worth pointing out that the number of cohabiting incorporates deficit projections for 2010.

The sum of these three needs - new families, elimination and reduction of the precariousness of the cohabitation - gives an annual production of about 1.8 million homes per year. This means that to meet the goals of housing policy proposals in this document will be necessary to build 23.5 million homes between 2010 and 2022. This constitutes a huge challenge, since this volume is the total construction of houses of the three most populous states in the country in 2009: Sao Paulo, Minas Gerais and Rio de Janeiro.

**Table 2.1.7. Needs for new housing, from 2010 to 2022**

| Year         | New housings                          |                          |                             | Total             |
|--------------|---------------------------------------|--------------------------|-----------------------------|-------------------|
|              | to meet the needs of the new families | to eliminate the deficit | to reduce the cohabitation* |                   |
| 2010         | 1.281.560                             | 120.000                  | 120.000                     | 1.521.560         |
| 2011         | 1.307.920                             | 220.000                  | 170.000                     | 1.697.920         |
| 2012         | 1.334.822                             | 220.000                  | 170.000                     | 1.724.822         |
| 2013         | 1.362.277                             | 220.000                  | 170.000                     | 1.752.277         |
| 2014         | 1.390.298                             | 220.000                  | 170.000                     | 1.780.298         |
| 2015         | 1.290.754                             | 280.000                  | 200.000                     | 1.770.754         |
| 2016         | 1.314.905                             | 280.000                  | 200.000                     | 1.794.905         |
| 2017         | 1.339.509                             | 280.000                  | 200.000                     | 1.819.509         |
| 2018         | 1.364.572                             | 280.000                  | 200.000                     | 1.844.572         |
| 2019         | 1.275.726                             | 376.821                  | 260.000                     | 1.912.547         |
| 2020         | 1.297.632                             | 376.821                  | 260.000                     | 1.934.453         |
| 2021         | 1.319.914                             | 376.821                  | 260.000                     | 1.956.735         |
| 2022         | 1.342.579                             | 376.821                  | 260.000                     | 1.979.400         |
| <b>Total</b> | <b>17.222.469</b>                     | <b>3.627.284</b>         | <b>2.640.000</b>            | <b>23.489.753</b> |

(\*)The deficit for cohabitation considers projections for 2010. Source: FGV.

Table 2.1.8 shows the effect of this policy on housing indicators. The two main consequences are (i) decreasing the distance between the number of households and housing, and (ii) gradually eliminating uncertainty - in 2022, all households will be adequate. The housing deficit will drop to a satisfactory level, decreasing from 11.3% in 2010 to 1.5% of Brazilian households in 2022.

Table 2.1.8. Housing and demographic indicators, 2010-2022

| Year                    | 2010        | 2014        | 2018        | 2022        | (%) a.a. |
|-------------------------|-------------|-------------|-------------|-------------|----------|
| Population              | 193.252.604 | 199.492.433 | 204.759.993 | 209.380.331 | 0.7%     |
| Families                | 63.588.276  | 68.983.593  | 74.293.333  | 79.529.185  | 1.9%     |
| Housing                 | 60.197.992  | 66.273.309  | 72.023.049  | 77.311.617  | 2.1%     |
| Adequate Housing        | 56.690.708  | 63.646.025  | 70.515.765  | 77.311.617  | 2.6%     |
| Housing Deficit *       | 7.200.329   | 5.640.329   | 3.720.329   | 1.173.045   | -14.0%   |
| Cohabiting              | 3.693.045   | 3.013.045   | 2.213.045   | 1.173.045   | -9.1%    |
| Precariosness           | 3.507.284   | 2.627.284   | 1.507.284   | -           | -100.0%  |
| Relative deficit        | 11,3%       | 8,2%        | 5,0%        | 1,5%        | -15.6%   |
| Inhabitants per housing | 3,04        | 2,89        | 2,76        | 2,63        | -1.2%    |

Source: FGV. (\*) Considers the number of families living in housing deficit.

## Housing investments

The result of this housing policy in economic terms is a significant increase in housing investment. The construction of new homes should raise about \$ 204 billion per year on average over the period. This is considerable progress, since the investment in new housing was R\$ 98 billion in 2009.

The value of new buildings used to make projections is \$ 86 200 in 2010. This value takes into account properties of different patterns, each with a reference value. For property for families with incomes up to three minimum wages, the assumed value is R\$ 50,000. This value is considered as the national average, and therefore below what is needed for construction in metropolitan areas<sup>5</sup>. Already the property for families with monthly income between 3 and 10 minimum wages, the value is R\$ 85,000. The properties of the mid-high consider an average of R\$ 250 000.

In projections that follow, it is the process of recovery of the property, ie the increase of the values mentioned above due to the dynamics of investment in real estate. The growth figures over the years makes the average spend of \$ 86,200 in 2010 to \$ 152.7 thousand in 2022. Importantly, this elevation of mean values is due to two factors: (i) the valuation of property, the natural period of expansion in real estate investment and growth in family income, and (ii) social mobility, which increases the number of families in the higher classes, with higher demand for real estate value, and brings down the number of families with incomes of up to three minimum wages. In this income class, for example, the number of families fell from 24.8 million in 2010 to 20.7 million in 2022.

<sup>5</sup> In most metropolitan areas, the figure will reach R\$ 60 thousand to R\$ 70 thousand.

**Table 2.1.9 - Housing investment , by component, R\$ billion, 2010-2022**

| Year    | Investment on new ones | Investment on rebuilding | Housing investment | Housing investment (% PIB) |
|---------|------------------------|--------------------------|--------------------|----------------------------|
| 2010    | 150,59                 | 38,46                    | 189,05             | 5,7%                       |
| 2011    | 159,90                 | 40,72                    | 200,62             | 5,8%                       |
| 2012    | 169,79                 | 43,11                    | 212,90             | 5,9%                       |
| 2013    | 180,28                 | 45,66                    | 225,94             | 5,9%                       |
| 2014    | 191,43                 | 48,37                    | 239,80             | 6,0%                       |
| 2015    | 188,87                 | 51,24                    | 240,10             | 5,7%                       |
| 2016    | 200,20                 | 54,07                    | 254,27             | 5,8%                       |
| 2017    | 212,21                 | 57,07                    | 269,28             | 5,8%                       |
| 2018    | 224,93                 | 60,26                    | 285,19             | 5,9%                       |
| 2019    | 223,10                 | 63,63                    | 286,73             | 5,6%                       |
| 2020    | 236,14                 | 66,98                    | 303,11             | 5,6%                       |
| 2021    | 249,93                 | 70,52                    | 320,45             | 5,7%                       |
| 2022    | 264,53                 | 74,27                    | 338,80             | 5,7%                       |
| Average | 203,99                 | 54,95                    | 258,94             | 5,8%                       |

Source: FGV.

The volume of investments needed to replace the depreciation, ie the amount of funds for renovations of residential properties should reach R\$ 55 billion on average over the period 2010-2022. This corresponds to 1.5% of the stock of housing capital. It is important to note that the actual progress of investments in new housing to increase the stock of real estate assets, raises the need for investment in rebuildings.

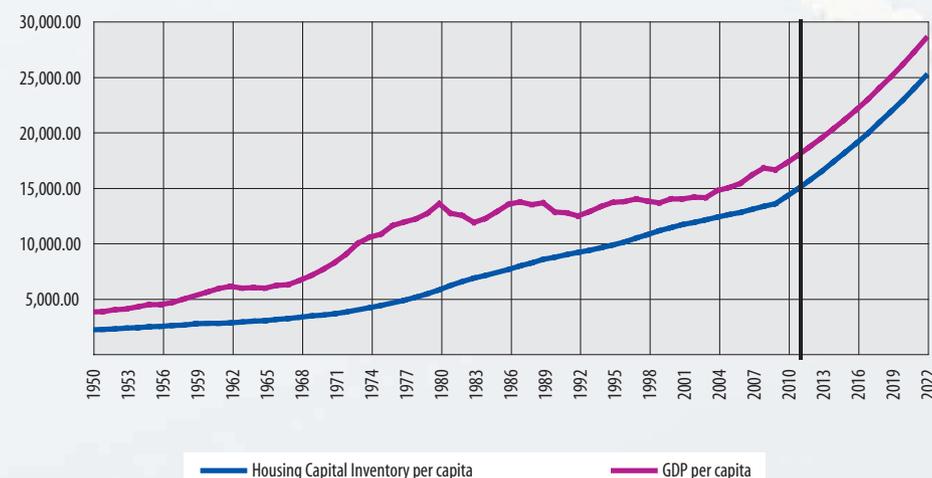
Table 2.1.9 gives the values of investment by component. To achieve the goals of housing policy will require investments worth R\$ 259 billion per year on average over the period. This equates to 5.8% of Brazilian GDP, which is a huge

challenge in terms of financing needs. In 2009, for example, the country had record amounts financed and, even then, the housing investment of R\$ 131 billion came in at just 4.2% of GDP.

The result of this housing policy is the constant accumulation of real estate assets, which lifts the housing capital stock per capita of \$ 14,000 in 2010 to \$ 24.9 thousand in 2022. That is, this process is consistent with the advance of per capita GDP projected for the period. The two variables are shown in Chart 2.1.6, which brings a long-term economic growth and accumulation of real estate assets.

**Chart 2.1.6 GDP per capita and housing capital per capita, R\$, 2009**

Source: IBGE e FGV.



## 2.2. Challenges and proposals

Brazil, as discussed in this publication is in a favorable moment for the solution to their housing needs, which involves designing a sufficient production to meet demand for new housing and substantially reduce the housing deficit. This production will require physical resources, substantial financial and human, whose acquisition is today the great challenge of the next 12 years.

### Five dimensions of the problem

Directly, housing production requires a commitment of five essential items: labor productivity, capital, building materials and land. In quantitative terms, the implications of growth in housing investment of 8.7% per year between 2009 and 2022, and GDP growth in construction, 6.1% per year between 2009 and 2022, about the needs of these items are enormous:

- **Workforce:** The demand for workers in construction will grow at a rate of 3.1% per year between 2009 and 2022, which means increasing the number of persons employed in the sector of 6.9 million in 2009 to 10.2 million in 2022. Will be 3.3 million new jobs. Attract and qualify the number of young people is a huge challenge, since the growth of the economically active population projected for the period is only 1.8% per year and that during these years will see a gradual reduction in unemployment.
- **Productivity:** Even considering the success in attracting young professionals to build the 6.1% growth of GDP of the sector must be

accompanied by an increase in productivity of the workforce 3% years. This increase in labor productivity will come from the qualification of the workforce, the formalization of the activities in the sector, the increased scale of housing projects and the adoption of new construction methods that allow a greater degree of industrialization in the chain.

- **Capital:** The need for credit for housing finance is expected to grow 9.4% annually, from \$ 70 billion in 2009 to \$ 225 billion in 2022. **Traditional sources** of financing the sector (FGTS and savings), despite having a promising growth path, will be insufficient to meet the required credit. Thus, as in the case of labor, the construction sector demand for funds will compete with demand from other sectors, all benefit from economic growth in the country, seeking **new funding sources**.
- **Materials:** The growth of housing investment in infrastructure and will bring a significant increase in demand for construction materials. This demand can be met largely by local industry or can be filled by imports. The proportion in which it occurs is a mystery today as some basic economic conditions, as the price of energy (electricity and natural gas) and the exchange rate are quite unfavorable for the domestic producer. It is worth mentioning that in a short time, from 2006 to 2010, the materials industry jumped from a surplus of \$ 3 billion to a deficit of \$ 2 billion. **Give competitiveness** to the domestic industry will be a need to

prevent the growth of the sector might be found very high trade deficits and deindustrialization of the chain.

- **Land:** The housing needs of the country involving the construction of almost 24 million new homes between 2009 and 2022. Whereas homes with 60 m<sup>2</sup> of private area on average, its volume of building entails the construction of 2.1 billion m<sup>2</sup> and the occupation of more than 900 million m<sup>2</sup> of land. Meeting these needs housing requires institutional improvements that prevent excessive pressure on the **cost of land**, which is a factor inhibiting investment.

The derivation of the challenges of housing in Brazil has been done correctly towards the formalization of production, with the participation of the private sector in providing quality products to the Brazilian families, the relief supply chain by creating special tax regimes and capital goods, consolidating the legal framework in the credit market and attention to families with low income subsidy programs. These factors allowed the recovery of the chain and formed a basis for more goals in a bold new phase of development. Following solutions perennial consolidated into long-term vision is a necessary condition for the sustainability of Brazilian housing policy.

Next, are presented the main lines and proposed solutions to the challenges of the next 12 years. These are not only necessary conditions for sustaining the desired trajectory of growth with price stability, but they also show the institutional development of State policy seen in long term.

## Productivity in construction

The GDP growth rate in construction, 6.1% per year requires significant increases in productivity in construction, which means the best utilization of existing resources (manpower, materials etc.). Raising the productivity of labor, critical condition at present and the future of the Brazilian labor market, must come in four priority areas: increasing capital intensity, the adoption of innovative construction techniques, increasing production scales and qualification of manpower.

The increase in capital intensity, ie, the increased use of machinery and equipment in the works, is the starting point for increasing productivity. The use of capital goods enhances the productivity of the workforce, increasing the utilization of hours worked and thus accommodating higher wages, which is an essential factor for the attractiveness of the construction labor market. This line of work, the government must meet the conditions for cheapening the purchase of machinery and equipment by the construction, which involves the **improvement of financing conditions** of capital goods and by **reducing the tax burden** on the machinery and equipment.

The adoption of constructive processes in industrial buildings for housing and increase of scale in production to low-income are two actions that should be encouraged to ensure increased productivity and reduced costs. The increase of scale not only brings direct gains in the purchase of materials, lower average fixed costs etc. Allowing for more productive technologies<sup>6</sup>. The adoption of new production processes, however beneficial they may seem, in general is

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<sup>6</sup> There are techniques that are only viable if the company has to scale the building, otherwise the cost is higher than the conventional technique. In low income, the shape of aluminum construction with reinforced concrete walls is an example. It is viable for projects with more than 2,000 homes.

subject to behavioral and economic barriers. In this sense, the adoption of innovative construction techniques **involves actions to stimulate innovation** to offset the risk of adopting new technologies or the high costs of new technologies. In the first aspect, the government must act as a promoter of technological development, given the immense risks of the development of new technologies.

In this direction there are two fundamental lines of action: industrialization and standardization projects for the poor. The stimulating industrialization in construction can bring significant gains in productivity and cost reduction. The adoption of these processes greatly increases the productivity and makes work easier, since the industrialized parts (structures, precast, etc.) are delivered ready to be worked on and require time only for the assembling. This technology also increases the quality and conformity of the works, with secondary effects on rework. The standardization of materials also help to reduce costs and increase productivity in low-scale buildings. Actions to support the development of standardized designs with **modular materials** allow small contractors have speed in setting up small-scale housing, facing the public and those regions where demand can not be met by large-scale projects.

The increased use of capital and technological change enables increased productivity of labor and require improvement of **workers qualification**. It will therefore be necessary to expand in an integrated way, manpower training and qualification system in construction. It is desired that the training besides allowing for a global education of the construction worker, improves their specialties, which increases the retention of workers in the activity<sup>7</sup>. It is important to note that the way to industrialization expands the participation of women in construction, which represents an important field of opportunities for

workers today even in small numbers in the sector. In this aspect, in view of the social gains from increasing the skills of the workforce, the Government will have vital role as a provider of financial and human resources.

## Competitiveness in industry

The increase of scale, standardization of materials and industrialization will bring gains for the industry as it is for investment incentives. Nevertheless, some basic economic conditions and the current projection for the future of these conditions bring concerns about the competitiveness in industry. **The price of energy** - electricity and natural gas - an important component of cost in most building materials (steel, metallurgy, non-metallic minerals, plastics, etc.) recorded strong growth over the year 2000. This fact meant more expensive national product compared to import.

On the other hand, the current **exchange rate** and its forecast for the next 12 years, which considers the inflow of capital investment, major sporting events and the exports of the pre-salt, are very unfavorable for the domestic producer. In less than five years, from January 2006 to August 2010, the industry of construction materials jumped from an annual surplus of R\$ 3 billion to an annual deficit of R\$ 2 billion.

Give **competitiveness** to the domestic industry will be a need to prevent the growth of the construction might be found very high trade deficits and deindustrialization of the production chains, a fact which already occurs in some segments. Since this scenario for 2022 should remain the real valued, strategies to increase competitiveness by passing policies that mitigate the cost disadvantages. Reducing the cost of energy should be achieved through **tax relief** and increased scale of industrial production through the improvement of

<sup>7</sup> *Unskilled workers migrate more frequently from activities*

**investment conditions.** Besides these actions of medium and long term, the government should increase its activities in monitoring the international trade, antidumping actions and monitoring.

### **New financing sources**

To meet the housing needs of the country between 2010 and 2022, requires the construction of 23.5 million houses, which will represent investments of nearly R\$ 260 billion per year on average over the period. It is estimated that the amount of credit required to handle this challenge will average R\$ 173 billion each year. However, projections made by **FGV** show that FGTS and savings could guarantee only 40% of these needs.

The scenario is especially critical to saving, since the expansion of credits from observed to have increased in recent years the relationship contracting / bank deposits to values very close to the limit established by the legal enforceability. Thus, over the next five years there should be a more intense pace as the credit expansion in the resources originating from savings. This scenario shows that the two traditional housing market fund account will not meet the needs of next year, which increases the urgency of **developing alternative sources**.

In the short term, where the problem with saving seems to be more severe, the current housing finance system could gain traction with some simple changes, such as the reduction of compulsory savings, currently set at 20% of funds raised in these accounts. Currently about R\$ 50 billion is held in the form of compulsory deposits each year. You can also increase the liability for 70% of savings deposits.

However, the scale of needs by 2022 requires that new investors find the attractiveness of the housing market and will be able to increase the current sources. New tools should be developed.

Private and foreign investors, especially insurance companies and social welfare are worldwide key players in raising funds for the housing sector. In fact, according to the Brazilian Association of Closed Entities for Welfare (Abrapp), assets of these institutions in 2009 was R\$ 500 billion. It started with the resolution of the National Monetary Council (CMN), which allowed raising the investments of the welfare institutions on assets in real estate for up to 10% of their equity.

However, to attract these institutions for the housing market, are still necessary some institutional changes that promote the tax and improve the legal security of investment and makes them more attractive. Measures such as the **concentration of the registration of property deeds** and **positive credit information of individuals** by allowing a further simplification of the routine of checking the quality of mortgage, can bring greater legal certainty to investors. The two measures, in addition to attracting new investors to the market, can have huge effects by reducing spreads, which would contribute to the final reduction of the credit rate.

The **strengthening of the secondary market** of receivables can also be stimulated, also with some fiscal exemptions, such as giving investment corporation in real estate receivables certificates (CRIs) the same exemption from IR that the individual already owns.

Another way is by developing new financing instruments for financial institutions, such as covered bonds or CDs estate, securities backed by

mortgages. Banks' interest in this type of instrument, as well as the already existing titling as the CRIs, still depends on the change in rules, such as establishing the requirement of directing 65% of the balances of savings for housing finance. The issuance of covered bonds, CDs or MBS based on the receivables generated by the operations of SBPE promote a declassification of the institution, which would then be sanctioned by the Central Bank.

## Housing Policy

The recent initiative toward a major housing policy should be established as a State policy. The program "My House, My Life" has shown that it is possible to coordinate government action and private initiative and leap former antidepressant in the production of social housing. So continuity is fundamental in the pursuit of debt reduction represented by the housing deficit. For this, two issues become critical: his inclusion in a broader context of housing policy, giving him a long time horizon, and the definition of a source for the subsidized resources.

Thus, it is important to put into practice the National Housing Plan, perfecting it as learning sponsored by My House, My Life. Another key issue is securing resources for the subsidy. In My Home My Life Program, the subsidy is undoubtedly a large element of the mortgage to income brackets from three minimum wages. In this sense, the approval of the Proposed Constitutional Amendment Housing is considered a key step to meet both families without ability to pay as those with reduced capacity. The Proposed Constitutional Amendment to Adequate Housing (PEC 285/08), in Congress, provides for the linking of public funds - Federal, State and Municipalities - for social housing. Its passage will ensure the necessary resources to eliminate the housing deficit.

## The supply of land for housing project

Brazil, as discussed in this publication is in a favorable moment for the solution to their housing needs, which involves designing a sufficient production to meet demand for new housing and substantially reduce the housing deficit. The solution of this challenge has been done correctly in the direction of formalization, with the participation of the private sector in providing quality products to the Brazilian families.

With increased production and the hot market, there is **increase in value of land** - which at one point undermines the provision of housing for low-income population. Therefore action is needed from governments to ensure the supply of land for construction of social housing. This is an issue with a trivial solution because it involves aspects related to urban planning and private property. What is expected here is that these two issues are properly addressed.

With regard to land supply, the role of municipalities is essential. It is for the municipal government, through zoning, to identify priority areas for residential occupation and, in parallel, direct actions of both infrastructure and encouraging the availability of land for housing. In this respect, it is important that local counterparts are crucial for the implementation of social housing programs.

The council, as stipulated in Article 182 of the Constitution, is the primary federal entity in the implementation of urban policy and this fact is embodied in the Statute of the City. Therefore it is up to municipalities to define the guidelines of urban planning and housing. These in turn are prerequisites for implementing programs and housing projects. The progressive involvement of municipalities is a necessary factor to consider the serious urban problems of the country and initiatives of federal and state governments to encourage the

strengthening of local capacity for urban policy are welcome.

The construction of the National Housing Policy, Housing System and the National Fund of Social Housing (SNHIS / FNHIS) and the National Housing Plan (PlanHab) involves the training levels of government housing policy, and municipalities are institutionally central. The program "My House, My Life, with assistance from Federal and private enterprises in developing housing projects in cities, has provided initiatives that need to be improved and deepened. But for this to occur, the supply of land is a necessary condition so that projects can be put into practice.

For a more immediate horizon, there should be goals to be achieved in the most critical regions, where there is widespread housing shortage and the supply of land for building is scarce - a typical case of metropolitan areas. Especially in these areas, measures of adequacy of zoning, incentives for vertical integration and activities of the public in order to provide infrastructure and restoration of degraded areas should be taken as priority, in order to achieve substantial progress over the next four years.

### **Sinergy of resources and actions**

The institutional improvement seen in recent years has made a program on the scale of My House, My life could have been released. Much has been achieved, compared to the dismantling of housing policy that followed the closing of the National Housing Bank (BNH) in 1986. Today, the Brazilian government has a policy position to undertake large-scale housing to meet the challenges, but it was necessary to stabilize the economy, create the regulatory framework of the real estate sector and enable the state as a whole. But in spite of these very important advances, much remains to be done.

One of the points to be improved is the articulation of government bodies in order to overcome the dispersion of the stock and housing programs. For this, you need cooperation and institutional arrangements that coordinate actions and resources. To remedy the shortage of housing in a country the size of Brazil, require the cooperation of all levels of government, private enterprise and social movements.

The advances made in this field have to be deepened so that the needs are met in the shortest time and with desired quality. The housing policy is an effort by Brazilian society as a whole and see if understood and regulated as a state policy and not because of particular government. Initiatives of the Federal Government in order to induce and strengthen collaboration are welcome, because experience has shown that best results occur where collaboration between the spheres of government was closer.

### **Sustainability in its broadest sense**

The equation of the housing problem is an opportunity to gain quality Brazilian cities, which will mean a leap in the level of population quality of life. The virtuous cycle of housing construction projected for the coming years should contribute to the mitigation of urban problems and therefore to improve the quality of life of the people. This means, for example, recover degraded urban areas and create urban infrastructure in strategic areas of housing, in a context in which the displacements are considered the population to work for schools and for health and leisure facilities.

The housing policy is a key to allow cities to grow neatly. In general, large urban centers must abandon the pattern of disordered occupation of surrounding areas - which constitutes the major source of accumulation of long-

term problems such as lack of infrastructure and transportation, education, health and recreation as well as devastation environmental assets. For smaller cities, we must implement a policy of planned land use in favor of a rational land use over time, without creating environmental liabilities and infrastructure for future generations.

Today there is consensus about a more compact city, with more planning and regulation of government in relation to the axes of desirable urban sprawl, with priority given to the model of quality public transport. The urban core set should be valued, with the creation of employment opportunities, leisure and services that do not involve long journeys. It is an agenda that involves the work of many administrations, and in the context of current housing construction should not be delayed.

The housing expansion that is now outlined involves the creation of large enterprises, whole neighborhoods. Such ventures require schools, health care, leisure and adequate provision of public transport and adequate sanitation. Thus it is essential that the private sector and government have acted in close cooperation, because everyone wins with an integrated and sustainable urban expansion. The National Housing Plan (PlanHab) established elements to guide urban growth in a context of new developments in urban areas and structure of public services. This is a permanent agenda of society and not just one or another administration.

With regard to the strict construction, the trend of industrialization and rationalization of processes should be intensified in light of the reduction of waste, emissions and the volume of debris. The search for energy efficiency in the building process and the real estate offered is an imperative. The launches real estate display each time the presence of green areas, solar energy sources, rational use of water as distinctive elements of the project. The private sector

needs, however, a context that encourages this process, especially with regard to tax issues related to industrialization and the deployment of more advanced technologies.

## Lengthy bureaucracy

The institutional improvement of a country is a key part of sustainable development. One of the chronic problems being solved in Brazil is that of bureaucratic inefficiency. FGV study this publication in 2009 of **Construbusiness** estimated the social cost of bureaucratic delays in Brazil was equivalent to R\$ 223 billion in 2007. In housing, this enhancement factor is length - if not non-viability - project.

