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## ABSTRACT

*It is well-documented that the state of Brazil's transport infrastructure requires significant improvement over the coming decade, especially in light of the major sporting competitions that the country will host (the World Cup in 2014 and the Olympics in 2016). However, the processes by which the country will amass, allocate, and disburse the requisite funding are complex. The government faces many additional challenges affecting the development of this infrastructure, including continuously evolving demographics and the country's emergence onto the world stage as a serious player in the global economy. In many senses, the latter is heavily dependent upon its ability to establish a sufficiently robust transport infrastructure network. This paper discusses the current state of the country's transport infrastructure, existing funding methods that have been employed, inherent challenges in the process, and recommendations to maximize the success of future infrastructure development. The paper also discusses the potential consequences of a failure to adequately advance development, as improvements to the transport infrastructure affect not only the country's ability to move people and goods, but also its credibility as a global economic competitor over the long-term.*

## I. INTRODUCTION

Given its large size, the country of Brazil has played historically a surprisingly small role in the forum of world economics. In recent years, however, the country has gone from an economy that was seemingly perpetually “emerging” to one that has a legitimate chance of becoming a global leader across several industries. The prevalence of oil, minerals, and other valuable commodities means that the country will be an important trading partner for the foreseeable future. These natural resources themselves are not necessarily new (though some are, like the pre-salt or sub-salt oil off the coast), but the country's ability to identify, extract, and monetize them efficiently and profitably has developed only relatively recently over the past few years. Likewise, the fertility and abundance of land has allowed Brazil to become the world's leading producer of cattle and sugarcane. The latter adopts even greater importance in recent years given the technological advancements that can harvest sugarcane with increased automation and convert it to ethanol, a viable and affordable source of energy.

As a result of these factors, Brazil's economy is increasingly deserving of not only constant monitoring, but perhaps also significant investment. However, one of the greatest challenges to the country's evolution will be the development and maintenance of transportation infrastructure. This includes the airports, roads, rail, and ports – tremendously costly

and complex assets that enable the necessary movement of people, goods, and raw materials. The country's prosperity and economic success will be largely dependent upon the infrastructure network that is established.

Yet this will not come easily. One of the most burdensome responsibilities of governments, funding this infrastructure goes far beyond initial development costs; each dollar spent on development requires a fraction of another dollar to cover its future maintenance. Unfortunately, Brazil is a country that has lagged with the development of its transport infrastructure. This is likely the result of several factors, including a slower, smaller economy; lower per capita income that has restricted the movement of the country's citizens; and limited funding available for this development. "In the 1970s, infrastructure investment averaged 5.4 percent of GDP but that number has dropped off to just over 2 percent in the 2000s."<sup>1</sup> Consequently, the country's infrastructure has been severely criticized. In the 2009/2010 World Economic Forum (WEF) Competitiveness Survey, the country's transport infrastructure received 3.76 points out of a maximum of 7, ranking the country 67<sup>th</sup> in the world.<sup>2</sup>

To its credit, the government has not only recognized its severe funding deficiencies, but it has attempted to institute coordinated programs to address the situation. In 2007, then-President Luiz Inácio Lula da Silva ("Lula") launched a

Growth Acceleration Program (PAC), an "umbrella" term used for the thousands of infrastructure projects around the country, including the rebuilding of houses and the construction of roads.<sup>3</sup> The Brazilian government has increased its spending to an average of 17 percent over the past five years as its economy has begun to gain traction. Nonetheless, these amounts are inadequate and spending still lags that of fellow emerging market countries India and China (38 and 44 percent, respectively). It also trails fellow Latin American countries Peru and Mexico.<sup>4</sup>

The poor quality of the country's transportation infrastructure also leads to significant indirect expense as well. To be sure, "Brazil's clogged roads and ports add billions of dollars to the cost of production every year."<sup>5</sup> Such a higher cost of production harms companies operating in the country, whether domestic corporations or major multinationals. For example, the American giant McDonalds once had to go a day without serving french fries at one of its Brazilian locations because the supply truck never arrived due to the poor road conditions.<sup>6</sup> These costs are also undoubtedly considered by foreign corporations as part of the process of deciding whether to expand to Brazil. The transport infrastructure of emerging economies has long been a major risk for the expansion of these companies, especially for corporations whose products are perishable (food, flowers, etc.).