Combating bureaucratic inefficiency must be given priority by governments. For the formation of a positive agenda for housing projects, the study outlined a number of points of improvement:

- **Streamlining** the review process at the municipal level, with intensive application of information technology in order to obtain quickness and transparency.
- **Integration** of the bureaucratic procedures of the three spheres of government in a single process to be consolidated in the district, which would eliminate duplication and facilitate procedures.
- **Forming** evaluation committees of bureaucratic procedures, with government and private enterprise.
- **Creating** of a single register of the property, which would reduce the number of operations to obtain the certificates.
- **Equipping** with adequate supervision, to enable a fast and transparent operation.

- **Improving** the legal environment as a whole, with the streamlining of procedures, intensive application of information technology to reduce costs for businesses and society as a whole.

We must move quickly on these things, because Brazil can not waste opportunities for investment and more expensive goods of direct interest of its people.

### **Increased involvement of private parties**

The increase in housing supply should occur in an environment conducive to an increasing role of private enterprise, as has happened in the case of the program "My House, My Life. This is a trend that should be improved. One way to advance in the field is the development of insurance market in the housing area, as shown on international experience.

## Annex

### Concept of Housing Deficit

There is an extensive discussion in the literature about how to measure the housing deficit, which gave rise to several methods of measuring the deficit. This study presents two main methods of measuring the housing deficit in Brazil: João Pinheiro Foundation (FJP) and the Civil Construction Union of São Paulo (SP-Sinduscon).

The methodology developed by the João Pinheiro Foundation (FJP) in partnership with the United Nations Development Programme (UNDP) is the most traditional. His first study was conducted in 1995 based on data from Census 1991. Since then, this methodology has been improved and updated. The following description used FJP source of study (2009).

The FJP faces the housing issue can not be viewed narrowly, ie, that the housing needs can not be reduced to a strict approach to housing shortage. Thus, FJP developed two different concepts: the housing deficit and housing inadequacy. For the first concept, it is understood that the housing deficit can be defined as the immediate and more intuitive notion of the need to build new homes to solve the social problems of housing. The second concept is related to problems of quality of life of residents.

The concept of housing shortage adopted by FJP includes dwellings unfit to be inhabited by the precariousness of their construction or because of wear of the physical structure. This concept can be subdivided into two classes: (i) deficit for restocking, "which refers to rural households that do not have walls

of masonry or wood-equipped; and (ii) "deficit by increasing inventory, which includes the makeshift dwellings, part of the family and cohabitation<sup>8</sup> are two types of rented residences: the highly compact<sup>9</sup> and those in poor families (family incomes up to three minimum wages) or pay 30% more of your income to the landlord.

**Table A.1 Concepts and definitions according to João Pinheiro Foundation**

| <b>Housing Deficit</b>  |
|---|
| <b>Stock turnover</b>   |
| a) Rustic Households  |
| <b>Increased inventory</b>  |
| a) Improvised dwellings   |
| b) Cohabitation family  |
| b.1) Rooms rented and transferred   |
| b.2) Families in secondary cohabitation intending to build individual homes                       |
| c) Excessive burden on rent   |
| d) Households rented with excessive density of residents per bedroom                              |
| <b>Inadequate households</b>  |
| a) Own households with excessive density of residents per household                               |
| b) Lack of infrastructure services<br>(electricity, water supply, sanitation, garbage collection) |
| c) Inadequate urban land  |
| d) No exclusive housing sanitary unit facility  |
| e) Inadequate coverage  |

Source: Fundação João Pinheiro, 2009

<sup>8</sup> Rooms rented or transferred and families cohabiting with the intention of building own homes.

<sup>9</sup> The excessive density of residents in rented dwellings was considered inadequate by FJP households. Rented houses and apartments that were occupied, in average, by over 3 people per dormitory were included in the housing deficit as from 2007.

The concept of inadequate housing, according to FJP, refers to households that do not provide desirable housing conditions, but that does not require the construction of new, just need repair or expansion. In this concept, include the households themselves with increased density of residents, with the lack of infrastructure, address problems of land, with the cover (roof) inappropriate, without exclusive facility or high depreciation.

Table A.1 summarizes the variables that compose the déficit housing and inadequate housing envisioned by the FJP.

The second method of measuring the housing deficit is developed by the Civil Construction Union of Sao Paulo - SP-Sinduscon. Under this approach, the housing deficit can be understood as a measure of lack of housing in a given society, which includes both the housing shortage and the poor condition of existing homes. This approach seeks to use objective criteria, allowing for comparison intertemporal and regional levels to measure the needs of the construction, replacement or improvement of housing stock.

The term used by the housing deficit Sinduscon-SP can be divided into two dimensions: (i) the inadequacy of households and (ii) cohabitation. The inadequacy is made up of makeshift homes, the rustic houses, houses in the slums (subnormal agglomerations) and the shanty houses. The cohabitation cohabiting secondary corresponds to families, or families who live in same household. From 2007, the National Household Survey brought new information about cohabitation. Were included in the questionnaire of 2007 questions about the intent of providing exclusive home and the reasons for cohabitation. The concept of cohabitation Sinduscon-SP, were considered only in cohabitation cohabiting families who intend to form a new dwelling. Table A.2 summarizes the main variables of the second deficit Sinduscon-SP.

**Table A.2. Concepts and definitions as per Sinduscon-SP**

#### **Housing Deficit**

##### **Inadequacy**

Rustic housings

Improvised housings

Shunty housings (subnormal agglomerations)

Tenement (rooms rented and transferred)

##### **Cohabitation**

Families living together with intention to move and build a new home

Source: FGV, 2008.

## **Recent developments in the mortgage**

From the late '90s, the consolidation of economic stability and important changes in the regulatory framework of the housing market have sought to bring more transparency and certainty to the market, thus strengthening the confidence of investors and families. Among the most important measures in the recent period, it is worth mentioning the 9514 law, which in 1997 established the Housing Finance System (SFI), which established a direct connection between the capital market and real estate business. After that, another important step occurred in 2002 with the Central Bank Resolution 3005, which determined changes in accounting for the Compensation Fund (FCVS). The expansive effects were extended by resolution 3177.

It is worth noting the law 10,931 of 2004, which created the patrimony of affectation, an instrument that gave security to the purchaser of property in

the plant in case of financial problems of the construction company and a milestone in the quest for greater transparency and formality. The same law governs the enforcement of liens created in 1997 with the IFC, the New Civil Code, and established the incontrovertible value - an instrument that establishes, in cases of litigation, the continued payment of part of the benefit is disputed.

It is noteworthy that these institutional changes were made in an environment of income growth and interest reduction, which allowed an impressive increase in housing finance operations. So in about ten years, the

housing market took a big jump. In 2007, SFH was responsible for recruitment of 529 000 representing a funding volume of R\$ 27.4 billion - an increase of 150% above the INPC for 1997.

In 2008, the fall in interest rates and terms of financing more elongated determine a new dynamic to the market in that more families had access to the market: advanced credit toward lower-income families. In 2010, the observed performance to a new record in July indicates that quantity will be achieved by traditional sources, either in volume or units of credit, which should surpass R\$ 70 billion.

**Chart A.1 Volume of loans contracted, SFH, R\$ billion, 2009**

Fonte: CEF, Banco Central



It is worth noting that throughout this period, the operations of SFI grew slowly and were directed in large measure to the non-residential market. Since the establishment of SFI, the institutional improvements that have occurred, involving greater security for financial transactions and tax aspects, such as exemption from IR in the applications of individuals in CRIs, facilitated the securitization. However, the cost still high credit undirected hampered the large-scale operation of the system in the residential market.

### **Projections of real estate loans**

In coming years, the favorable outlook for the economy and therefore for employment and household income, provide a glimpse also very positive outlook for the two main funds housing credit.

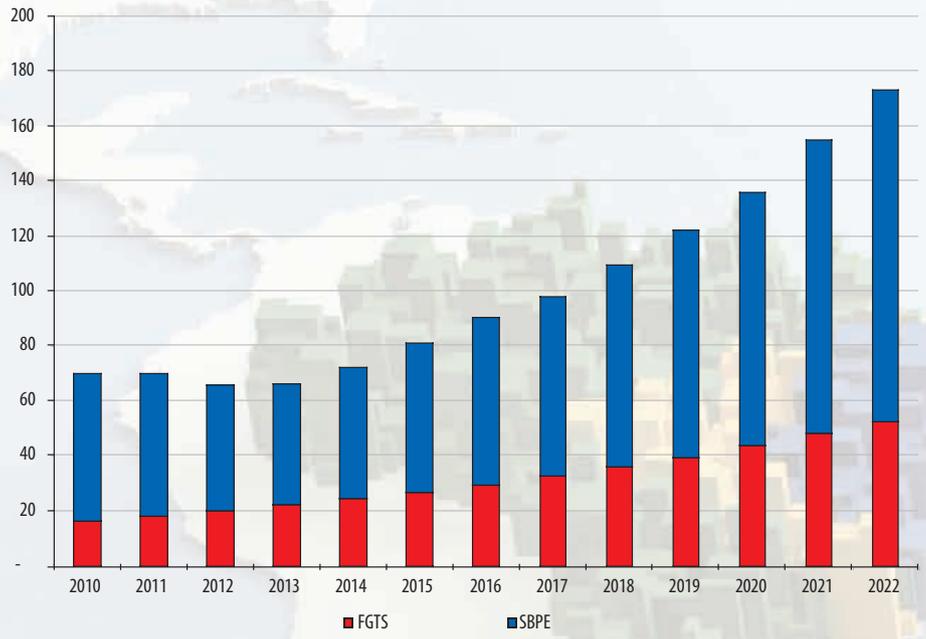
In fact, growth in occupancy and, in particular, formal employment, will ensure the increase of the FGTS collection. These favorable conditions associated with a balanced management will determine the elevation of the existing fund, which increase the proportion of resources devoted to the housing market. In 2009, contracts directed to the housing market absorbed R\$ 15 billion or 12.5% of the total availability of fund. Over the next few years this proportion may rise so that the FGTS may provide an average R\$ 31.5 billion for the housing market, or 22% of their availability.

The positive macroeconomic environment, with sustained growth in real average wages, employment, and therefore the overall wages will also have repercussions in net savings, which should grow about 7.4% per annum in the period. As credit growth observed in recent years have increased the employment relationship / bank deposits to values very close to the limit established by the legal liability (65% of the balances of savings), over the next five years there should be no more an expansion of credit with source of savings in resources was so sharp as in recent years. This means that a contract must register SBPE average around R\$ 50 billion. As the credit expansion of the observed capacity expansion will be recovered to the extent that loans contracted in the years 2000 are being paid off, bringing the average for the period 2010-2022 to R\$ 69 billion.

It is important to note that the dynamics of housing demand by 2022 will generate credit needs of about R\$ 173 billion on average every year. FGTS and savings could ensure around 40% of these needs. Therefore, despite the favorable growth prospects of the two main funds of the housing market, they alone will not give account of the needs of the country until 2022.

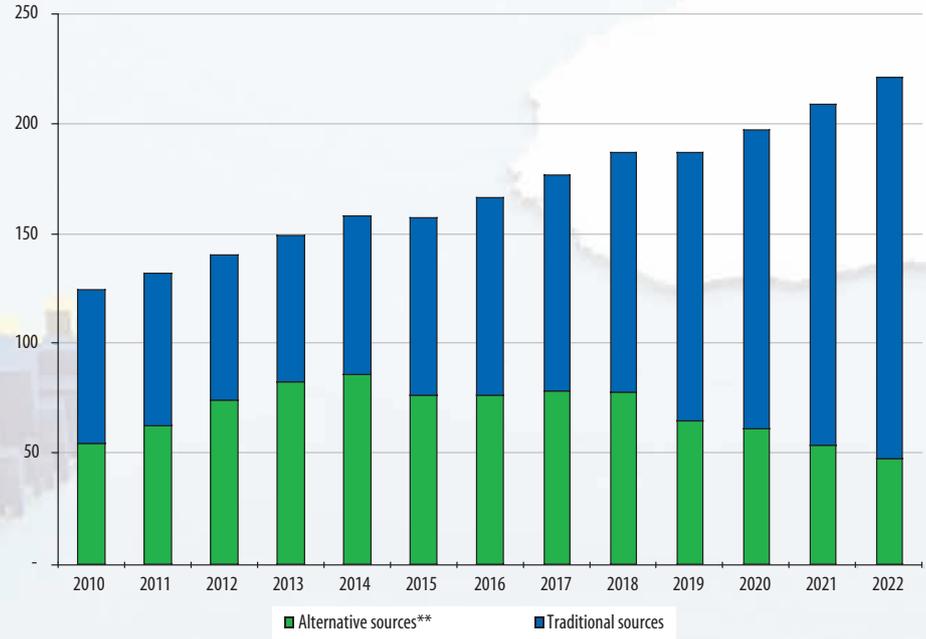
### Chart A.2 - SBPE and FGTS application in the housing market, R\$ billions

Source: FGV



### Chart A.3 - Credit needs, R\$ billion

(\*\*) Does not include subsidies or pre-savings. Source: FGV



### 3. Infrastructure

The answers to these questions will enable us to identify key actions and policies that, according to the integrated view of various public and private represented here, once implemented in the short term, this will enable the investment agenda and sustainable growth through 2022. What are the main needs of the Infrastructure as a whole and its main industries? Where are bottlenecks are most relevant? Are there regulatory obstacles and / or dependents directly on shares in the public sector? What volume of resources needed for investment and what proportion it will be up to the private sector?

The answers to these questions will enable us to identify key actions and policies that, according to the integrated view of various public and private agents represented here, when implemented in the short term, should enable the investment agenda and sustainable growth through 2022.

Brazil already has mapped the priorities for investment in each infrastructure sector for the short and medium term (PAC-1 and PAC-2, 2014) and in some sectors, for the long term. Investment plans as the sectors of Energy (ten-year plans and for 30 years) and Transport (national plans of logistics and transportation, with the horizon of 10 years and over) are examples of plans for current and comprehensive.

However, not all sectors have complete mapping of the investment needs for the long term, nor have a clear set of priorities. There is more needed to ensure the interrelationship between the various investment plans, or even among the priority projects, a department or document that is focused on identifying problems common to different areas or even in the diagnosis of

priority actions that could unlock the agenda of one or more sectors of the infrastructure; ie, **lack of coordinated and integrated among the various folders, such structured activities for an area responsible for studies, the integrated planning and the feasibility of the actions elected as a priority with a view to developing all sectors of infrastructure as a whole.**

We understand that the financial planning and responsibility for implementation of priority actions (including the election of priorities) need to be integrated into the front next to the command inter executive power of the Presidency, bringing together skilled technical staff capable of ensuring a coordinated major sectors of infrastructure, the analysis in detail of the main projects in each area and their interconnections; that this front is necessary interministerial seek to optimize resources and remove obstacles common, often within reach of a ministerial action.

Without it, efforts are diffuse and dependent on political and institutional power of each individual sector, government policies do not enable for not treated as a guideline of the state, and thus growth can not be sustained in successive governments.

The lack of integrated planning is further reflected in the lack of information, unavailability of projects that anticipate, with low margins of error, the amount of investment over time, or even the existence of legal obstacles and bureaucratic and not always necessary usually dissociated from the priority goals and objectives of each area or department. Thus, crucial questions - such as the development of intermodal transport sector in railways and waterways

interconnected with the ports and airports, including access by road - run into specific questions that could be treated in a focused and coordinated way. In this aspect, we advise to create a **Council or Special Secretariat of Infrastructure for the Integrated Resource Planning.**

Also, we believe as fundamental to the development of the sector that this Council or the Special Secretariat for Infrastructure, suggested here, you should join the training of skilled technicians and permanent, dedicated to the development of a Project Database - that is, a growing body of projects analyzed and detailed the level of a basic project or Executive in order to minimize the margins of error and distance between budget allocation and execution. The Council would be responsible for studies and proposals for infrastructure, analyzed and prioritized together with various actors involved, including impact studies and environmental compensation, tax impact and tax (to eliminate obstacles such as double taxation, for example), to anticipate risks associated with absence of regulatory and institutional settings or even financing and warranties.

These initiatives tend to facilitate, by far, review processes and approval of works and, therefore, the budget execution, likewise, would increase the attractiveness of the sector to private capital increasingly necessary to boost the sector agenda. Such an initiative would mainly provide the investing public an integrated view of the infrastructure sector - their needs, bottlenecks and opportunities - which would certainly improve the quality and efficiency of investments made.

On the other hand, part of the delay in public works, which contributes to the gap between budget allocation and execution, is achieved by the private sector's own difficulties in anticipating possible gaps and execute the entire

project. The absence of coordinated planning between the different areas (including supply chain) and uncertainty about the pace of implementation of vital programs generate productive bottlenecks (eg lack of basic inputs such as materials and labor) that sometimes compromise the execution of schedules.

**Council or the Special Secretariat of Infrastructure for the Integrated Resource Planning: an area responsible for coordinating actions and public policies aimed exclusively at infrastructure development, bringing together the various Departments concerned (Transports, Energy and Mining, Telecommunications, Ministry of Cities, Ministry of Defence - airline industry - Special Secretariat of Ports, Ministry of Defence, Ministry of Planning and Management, Ministry of Environment, Ministry of Finance). Must be incorporated into a ministerial front, next to the command of the executive power of the presidency as a way of increasing responsibility for planning and implementation of infrastructure programs to a permanent staff of the Brazilian State.**

This study seeks to contribute in a modest and initial manner to a future integrated resource planning to compile available information on the investment agenda and priorities for key infrastructure sectors: Transportation, Energy, Telecommunications and Sanitation (sewers and water and sewage treatment). Our goal is to show the amount of necessary investments, sectorial goals by 2022, major general and specific challenges to each segment and suggestions for public policy measures required to enable such investments. In sum the amount of investment required segregated public resources from

private and mixed<sup>1</sup> in order to better illustrate the need for increased involvement of the private sphere in the coming years. As a basic premise, we adopted the numbers of their Investment Plans available in each sector and infrastructure segment until 2022 (with its own estimates when necessary). This mapping also had the active participation of members from all sectors mapped here, assembled by FIESP in a specific working group for this purpose.

Our hypothesis is that the government will be able to fulfill its plan forworks until 2014. This period will certainly be marked by high public investment, to the extent that the country will need to prepare for two big events in the years that follow: World Cup and Olympics. Thus, for the years 2010 to 2014 will adopt the percentage of public investment raised by periodic survey by Exame Magazine among the planned spending with works still unfinished in 2010 - and extending mostly until 2014.

After this period, however, we assume a slowdown in public investment, which will follow the expected growth of the account of government consumption (national accounts), designed by ACL. Thus, we use the projection of LCA growth rate of government consumption between 2015 and 2022 to estimate the amount of public funds which can invest in this period (2015-2022). Thus, the difference between the total investments calculated by this ACL and that estimate could be made by public investments should therefore be covered by private investment.

The table below summarizes these figures by infrastructure sector. By 2022 Brazil should be investing over R\$ 2 trillion in infrastructure.

| <b>Cumulative investments 2010-2022 (R\$ billion 2010)</b> |              |
|--|--------------|
| <b>Transport</b>   | <b>410</b>   |
| Highways   | 200          |
| Railway  | 130          |
| Hidroways (ports and waterways)                            | 60           |
| Airway   | 20           |
| <b>Power</b>   | <b>385</b>   |
| <b>Oil and Gas</b>   | <b>955</b>   |
| <b>Telecommunications</b>                                  | <b>100</b>   |
| <b>Sanitation</b>  | <b>206</b>   |
| <b>TOTAL</b>   | <b>2.056</b> |

Source: LCA projections based on PNLT (Transport), POE (Power), Business Plan Petrobras (Pre-Salt), BNDES (Telecommunications), Ministry of Cities and ASFAMAS (Sanitation).

These figures may be underestimated because they do not include, for example, investments in urban mobility by states and municipalities, only the State of São Paulo, for example, plans to invest in urban transport (Metro, CPTM and others gathered in the Integrated Plan for Urban Transport of São Paulo - PITU) over R\$ 48,700 million between 2006 and 2025.

Along with the investments, we present a performance target for each sector, which may be associated with global parameters or Latin American

<sup>1</sup> A publication of Exame magazine on the works that were started and not completed, was used to make the segregation between public and private, in 2010, the Annual Review of Infrastructure 2009-2010.

service quality<sup>2</sup> or in the case of transport, with greater participation of modal "clean" (rail and / or fluvial ) in the transport matrix. That is, not enough occurring and planned investment spending, they need to be efficient and focused on priorities. This allows the construction of a performance indicator, the industry sector, which will be accompanied along the *Construbusiness* issues.

**It's not intended to estimate precisely the need for investment in each infrastructure sector. At this point, it's expected to offer an content of total investment to gauge the challenges for infrastructure. Regardless of whether public or private is to create conditions necessary to effect the content of investments required.**

Thus, this issue inaugurates a Construbusiness monitoring the performance of investments in infrastructure, which will ascertain whether the measures proposed here will be implemented or not and, additionally, need to be supplemented or updated in the light of new challenges for the civil construction chain .

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<sup>2</sup>The global and Latin Americans parameters are from the World Economic Forum called "The Global Competitiveness Report" research, ranks 131 countries in more than 100 indicators, including the topics of Macroeconomics, Institutions, Financial Markets, infrastructure, among others. This is an annual survey, which may be followed in the coming years in order to verify Brazil's performance.

### 3.1. Transport

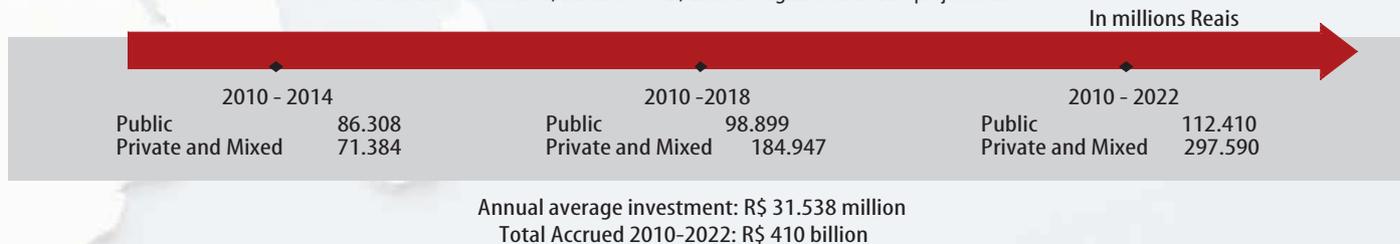
The shortage in dimension of the transportation sector is reflected in the amount of resources needed for investment.

**According to the National Logistics and Transport Plan (PNLT), established in April 2007, the investments needed to reduce bottlenecks, considering the medium and long term, the total amount of \$ 290 billion between 2008 and 2023.** Such investments include the extension of highways, the interconnection of the North-South with the mesh in the Southeast, the construction of the Balsas extension of the North-South, port construction Swordfish articulated to the North-South, among others<sup>3</sup>

The values of PNLТ need revision and updating<sup>4</sup>. For this study, we estimate that between 2011 and 2022 to be invested over R\$ 410 billion in transport, which can be made with a substantial increase in private capital. Today, for every R\$ 1 invested, there is R\$ 0.28 in private and mixed investment (undertaken jointly between spheres and / or public and private companies). By 2022, it is necessary that this ratio (1: 0.28) go to 1: 3.35, as shown in Figure 3.1 below.

**Figure 3.1: Required investments in the sector of Transport - Earnings - 2010 to 2022 (R\$ of 2010)**

Source: LCA Consultants, based on PNLТ, Exame Magazine and LCA projections.



<sup>3</sup> The National Plan should be complemented by urban transport plans, such as the Comprehensive Plan of Urban Transport in São Paulo (PITU), which supports planning policies and investment in the transport sector in the metropolitan region of Sao Paulo with work scheduled up to 2025. The following are part of the optimal strategy of PITU: metro expansion of 58 km of lines in 2005 to 168 km in 2025, and the interconnections between metro lines of Paulista Metropolitan Trains Company (CPTM), which will also be expanded; and expanded by nearly 400 km of bus lanes. With those investments, the railway would be able to move passengers from the railroads, with significant reduction of travel time and emissions. Therefore, their values are very outdated and do not reflect the real needs of the transportation sector.

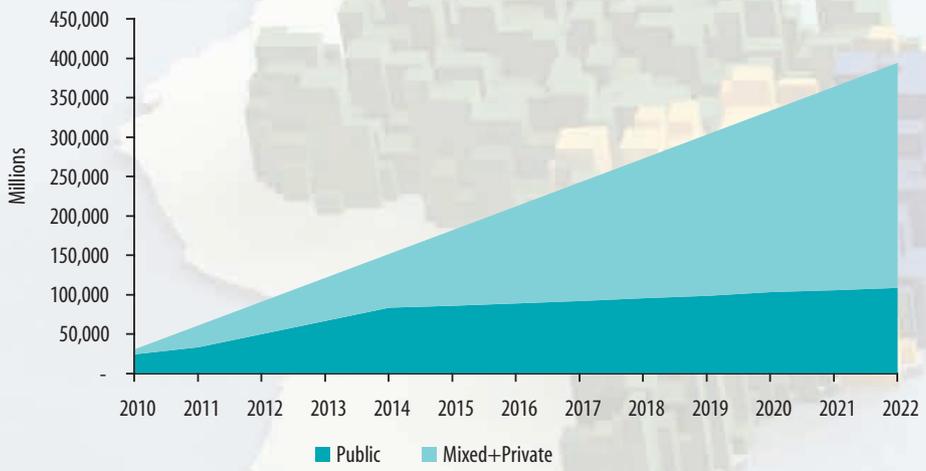
<sup>4</sup> Moreover, it is known that some priority investments are not recorded as a solution to the urban stretch of the Regis Bittencourt; ring or contour to remove the bottleneck between the Fernão Dias Mairiporã-Atibaia; ring to remove the bottleneck in Ayrton Senna in the access to Guarulhos; access areas to the Beltway and the new unscheduled port stretches (Santos, Bahia, etc..) and new accesses to airports and waterways.

Figure x shows clearly the importance of private capital investments in the following: adopting the premise that there should be balance in public spending over time and these will grow at a modest investment in the transport sector only enable through substantial increase in the amount of private capital.

Such investments should be in line with the vision of integrated logistics.

### Chart 3.1: Evolution of Transport estimated investments by the public and private/mixed fields - from 2010 to 2022 (R\$ million 2010)

Fonte: LCA Consultores com base no PNL, Revista Exame e projeções LCA.  
Source: LCA Consultants, based on PNL, Exame Magazine and LCA projections.



In a situation of integration between modes, it is expected that the demand to migrate from the specifics of the product to be transported to the most appropriate modal among those available (road, rail, airport, sea - ports and waterways - and pipeline ) to carry out their activities and distribution outlets, optimizing logistics strategies and thereby increasing the competitiveness of the final product.

**The current distribution of investment and tax incentives among transport modes does not allow the proper and expected intermodality, generating high costs of logistics at the disposal concentrate mainly on road transportation. It is vital that planning integrated logistic identify gaps in access, priority investments in other modes (mainly rail and water transport) and provide appropriate incentives for the development of intermodality, with gains by reducing travel time and associated emissions.**

Table 3.1 shows that the Brazilian matrix of cargo transportation has a high degree of dependence on road mode. Of the total cargo transported, if they give 61.1% by road, followed by far by the railroad (20.7% loads).

**Table 3.1: Brazilian transportation matrix - intermodal freight distribution - 2006 and projection for 2025**

| Modal    | Participation (%) |      |
|----------|-------------------|------|
|          | 2006              | 2025 |
| Air      | 0,4               | 1,0  |
| Waterway | 13,6              | 29,0 |
| Ductway  | 4,2               | 5,0  |
| Railway  | 20,7              | 32,0 |
| Highway  | 61,1              | 33,0 |
| Total    | 100               | 100  |

Source: ANTT (2006) and PNLT (2025).

This design of the Brazilian transport matrix, and not very diversified in overloaded roads, carries several disadvantages to the domestic industry, especially in terms of travel time and overall cost. For the other modes we have: (i) air transportation is under-estimated and also concentrated in regions of high density of use (the South - South - Brasilia), which makes them less competitive prices; ii) the waterway presents serious bottlenecks for storage, access and transfer infrastructure (terminals), also with high concentration in a few branches and regions (North and South), and (iii) the railway lacks a comprehensive program that allows its extension and interconnection to other modes to allow the flow to a lesser extent, so is still slow and limited to serve as an alternative, especially at fractional loads. Common to them all, there is the problem of institutional design and governance that precedes a good regulatory design - definitions about who is responsible for the planning, operation and subsequent implementation and monitoring. These issues, especially for air transportation modes and ports, are of vital importance.

The railroads, however, also does not meet the demand with excellence, is subject to poor preservation conditions, which ultimately raise the costs of transport and thus undermining the competitiveness of national products. The World Bank estimated the weight of transport in the cost structure of distribution in Brazil: 31.8% of logistics costs (including administration, warehousing, inventory, legal requirements and transportation) are referring only to the item transport, as shown in Table 3.2 below. This percentage helps explain why the Brazilian logistics costs are the highest in the world.

**Table 3.2: Structure of the logistic costs in Brazil – 2007**

| Logistic costs   | Participation (%) |
|------------------|-------------------|
| Administration   | 20,5              |
| Storage          | 19,0              |
| Stock            | 18,7              |
| Legal procedures | 10,1              |
| Transport        | 31,8              |
| TOTAL            | 100,0             |

Source: World Bank in PNLT, Figure 27

The World Bank also shows that in Brazil, the logistics costs represent on average 20% of the Gross Domestic Product (GDP), twice that of the United States (Table 3.3).

Table 3.3: Logistics cost as % of GDP – 2007

| Country        | % of GDP          |
|----------------|-------------------|
| Logistic costs | Participation (%) |
| Peru           | 24,0              |
| Argentina      | 21,0              |
| Brazil         | 20,0              |
| Mexico         | 18,0              |
| Irland         | 14,2              |
| Cingapura      | 13,9              |
| Hong Kong      | 13,7              |
| Germany        | 13,0              |
| Taiwan         | 13,0              |
| Danmark        | 12,8              |
| Portugal       | 12,7              |
| Canada         | 12,0              |
| Japan          | 11,3              |
| Notherlands    | 11,3              |
| Italy          | 11,2              |
| United Kingdom | 10,6              |
| United States  | 10,5              |

Source: World Bank in PNL, Picture 26

A study by Gonzalez, and Guash Serebrisky (2007), World Bank, shows that the cost of transportation<sup>6</sup> in Brazil accounted for 26% of the price of the product in 2004, extremely high value compared to the average of OECD

countries (9%). The high cost of transportation in Brazil is related to several factors: (i) elevated road freight for short distances (while the rail is significantly lower); A study of Gonzalez, Guash and Serebrisky (ii) increased cost of cargo insurance due to the high risk of robbery through highway transportation and lack of qualified personnel (drivers); (iii) loss, damage or transshipment of cargo on railroads is almost four times higher than in the rail (containerized products have no losses); and (iv) taxation in the intermodal transportation increases the cost and increases the dependence on highway mode.

Regarding the latter point, it is worth explicit details. For intermodal operations, taxes can be levied to stretch or stretch on the total course.

In the first situation, the cost of ICMS (Tax on Circulation of Goods and Services, in this case services and Intermunicipal Transportation Services) to carry a load between Minas Gerais and Sao Paulo by the roadway (within the State of Minas Gerais) and rail ( by SP) would be: rate of 18%<sup>7</sup> on the value of the freight rate of over 12%<sup>8</sup> of the value of rail freight - that is, double taxation occurs. In the second alternative, you pay tax as if the transport was performed by a single mode. In the example, the cost of GST would be 12% on the total freight traffic and the tip of the rail route.

However, the second alternative (full course) requires the figure of the **Multimodal Transport Operator (OTM)**, responsible for transport of cargo from origin to final destination before the shipper and the tax authorities, regardless of the modes used. However, it is simple to accredit themselves as an OTM: you must have minimum capital of R\$ 2 million (Law No. 9.611/98) and uncertainties regarding the insurance payment and collection of ICMS. Thus, this alternative is not feasible. So, double taxation is imposed as a general rule, and its high cost tends to derail the multimodal operation. Thus, double taxation is a

<sup>5</sup> Gonzalez, J.; Guash, J; Serebrisky, T. *Latin America: Addressing High Logistics Costs and Poor Infrastructure for Merchandise Transportation and Trade Facilitation. The World Bank. San José consultation. Available at [http://www.iadb.org/res/ConsultaSanJose/files/Infrastructure\\_Guash\\_SP\\_Final .pdf](http://www.iadb.org/res/ConsultaSanJose/files/Infrastructure_Guash_SP_Final.pdf), last access in Oct/29/2010.*

<sup>6</sup> ICMS to provide internal service in MG

<sup>7</sup> ICMS to provide external service in MG and SP

major barrier to the development of intermodality in Brazil. Due to stretch length, it also becomes a barrier to market development of logistics operators operating with scale and efficiency, which in turn inhibits the expansion of road capacity in alternative modes to road transport.

The exercise proposed by Angelo (2005)<sup>8</sup> shows how the cost of road-rail intermodal operation (excerpt excerpt) is higher than the cost of the transport only through roads, demonstrating the perverse effect of double taxation on the market (see Table 3.4 below).

**Table 3.4: Comparative cost of transportation in the modal road and rail and road - 2005**

| Operation         |                   | Payment            | Type of Benefit  | Distance | Tax rate | Cost (R\$/ton) |
|-------------------|-------------------|--------------------|------------------|----------|----------|----------------|
| <b>Road</b>       |                   |                    |                  |          |          | <b>22.20</b>   |
| Sorriso (MT)      | Santos (SP)       | Single             | External (MT-SP) | 2.197    | 12%      | 22.20          |
| <b>Road-rail</b>  |                   |                    |                  |          |          | <b>26.95</b>   |
| Sorriso (MT)      | Alto Taquari (MT) | Stretch to stretch | Internal (MT)    | 901      | 17%      | 15.13          |
| Alto Taquari (MT) | Santos (SP)       |                    | External (MT-SP) | 1.294    | 12%      | 11.82          |

Source: Angelo (2006).

**This problem requires urgent revision so that current cargo transport matrix becomes balanced in reference to the growth of other modes, allowing the appropriation of the various advantages of intermodality-economic efficiency (reducing transportation time and costs of logistics and transportation), efficient energy (reducing consumption of fossil fuels) and reducing the volume of traffic and carbon emissions in large urban centers.**

With the investments that are estimated, which is planned to be reached in 2025 with an array configuration of transport matrix and different from the present: transport by road, rail and water transport will account for one third each for moving the cargo, as shown in Table 3.4 above.

<sup>8</sup> Angelo, L. *Transfer Products Logistic Costs*. Gelog, UFSC. 2005. Available at <http://www.logisticadescomplicada.com/wp-content/uploads/2010/06/Custo-Log%C3%ADstico-de-Transfer%C3%A4ncia.pdf>, last access in Nov/08/2010.

## 3.1.1. Road transport: modernize and expand

Based on PNLТ, road transport will require investments of about R\$ 60 billion from 2011 through 2022.

Recent studies by IPEA<sup>9</sup> and ABDIB<sup>10</sup> point to significantly higher amounts. IPEA shows values around R \$ 183.5 billion and ABDIB study points to the need for annual £ 12.6 billion over the next 10 years. Of this amount, according to our assumptions of maintaining current levels of public spending, private participation (from 2.4% in 2010) must grow significantly to meet this need for investment, what will represent more than half the total (51.4%) in 2022.

In practice, if indeed the public expenditures to grow slightly in coming years about the relatively high levels of 2009/2010 and keep the proportions by sector, the volume of investment needed in roads will require strong growth in private sector participation modalities available today - providing simple or PPPs - and there may be room for new forms of private participation - as in the case of Grants Administration, where the Government contracts for a long period (5 to 10 years) the services of paving, maintenance, expansion, etc. required to improve the quality of the roads.

**Figure 3.2: Required investments in the Highway sector - Earnings - 2010 to 2022 (R\$ 2010)**

Source: LCA Consultants, based in PNLТ, Exame and projections LCA



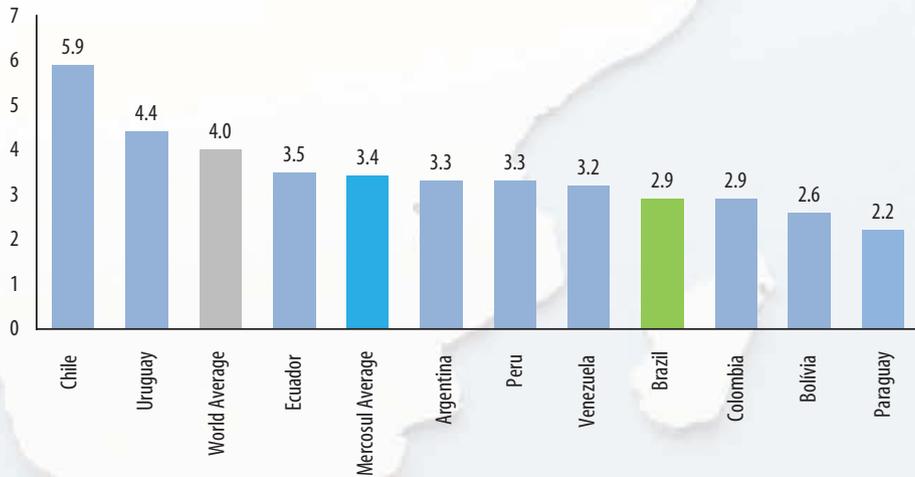
<sup>9</sup> IPEA. Mapping IPEA Highway Works. Valor Economico newspaper, October 28, 2010. F1. "Negócios nas pistas". "Business on the highway lanes."

<sup>10</sup> ABDIB in Jornal Valor Econômico, 28/Oct/2010. F1. "Negócios nas pistas".

The objective of these investments is to advance the position of Brazil in the parameters of global competitiveness. According to the Global Competitiveness Report (GCR) of the World Economic Forum, the note received by Brazil (in a range that goes from 1 to 7) was 2.9, below not only developed countries but also the global average (equal to 4,0), as shown in Chart 3.2.

**Chart 3.2: Ranking of the quality indicator of roads (grades 1-7) 2010/2011 - Selected Countries of Latin America**

Source: GCR 2010 - World Economic Forum. Prepared by: LCA Consultores.



We hope that Brazil can attain, in 2022, the current rating of Chile best placed country in Latin America, namely Brazil to climb three spots in the rankings. There is much therefore to be done to achieve that goal.

**Figure 3.3: Aims to improve the ranking of the World Economic Forum - 2010 to 2022**

Source: LCA Consultores based on the World Economic Forum 2010 indicators



The highway network in Brazil is the fourth largest in the world, according to the (2009). However, only 12.2% of the total are paved, percentage clearly inadequate for the needs of the country and well below that experienced in developed and developing countries such as Mexico (49%), India (47%) and Turkey (41%).

**Table 3.5: Ranking of countries by percentage of paved roads**

| Ranking | Countries      | % paved roads (km) | Road Extension (km) |
|---------|----------------|--------------------|---------------------|
| 1       | Germany        | 100.0              | 644,440             |
| 2       | France         | 100.0              | 951,220             |
| 3       | Italy          | 100.0              | 484,688             |
| 4       | United Kingdom | 100.0              | 387,674             |
| 5       | Switzerland    | 100.0              | 71,214              |
| 6       | Netherlands    | 100.0              | 12,100              |
| 7       | Spain          | 99.0               | 666,292             |
| 8       | South Korea    | 86.8               | 100,279             |
| 9       | Russia         | 84.7               | 871,000             |
| 10      | China          | 81.0               | 1,870,661           |
| 11      | Belgium        | 78.0               | 150,567             |
| 12      | Japan          | 77.7               | 1,177,278           |
| 13      | United States  | 64.5               | 6,433,272           |
| 14      | Mexico         | 49.5               | 235,670             |
| 15      | India          | 47.4               | 3,383,344           |
| 16      | Turkey         | 41.6               | 426,906             |
| 17      | Australia      | 41.6               | 810,641             |
| 18      | Canada         | 39.9               | 1,408,900           |
| 19      | Sweden         | 30.5               | 424,947             |
| 20      | <b>Brazil</b>  | <b>12.2</b>        | <b>1,610,081</b>    |

Source: IFR and ANTT

By taking into account the death rate for highways (the indicator relating to territorial size, population and vehicle fleet) in Latin America, Brazil, the

largest economy in the region, occupies the 10th place ranking, behind countries like Panama, Paraguay and Uruguay (NTC & Logistics).

**Thus, a feasible intermediate goal for 2014 with regard to paving roads would be double the current percentage, passing from 12.2% to 25%, half the current numbers Mexican or Indian.**

Despite the vast extent of Brazilian highways, it is noteworthy that this size is insufficient to keep up with demand for this mode of loading so as not to cause bottlenecks that result in loss of competitiveness for local industry.

**Investment in highway shall remove the main bottlenecks: restoration and maintenance of existing highways and promotion of new ventures.**

The CNT Highway Survey 2010 shows that only 16% of the roads are privately managed. And just the private ones are the ones with better quality: 87.3% are classified as "great" or "good" while 58.1% received public assessment of "bad" or "regular" (Table 3.6).

**Table 3.6: Evaluation of the roads by type of management (public or private) - % of roads - 2010**

| Evaluation   | Public Extension | Concession Extension |
|--------------|------------------|----------------------|
| Great        | 7.1              | 54.7                 |
| Good         | 25.3             | 32.6                 |
| Medium       | 37.6             | 11.3                 |
| Bad          | 20.5             | 1.3                  |
| Terrible     | 9.5              | 0.1                  |
| <b>Total</b> | <b>100.0</b>     | <b>100.0</b>         |

Source: CNT.

This being the background, increasing private sector participation is urgently needed to boost the development of road transportation. New bidding processes must occur for the network expansion, a process in clear, safe, fast and without delays in contracting of works. At the same time, some measures to ensure the maintenance of the roads are necessary: (i) increased surveillance for control of overweight load, (ii) the hiring of regular maintenance works, not just expansion works; (li) the hiring of regular maintenance works, not just the expansion works, (iii) extending the storage capacity of asphalt through public-private investments to increase the capacity of the refinery tank farm, in order to include also the seasonality of paving activity, and (iv) review of axle load limits, with appropriate adjustments to existing projects.

**There exists, even under the contracts that local governments lack the resources to keep the works of paving of roads secondary roads, major media outlets for agricultural production to locations farther away from the main network of roads.**

It is key to the formation of funding for projects on local roads, in view of the potential economic value of the zone of influence of these roads. In fact, this purpose would be an application for CIDE, established by Law No. 10.336/2001, the Contribution of Intervention in the Economic Domain (CIDE) levied on the importation and marketing of oil and oil products, natural gas and its derivatives and Ethanol fuel. According to this law, the funds raised by CIDE should be designed for the following purposes:

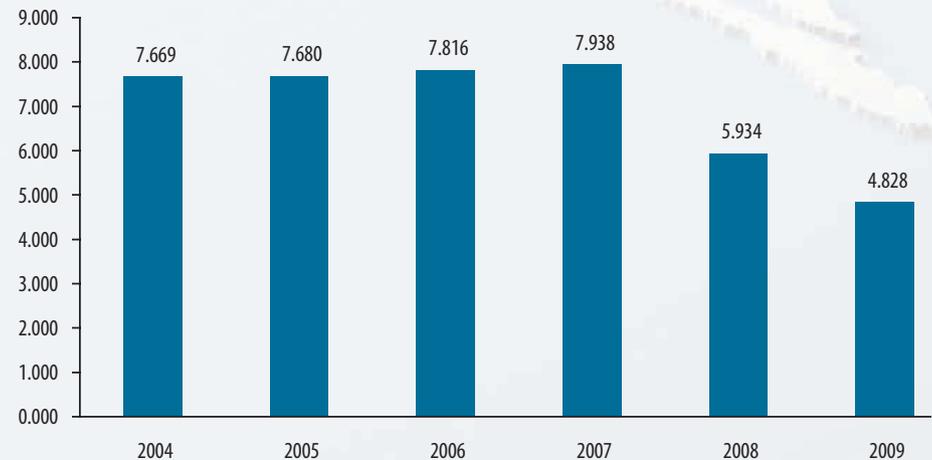
- I. Payment of subsidies to prices or transportation of fuel ethanol, natural gas and their derivatives and petroleum products;
- II. Financing of environmental projects related to the oil industry and gas; and

### III. Transport infrastructure funding programs

However, this feature has not been widely used for the purposes to which it is proposed. According to data from the IRS, the CIDE revenue between 2004 and 2009 grossed nearly R\$ 40 billion, which is not insignificant. If it had been applied to its purpose, the bottleneck of Investment in the road today is 20% smaller.

**Chart 3.3: Collection of CIDE - 2004-2009 - R\$ million - from 2002 to 2009 - nominal values**

Source: Receita Federal. Prepared by: LCA Consultores.



For in fact the proceeds from the collection of the CIDE is intended for the effective development of the transportation sector, it is necessary that the Federal Government with the Ministry of Transport activate the National Fund of Transport Infrastructure (FNIT), which was created along the CIDE, to be

responsible for financing the sector. The regular and direct channeling of resources to the Fund CIDE prevent diversions for other uses and ensure automatic release in pace with the speed of the works, federal or state.

According to the National Confederation of Transport, the same state of Sao Paulo in 2009 showed that the best general conditions of roads (paving, signage and geometry) of the country, is far from the situation of countries with similar levels of development, such as India.

In the State, only 33,000 km of roads, a total of 200,000 km (16% of the total) are paved, and much of the paved roads is due to investments made by DER, DERSA and highway concessionaires along the recent years.

We must also remember that investments in highways in the interior decrease logistics costs and increase capillary flow of production of these cities, promoting a greater exchange between the interior regions. Also allow the population living in areas remote from urban centers have easier access to public services, facilitating the concentration of such infrastructure services and improving efficiency of public investment as a whole.

Consultants, entitled "Proposals to increase efficiency and leverage investments in road infrastructure in the State of Sao Paulo," provides suggestions to enable the development of the highway in São Paulo in order to decentralize the State's economic and social development.

Among the main obstacles to be overcome, there are:

- The improvement and expansion of the staff of DER and DERSA;
- The recovery of municipal roads, allowing the social and economic development of those regions;

- Technical and financial assistance to municipalities in the achievement of improvements in roads;
- End of phase inversion in bidding processes, and aimed at hiring the best design;
- Search link resources of the CIDE-Fuels, to increase the capacity of state investment in infrastructure;
- Facilitate fund writ as needed to comply and ensure legal decisions, while resources for investment in infrastructure;
- Proposed GST reduction program for businesses that fund the maintenance of roads, under a program coordinated by the DER and DERSA;
- Take steps to increase credit limits, along with international financiers;
- Training of manpower in the sector, and
- Long-term planning to ensure a supply of raw materials (asphalt, stone and sand) to carry out the works.

As we can see, many proposed actions can be adopted nationwide, reducing logistics costs, the number of traffic accidents - resulting in thousands of deaths each year - and reducing the concentration of economic and social development.

**Recovery and maintenance of highways: adapt legislation (review concepts as the limit) and adapt projects.**

## 3.1.2 Railways: expansion of networks to ensure sustainability and competitiveness

Estimated investment to expand and improve the quality of the railroads are in the order of R\$130 billion by 2022. (Figure 3.4).

**Figure 3.4: Required investment in the Rail sector - Earnings - 2010 to 2022 (R\$ 2010)**

Source: LCA Consultores based on PNL, Exame Magazine and LCA projections.

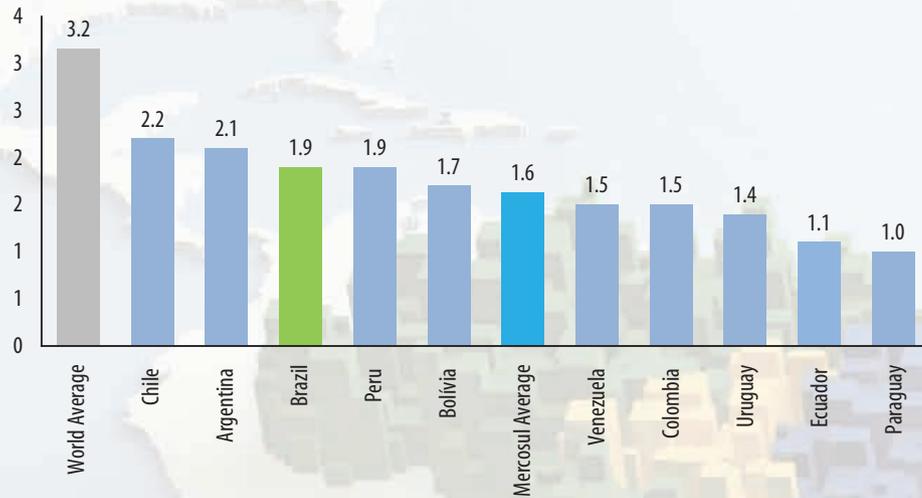


For Brazil to reach international standards, should meet the goal of improving the ranking of the *World Economic Forum* on the quality of railway infrastructure: moving from a very low note in 2010 of 1.9 (on a scale of 1 to 7) to the world average - now equal to 3.2 (Figure 3.4) - in 2022. As quality

of railway infrastructure, we understand the extent and efficiency of rail compared to the country with the highest note. The intermediate goals are shown in Figure 3.5.

### Chart 3.4: Ranking of the quality indicator of railways (grade 1-7) 2010/2011 - Selected Countries of Latin America

Source: GCR 2010 - World Economic Forum. Prepared by: LCA Consultores.



### Figure 3.5: Aims to improve the ranking of the World Economic Forum - 2010 to 2022

Source: LCA Consultores based on the World Economic Forum 2010 indicators.



The research of the World Economic Forum illustrates the situation of railroad in Brazil: Beyond the small extension on the roads that exist have poor conditions.

**The rail sector needs investments of the highest among transportation modes. The expansion is a priority.**

Between 1997 and 2009, there was an increase of 56.1% in the movement of cargo transported by rail (Chart 3.5) and a 80.1% reduction in accident rates<sup>11</sup>.

### Chart 3.5: Accidents per million train miles and freight moved x million TU (tonne useful), 1997-2009

Source: ANTT. Prepared by: LCA Consultores..



<sup>11</sup> Data available at [http://www.antfferovias.org.br/joomla/index.php?option=com\\_content&view=article&id=83&Itemid=513](http://www.antfferovias.org.br/joomla/index.php?option=com_content&view=article&id=83&Itemid=513) e [http://www.antfferovias.org.br/joomla/index.php?option=com\\_content&view=article&id=151:iv-brasil-nos-trilhos-2010&catid=63:noticias&Itemid=561](http://www.antfferovias.org.br/joomla/index.php?option=com_content&view=article&id=151:iv-brasil-nos-trilhos-2010&catid=63:noticias&Itemid=561). Acessado em: 29/10/2010.

Despite this evolution, the railroad still needs investment to expand the mesh with a vision of integrated logistics. Table 3.7 shows the evolution of the railway (Extension in Trails, the Main Line and Branches, in Bitola) and is easy to

perceive the fact that the expansion of the mesh is less than expected: from 2004 to 2008 the growth was only 6.61%.

**Table 3.7: Extension of the railway on gauge - 2004-2008**

|               | 2004   | 2005   | 2006   | 2007   | 2008   |
|---------------|--------|--------|--------|--------|--------|
| TOTAL         | 28,874 | 28,977 | 29,013 | 28,607 | 30,784 |
| 1,00 m        | 23,139 | 23,146 | 23,131 | 23,068 | 23,196 |
| 1,10 m        | 17     | 17     | 17     | 17     | 17     |
| 1,00 / 1,44 m | 11     | 11     | 11     | 11     | 11     |
| 1,00 / 1,60 m | 543    | 543    | 543    | 512    | 512    |
| 1,60 m        | 5,164  | 5,260  | 5,310  | 5,016  | 7,048  |

Source: ANTT

The railway is still far from participating in the array of Brazilian cargo transportation matrix as it should. By comparing the size of the Brazilian with other countries with large territorial extension, you can see how this modal is underused in Brazil: only 20.7% of the transport volume of cargo is carried by rail. Russia transported 83% in 2005 of its cargo on railroads and Canada, 52%<sup>12</sup>.