The amount spent on Brazil's transport infrastructure will need to be increased significantly over the coming decade or the country's economic progress will be threatened. This additional investment should bolster the country's positive momentum and rising GDP over recent years. To be sure, US-based investment manager PIMCO is forecasting that, as a result of substantial increases in incomes and jobs and the government's commitment to the major funding of infrastructure development, Brazil's economy will achieve 7.5 percent growth in 2010.<sup>7</sup> This compares incredibly favorably to the US, which is forecasted to expand just 2.2 percent.<sup>8</sup>

Brazil will require more investment in its transport infrastructure than can be funded solely by the government. Consequently, private capital sources, including domestic and foreign multinational firms, individual investors and investment groups, and the broader capital markets will undoubtedly play a role. As detailed below, the current state of the country's transport infrastructure offers an abundance of investment opportunities, including those that could be satisfied through public-private partnerships (P3s). Such arrangements involve joint participation of public and private sector parties in major capital projects to achieve a number of benefits, which may include accelerated project delivery, increased project financing, and sharing of project risks. However, there are a number of challenges that will face the government and any additional investors. Given the current state of the country, and

its potential as a major world economic player, the stability and timeliness with which this infrastructure is developed carries great consequences.

## II. STATUS OF CURRENT INFRASTRUCTURE

As noted above, Brazil's infrastructure is in desperate need of improvement. Overall, the country's infrastructure (not just transport) ranked 84<sup>th</sup> on the WEF survey, with a 3.8 in out of 7, below the world average of 4.3. This falls behind several African countries (including Rwanda, Botswana, and Côte d'Ivoire) and many Latin American countries (including Guatemala, Costa Rica, and Mexico). The infrastructure of the United States, by comparison, is better, but ranks only 23<sup>rd</sup> with 5.8 points.<sup>9</sup>

According to the Brazilian Ministry of Transport, one of the country's biggest problems in the area of transport infrastructure is that its transportation mix is unbalanced, especially when compared to other countries. Consequently, the Ministry of Transport (MOT) has developed a National Plan for Logistics and Transportation (PNLT), which seeks, among other goals, to establish "a more balanced Brazilian transport matrix with a significant participation of rail and water modes, which are more efficient in terms of economy and energy consumption."<sup>10</sup> This is, in fact, a problem that many countries face, including arguably the United States. As the world's energy supply evolves, and more sustainable

sources such as ethanol and electricity become more available and affordable, the transportation mix for many of these countries will change. In the meantime, having a vision of the desired transport network will allow Brazil to allocate its limited investment dollars appropriately, ensuring that rail and water modes receive sufficient funding to realize the mix in the PNLT.

This section describes the current status of four major elements of Brazil's transport infrastructure network: airports, roadways, rail, and ports. While not an exhaustive description of the network or every initiative and investment that has been undertaken or is planned, it summarizes the conditions and challenges of each asset type.

### **A. Airports**

The Brazilian airport network has long been lamented as underdeveloped and poorly maintained. The network is run almost exclusively by Infraero, an authority that reports to the country's defense ministry. In operation for 37 years, Infraero has more than 28,000 employees and contractors assisting in the management of 67 airports throughout the country. These airports handle 97 percent of all air traffic in the country, with more than 2 million takeoffs and landings and over 113 million passengers annually.<sup>11</sup> The company's charge is quite difficult, considering that the airports are spread across a country the size of the contiguous United States. This

presents both cost and coordination challenges due to distance. Many of the airports do not have commercial air service, and thus revenues are likely lower than those airports in major cities like São Paulo and Rio de Janeiro. This impairs the earnings of Infraero, and subsequently provides less funding available for infrastructure improvements.