The goal of expansion of the railway in Brazil, according to PNLT is an increase of 11,800 km in length by 2025, rising to account for 35%. This change in the transport matrix would also improve the emission of greenhouse gases (GHGs) since the railroads are responsible for most emissions, while the

rail uses less fuel and emits fewer pollutants<sup>13</sup>. It also enables you to change the use of fossil fuel (diesel) for renewable energy (electricity).

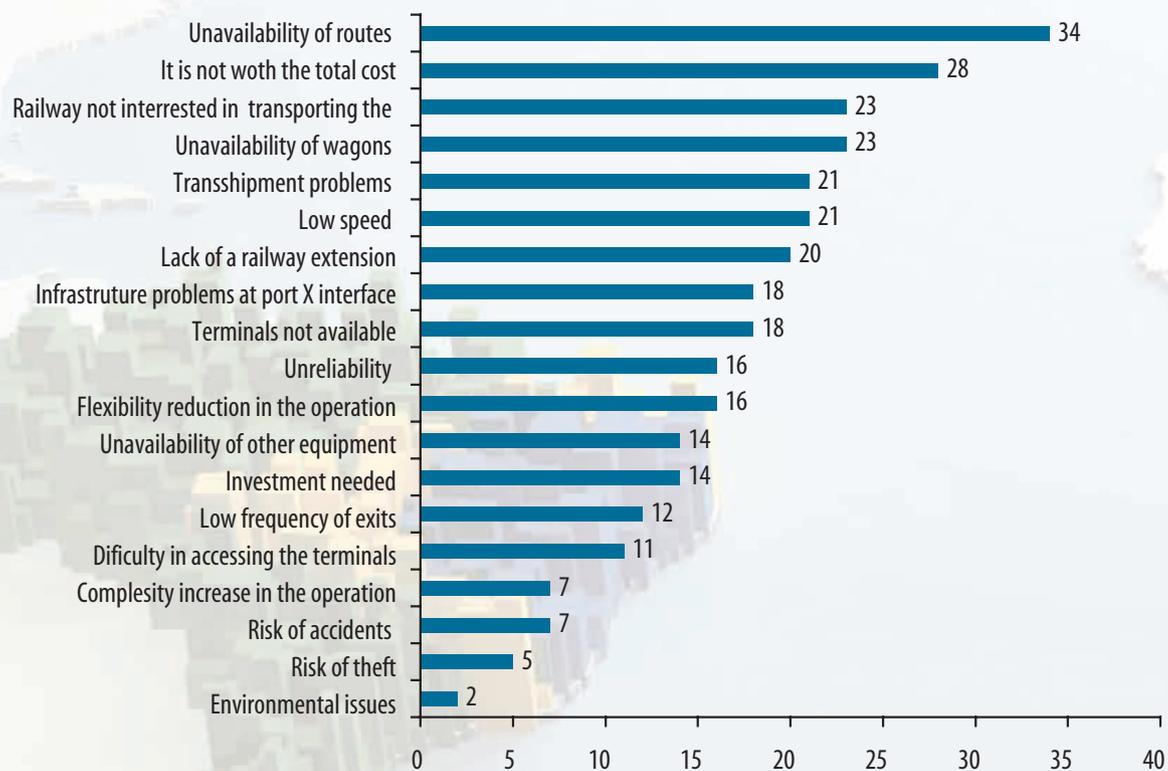
According to research by the Institute of Logistics and Supply Chain (ILOS), performed with the 220 largest Brazilian companies in sales, in 2008 the two major reasons for non-use of railway routes are the unavailability and high cost. Besides the need for investments to expand the railway network, the industry faces other obstacles that hamper their competitiveness, contributing to the use of its locomotives to transport freight is less than it could be and raising the cost of this modal.

<sup>12</sup> Source: Ministry of Transport, *Modal Comparison of Transport of large territorial extension countries in volume of tonnage carried per kilometre (RTK) in 2005.*

<sup>13</sup> Information available at <http://www.cp.pt/cp/displayPage.do?vgnextoid=8bb597d23550d110VgnVCM1000007b01a8c0RCRD>, last access in 09/11/2010.

### Chart 3.6: Key reasons for non-use of railways in Brazil

Source: ILOS (2008). Elaboração: LCA Consultores.



A major constraint faced by the railroad is the issue of **trespassing the right of way**, which is the strip of land where the railroad is located and other facilities of the railroad. Several communities, over the years, settled along the railroad tracks and in their domain.

This problem is worrying for two reasons. Firstly, because the number of accidents increases considerably with traffic. And, secondly, because it adversely impacts the operational performance of the transport, since the trains have to reduce speed significantly, especially in urban areas, where the average speed is reduced from 40 km/h to 5 km/h<sup>14</sup>, not only delaying the cargo transport, as well as increasing wear on the train and encouraging cargo theft.

**Therefore, it is necessary to invest in programs of dispossession and relocation of communities housed in an irregular way along the railroad right of way, thus eliminating the risk of accidents and increase the performance of the modal.**

An alternative solution to this problem is, in some cases, the construction of rail contours in cities and densely populated areas with a predominance of raids on the line.

Another very problematic issue for rail is the question of **crossings** (PN), or one or more crossings of railways to roads at the same level. This question leads to the same problems caused by the invasions of the tracks on the field, but with the added difficulty of disrupting road traffic.

Another very problematic issue for trPara improve conditions at level crossings, the Federal Government needs to direct investment to work these intersections, **giving priority to the most critical PNs 2611, even though they recorded more than 12 000 PNs** (according to the National Association of Transporters Rail - ANTF 2009).

**The decrease of level crossings, the relocation of families out bands of field and / or construction of railway loops in large urban centers should enable faster and more efficiently by rail, reducing its cost.**

A point of much relevance to the development of the sector is the adoption of the new concession model, whose draft was already presented at a meeting between industry players, users and government officials in the House Thematic Infrastructure and Logistics Department of Agribusiness Development, Industry and Foreign Trade (MDIC). A very important point also for Under this new model, more than one operator will operate on the same stretch of railway network, encouraging competition in the sector and contributing to the reduction of transport cost to users. Calculations of the National Association of Freight Transport Users (ANUT) realize that this new model can reduce up to 40% the cost of rail transport in the country.

**The Railway Sector in need of a new type of grant to expand the railway network in at least 11,800 km, with the participation of the modal must jump from the current 20.7% to 35% in the Brazilian matrix of cargo transportation by 2025.**

Finally, it should be noted, in regard to passenger transport, the High Speed Train (HST) places Brazil before the select group of countries with this type of transport. The project is already underway, as shown in recent Provisional Measure No. 511 of 05/11/10, was authorized to guarantee funding for investment in the stretch between Rio de Janeiro and Campinas. It is estimated that the HST will reach an average speed of 280 km/h on a path that includes Sao Paulo, Campinas, Viracopos, Sao Jose dos Campos, Rio de Janeiro and Resende (with a stop at Galleon). The express route between Sao Paulo and Rio de Janeiro may be done in 93 minutes, according to estimates from consultancy Halcrow/Synergy. It is noteworthy that the HST already includes the Urban Mobility Plan for the 2014 World Cup.

<sup>14</sup> Railway Research, CNT. 2009. Available at: <http://www.cnt.org.br/informacoes/pesquisas/ferroviaria/2009/>. Accessed in: 03/11/2010.

### 3.1.3 Air transport: regulatory framework for expanding investments

A recent study commissioned by BNDES gives an account of the need for about \$ 30 billion investment in the airline industry in the twenty years between 2010 and 2030. Distributed linearly, these investments are close to R\$ 20 billion for the period 2011-2022, this time cutting our Construbusiness.

Generally speaking, 13 out of 20 major domestic airports are saturated with respect to the level of services to users (passenger terminal) and half with regard to the movement of aircraft (yards) and the rest will take its capacity in the next 5 to 10 years. It is therefore a high level of urgency in making the investments identified as priorities.

Therefore, investments must be focused on passenger terminals, identified as the main bottleneck in the industry (about 65% of the need for investments), followed by expansion of courtyards for moving aircraft on the ground (20%) and, finally, expansion of lanes (15%). These figures assume a

strong growth in air mode, with demand expected to triple in 20 years (310 million PAX / year or 0.7 trip per capita per year in 2030), and strong devolution of hubs now highly concentrated in the axis MASP-RJ-BSB, which in turn requires flexible system of tariffs and airport competition and integrated planning with the Ministry of Transport to allow access and intermodal connections<sup>15</sup>.

Therefore it will be crucial to count on private financial and technical resources for this expansion, given the concentration of heavy investments in the short term, and restrictions on expansion of public spending. Following our general parameters (expansion of public investments limited to rate of vegetative growth of consolidated public expenditure projections as LCA), private investment in this sector will grow in importance over the medium term (from 2014/15) and equal the amount the public in 2022.

**Figure 3.6: Required investments in the Air sector - Earnings - 2010 to 2022 (R\$ 2010)**

Fonte: LCA Consultores com base no PNLIT, Revista Exame e projeções LCA.



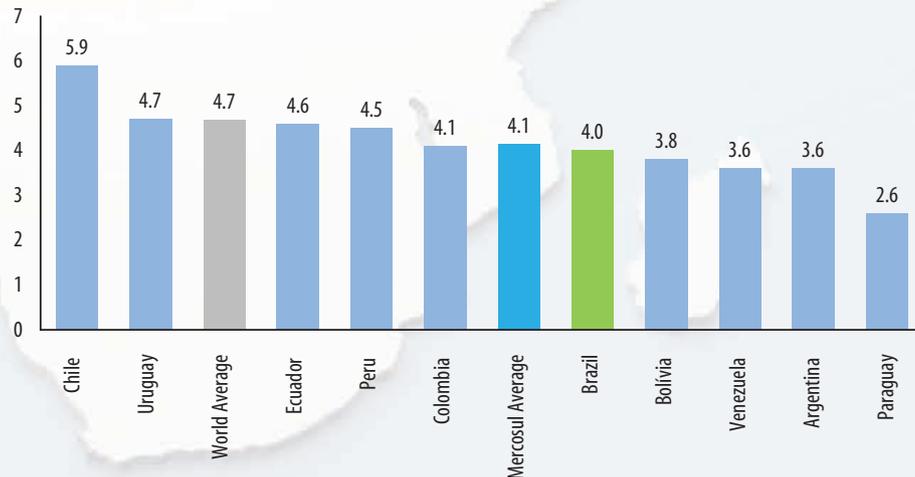
Annual average investment: R\$ 1.538 million  
Total Accrued 2010-2022: R\$ 20 billion

<sup>15</sup> If price signals are not used to promote the reduction of the number of flights necessary resources to enhance port infrastructure (roads, patios and even new airports in big cities) have to be much higher, while there will be idle in centers of lower density.

Not only expansion is necessary, but stipulate a target of achieving Brazil's current levels of quality in Chile in 12 years, or whatever, and 2022 (Chart 3.7). also improves the quality of the service. World Economic Forum's ranking will drop from 4.0 (2009) to 5.9 in 2022 (Figure 3.7). Airline service quality means the speed and agility in loading and unloading terminals, the regularity of flights (patios and centralized and modernized air traffic control) and the balance between supply and demand over time.

**Chart 3.7: Ranking of the quality indicator for air transport (grade 1-7) 2010/2011 - Selected Countries of Latin America**

Source: GCR 2010 - World Economic Forum. Prepared by: LCA Consultores.



**Figure 3.7: Targets for improvement in the average monthly minutes used per user - from 2010 to 2022**

Source: LCA Consultores based on the World Economic Forum 2010 indicators.



In recent years, civil aviation has grown considerably and the number of passengers carried rose from 71.2 million in 2003 to 128.1 million in 2009<sup>16</sup>. Nevertheless, most of the 67 INFRAERO airports have serious structural deficiencies that make loading and unloading inefficient, causing delays in air traffic as a whole.

**According to a survey done by the National Union of Airline Companies (SNEA), 17 major airports in the country must increase its check-in area, as space is saturated.**

The SNEA also found that most airports INFRAERO lacks appropriate structure for storing luggage not collected and there is a lack of personnel to care for passengers in the inspection procedures and X-ray. There is also the problem of small departure space and no lanes that can be used as alternative emergency landing tracks.

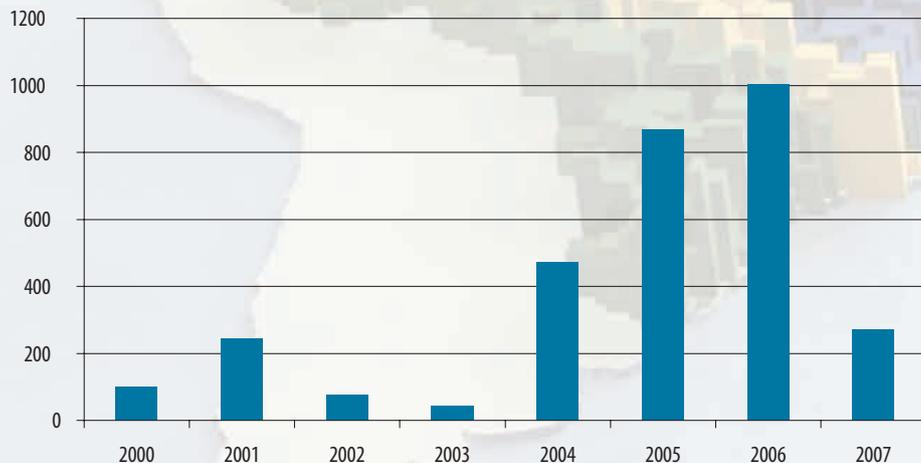
**Regarding cargo transportation, structural bottlenecks are even greater. INFRAERO keeps only 34 Logistic Terminals for Air Freight (TECA) in some airports, and many of them have inefficient infrastructure.**

<sup>16</sup> INFRAERO information. World Economic Forum 2010.

Investments for airport infrastructure have been insufficient to resolve these bottlenecks. Since 1942, when regulating the airline industry was centralized by the Ministry of Aviation, INFRAERO and the other state administrators became responsible for the construction of airport infrastructure. ANAC is responsible for the inspection of these works, taking into account the demand projections created under its command. In recent years there has been a decrease in the level of investment from these public entities in the airport sector, as shown in Chart 3.8 below.

**Chart 3.8: Distribution of investments (non-budgetary and budgetary resources) in the airport sector, in real terms in December 2008 in R\$ millions.**

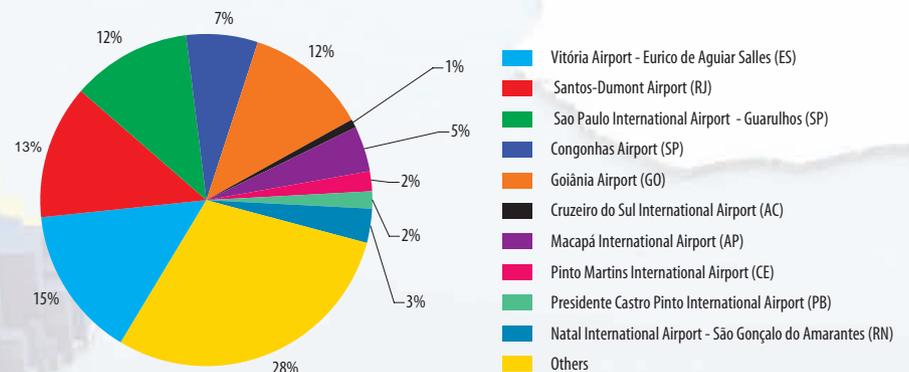
Source: IPEA (information of the Ministry of Planning, Budget and Management), 2010.  
Prepared by: LCA Consultores.



Also, note that the actions of INFRAERO in improving the infrastructure have focused too much on the Southeast, when in fact there are airports around the country with serious structural problems (Chart 3.9).

**Chart 3.9: Distribution of investment INFRAERO in various airports.**

Source: IPEA, 2010. Elaboration: LCA Consultores.



It is of utmost importance to have more profitable investments in the airport sector. Therefore, condition assessments will be required by the INFRAERO for each airport, in order to better distribute the investment. Increased fundraising from the private sector can also contribute to the improvement of airports, besides accelerating the process of building new structures for air transport. In

fact, a recent study found that the IPEA<sup>17</sup> **INFRAERO does not have financial capacity to perform all the necessary investment in the airport sector, which further reinforces the need for partnership with the private sector.**

Another measure that could boost investment in airports is a review of regulatory devices, particularly those related to environmental restrictions. Currently, state and federal environmental laws are overlapping. Often, construction of infrastructure works, the procedures for environmental regulation (obtaining permits and impact studies, for example), are required by both state and federal governments, duplicating the efforts of investors. Unify and standardize these procedures will certainly accelerate the infrastructure construction, while maintaining compliance with the environmental requirements.

Many times in the construction of improvements to the airport sector are lacking, therefore, various investments both in the structures of passenger transport, and in cargo transportation.

**It is necessary to modernize the terminal cargo logistics (TECA), extending them also to more airports in the country, and improve facilities for loading and unloading of passengers so that they grow with quality.**

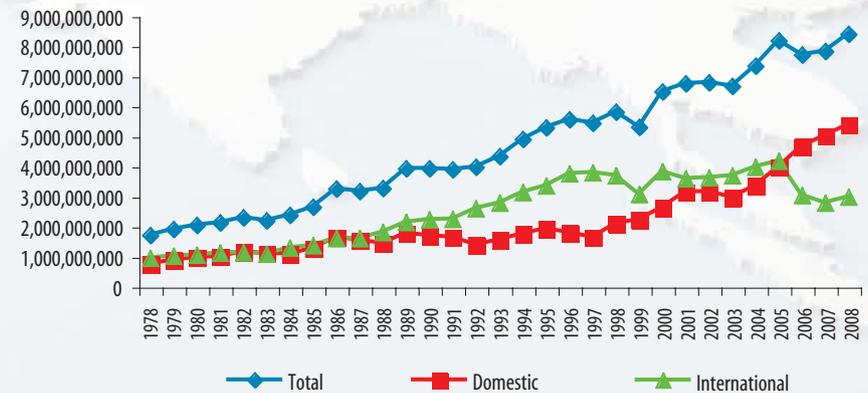
The increase in infrastructure investments should be made, which requires the identification of structural bottlenecks at each airport. Furthermore, actions should be facilitated investment, keeping the state and federal environmental laws uniform.

Another very significant structural bottleneck in the aviation industry is slow in the order of loads. Chart 3.10 shows that, although it represents less

than 4% of the total transport of goods from the country, work in airport cargo terminals has increased in recent years.

**Chart 3.10: Evolution of the cargo volume transported in TKU million used, 1978-2008**

Source: IPEA, 2010. Elaboration: LCA Consultores.



**Despite the undeniable improvements that the sector had in recent years, notably with the construction and computerization of TECA INFRAERO by the order of cargo, both import and export, is still very slow.**

Figure 3.8 shows that, in fact, the order of cargo - both for import and export, is very complex and involves several procedures. However, synchrony among these has been hampered by the slowness of some of the steps: in many TECA personal foul for the operation of forklifts and warehouses, in addition, customs procedures and sanitary - Revenue and ANVISA - are pretty slow and

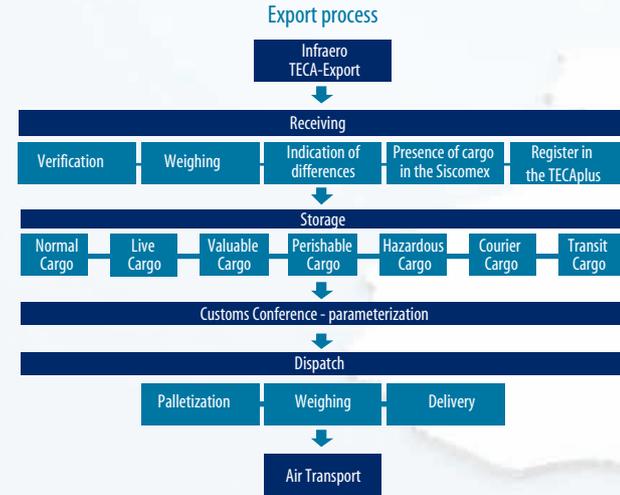
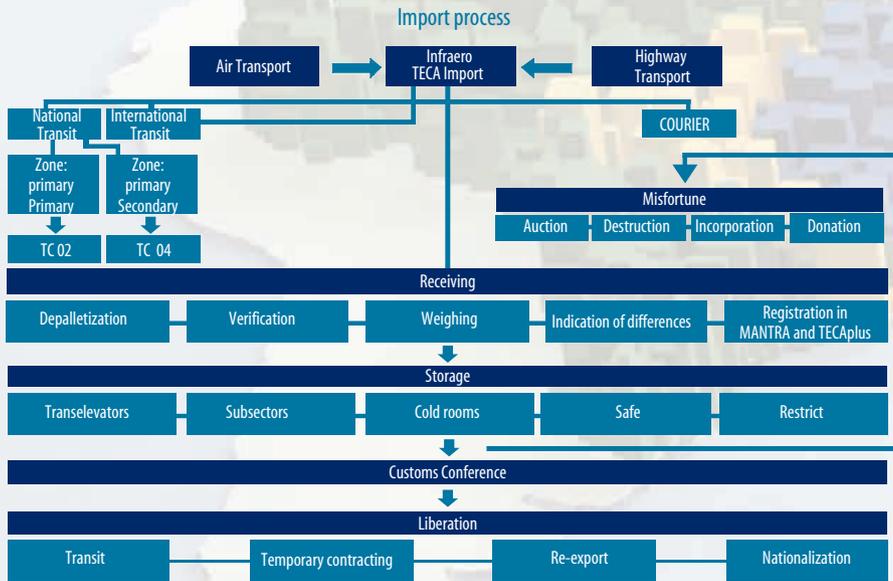
<sup>17</sup> *Panoramas and Prospects for air transportation in Brazil and worldwide. Axis Of Brazilian Development Series, No. 54. March, 2010*

only occur on weekdays, and the cargo that arrives on Saturday and Sunday to await the completion of those requirements in working days. Not optimizing the existing infrastructure generates a slowing down bottleneck, which affects the entire air cargo. .

**Need for greater coordination between the authorities and INFRAERO working at airports: the Federal Police, IRS and ANVISA.**

**Figure 3.8: overview of procedures for cargo import and export**

Source: INFRAERO. Elaboration: LCA Consultores.



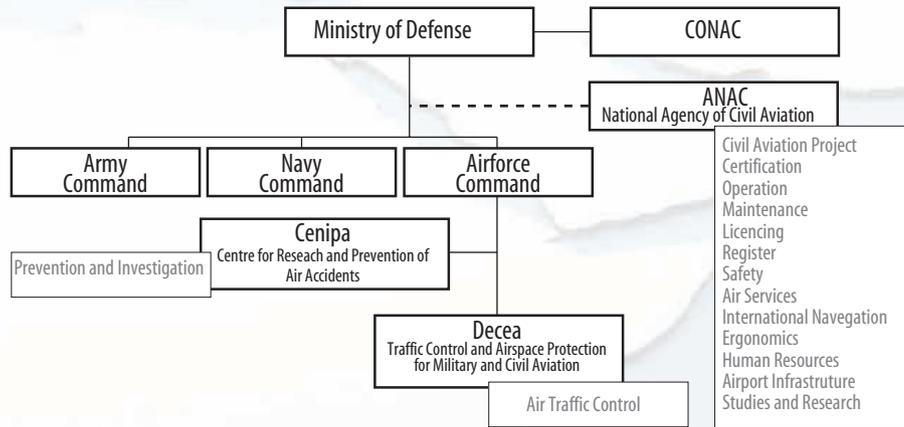
The improved procedures are now able to increase air cargo, even without expansion of infrastructure: INFRAERO must ensure that the TECA maintain sufficient staff to its operations, and the IRS and ANVISA should gradually begin operations on weekends, untangling the loads as soon as possible.

Finally, we point out that the airline industry lacks a centralized planning. The various bodies and aviation-related companies have not had a coordinated action, should be defined, in practice, the functions of each.

The regulation of the airline industry is for the National Civil Aviation Agency (ANAC), created by Law No. 11.182 of September 27, 2005. The FAA has replaced the former Civil Aviation Department (CAD), linked to the Air Force Command, responsible for the regulation and investment sector.

**Figure 3.9: institutional arrangements in the airline industry.**

Source: IPEA (2010). Prepared by: LCA Consultores.



There should be more coordination between the departments and efficient task division. The studies and demand projections, for example, have no well-defined specification, although it should theoretically be performed by ANAC (who inherited the role from the former IAC – Civil Aviation Institute), there are no rules on the frequency and format in which these projections should be made. Therefore INFRAERO's work at the airport becomes misguided.

**Need for greater coordination between INFRAERO, ANAC, DECEA (Department of Airspace Control) and Defense Ministry**

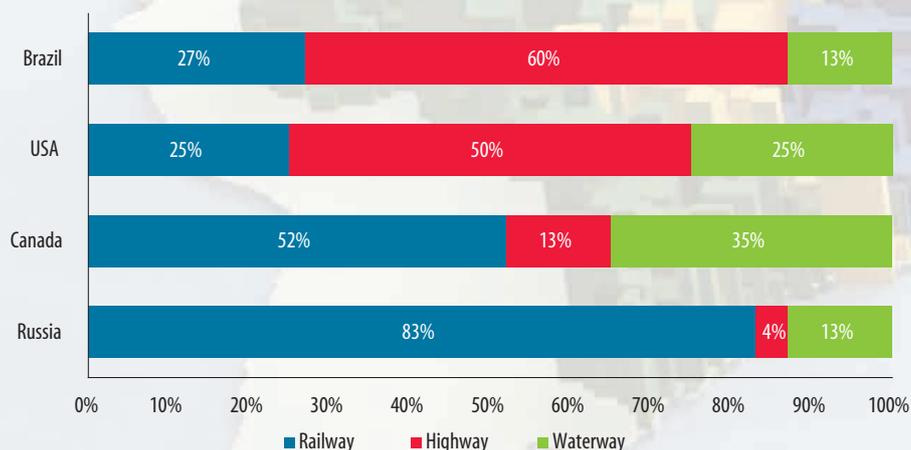
Major activities aimed at building infrastructure should continue with INFRAERO and state administrations, and the FAA to review them and coordinate them with the demand projections. It should also encourage private investment in airport infrastructure and relieve ANAC from some assignments that are not strictly regulatory. These measures will not only organize, but also accelerate the development of the sector.

## 3.1.4 Water transport: Waterways and ports - Integrated logistics planning

Participation in the waterway modal Brazilian transport matrix is still very shy when compared with other countries. In the United States, for example, 25% of cargoes are transported by river and 35% in Canada. In Brazil, where there is a predominance of highways, only 13% of cargoes are transported by the modal (Chart 3.11).

**Chart 3.11 - Participation of freight by mode in selected countries**

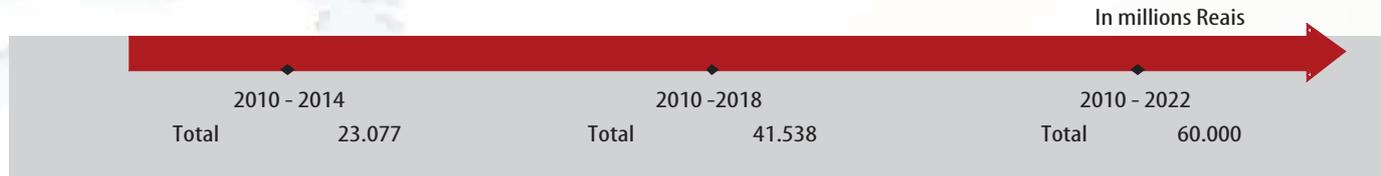
Source: Ministry of Transport (2005). Prepared by: LCA Consultores.



Improving the quality of the modal and thus greater participation in the array of cargo transportation matrix, it is estimated that the investment needed for the sector is \$ 60 billion by 2022. Currently the largest share of investments is derived from the public sector, representing 97% of the funds (or about R\$ 4.6 billion annually). However, here we also hope that there is a reversal of that ratio at the end of 2022, when mixed investments (private and public) would account for slightly more than 90% (U.S. \$ 55.5 billion) of total investments. By the end of 2022 it is expected that the average annual investment is of R \$ 4.6 billion (Figure 3.10).

**Figure 3.10: Required investments in the sector Waterway - Earnings - 2010 to 2022 (R\$ 2010)**

Source: LCA Consultores based on PNLТ, Exame Magazine and LCA projections.

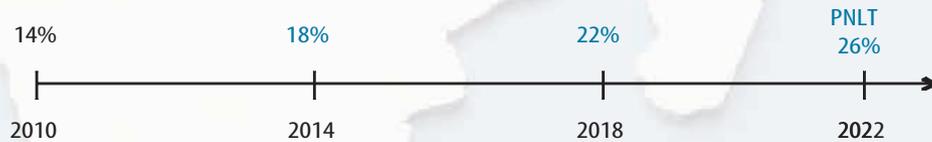


Annual average investment: R\$ 4.615 million  
 Total Accrued 2010-2022: R\$ 60 billion

These investments are needed for the industry goal, set by PNLТ is achieved. The goal is to increase participation of water transportation from the current 14% to 29% in 2025. Considering this fact, the LCA estimates that in 2022 the water transport should represent about 26% in the array of charges (Figure 3.11).

**Figure 3.11 - Meta participation of water transport in the transport matrix - 2010-2022**

Source: LCA Consultores based on PNLТ.



The following are details for waterways and ports.

### 3.1.4.1 Waterways - enabling intermodality

Brazil has enormous potential for river traffic with approximately 63,000 km of rivers and lakes, of which 40,000 km are navigable. However, the potential is still largely unexplored, with navigation occurring in only 13,000 km, with greater concentration in the Amazon region.

**Estimates of the National Agency of Transportation (ANTAQ) indicate that currently are transported some 45 million tons / year in the Brazilian waterways, and the identified potential is at least four times that amount.**

Considering the environmental aspects, the water transportation emits less greenhouse gases than road transport. This was identified by the National Plan on Climate Change - PNMC 2008.

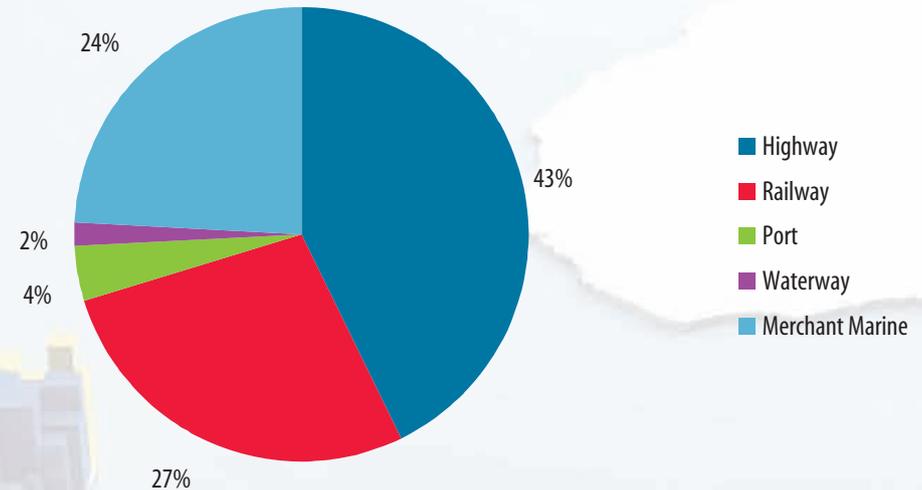
**The Department of Transportation of the United States pointed out that the waterway presents efficiency (load / power) 29 times, fuel consumption 19 times lower, and emissions of six times less CO2 than road transportation.**

It is also important to note that in economic terms waterborne transport enables the reduction of tariffs and freight costs, and contribute to reducing the flow of trucks on highways, enabling gains in competitiveness in marketing of products, besides reducing the number of accidents, cost hospitals and lower maintenance costs of highways<sup>18</sup>

The low level of investment in the waterway can be confirmed by the low percentage of PAC resources 1 and 2 for the modal. While road transport accounts for 43% of total resources for rail and 27%, investment in waterways represent only 2% (Chart 3.12)<sup>19</sup>.

**Chart 3.12 - Distribution of PAC resources 1 and 2 by modal**

Source: PAC 1 and PAC 2. Prepared by: LCA Consultores.



**Effective Intermodal Transport Operator - OTM: even after the enactment of Law No. 9611 of February 19, 1998, the adjustment of the instrument has been given to the extent expected. It should be proposing improved legislation of ICMS to CONFAZ, along with standards and deadlines for issuing the insurance of the OTM.**

<sup>18</sup> As a way of increasing the participation of water transportation in the transport matrix, the Waterways Department of the State of Sao Paulo began a study that is at the pre-feasibility, economic and environmental development for the construction of a hidroanel in Sao Paulo. The estimated project cost is \$ 2 billion, with an estimated time of 20 years to complete the work. Even if it is a long term project, the hidroanel will be important, as you will reduce about 30% of daily trips of trucks, which generate about 1 billion tons of cargo per year.

<sup>19</sup> Major new developments, according to ANTAQ: Tietê-Paraná; works conformation of the navigation channel Guaira (PR); transposition of UHE Itaipu, Tocantins-Araguaia Waterway; locks Tucuruí, Lajeado, Estreito and Peixe.

Studies of potential use of hydro projects and assistance to transport infrastructure (dredging, locks, denying, elevated bridges, transshipment terminals etc..) Required for the expansion of this modal certainly should subsidize new projects, waterways, and is to be expect that the interest of private investors grow substantially resolved after the fiscal and legal bottlenecks.

**There is need for integrated planning that governs the multiple use of water and balance the modal matrix, incorporating all the ministries involved in an institutional articulation of the State.**

This joint action must involve ANA ANTAQ, ANEEL and DNIT agencies, so that there is clear specifications for each sector, organizing the multiple use of water for power generation, industrial supply, irrigation, fishing and also for navigation, maximizing the social, economic and environmental. To that end, it is also important to maintain an integrated planning between projects to produce electricity with the navigability of rivers.

The water transport sector also presents difficulties for approval of environmental licenses, which prevents the full development of the modal. The central problem is the difficulty to clearly define the object to be licensed. For some, the environmental licensing of interventions should include the waterway as a whole, for others, the environmental licensing should be required by an individual, covering each work or engineering service, but within an overall view of the waterway. In this sense, the main action to take is to prepare a regulatory framework for licensing of waterways environmental interventions in order to define the object to be licensed. This regulatory framework should be joint development of the Ministry of Transport, Ministry of Environment and IBAMA (Brazilian Institute of Environment and Renewable Natural Resources).

**Discharge of fuels and lubricants: a preliminary analysis of the problems identified in the shipping industry that the cost of bunker oil and lubricant is one of the factors that affect the competitiveness of the waterway. In accordance with PETROBRAS, the final price of fuels and lubricants for river transport is 37% higher than the value paid for the long-distance navigation because of the incidence of federal taxes (PIS/COFINS) and (ICMS). Regarding the PIS / COFINS, there is already a normative (Law 11.774/2008 and Instruction in the RFB. 882/2008) which allows the exemption. In this sense, one should evaluate the possibility of proposing to the National Council of Farm Policy - CONFAZ the VAT exemption of fuel and lubricants of inland navigation as a way of promoting the sector.**

Regarding the PIS/COFINS, there is already a normative (Law & Instruction 11.774/2008) Another problem is related to the waterways in the absence of a strategy that ensures the implementation of continuous dredging services, signage and lights. Currently, these activities are conducted in a segmented and discontinuous. For this, the Ministry of Transport intends to create procedures to ensure the maintenance of waterways throughout cycles of five years, including bidding for signaling projects, dredging, buoys and environmental studies, and maintenance works.

The General Plan for the Granting of Brazilian Ports (PGO), which now includes the waterways, is being reviewed by the Federal University of Santa Catarina, hired by ANTAQ. In that study are being examined issues such as width, depth, ability to receive ships and there are no estimates of completion of this study. The importance of the waterways of PGO is related to the fact that this

plan will serve as a planning tool of the government and the private sector, giving greater certainty for investment.

**Other measures for inland waterway transport sector: Incentives for renovation and modernization of the national fleet: shipbuilding incentive through tax exemptions for the production of the steel industry; specific incentives for the production of river craft, given the high concentration of supply capacity to meet the demand of the oil and gas, and relaxation of legal requirements and importation of charter boats.**

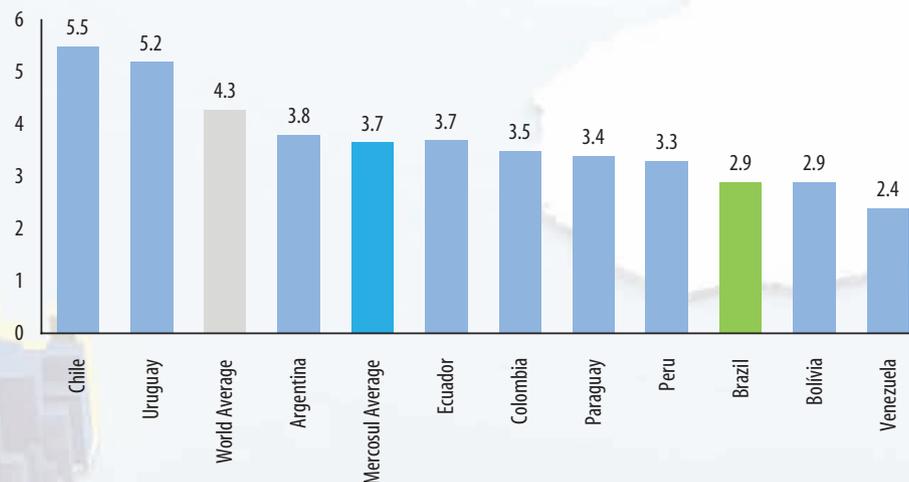
### 3.1.4.2 Ports – Implementation of the General Concession Plan

The volume of investments for the waterway modal, shown above, should be reflected in the improvement of the quality of Brazilian ports.

Chart 3.13 shows that, according to the ranking of the World Economic Forum 2010, the quality of the ports in Brazil was assessed with an average score of 2.9 (on a scale of 1 to 7). On that note, Brazil is far below the global average (4.3) as well as the mean of the Mercosul countries (3.7). By quality of infrastructure of the ports are considered the port facilities and inland waterways in the country comparison of best grade.

**Chart 3.13: Ranking of the quality indicator of ports (grade 1-7) 2010/2011 - Selected Countries of Latin America**

Source: GCR 2010 - World Economic Forum. Prepared by: LCA Consultores.



As noted, the quality of port infrastructure is below countries like Peru, Colombia and Ecuador. Thus, the goal that is established for the modal is that by 2022 Brazil's note is equal to the current note of Chile, which is 5.5 (Figure 3.12).

**Figure 3.12: Goals to improve the quality ranking of the ports - from 2010 to 2022**

Source: LCA Consultores based on the indicator of the World Economic Forum 2010.



**The quality of Brazilian port infrastructure falls short of that reported in neighboring countries. The priority of the sector is the expansion and modernization, with planning and integrated view of logistics.**

Despite the large extension of the Brazilian coast, in favor of exploitation of the port activity, the country presents statistics of cargo volume and container traffic much lower than countries with small coastal strip. In terms of cargo volume among the 60 major ports, Itaguaí is in the 35th ranking, the Tubarão 37th, Itaguai (Sepetiba) 44th position and Santos in the 49th by the American Association of Port Authorities. In terms of container traffic, Brazil appears only once: the Port of Santos is in the 38th position.

The low use of port services originates from the old problems of infrastructure: (i) difficulties of access to ports by road and railways, (ii) lack of strategic planning so as not to accumulate cargo in ports, and (iii) lack of investment existing ports.

Access between the different modal can endear a lot of cargo logistics. Poor conditions of existing highways and railroads, as well as the lack of interconnection to more remote locations, make the path longer and spending on higher fuel. It is important that in addition to increased investments in road and rail access to the main national ports plan to access rings in the vicinity of these ports, especially Itaguaí, Santos and Paranagua.

The accumulation of cargo in ports is another issue of great importance. The goods inspection by customs authorities constantly creates delays in releases of goods.

The accumulation of cargo in ports is another first, it is necessary to increase the number of officials in charge of analyzing the products. Second, the increase in surveillance areas outside ports should contribute to better utilization of facilities. Finally, the outsourcing of loads of auctions may be the quickest way to release such goods immobilized.

Another negative aspect is the lack of investment in the existing port facilities. Large ships often can not dock at the port due to the lack of depth of the berths and drive bays, or when they do, owners are required to embark with volumes below their capacity, raising the price of freight and reducing the competitiveness of ports and products.

**Investment in dredging to deepen the draft of port facilities, in particular, continuing the practice of contracting for longer periods, renewable depending on the achievement of specific milestones**

It is essential that the process of grants (PGO) is streamlined, in order to have an integrated view of logistics. That is, to have equal investments in terms of port access, both in terms of maritime access (dredging and deepening and maintenance of access channels, basins evolution, anchorage basins and berthing areas to major ports) as well as from the land point of view. In this case, expanding other modes of transport matrix in Brazil (highways and railroads) and the elimination of bottlenecks in the vicinity of the port, besides the establishment of new yards off charge regulators the port area.

## 3.1.5 Pipelines: better fuel distribution

Statistical Yearbook of the Brazilian Petroleum, Natural Gas and Biofuels 2009 the National Petroleum Agency (ANP). Of these, 434 products or about 7.876 million km, are used to transport oil and oil products (Table 3.8). With prospects for the coming years to increase production of oil and natural gas, and the growth of the ethanol market, it becomes evident the need for investment in pipelines.

**Table 3.8 - Number and extension of pipelines in operation, by function, the second busiest products - 31/12/2009**

| Products handled    | Pipelines in operation |            |                |
|---------------------|------------------------|------------|----------------|
|                     | Function               | Quantity   | Extention (km) |
| <b>Total</b>        |                        | <b>569</b> | <b>17,796</b>  |
| Derivatives         | Transfers              | 304        | 1.099          |
|                     | Transport              | 98         | 4.792          |
| Natural gas         | Transfers              | 61         | 2.270          |
|                     | Transport              | 37         | 7,574          |
| Oil                 | Transfers              | 32         | 1,985          |
| Others <sup>1</sup> | Transfers              | 32         | 36             |
|                     | Transport              | 5          | 40             |

Source: Brazilian Oil, Gas and Biofuels Statistics, 2009 of the ANP. Prepared by: LCA Consultores

<sup>1</sup>Others - includes pipelines to move ethanol, hydrous ethanol, turpentine and methanol, ethane and propane feedstock for petrochemical products, propylene and pyrolysis gasoline for input for the petrochemical industry.

A partnership formed by Petrobras and private business aims to develop a logistics project for ethanol, through the construction of pipelines that will link the Midwest to the Southeast coast. The pipeline will extend over 1,000 km, with tanks and collection centers tied to the waterway and road networks in 2020 and is expected to be transported 23 billion liters. The investments are estimated at US\$ 1.1 billion over the next five years and the operation should start in the second half of 2011. The project is at the stage of preliminary license from IBAMA for the collection.

Another side project to build ethanol pipeline is being developed by a consortium of power plants. Called Uniduto, the project will link the Midwest, São Paulo and Santos region, with an estimated investment of R\$ 3 billion and extension of 614 km. The project is based on the construction of pipelines that incorporate a different transport modes (rail, road, waterway, sea or air). The expectation is that the work ends in 2013 and has the capacity to carry 16.6 billion gallons per year. This ethanol pipeline will have seven bases collecting and distributing the fuel. One is the Anhambi near the Tiete-Parana waterway. This base would receive the fuel coming from the Midwest and then enter the duct. There are rumors that in the future Uniduto join the partnership with the alcohol formed by Petrobras, but nothing concluded yet.

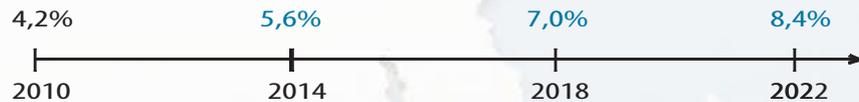
**Pipelines for gas distribution: key to enhancing the distribution of pre-salt**

Currently 95% of Brazilian ethanol is transported by road, which leads to impacts on costs and creates major logistical bottlenecks, and generate social and environmental impacts. The expectation is that the transport of ethanol through pipelines can reduce transportation costs by 20%, increasing the competitiveness of the product.

The involvement of the ducts in the load transport matrix is approximately 4%. The PNLT sets a target of 2025 for this modal representing 5% of the total cargo transported. Thus, for 2022, based on PNLT and market intelligence estimates of the LCA show that the involvement of the ducts should be 8.4%, as shown in Figure 3.13.

### Figure 3.13 - Pipelines participation goal in transport matrix - 2010-2022.

Source: PNLT. Prepared by: LCA Consultores.



**The main goal for pipelines is the increasing participation at the matrix of cargo transportation.**

The main advantages of pipeline transportation are: the large amount of product that can be transported, not the need for storage, a reduction in transport costs, and less chance of loss or theft of cargoes. However, the environmental damage in case of leakage may be very large.

A Study of Development Secretariat of São Paulo was estimated at R\$ 27 million reduction in annual public spending on health (prevention of accidents and respiratory diseases) and the withdrawal of 226,000 truck trips from highways. The study found an ethanol pipeline capable of carrying 12 million gallons of ethanol per year.

Another measure that is also required is that the industry lacks a pipeline regulation. The lack of a regulatory framework creates uncertainty and prevents new investment. This regulatory framework should have the function of creating a regulation which provides for the effectiveness Act 7029, which has existed since 1982 (available on the pipeline transportation and other matters).

## 3.2 Energy: expand with incentives for energy efficiency

The electricity sector in Brazil has undergone various advances in the last decade, with significant changes in the sector model after the 2001 crisis. Energy security, with low tariffs, has become even more the focus of the sector, with targets for universal access and quality in the service of generation, transmission and distribution.

**The Ten Year Plan for Energy (PDE) calculates that by 2019 will be contributed approximately R\$ 950 billion in energy sector investment, including projects in power, oil, natural gas and biofuels, with the largest amount of oil absorbed by areas and natural gas (70% of resources, largely because of advances in the pre-salt) and electric power generation (18%).**

Such investments are necessary for the Brazilian economy can grow at a rate of 5% per annum. Among the measures outlined by the SMP are: (i) expansion of electricity from renewable sources, (ii) extension of transmission lines at 36,800 km in search of greater security for the National Interconnected System; (iii) increase in oil production by 2.5 times, reaching a level of about 4 million barrels per day and building new refineries so that Brazil could become an exporter of oil in 2019, and (iv) increased production of ethanol by 2.5 times.

**The National Energy Plan (PNE), in turn, presents a longer-term planning, by 2030, incorporates the diversification of energy matrix through clean energy production and enhances energy security.**

In the energy matrix, is highlighted by the increase of thermal generation (nuclear, natural gas and coal) and other renewable sources (biomass, wind power plants and municipal solid waste). New large hydropower also return to the agenda, but under new conditions of construction and operation based on new determinations in the environmental field (drastic reduction of the flooded areas) and PCHs (Small Hydro Powers), new wind farms, power cogeneration from sugar cane biomass, natural gas plants, coal plants and nuclear plants in the Southeast and Northeast<sup>20</sup>. Thus, the SNP estimates, within the set that the expansion of supply requires investment of around US\$ 800 billion between 2010 and 2030. However, diversification of the matrix and new configuration of the hydroelectric plants with less environmental impact should endear the final energy for the current mix.

**Diversification of energy matrix under the PEN will impact rates. Therefore, energy efficiency becomes vital for the Brazilian economy to grow competitively.**

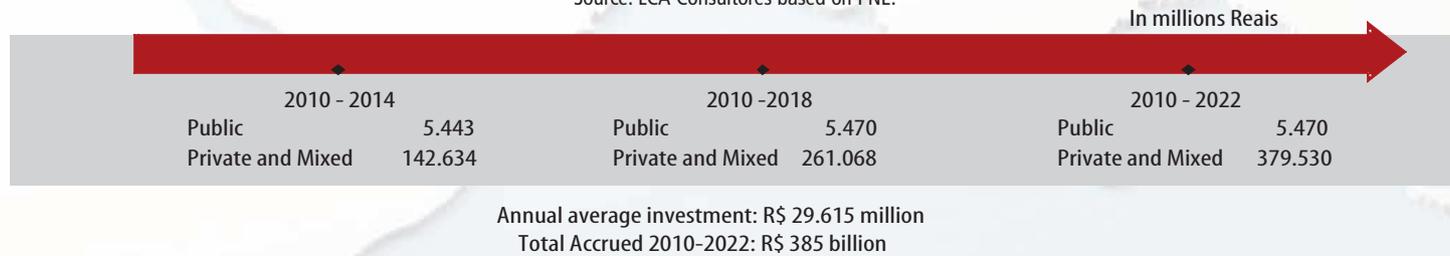
<sup>20</sup> The increase in electricity demand must necessarily be accompanied by initiatives on energy efficiency in continuity to PROCEL (National Program for Electric Energy Conservation ) and to the PBE (Brazilian Labeling Program), but not limited to the expansion of these programs.

Based on estimates of the PNE and the investment in pre-salt provided by Petrobras in its Business Plan in 2009, LCA has calculated the amount of accumulated investments between 2010 and 2022 to fulfilling the goals of the PNE: around R\$ 385 billion for electricity and R\$ 955 billion for oil and gas, as

shown in Figure 3.14 and Figure 3.15. Note that the private sector and mixed (public and private) today, bears 96% of investments in 2022 will for almost all (99%), particularly in view of the planned investments by Petrobras (classified as mixed between public and private).

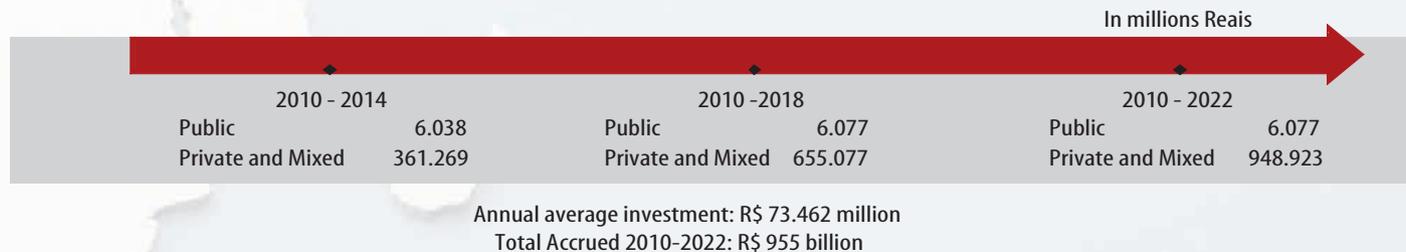
**Figure 3.14: Required investments for the electricity sector - Earnings - 2010 to 2022 (R\$ 2010)**

Source: LCA Consultores based on PNE.



**Figure 3.15: Required investments for the oil and gas - Earnings - 2010 to 2022 (R\$ 2010)**

Source: LCA Consultores based on PNE and Petrobras Business Plan 2009.



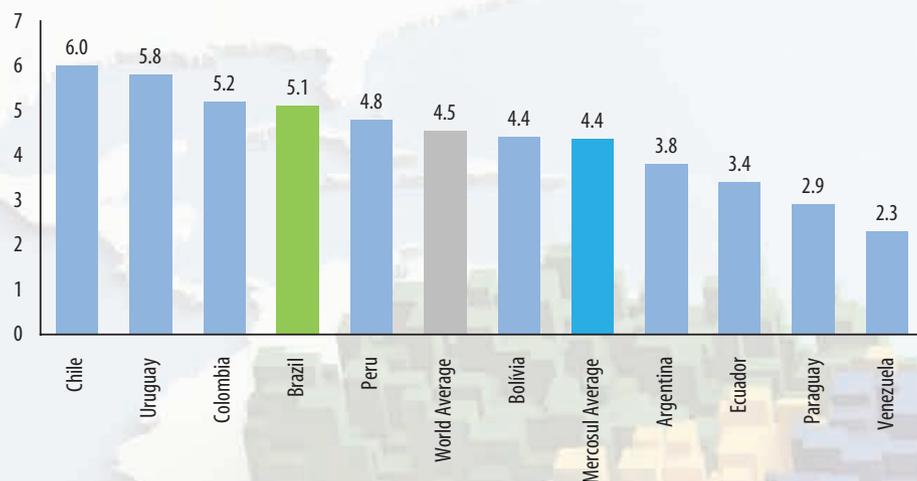
**The required investments in energy by 2022 are around R\$ 1.34 trillion in electricity and oil and gas.**

The increase in investment should translate into better performance in Brazil's global indicators of quality. As previously mentioned ranking of the World

Economic Forum, Brazil has been attributed to an average score of 5.1 in the interval ranging from 1 to 7 (Chart 3.14).

**Chart 3.14: Ranking of the energy quality indicator 2010/2011 - Selected Countries of Latin America**

Source: World Economic Forum.



Although Brazil has put in place over several South American countries and even the world average, there are still improvements to be considered in regard to quality of service (interruptions and voltage fluctuations). Thus, we determined the goal for Brazil to reach the current note, Chile in 2022-the highest ranked Latin American country in 2010. Intermediate goals for 2014 and 2018 are getting scores of 5.4 and 5.7 for two years, respectively (Figure 3.16).

**Figure 3.16: Aims to improve the ranking of the World Economic Forum - 2010 to 2022**

Source: LCA Consultores based on the World Economic Forum indicators



This sector has already achieved great improvements: (i) the establishment of Incentive Program for Alternative Sources (PROINFA) in 2003, prepared by Law No. 10,438, (ii) creation of the Energy Research Company (EPE) in 2004, by Law No. 10. 847, an institution whose function is to assess the security of supply of electricity, and (iii) the enactment of Law No. 10,848, the same year, which established a new framework of rules for the electricity sector; and (iv) the creation of the Commercialization Chamber (CCEE) to continue the functions of the defunct Wholesale Electricity Market (MAE), through Decree No. 5177. Among the changes brought about by the new model, there is the creation of environments from the regulated (ACR) and agreements (ACL), allowing greater competition in the generation and marketing segment and greater planning of transmission and distribution. Another change is the mechanism of reallocation of energy to mitigating hydrological risks, optimizing the resources in order to consider technical and economic factors.

In 2007, with the launch of the PNE by EPE, was instituted for the first time an integrated planning of energy resources. The long-term planning entails an intertemporal dynamic that affects investment decisions: changing scenarios and regulatory interactions between agents, as well as technological advances make the prediction of return on investment based on a very

imperfect knowledge of the economic environment. Thus, expectations of change are not mitigated, a source of risk for investment.

**The main challenge for the Brazilian energy sector is to reconcile the goals of sustainable growth with low tariffs offer, considering that the final cost of clean energy tends to be higher as the sector takes before a social cost (environmental). The most rational way to resolve it is to focus on energy efficiency, focusing on processes and efficient products and intelligent networks.**

In addition to diversifying energy sources, ensuring investments in transmission and distribution is key to energy security. Distributed generation increases system security, especially in large urban energy consumers.

Frequent maintenance of investments ensures the reduction of small power outages. Among some selected countries in Latin America, Brazil ranks as the third largest number of interruptions per user: 15.53. The mean values between 1995 and 2005 for each country is shown in Table 3.9 below. Note that the median of the selected countries is lower than the Brazilian (9.77).

**Table 3.9: Number of breaks by users - Selected Countries - Average between 1995 and 2005**

| Country   | Number of interruption by user |
|-----------|--------------------------------|
| Colombia  | 165,25                         |
| Peru      | 29,20                          |
| Brazil    | 15,53                          |
| Panama    | 6,39                           |
| Chile     | 9,77                           |
| Argentina | 5,39                           |
| Bolivia   | 4,51                           |
| Mediana   | 9,77                           |

Source: World Bank.

The change in consumption pattern toward clean energy<sup>21</sup> sources and reducing losses is part of the new government's strategy to accelerate the processes of energy efficiency in general, which includes: reduction of power outages, reduce energy waste, virtual energy generation and adoption of smart grid.

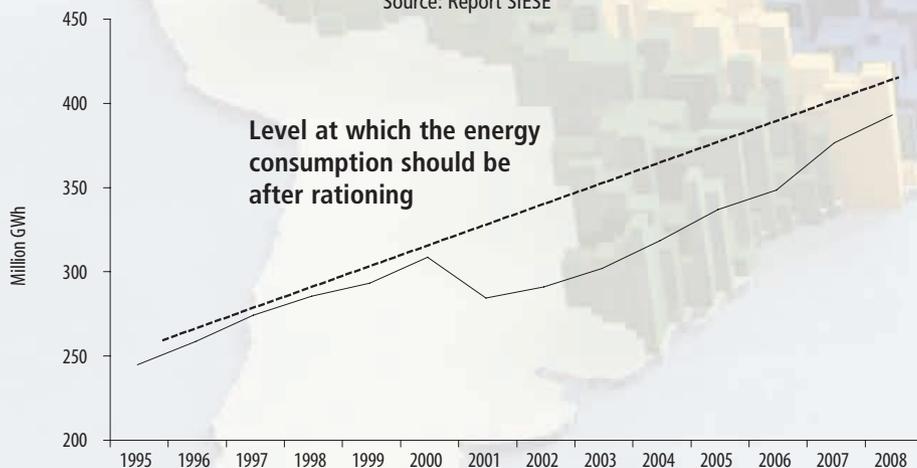
**The goal of the energy sector is to grow efficiently. Energy is one of the most costly inputs industry, especially the aluminum, steel, ferroalloy, petrochemical and pulp.**

<sup>21</sup> Sources with lower emissions of greenhouse gases (GEE) should be prioritized, according to the guideline of Brazil GHG Protocol Program, seeking to obtain sustainable competitive advantages as a business, as well as the possibility of participating in the carbon credit market.

It is emphasized that the rationalization of possible postponement of the exhaustion of reserves, the cost reduction and consequent increase in competitiveness for domestic industries. The so-called "virtual generation", which means energy savings for the consumers, leading to reduction in investment in the network by the distributors, it is a change in the consumption pattern. For example, learning established in the period of rationing - which encouraged consumers to use more efficient light bulbs, to ration the use of appliances to meet the target consumer - permanently changed the level of consumption, as shown in Chart 3.15. This change of behavior shows that consumers are able to rationalize their consumption, which is fully in line with the perspective of sustainable development and to accelerate the expected effect of the implementation of *smart grid*.

**Chart 3.15: Total consumption of electricity (GWh) - 1995 to 2008**

Source: Report SIESE



**Adopting the so-called "smart grid"<sup>22</sup> can radically alter the landscape of the electricity sector. This is a set of intelligent technologies that enable the management of power consumption by increasing connectivity, automation and coordination among market players. One of his main achievements is the ability to manage demand in order to encourage the load to shift the peak times for other periods and assign economic value to the actual energy savings.**

Smart meters are one example of a measure which benefited from the rationalization of consumption, especially during peak hours. With smart meters, consumers can instantly access their consumption, allowing the collection of tariffs differentiated by the distributors as the cost of generation at the time of consumption. Consumers would identify the equipment that consumes more energy and time most suitable for its use, adjusting their habits better. Another feature of the smart grid is the self-generation: the residences could resell the excess self-generated energy, usually solar energy or batteries for electric cars.

<sup>22</sup> The guidelines to support the deployment of smart grid in Brazil are expected in late 2010 in a final report by the Working Group of the Ministry of Mines and Energy, established through Decree No. 440/2010 MME.

## 3.3 Telecommunications: modernization and expansion of the use of services

Access to telecommunications services at competitive prices and implies having adequate conditions of quality. This is one of the basic principles established by the sector regulatory framework, the General Telecommunications Law (Article 2). In accordance with the Map of Guaruja (54 Telebrasil Panel), August 2010, **the expansion of broadband service, especially for the class C, is one of priority goals for telecommunications services in Brazil today.**

Decree No. 7175 of 12 May 2010, established the National Broadband Plan<sup>23</sup>, which certainly will make resources for the expansion and cheapening of new broadband technologies.

**The main goal is to raise PNBL broadband penetration to reach by 2014, up 50% of urban households, all the small businesses that require access<sup>24</sup>, 100% of public bodies, as well as implement new federal telecenters , improved access to mobile broadband and increase the number of private discussions of collective access to broadband Internet.**

Other mechanisms to stimulate the expansion of telecommunications services within the PNBL are: (i) the granting of new licenses in the sector of TV

via cable, (ii) support for digital TV, which will provide interactive services and in the future may bring digital content broadcast both on TV and the Internet, (iii) credit from the BNDES (Banco Nacional de Desenvolvimento Economico e Social - National Bank of Economic and Social Development) for broadband operators to reach cities with low population density; (iv) continuity of funding lines for wireless technologies in BNDES FUNTTEL (Fund for the Technological Development of Telecommunications), FNDCT (National Fund for Scientific and Technological Development) and FINEP (Financier of Studies and Projects) (v) availability a special line of credit from BNDES for the dissemination of private collective access points; (vi) inclusion in Supersimples and reduction of licensing fees for small service providers to offer wireless broadband access, (vii) training of new entrepreneurs interested in collective access points, (viii) project financing for mass Broadband by Fust (Universal Service Fund Telecommunications), (ix) tax exemption of broadband equipment, (x) extending the coverage of 3G services to all municipalities; providers large and small in the procurement of radio spectrum for broadband by dividing into different coverage areas (blocks with national coverage and others with local coverage).

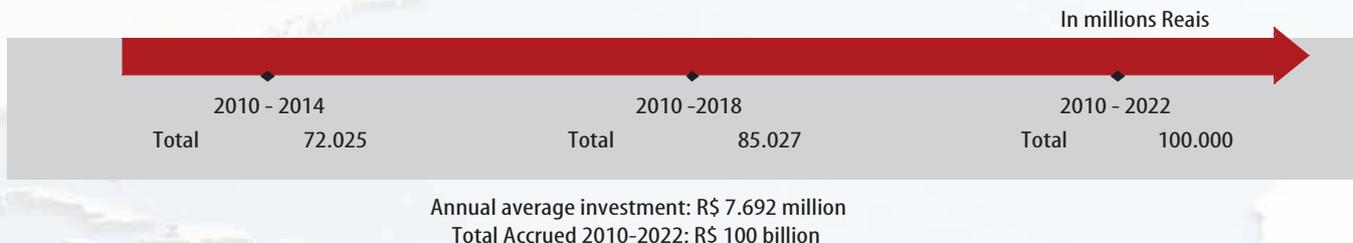
**It is estimated that investment in the sector by 2022 is around R\$ 100 billion, with an annual average of R\$ 7.7 billion.**

<sup>23</sup> A National Plan for Broadband: Brazil High-Speed, 2009. Available at: <http://www.mc.gov.br/plano-nacional-para-banda-larga>. Accessed: 12/11/2010.

<sup>24</sup> The common goal for households and small businesses sum about 29 million hits individual cities. Source: PNBL.

**Figure 3.17: Required investments for the telecommunications segment - Earnings - 2010 to 2022 (R\$ 2010)**

Source: LCA Consultores based on infrastructure investment data of BNDES.



These investments are crucial, especially on account of the great events scheduled for the next year in Brazil (World Cup and Olympics).

**The 2014 World Cup will be the event of interactivity, downloads and high definition TVs, which require lots of broadband capacity.**

Brazil ranked fifth worldwide in terms of mobile terminals (preceded by China, U.S., India and Russia) in mobile telephony. But the average consumption is very low.

The low income population is making use of mobile pre-paid starting to use the phone to receive calls, rather than for calls. This low consumption is certainly related to the high cost of service in Brazil, heavily influenced, in turn, the crushing burden of taxes levied on the services sector. The average monthly expenses of mobile phone users in Brazil is about R\$ 35 (US\$ 21), placing Brazil as the second-highest tax burden in the world. Without taxes, the average expenditure would rise to R\$ 25 for the same services (60% of average expenditures). The rationalization of the tax burden will lower the price of equipment and services, price reduction should be passed on to the end user tariffs. Thus, it is necessary that, together with a larger financial resources to expand access to telecommunications services, also a rationalization of the tax burden so that a service is offered with a lower price to consumers, thereby

**Figure 3.18: Goals for universal access to broadband by 2022<sup>25</sup> - 2010 a 2022**

Source: LCA Consultores based on population data by IBGE.



<sup>25</sup> Universal access to broadband in the urban population

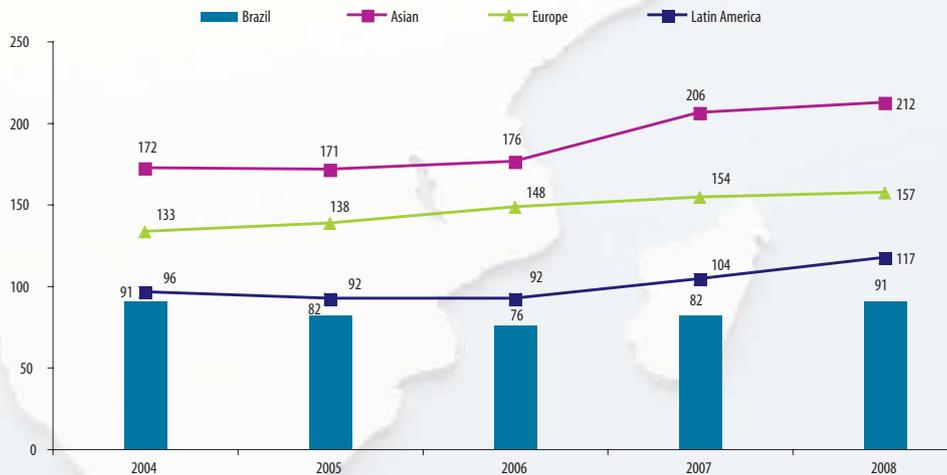
promoting Increased use once provided access, as mentioned in the Map of Guaruja, event Telebrasil August 2010.

Reduction in service costs is essential in order to extend the use of telecommunications services. The tax rationalization in the telecommunications industry is vital for this process.

Chart 3.16 shows that in Asia, a user uses an average of 212 minutes, while in Brazil the figure is only 91 minutes, below the Latin American average minutes (117 minutes).

**Chart 3.16: Average minutes per user per month (MOU) for regions of the world and Brazil - 2008**

Source: Merrill Lynch - Global Wireless Matrix.



**Despite the high penetration of mobile phones in the phone market, the minutes used in Brazil are well below the world average.**

Thus, a goal that is needed is that Brazil will reach the current average use of Asian countries, 212 minutes per user per month until 2022 (Figure 3.19).

**Figure 3.19: Millennium increase in average monthly minutes used by the mobile user - from 2010 to 2022**

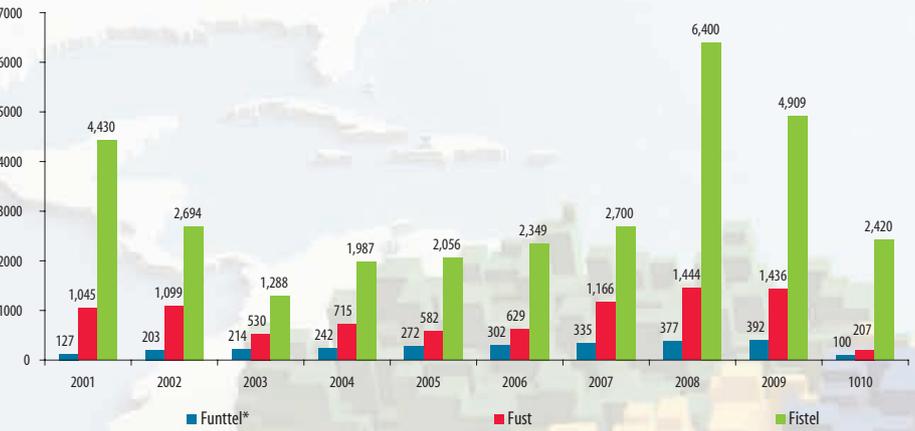
Source: LCA Consultores based on data from Merrill Lynch.



The application of the Fund for Universal Telecommunications Services (FUST), created in 2000 by Law No. 9998 and supplied with 1% of gross operating revenues of the operators, will certainly accelerate access to public telephony services, especially those with higher Agret value. Chart 3.17 below shows only collected in 2009 were about R\$ 1.4 billion.

## Chart 3.17 - Collection of Public Funds: FUNTTEL<sup>(1)</sup>, FUST<sup>(2)</sup> and FISTEL<sup>(3)</sup> (in millions R\$)

Source: Telebrasil. (1) Fund for scientific and technological development of telecommunications. (2) Universal Service Fund Telecommunications. (3) Telecommunications Supervision Fund.



However, there is a systematic curtailment of these resources. Even if this is an amount for a determined purpose, the total of funds raised from the public telecommunications service, 92.9% were not applied pursuant to Law No. 9.998/00.

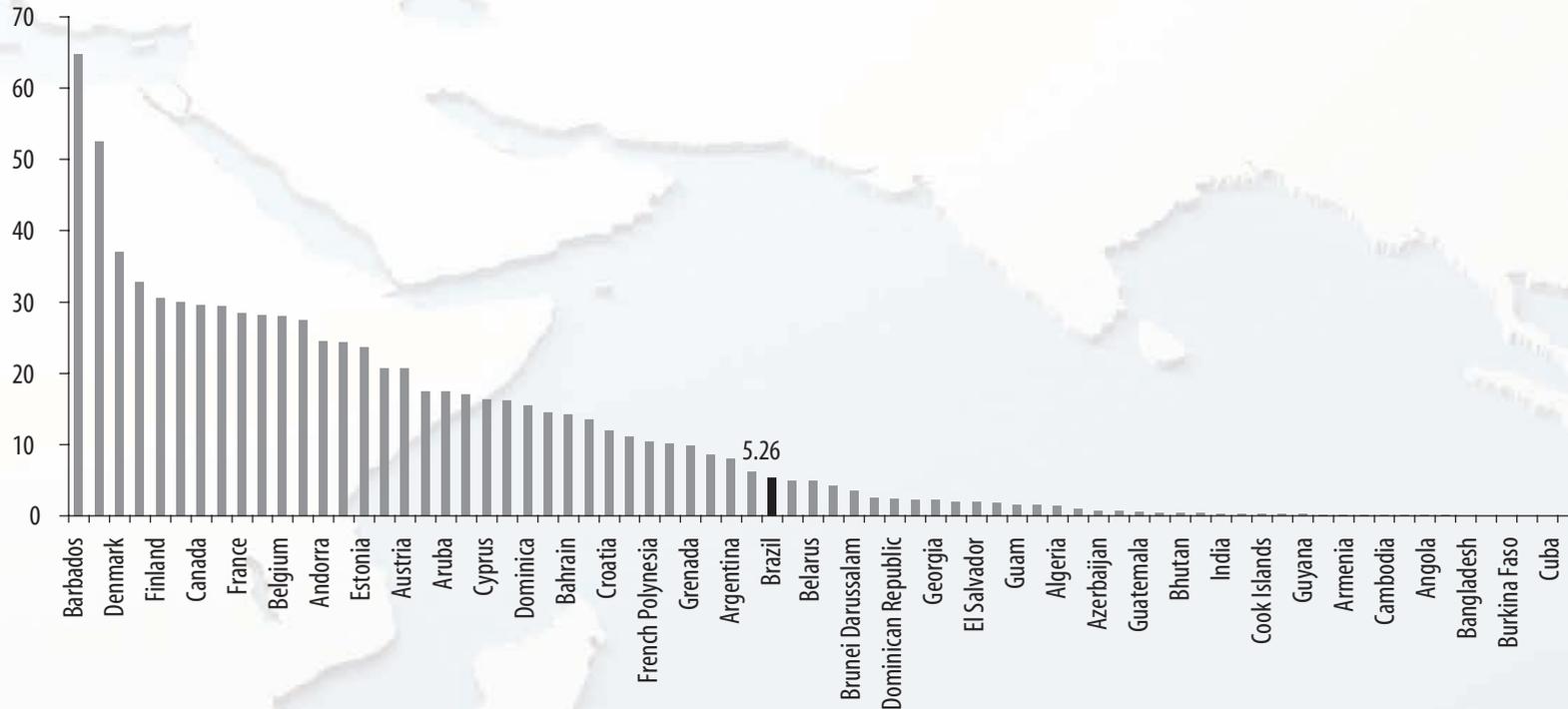
With the evolution of the computer industry and the advent of converged networks and services, the concept of universalization must now also cover the issue of digital inclusion. Thus, when we speak of universal telecommunications services must refer not only the expansion of telephone services, but also to increased access to digital networks of computers. And in that respect, the Brazilian situation is still quite poor, since in 2009 only 27.4% of all U.S. households had computers with Internet access. According to data from Internet<sup>26</sup> Broadband International Telecommunication Union (ITU), among 74 countries, Brazil ranked 35th in the 2008 rankings, with 5.26 broadband subscribers per 100 inhabitants.

<sup>26</sup> Data from the National Research by Household Sampling (PNAD – IBGE).



**Chart 3.18: Number of subscribed to broadband per 100 inhabitants - Selected Countries - 2008**

Source: ITU.



So there is still a long way to go for achieving universalization of telephone and broadband. The advancement of technology convergence also represents an important contribution to that offer services of telecommunications with lower rates for consumers, and therefore in order to increase the use of the same in all layers of society.

Convergence technology is the use of a single network or technology for the provision of more than one service. An example of what is technological

convergence is the VoIP (Voice over Internet Protocol) which allows voice service through the use of the Internet. Another very significant example is the growing use of mobile phones as a means of Internet access, movies, TV and radio.

Thus, convergence means that companies operating in the same sector, but offering different products and services, start to provide the same services, enhancing therefore the competition for each service so as to contribute to reducing the price borne by the consumer.

**Technological convergence drives the network, as it is not necessary to duplicate networks, but to take advantage of already installed. However, it is essential that there be frequent maintenance of infrastructure, in view of the rapid expansion of access.**

These investments in expansion and maintenance must be adequately compensated and that will only occur upon the stipulation of a regulatory framework consistent with the structure of today's most competitive offer.



## 3.4 Sanitation: universalization with a credible goal

The deficiency of public sanitation services has a long history and is the result of discrete actions and lack of long-term planning. The first plan focused on structured actions in the sanitation sector is the National Sanitation Plan (Planasa), launched in the 70s. Planasa achieved its goal of increasing the coverage of water supply, but with regard to the sewage did not reach significant advances. Even Planasa also contributed to the increase in population coverage of sewage, its level remained unsatisfactory. In the decade following its formation, the model presented Planasa exhaustion and became extinct at the end of 80s, leaving a gap in planning and development of basic sanitation sector in the country.

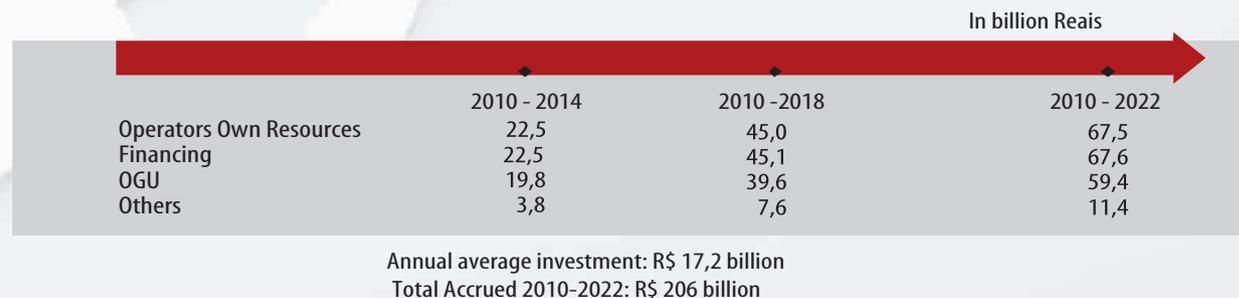
Only in 2007 was drafted to Law 11,445, known as the Law of Sanitation and responsible for setting the new policy for the sector. The Law of Sanitation was instructed, inter alia, strategic planning, defining the services through

concession contracts, the definition of goals and plans with the origin of funds for financing. Even after nearly three years of publication of this Law, little had been done effectively so that cities and states adapt their local laws to guidelines established by the regulatory<sup>27</sup> landmark.

A study conducted by sizing Modernization Program for the Sanitation Sector (PMSS), published in 2003<sup>28</sup> and revised in 2010 by the Brazilian Association of Producers of Materials for Water (ASFAMAS), estimated to be needed more than R\$ 206 billion in investments for universal access to sanitation by 2022. Based on these values, LCA estimated that 33% of the total investment required in 2022 (R\$ 67.5 billion) to be conducted with operators' own resources, other funding 33%, 29% (R\$ 59.4 billion) with funds from the Federal Budget (OGU) and 6% (R\$ 11.4 billion) investment from other sources. (Figure 3.20).

**Figure 3.20: Required investments for the segment of sanitation - Accumulated from 2011 to 2022. (R\$ 2010)**

Source: LCA Consultores based on PMSS studies in 2003 and revised by ASFAMAS.



<sup>27</sup> An example was the postponement to 2014 the deadline for the completion of major tasks aimed at universalization.

<sup>28</sup> Sizing of investment needs for the Universal Service Water Supply and Collection and Treatment of Sewage in Brazil. Ministry of Cities. National Secretariat of Environmental Sanitation. 2003.

**The goal of universal sanitation in the country is established by the Law of Sanitation for the urban population is the target for universal access by 2022 and total population by 2025.**

According to statistics from the National Information System on Sanitation (SNIS) in 2008 the urban population coverage rate was 94.7% for water services and 50.6% for sewer.

Based on this index and considering the deadline for universal access, the LCA calculations indicate that the end of 2010 the rate of urban population coverage should be 95% water, 58% for sewage collection and 49% for sewage treatment. Similarly, for 2014, the rate of urban population coverage should be 97% water, 72% for sewage collection and 66% of sewage treatment. (Chart 3.19).

These intermediate goals, although ambitious, are fundamental for achieving universal water service, sewage collection and treatment throughout Brazil by 2025.

**Chart 3.19: Ratio of population coverage for the service universalization urban - from 2010 to 2022<sup>29</sup>.**

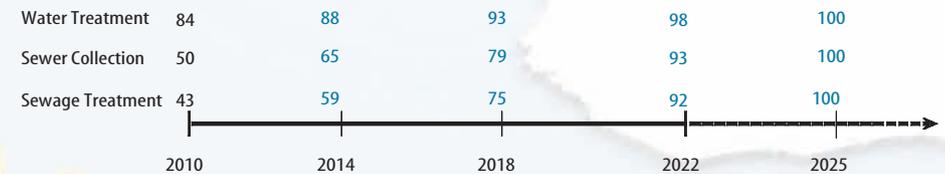
Source: SNIS population coverage index 2008. Prepared by: LCA Consultores.



As for the service universalization total, so that the target be reached by 2025, requires that by 2014 coverage is 88% water, 65% for sewage collection and 59% for sewage treatment (Chart 3.20).

**Chart 3.20: Ratio of population coverage for the service universalization total - from 2010 to 2024**

Source: SNIS population coverage index 2008. Prepared by: LCA Consultores.



Study of the Inter-American Development Bank found that a total of 25 countries in Latin America and the Caribbean, only eight reached the targets set by Millennium Development Goals (ODM) in 2008. They are: Bahamas, Barbados, Belize, Chile, Ecuador, Mexico, Paraguay and Uruguay. Of the remaining 17 countries, including Brazil, 7 have growth rates that enable the achievement of goals. However, Brazil is far more than the target countries like Honduras, El Salvador and Guatemala. Given this scenario, one of the goals for the sanitation sector is that they pursue the ODMs.

For the universal goal is achieved as credible, a set of actions should be performed. As noted previously the biggest problem of sanitation in the country is not about creating a regulatory framework for this already exists (Sanitation Law), but the fulfillment of this milestone. To solve the problem of dissonance

<sup>29</sup> The rates of population coverage, 2010, both for water and for sewage collection and treatment, were estimated based on the values of population coverage provided by the SNIS, 2008. These estimates also considered the universalization occurring in 2022 (urban) and 2025 (total).

between local laws and regulatory milestone, it is important that the Ministry of Cities to promote the enforcement of guidelines and provisions of laws governing sanitation, through state and local plans, settlement services and concession contracts or programs losers, weak or nonexistent, so they are aligned with the current regulatory milestone.

It is also the Chamber of Commerce and Senate that should ensure the stability of the regulatory framework, i.e., preventing it from being disfigured by a new law. It is important that the Federal Legislature deeply discuss the draft laws, such as inadequacy of setting tariffs, limits on charges for services and setting rules for the provision of services.

The prosecution also has an important role to oversee affronts to the law, for example, the constitutional amendment in Parana and the proposed constitutional amendment in Rio Grande do Sul, which seek to prohibit private sector participation in sanitation, injuring federal law. The prosecution also is responsible for adequate monitoring of the implementation of the plans of state and municipal sanitation. Also with respect to laws, but when it comes to the judiciary, it is important to focus efforts so that there is harmony in the three trial levels of the federation, thus avoiding repetition of trials and seeking speedy trial of judgments. Thus, several sectors of the economy would benefit, including sanitation.

An important consequence of not complying with the regulatory milestone (including those related to legal uncertainty and low speed of processes) is the reduced attractiveness of the sanitation sector to private

initiative. The private sector participation in sanitation is recent - since its inception after 1994 - and currently is concentrated in the Southeast and South. An important consequence of the lack of compliance with the provision of sanitation services in Brazil remains focused primarily on operators of direct administration of the public sector - companies such as State Water and Sanitation (CESB<sup>30</sup>) imposed by Planasa. According to data from the National Sanitation IBGE (PNSB-IBGE), 42% of the service providers of water were administered by the public sector in 2008. This number has increased since 2000, when he was only 37%. As for sewage, this percentage is even higher (57.5%) but decreased compared to 2000, when the public sector accounted for 63.3% (Table 3.10).

**Table 3.10: Water and sewage companies with direct administration of the public sector (% of total enterprises) - 2000 and 2008**

|             | Water |      |                    | Sewage |      |                    |
|-------------|-------|------|--------------------|--------|------|--------------------|
|             | 2000  | 2008 | Difference in p.p. | 2000   | 2008 | Difference in p.p. |
| Brazil      | 36.6  | 42.4 | 5.9                | 63.3   | 57.5 | -5.8               |
| North       | 49.6  | 43.0 | -6.6               | 37.1   | 48.3 | 11.2               |
| Northeast   | 35.2  | 47.2 | 12.0               | 86.1   | 73.1 | -12.9              |
| Southeast   | 38.0  | 40.2 | 2.2                | 57.3   | 55.4 | -1.9               |
| South       | 35.0  | 38.1 | 3.1                | 58.5   | 49.6 | -8.9               |
| Center-East | 29.9  | 43.1 | 13.2               | 33.3   | 19.7 | -13.6              |

Source: National Research for Basic Sanitation. IBCE. Prepared by: LCA Consultores.

<sup>30</sup> According to data from the NHIS in 2008 were 26 CESB that provide water services to 3,980 municipalities and sewerage services to municipalities in 1082. Although there also are few Municipal Companies of Basic Sanitation (CMSB) providing the service, being responsible for the care of 627 municipalities with water and 372 municipalities with sewer.

In the current climate of lack of compliance with regulatory framework and low private investment, achieve the goal of universalization of the water supply and sewage stands as a major challenge for the industry. It happens that, even with the increase in recent years regarding the provision of services, the problem of low coverage in some areas still persists. According to the survey of the PNSB-IBGE, 92.8% of municipalities are serviced by water supply service, but only 55.2% of the municipalities are covered by sewage collection. The small improvement of the sewage system is stark: in eight years, the increase in coverage was only 2.9 percentage points in Brazil. In the northern region, 86.6% of the cities have no sewage (Table 3.11).

**Table 3.11: Municipalities with water supply service and sewage disposal (% on the total) - 2000 and 2008**

|             | Water |      |                    | Sewage |      |                    |
|-------------|-------|------|--------------------|--------|------|--------------------|
|             | 2000  | 2008 | Difference in p.p. | 2000   | 2008 | Difference in p.p. |
| Brazil      | 80,3  | 92.8 | 12.6               | 52.2   | 55.2 | 2.9                |
| North       | 43.7  | 78.0 | 34.3               | 7.1    | 13.4 | 6.2                |
| Northeast   | 84.2  | 91.0 | 6.9                | 42.9   | 45.7 | 2.8                |
| Southeast   | 85.1  | 95.8 | 10.7               | 92.9   | 95.1 | 2.2                |
| South       | 77.0  | 96.5 | 19.6               | 38.9   | 39.7 | 0.8                |
| Center-West | 91.9  | 94.2 | 2.3                | 17.9   | 28.3 | 10.4               |

Source: National Research for Basic Sanitation. IBGE. Prepared by: LCA Consultores.

**Definition of a socioeconomic standart to optimize the allocation of public resources in sanitation.**

According to estimates by the SNIS in 2008, the national average index of servicing the whole was 81.2% for water supply and 43.2% for sewage collection, as shown in Table 3.12. When reviewing these indicators by region, we see that they are worse in the North and Northeast. While the South and Southeast show index rates of total coverage of water at 86.7% for the South and 90.3% for the Southeast, the North shows an index of 57.6% and the Northeast region of 68%. This difference between regions is even larger when looking at the rate of sewage treatment, which for the Northern region is 5.6% against 66.6% in the Southeast. Therefore, it appears that these gaps in water supply and sewage are concentrated in rural areas, people of lower income and less developed regions of the country.

**Table 3.12: Population served by water and sewer system - Service providers participating in the SNIS, according to the geographical region - 2008**

| Total Region | Service index (%) |       |        |       | Index treatment |
|--------------|-------------------|-------|--------|-------|-----------------|
|              | Water             |       | Sewage |       |                 |
|              | Total             | Urban | Total  | Urban | Sewage (%)      |
| Brazil       | 81.2              | 94.7  | 43.2   | 50.6  | 34.6            |
| North        | 57.6              | 72.0  | 5.6    | 7.0   | 11.2            |
| Northeast    | 68.0              | 89.4  | 18.9   | 25.6  | 3.5             |
| Southeast    | 90.3              | 97.6  | 66.6   | 72.1  | 36.1            |
| South        | 86.7              | 98.2  | 32.4   | 38.3  | 31.1            |
| Center-West  | 89.5              | 95.6  | 44.8   | 49.5  | 41.6            |

Source: SNIS. Prepared by: LCA Consultores.

Apart from regulatory issues and investment, other factors complicate the universal service: there is inefficiency in the management and poor quality of physical infrastructure by the holders of the service (CESBs), causing loss of revenue. More precisely, the losses can be: physical (water produced and lost in the process of distribution) and commercial (produced water consumed, but that is not measured and therefore not charged to the consumer). Such inefficiencies can be exemplified by the high rate of income losses and high rate of water payments unaccounted for: according to the SNIS in 2008, the rate of turnover loss was 37.4%. Although there is a declining trend in loss ratio - the amount corresponding to 2008 is the smallest of the entire series, which started in 1995 - it appears that the index is still quite high. Thus, the regulatory agencies should require operational efficiency through self-sustaining investments, with long-term vision and planning.

Although there is a downward trend sanitation services still generate substantial energy losses for the distributors of electricity according to consumption inefficient in service delivery. Approximately 3% of electricity consumption in the country are consumed by service providers of water and sewer, a significant amount capable of generating significant losses. Seeking to remedy this problem was created PROCEL SANEAR (Efficiency Program in Environmental Sanitation), coordinated by the National Environmental Sanitation and linked to the Ministry of Cities. The program encourages the efficient use of electricity in sanitation systems, performs actions for efficient use of water resources with a strategy to prevent the shortage of water for hydroelectric generation. The main goals of the program are: (i) improvement of the performance indicators associated with the processing power and water sanitation service providers, and (ii) increasing awareness of consumers regarding the appropriate use of energy power and water.

Another problem identified in the sanitation sector in the country refers to the high rate of sewage that is released in natura, without any treatment, constituting an important source of spread of infectious and parasitic diseases. As noted previously (Table 3.12), only 34.6% of the population is treated sewage, being reflected in higher share of the municipalities (40.3%) with outbreaks of diseases related to sanitation. Table 3.13 below that observed in the North and Northeast over 60% of municipalities are affected by diseases related to sanitation.

**Table 3.13: Number of municipalities with diseases associated with sanitation - Large Regions - 2008**

| Region               | Municipality quantities |
|----------------------|-------------------------|
| North                | 67.7%                   |
| Northeast            | 61.1%                   |
| Sutheast             | 32.1%                   |
| South                | 12.8%                   |
| Center-East          | 33.9%                   |
| Brazil               | 40.3%                   |
| - Diarrhoea          | 67.6%                   |
| - Worms              | 62.1%                   |
| - Dengue             | 68.9%                   |
| - Hepatitis          | 23.5%                   |
| - Dermatitis         | 20.1%                   |
| - Air borne diseases | 29.2%                   |
| - Others             | 51.8%                   |

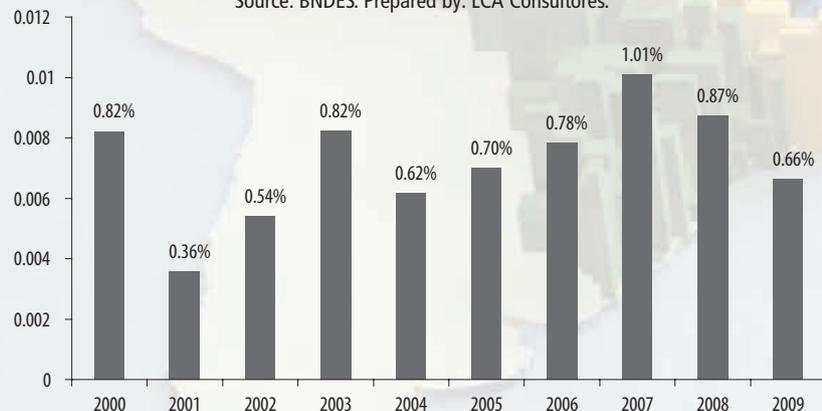
Source: National Research of Basic Sanitation. IBGE. Prepared by: LCA Consultores.

Faced with this reality and the serious health problems, it is essential to prioritize investments in sewage (collection and treatment), whereas the low level of attendance for this item is well below the level of water coverage. In general, a larger financial investment in the sector is also necessary for the universalization occurs within the established deadlines.

Although recently the availability of resources has increased, access to these resources is still considered an obstacle. Less than 1% of BNDES funds are reserved for Water and Sewer, as can be seen in Chart 3.21 below. The reduced speed with which the credit is granted funding institutions creates an additional barrier, although its cause is not only within the excessive procedures that arise for their release. The private sector also contributes to delay the release of funds, as they often offer low-quality projects, whose adequacy requirements require several steps, increasing the time between the request and the resource disbursements.

**Chart 3.21: Share of funds disbursed for Water, Sewage and Garbage in total BNDES disbursements**

Source: BNDES. Prepared by: LCA Consultores.



Another point that deserves special attention when it comes to funding is the financial recovery of the state sanitation companies. Currently, many companies are in deficit, with low debt capacity and only a limited set of companies are able to hire new financing. In this scenario, the sector's development is compromised, without borrowing, firms can not expand their investments to achieve the goals established by the Law of Sanitation.

An alternative that is put forward to aid the financial management of companies is through further encouragement of participation by the FI-FGTS (Guarantee Fund of the Government Severance Indemnity Fund for Employees) in service providing firms. The FI-FGTS is an infrastructure investment fund that integrates the Capitalization Program and Modernization of the State Sanitation Companies of the Caixa Economica Federal. This program was launched in 2008 and until today not a penny of the money available was applied. The program provides for direct financing to fund companies that have debt capacity - or the purchase by the fund, up 49% stake in each company<sup>31</sup>. This second mode is used for companies with financial difficulties, the situation of most water utilities.

The actions for sanitation have great dependence on the public budget to be unviable. However, with public funds increasingly scarce, it becomes necessary to stronger performance of the private sector, including through partnerships with the public sector. Otherwise, only public investment with the goals of universal access will be extended by 50 years, well beyond the deadline.

The public-private partnerships (PPP) have become important alternatives for achieving the goal of universalization. For this, it is expected that the Ministry of Cities to make a wider disclosure of PPPs existing practices in sanitation, for example, concession, sponsored concession and administrative concession. However, for the PPP model spread need to be strengthened legal certainty and

<sup>31</sup> The goal of buying 49% of companies is not to be a majority shareholder, but utilize CEF resources to implement the policies to improve management and, after recovery of the assets, sell the shares purchased, preferably to the company itself.

transparency. If not, private initiative will not find incentives to invest in the sector.

Steps must be taken urgently in order to broaden the participation of the private sector: (i) reducing the excessive number of procedures to arrange an investment in the country, (ii) improved performance of private banks to finance projects with sanitation, and (iii) rationalizing the tax burden on services or on the productive chain of the reorganization or, more directly, through tax exemption for private companies that work with the sanitation. Such measures allow for greater incentive for new partnerships with the private sector are carried out. It is important that heads of services and regulatory agencies understand that the private sector should be seen as a facilitator of solutions, an option made available to the public authorities so that the universalization process of sanitation occurs more rapidly.

With regard to taxation, reduction of federal taxes on State and Municipalities sanitation system could be proposed as a stimulus to increase investments in the sector. The proposed mechanism would occur through the exemption of PIS/COFINS sewage works and such funds should only be used for new investments in the sector as lost funds repayable. It is estimated that this action will make available funds of approximately R\$ 2 billion a year<sup>32</sup>, a figure crucial to the universal service goals are met. Other actions can also be made to comply with the universal. For example, at the federal level, the establishment of deadlines for the holders of the provision of sanitation services to draw up local plans, stating goals, solutions and funding resource sources.

From the foregoing, we conclude that despite relative progress in coverage rates for water and sewer observed in recent years, rates of sewerage are still far from a satisfactory level. Adequacy of local laws to comply with the regulatory framework, establishing intermediate goals for universalization, improve operational efficiency, adjustments of concession contracts, larger investment, mainly for sewage, better conditions and access to credit, relief from tax burden in the chain of sanitation services and reducing dependence on public budget are some of the issues to be resolved so that the sector continues to develop and be able to get to 2022 with the urban sanitation services universalization.

Besides improving the quality of life, the investment in sanitation contributes also for its development and brings positive externalities for other industries. According to data from the World Health Organization, for every Real invested in sanitation, municipalities save five Reais on curative medicine of the public network. The externalities generated by these investments is reflected in sanitation, besides generating employment for the whole production chain involved, also adds value to the real estate and tourism sectors.

Area are planned aiming at the medium and long term and beyond a political cycle, giving greater assurance of future security. It is critical that sanitation in Brazil take clippings and public policy effectively becomes an instrument to increase the quality of life.

<sup>32</sup> Sector agents estimates, like ASFAMAS (Brazilian Association of Producers of Sanitation Materials).

## 4. Conclusion: pillars of the development of the civil construction chain

This section will be treated three themes common to both the housing area as the area of infrastructure, and that are essential for sustained growth. They are: (i) availability of resources and legal, (ii) improving management capacity in public and private; and (iii) training and attraction of manpower in

the construction chain. These themes address issues essential to the development of the Brazilian economy as a whole, but certainly are investments in infrastructure its most sensitive point, since, without these pillars, the efforts to expand investments will prove fruitless in the long term.

### 4.1 Sustainability: legal resources and safety of long-term investor

There are two core issues on the agenda of sustainable growth: (i) attract capital for large investments with long term returns, and (ii) ensure compliance with contractual provisions and maintenance of market conditions and regulations existing when the investment decision.

For this, two factors are essential: (a) availability of resources and (b) legal. The first deals with resources in a broader sense, though he is more focused on capital and financing resources and the second relates to the business environment for investment.

#### 4.1.1 Resource availability

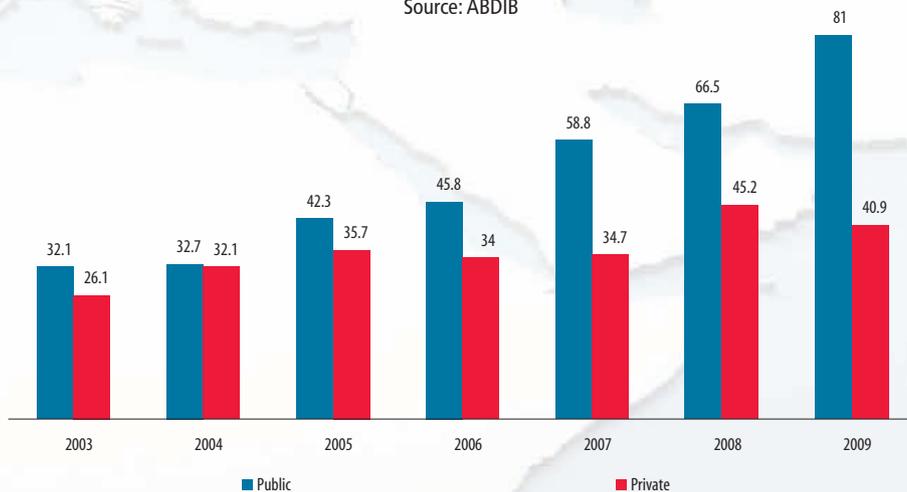
Create an agenda of state involves generating conditions for economic development without, for both the availability of public resources is the only

alternative. Given the volume of investment made in previous sections, it is evident the need for resources in unprecedented volumes, is the capital (equity) or funding, and the history of the Brazilian economy. Likewise, the need to contribute and offer guarantees with strong balance sheets and space to take on new debt tends to decrease, while the number of economic groups large enough and willing to engage in infrastructure is limited.

On the first point, the capital, it is noteworthy that since 2003, the resources available for investment in Construction Chain are mostly from the public budget (Chart 4.1). In 2009, 66% of investments in the infrastructure sectors were held by the public sector, only 34% held by the private sector.

**Chart 4.1: Public and Private Resources  
(in billions of \$, 2009 prices) - 2003 to 2009**

Source: ABDIB



**Ensuring sustainable growth is to ensure, at once, the expansion and diversification of funding sources willing to assume effectively the planned investments.**

On one hand, it is crucial to ensure that items of public spending has focused on investments in infrastructure are kept for that purpose, and not contingent or discontinued. This guarantees to at least one important source of revenue from public sources. On the other hand, it is essential to create institutional and market conditions that are able to attract and enhance the interests of private groups in long-term investments in infrastructure.

The Contribution of Intervention in the Economic Domain (CIDE), levied on the importation and marketing of oil, natural gas and derivatives, as well as the National Telecommunications Fund (FUNTEL) are two examples of contingent resources and would be better preserved in those sectors where are collected<sup>33</sup>. Finally, Proceeds from the liquidation of public debts (precatorius) should also be a source of funds for investments in the sector.

A discussion of relevant legal in Brazil for many years concerns the settlement of public claims. It is estimated that there are now over \$ 100 billion of cash in the form of credits. One way to accomplish the Constitutional Amendment 62 is the creation of a **Fund Investment in Infrastructure and Housing**, which enables the holder of such claims anticipate future funds (your credit rights) provided that decides to invest in infrastructure.

**The creation of an Infrastructure Investment Fund and Housing ballasted settlement of public claims (writ) has the potential to channel the resources for infrastructure investment of R\$ 20 to R\$ 25 billion from the creation of the Fund (projection LCA<sup>34</sup>).**

In housing, the approval of PEC housing is crucial to the sustainability of resources needed to solve the housing shortage.

Regarding the need for more resources (new fundings) to cover these amazing volumes of investment, it is crucial to **encourage and support the development and depth of capital markets.**

<sup>33</sup> See the sections *Highways and Telecommunications* about these taxes.

<sup>34</sup> The paper "Precatórios Uma Solução Definitiva - A Definitive Security Solution" DECONCIC/IESP. November 2009. offers a detailed suggestion for the structuring of that fund, under the EC 62.

For this purpose, renewed tax advantages or Government direct support (through BNDES-PAR among others) in transactions with private papers in the market tend to favor the growth of this practice as a source of additional resources, since these incentives tend to make new investors (households, enterprises, institutions) become indirect investors in infrastructure by buying some papers in the capital market.

Finally, it is necessary to encourage and support the development of the insurance market focused on infrastructure - completion and performance bonds, surety bond (targeted investments in infrastructure) and reinsurance. Given the importance of this matter, it is necessary that the Government does not lose sight of this issue and to redouble its efforts to facilitate these operations, in particular via the strengthening of private agents already trained and qualified (know how) to operate such a market.

Last but not least, it should strengthen the private sector and ensure the necessary investments and ensure the proper timing in order to avoid having excess capacity utilization and lack of goods, supplies and materials essential for continued investment. Given the relevance of the topic, it is crucial that there is

**Reduce wastefulness, to innovate in gestation projects and encourage recycling will also increase the availability of resources.**

also an integrated planning to ensure that expansion plans for investment in new productive capacity for inputs are compatible with the investment plans of the public agenda, either to avoid unwanted idleness or rather, lack products.

### 4.1.2 Legal Security

In addition to available resources, there must be certainty for the expansion of private investment in sectors of the construction chain.

The extensive legislative agenda that addresses issues related to Construbusiness is indicative of the lack of improvement of the legal-regulatory infrastructure<sup>35</sup> sectors.

Indeed, in an international comparison, it is noted that in Brazil a number of aspects related to legal certainty are worse than in other countries (Figure 4.1). Especially in efficiency in the procurement process and the security provided by guaranteed contracts, the situation in Brazil is very bad.

<sup>35</sup> FIESP's working group had access to projects currently under discussion during contacts with the committees in the House of Representatives Financial Supervision and Control of Urban Development, Environment, Mines and Energy and Roads and Transportation, the Committee on Senate Environment, Regional Development and Infrastructure, and, finally, the Committees of the Legislative Assembly of the State of Transportation and Communications, of Environmental Defense, Public Works and Services, Metropolitan Affairs and Issues Municipal.

**Figure 4.1.**  
**Comparative table of legal security status.**

Source: DECONCIC – FIESP. RI USP Jr.

|   | 1° Peru | 2° Chile | 3° Colombia | 4° Brazil | 5° Argentina | 6° Venezuela |
|---|---------|----------|-------------|-----------|--------------|--------------|
| Negotiation cost referent to Federal areas                          | Blue    | Yellow   | Yellow      | Yellow    | Red          | Yellow       |
| Permissiveness for bidding exemption                                | Blue    | Yellow   | Blue        | Blue      | Yellow       | Red          |
| Scope of preferences  | Blue    | Yellow   | Yellow      | Blue      | Yellow       | Red          |
| Efficiency in the contracting process                               | Blue    | Yellow   | Blue        | Red       | Red          | Yellow       |
| Quality in the organization in registering the interested parties   | Blue    | Yellow   | Yellow      | Red       | Yellow       | Yellow       |
| Security provided by contracts warranty                             | Red     | Yellow   | Blue        | Red       | Yellow       | Yellow       |
| Easiness to modify and/or terminate contracts by the Administration | Yellow  | Blue     | Yellow      | Yellow    | Yellow       | Red          |
| Efficiency of alternative solutions to the dispute                  | Blue    | Red      | Red         | Red       | Yellow       | Yellow       |
| Judicial Information  | Red     | Yellow   | Red         | Yellow    | Red          | Red          |

**Caption**

Worst situation



Intermediate situation



Best situation



It is therefore necessary to perform a series of changes in the regulatory framework, addressing questions on federal and legislative frameworks, to ensure that the regulatory apparatus effectively bring greater legal certainty both for contractors and for contractors.

**We need to establish a much clearer legal framework, agile and well-defined for the infrastructure sector.**

One aspect in particular lacks the legal-regulatory improvement immediately. This is the **segment of aggregates (sand, stone and clay)**. Land-use activities should be prioritized, failing to derail the transport of essential supplies over long distances given the low value of the product against the cost of freight. Accordingly, **the administrative decentralization of the activity (currently done at the federal level, but operated in municipalities) must be a priority to give greater flexibility to the decision allowing the expansion of the planned and orderly activity.**

Reforming the Law of Tenders is another relevant example in this regard. The issue can be illustrated by the recurrent use of the use of "phase inversion" in the bidding processes - for example, when the analysis of the proposed commercial / financial analysis occurs before the qualification and quality of competitors<sup>36</sup> - which can cause damage substantial public interests. The Provisional Measure No. 489 of May 12, 2010, for example, to allow them to be adopted inversion of phases in the procurement of works and services required for the Olympic Games or World Cup in 2014, raises the possibility of many infrastructure projects that will be achieved in the coming years will be contracted under the auspices of the inversion stages - with serious risks to the quality and reliability of the enterprise that will be finalized.

<sup>36</sup> Article 43 of Law No. 8.663/93 determines that the documentation analysis regarding the qualification of competitors in the bidding process should be made prior to the opening of commercial bids.

Thus, it is necessary to reform the Procurement Law in order to remove ambiguity about the order required on these contracts: characterization and demonstration of expertise followed by the lowest price. Thus, we could eliminate the risk of inappropriate hires that make only enhance the perception of risk by investors better trained, reducing its interest in infrastructure.

**Modernizing the Law 8.666/94 is vital to ensure flexibility in hiring for public works, with security of receipt by the contractor and execution of the work in time and quality required by the contractor.**

It is also necessary that the values of SICRO Cost Tables (Highway Costs System) and SINAPI (National System of Costs Survey and Civil Construction Index) are reference values only and do not cost limits, thereby respecting the peculiarities of each project. That is, each project, when hired, need to discriminate in the hiring process the basic features of the project in order to have signal to the supervising agencies specifics of the venture. This gives greater clarity to investors and the oversight, avoiding questions about the use of certain product specifications, and therefore possibly different values of the tables SICRO and SINAPI.

**Contracts must provide for minimum period for project design and specification details of the work**

Diversify forms of employment, increasing, for example, public-private partnerships (PPPs), is also important to enhance efforts and increase investments in infrastructure.

In addition to the reform of the Law of Tenders, it is very important to create mechanisms that ensure the continued flow of resources from the public

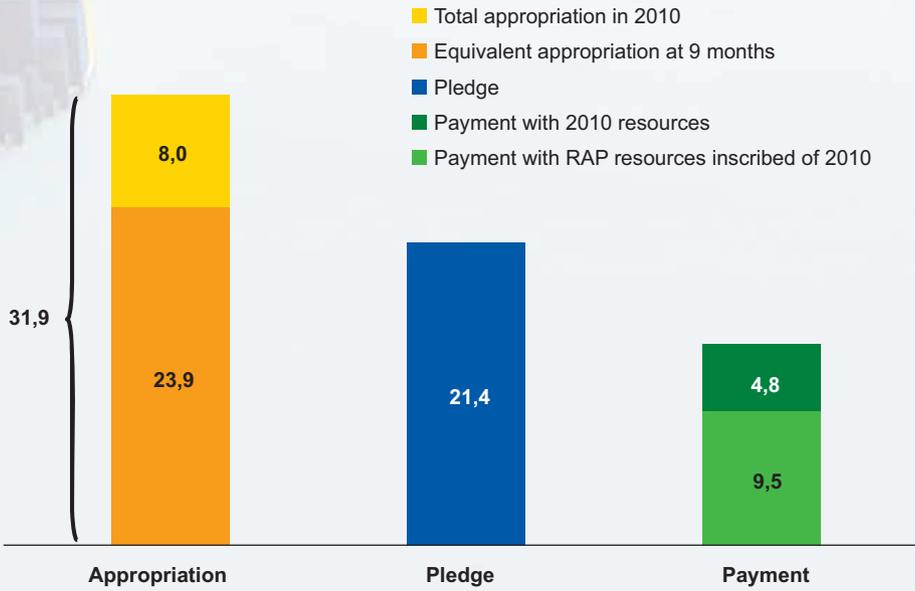
budget and payments within the physical and financial schedule established. According to a study conducted by TCU, 160 cases of 400 study indicate that this is the main cause for the suspension of works.

The distance between appropriation and implementation of the CAP reflects, among other factors, the legal uncertainty that paralyzes the developments.

The Chart 4.2 below illustrates this gap between the resources of the PAC. The public and private management as well as the shortage of manpower also collaborate to that picture, as treated in the following items.

**Chart 4.2: Allocation, Commitment and Payment of the PAC until September 2010.**

Source: PAC (cited SOF) - reference date: September 2010.  
Prepared LCA Consultants. RAP: Remains to pay



## 4.2 Public and private management

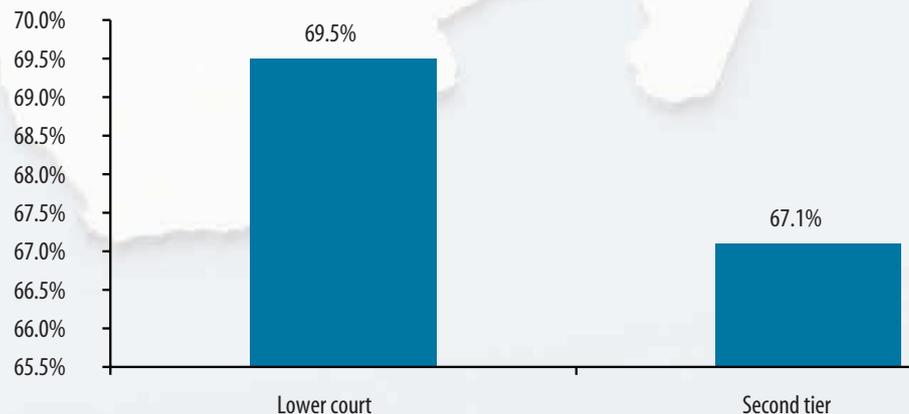
The theme of public and private management was the main line of the last edition of Construbusiness and back to prominence and merit attention in this historic edition. The same recommendations become necessary here, both for the public and private sector.

The congestion charge of Brazilian courts really is very high, as shown in Figure 3: 69.5% in 1st instance and 67.1% in the 2nd instance.

Another example of slowness is the issue of settlement of public claims. In the State of São Paulo, for example, there is the amount of funds to pay part of the credits, but the discharge is slow because the Judiciary is not computerized and has difficulty in putting the receivables in chronological order.

### Chart 4.3: Congestion Tax<sup>(1)</sup> in 1st and 2nd instance of Brazilian Federal Court -2009<sup>(2)</sup>

Source: CNJ. (1) Number of files downloaded on the number of new cases and pending. (2) For the 1st instance, added the numbers of cases and knowledge of the phase of implementation.



### Computerization of the judiciary is a priority to organize and expedite the decisions of Justice.

The same speed must also be given to environmental issues, since the time it takes to accomplish all the steps of an environmental permit is too slow, which causes delays and increases the risk of new developments.

According to World Bank data, in case of an enterprise in a dam, a step that initiates the licensing process, namely the sending of the term of reference by IBAMA to the entrepreneur should take 30 days in accordance with regulations. However, this process takes 394 days in Brazil. In fact, the IBAMA data show that less than 31% of lessons had issued environmental input at least one year before the issue - Table 4.1.

**Table 4.1 - Issuance of Environmental Licenses. % of the licences that take a year or more to be issued.**

| Year                      | Previous Entries |
|---------------------------|------------------|
| 2003                      | 25.4%            |
| 2004                      | 23.4%            |
| 2005                      | 18.0%            |
| 2006                      | 27.7%            |
| 2007                      | 20.4%            |
| 2008                      | 23.9%            |
| 2009                      | 23.1%            |
| 2010                      | 30.8%            |
| <b>Average</b>            | <b>24.1%</b>     |
| <b>Standard Deviation</b> | <b>4.0%</b>      |

Source: IBAMA.

**There must be standardization of criteria for analysis, agility and transparency in the process of obtaining environmental permits, which must be done in a harmonized way in all areas.**

All these issues discussed above eventually causing the same symptoms: a reduced appetite for investment of private long-term return too long and increased risk of existing investments, increasing the project. For the contractor, the risk of not having the work contracted on terms and conditions initially foreseen. This results, besides the maintenance of the bottlenecks, in providing services to the public interest more expensive than they should, harming not only those involved directly in the industry, as well as all members of society.

## 4.3 Labor

### Shortage of manpower, is a common bottleneck at all levels of civil construction chain.

Caged data from September 2010 show that the Building was one of the sectors that generate formal jobs in the year, totaling 330,000 new jobs (net balance between admissions and dismissals), which represents 15% of new jobs

generated in the country, behind only the Industry of Transformation. The demand strongly heated, however, has not been enough to attract manpower and keep it in the segment. Survey of Construction in September 2009, prepared by the National Confederation of Industry (CNI), the biggest problem identified by the Jail Construction was the lack of skilled worker (voted by 64% of companies).

**Table 4.2: Key problems identified by Construction firms (in % of firms that voted) - September 2010**

|                               | Total   |         | Small   |         | Medium  |         | Large      |         |
|-------------------------------|---------|---------|---------|---------|---------|---------|------------|---------|
|                               | % firms | Ranking | % firms | Ranking | % firms | Ranking | % de firms | Ranking |
| Lack of qualified worker      | 64.0    | 1       | 63.4    | 1       | 63.8    | 2       | 68.8       | 1       |
| High taxation                 | 58.0    | 2       | 55.0    | 2       | 64.5    | 1       | 46.9       | 2       |
| High hand labor cost          | 30.2    | 3       | 34.6    | 3       | 27.0    | 3       | 18.8       | 5       |
| Fierce competition for market | 25.5    | 4       | 26.7    | 4       | 20.6    | 6       | 40.6       | 3       |
| High Interest Rates           | 21.7    | 5       | 20.4    | 6       | 22.7    | 5       | 25.0       | 4       |
| Lack of working capital       | 18.7    | 6       | 21.5    | 5       | 17.0    | 7       | 9.4        | 8       |
| Non-payment by customers      | 18.4    | 7       | 15.7    | 7       | 23.4    | 4       | 12.5       | 6       |
| Climate conditions            | 12.4    | 8       | 14.7    | 8       | 10.6    | 9       | 6.3        | 10      |
| Lack of raw material          | 11.5    | 9       | 13.6    | 9       | 9.9     | 11      | 6.3        | 10      |
| Environmental licensing       | 10.4    | 10      | 10.5    | 10      | 9.9     | 11      | 12.5       | 6       |
| High raw material cost        | 10.2    | 11      | 8.9     | 11      | 12.8    | 8       | 6.3        | 10      |
| Lack of demand                | 9.6     | 12      | 8.9     | 11      | 10.6    | 9       | 9.4        | 8       |
| Lack of long term financing   | 8.0     | 13      | 7.3     | 14      | 9.2     | 13      | 6.3        | 10      |
| Land availability             | 7.4     | 14      | 7.9     | 13      | 7.1     | 14      | 6.3        | 10      |
| Others                        | 3.3     | 15      | 3.7     | 16      | 3.5     | 15      | -          | 16      |
| Lack of support equipment     | 3.0     | 16      | 4.2     | 15      | 1.4     | 16      | 3.1        | 15      |

Source: CNI.

According to the Infrastructure<sup>37</sup> Services Committee, in 2007 only 4.2% of all students graduated in Engineering in Brazil and this number is seven times lower than the number recorded in South Korea.

**The high dropout of students in engineering cursantes reaches 60% in public schools and 75% in private schools explains the low proportion of engineers per 100 000 inhabitants: 6, while in developing countries like Brazil that average between 18 and 30.**

The apparent scarcity of supply of manpower for the domestic sector is also shown by a survey conducted by the Federal Council of Engineering, Architecture and Agronomy (Confea), the results point to the rising number of foreign professionals in the sector of building, growing 670% between 2006 and 2010. Namely, since the restriction of the supply of such professionals in Brazil, the Brazilian Construction Chain are importing engineers and architects. The same happened with the employees at Petrobras: 30% of contractors to work on the platforms are foreigners (source: Commission of Infrastructure Services).

According to a preliminary study by IPEA<sup>38</sup>, 2010, the number of trained engineers in Brazil, if current trends continue, it should be enough to meet a growth of only 3% of GDP in coming years because, even if one is available high number of graduates, the authors point out that every 3.5 trained engineers in Brazil, only one has formally profession (in general, are attracted to the financial market). Thus, it is necessary to create incentives for the maintenance of learners within the sector of construction, which can be done through partnerships with

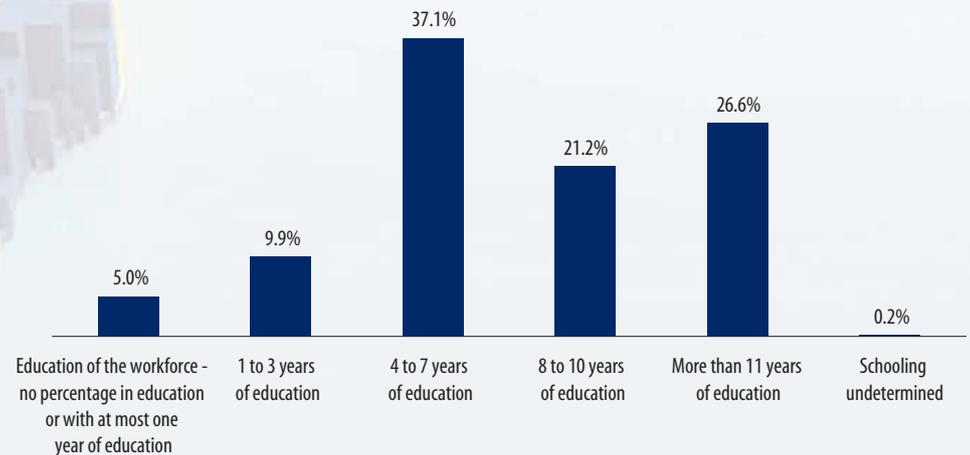
universities to engage students since the early college years.

The same shortage that exists in the areas of Engineering and Architecture, this show is for threads related to water use<sup>39</sup>, information technology, sanitation and many other issues of infrastructure.

Even if there were sufficient number of workers, the problem of qualification to show the utmost importance, as shown in Chart 4.4 below. Despite improvement in recent years, the level of education among workers in the Construction Chain is still very low: most workers have 4-7 years of study, or fundamental level I incomplete.

**Figure 4.4: Education of manpower - Percentage to total workers**

Source: CBIC.



<sup>37</sup> Infrastructure Services Committee. *Agenda 2009-2015: sectoral strategic challenges - Final Report. 2010.*

<sup>38</sup> Information available at [http://www.ipea.gov.br/003/00301009.jsp?ttCD\\_CHAVE=13645](http://www.ipea.gov.br/003/00301009.jsp?ttCD_CHAVE=13645), last access in 27/10/2010.

<sup>39</sup> The capacitation program contained in the National Plan for Water Resources has not yet been implemented by the National Water Agency (ANA) (source: Commission of Infrastructure Services. *Agenda 2009-2015: Sectorial Strategic Challenges - Human Resources for Innovation and Competitiveness. 2010*)

**According to figures from CBIC, approximately 73% of workers in jail have not completed high school. The level of education affects the productivity of workers, which consequently increases the cost of projects.**

The works that could be done by a lower cost often even no longer projects because of high amounts budgeted. In other cases, works are carried out with materials and technology of lower quality to offset the high costs generated by the low productivity of labor.

Still, the low education and productivity through the industry bearing an image of backwardness and insecurity, which causes the economically active population has a great indifference in civil construction activities. The sector, which today has low productivity and shortage of manpower, it is also very little attraction for young professionals.

**The lack of human resources with high technical quality therefore represents a structural bottleneck in all sectors of the Construction Chain you need at the outset to be faced that the already rapid growth of the chain does not run the risk of being interrupted at this moment or in the near future.**

In order to solve the problem of the low technical level (and hence low productivity) and shortage of manpower in the construction chain, some actions / proposals should be considered:

- I. Partnerships with universities (consistently) to suit the market need to educate professionals and accelerate the diffusion of knowledge generated in universities;
- II. Developing lines of credit and loans for undergraduate courses;
- III. Incentives and actions of attracting and retaining qualified workers in the construction sector, through:
  - a. Disclosure of goals and projections that motivate young people to choose work and career in the chain, and
  - b. Promotion and sponsorship of lectures, symposia and national and international conferences on the chain, their needs and expectations.
- IV. Participation of representatives (employers, associations and entities) in the sector councils with the MEC and / or establish public consultations to allow for greater interaction with industry in formulating regulations that impact the participation and training of professionals in Construction Chain such as Law and 11.788/2008 CNE resolution No. 2 of 2007 which provide for student internships;
- V. Creation of databases with information about the needs of manpower at all levels can provide information about industry needs and actions in the area of training of manpower.

Finally, it should be noted that the payroll reduction is a significant initiative to allow the sector to expand formally and increase the competitiveness of the productivity chain of civil construction.

The topics discussed here show the high complexity of the subject development, which requires the adoption of an Integrated Resource Planning in the state to be effected urgently by the Government.

**Disclaimer:**

*These results are directly conditioned to information and survey data available during the analysis as follows:*

- *The information contained in this document was developed by LCA together with the Strategy Committee of DECONCIC - FIESP, designated to develop Construbusiness 2010 and transmit the opinions of that GT-Work Force/FIESP;*
- *The findings reported here are faithful to the shared analysis under the Strategic Committee, and do not reflect the views of the LCA.*

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## Cadeia Produtiva da Construção/Construction Productive Chain

### Sindicatos/Unions

Sindicato da Indústria da Cerâmica de Louça de Pó de Pedra, da Porcelana e da Louça de Barro do Estado de São Paulo – SINDILOUÇA; Sindicato da indústria da Construção Civil de Grandes Estruturas no Estado de São Paulo - SINDUSCON-SP; Sindicato da Indústria da Construção do Mobiliário de Leme – SINDILEME; Sindicato da Indústria da Construção e do Mobiliário de Santa Gertrudes – SINCER; Sindicato da Indústria da Construção Pesada do Estado de São Paulo – SINICESP; Sindicato da Indústria da Extração de Minerais não Metálicos do Estado de São Paulo – SINEXMIN; 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 do Estado de São Paulo – SINAFER; Sindicato da Indústria de Artefatos Metais Não Ferrosos do 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 – SINDISTALAÇÃO; Sindicato da Indústria de Lâmpadas e Aparelhos Elétricos de Iluminação do Estado de São Paulo – SINDILUX; Sindicato da Indústria de Mármore e Granitos no Estado de São Paulo – SIMAGRAN; Sindicato da Indústria de Material Plástico do Estado de São Paulo – SINDIPLAST; Sindicato da Indústria de Mineração de Pedras Britada do Estado de São Paulo – SINDIPEDRAS; Sindicato da Indústria de Móveis e Junco e Vassoura de Escovas e Pincéis do Estado de São Paulo – SIMVEP; Sindicato da Indústria de Pinturas, Gessos e Decorações do Estado de São Paulo – SIPIGEDESP; Sindicato da Indústria de Proteção, Tratamento e Transformação de Superfícies do Estado de São Paulo – SINDISUPER; Sindicato da Indústria de Serrarias, Carpintarias, Tanoarias, Madeiras Compensadas e Laminadas no Estado de São Paulo – SINDIMAD; Sindicato da Indústria de Tintas e Vernizes no Estado de São Paulo – SITIVESP; Sindicato da Indústria de Vidros e Cristais Planos e Ocos no Estado de São Paulo – SINDIVIDROS; Sindicato da Indústria da Cerâmica para a Construção do Estado de São Paulo – SINDICERCON; Sindicato das Empresas de Compra, Venda, Locação e Administração de Imóveis Residenciais e Comerciais do Estado de São Paulo - SECOVI-SP; Sindicato das Empresas de Compra, Venda, Locação e Administração de Imóveis Residenciais e Comerciais do Estado do Rio de Janeiro - SECOVI-RJ; 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 das Indústrias 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 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 & Sindicato da Indústria de Produtos de Cimento do Estado de São Paulo - SINAPROCIM / SINPROCIM; Sindicato Nacional da Indústria de Trefilação e Laminação de Metais Ferrosos – SICETEL; Sindicato Nacional da Indústria do Cimento – SNIC; Sindicato Nacional das Indústrias Siderúrgicas – SNIS; Sindicato da Arquitetura e da Engenharia Consultiva - SINAENCO

**Entidades/Organizations**

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VICE-PRESIDENTE/VICE-PRESIDENT: Carlos Alberto Orlando

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DIRETOR TITULAR/INCUMBENT DIRECTOR: José Carlos de Oliveira Lima

DIRETORES TITULARES ADJUNTOS/ASSISTENT INCUMBENT DIRECTORS:

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EQUIPE DECONCIC/DECONCIC STAFF:

GERENTE/MANAGER: Claudinei Florencio

COORDENADOR/COORDINATOR: Carlos Alberto Laurito

ANALISTA DE PROJETOS PLENO/FULL PROJECT ANALYST: Karina Vieira Dias

ASSISTENTE DE PROJETOS/PROJECT ASSISTENT: Patrícia Alberto Gomes dos Santos

ASSISTENTES/ASSISTENTS: Andrea Beraldo Kapamadjian – Carolina de Souza Borges – Vanderléia Ricardo da Silva

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Renato José Giusti – Titular Adjunto/Assistant Incumbent

## INTEGRANTES/PARTICIPANTS:

Carlos Alberto Orlando - Carlos Roberto Petrini - Dilson Ferreira - João Batista Crestana - João Claudio Robusti - José Roberto Bernasconi - Luiz Eulalio de Moraes Terra - Manuel Carlos de Lima Rossitto - Mario Willian Esper - Marlus Renato Dall' Stella - Paulo Safady Simão - Renato José Giusti - Ricardo G. Mascheroni - Sergio Tiaki Watanabe - Soriedem Rodrigues.

## GRUPOS TÉCNICOS DE TRABALHO/TECHNICAL GROUPS:

HABITAÇÃO/HOUSING João Claudio Robusti (Coordenador/Coordinator)

INFRAESTRUTURA/INFRASTRUCTURE Manuel Carlos de Lima Rossitto (Coordenador/Coordinator)

**ENTIDADES PARTICIPANTES/PARTICIPATING ORGANIZATIONS**

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**PARTICIPAÇÕES ESPECIAIS/SPECIAL PARTICIPATION**

Adalberto Febeliano - Altamir Tedeschi - Augusto Andrade - Armando Ricardo Jr - Benedito Porto Neto - Elisabete França - Flavio Brando - Fernanda Correa - Renato Romano - Jamil Abukater - João Abukater - José Alberto Pereira Ribeiro - Jose Vitor Mamede - Junia Santa Rosa - Lucas Pessoa Pedreira Lapa - Marco Túlio Bottino - Mansueto Lunardi - Marcos Monti - Marcos Otavio - Plinio de Oliveira Barbosa - Ricardo Pereira Leite - Roberto Mascheretti - Rodolpho Tourinho - Yves Besse.

**Construbusiness 2010 – Congresso Brasileiro da Construção (9ª edição)/Brazilian Construction Congress (9th edition)**

**Brasil 2022: Planejar, Construir, Crescer/Brazil 2022: Plan, Build, Grow**

**Realização/Execution**

Departamento da Indústria da Construção - DECONCIC/Industry and Construction Department - DECONCIC  
Federação das Indústrias do Estado de São Paulo - FIESP/Federation of Industries of the State of São Paulo - FIESP

**Projeto Gráfico/Graphic Design**

Departamento de Comunicação - DECOM/FIESP/Communication Department - DECOM/FIESP

**Diagramação/Diagramming**

Grafismo Design e Comunicação

**Pesquisa e Análise/Research and Analysis**

FGV Projetos

Fernando Garcia (Coordenador do projeto pela FGV e professor-adjunto da Escola de Administração de Empresas de São Paulo (EAESP-FGV))/(Project Coordinator from FGV and an assistant professor at the Business Administration School of São Paulo (EAESP-FGV) - Ana Maria Castelo (Coordenadora de projetos da FGV-Ibre e consultora da FGV projetos)/(Project coordinator – FGV-Ibre and consultant of FGV projects) - Edney Cielici Dias (Pesquisador da FGV-Ibre e consultor da FGV Projetos)/(FGV Projects consultant and Researcher - FGV-Ibre) - Ana Lélia Magnabosco (Consultora FGV Projetos)/(FGV Projects Consultant)

LCA Consultores

Fernando Camargo (Sócio Diretor/Partner) - Carlos Urso (Coordenador de Projetos/Project Coordinator) - Cláudia Viegas (Coordenadora de Projetos/Project Coordinator) - Solange Kileber (Economista Sênior/Senior Economist) - Braulio Borges (Economista/Economist) - Ricardo Sakamoto (Economista/Economist) - Tiago Maciel (Economista/Economist) - Ana Carolina Garcia (Estagiário/Trainee) - Mariana Suplicy (Estagiária/Trainee)

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Catharina Parodi

São Paulo – 29 de Novembro de 2010/São Paulo - November/2010

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