Air travel in Brazil has increased dramatically – up 35 percent in the past two years<sup>12</sup> – as a result of tourism and the growing involvement of Brazil in the world economy, among other factors. This growth is expected to continue: consulting firm McKinsey has estimated that Brazil's airports have a current capacity of 126 million passengers a year, but existing demand will jump to 146 million by the time of the World Cup.<sup>13</sup> Social changes domestically are also furthering this travel, as the country's middle class has expanded. As seen in the exhibit, the country has averaged 11.8 percent annual growth in air passengers since 2003. Further, the number of foreign visitors is expected to double over the next ten years.<sup>14</sup>

***Of the top 20 airports in Brazil, 13 don't have terminals that can meet today's demand, and the number of foreign visitors is expected to double over the next ten years.***

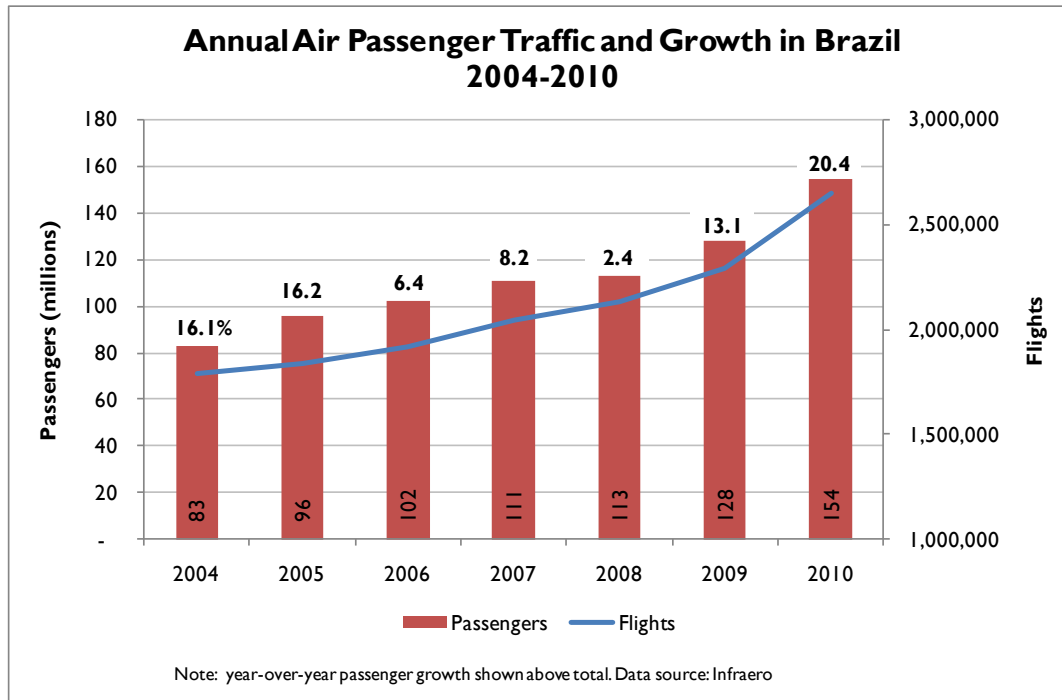
Unfortunately, the country's airport infrastructure has not kept pace with this rapid growth: "Of the top 20 airports in Brazil, 13 don't have terminals that can

meet today's demand. This includes São Paulo Guarulhos, the region's largest hub..."

<sup>15</sup> This is especially troublesome, as São Paulo will be a primary gateway for the upcoming World Cup and Olympics competitions. One of the largest

On Wall Street, investors are anxious as to whether the country will be able to successfully implement the necessary investments to satisfy demand. "According to Infraero, approximately R\$5.5 bn of investments are required to expand

capacity at 13 Brazilian airports ahead of the FIFA World Cup in 2014... The 13 new terminals would increase passenger capacity by 54 million, equivalent to almost 50% of the existing capacity in all Brazilian airports."<sup>18</sup> An analyst at



infrastructure problems at the airports of Brazil is the dilapidated and space constrained terminals. The director general and Chief Executive Officer of the International Air Transport Association has publicly criticized the lack of improvement at these airports: "I don't see much progress and the clock is ticking. To avert a national embarrassment we must get all the stakeholders to the table and finalise a plan."<sup>16</sup> Despite strong tourism ratings for the country (Brazil ranked 45th in the WEF survey), its airport infrastructure is only rated 101<sup>st</sup>.<sup>17</sup>

recently expressed concern that it may already be too late to complete major upgrades to Brazil's airports in advance of the 2014 World Cup.<sup>19</sup>

## B. Roadways

Like the United States, Brazil is heavily dependent on its road system for transportation. However, there is great disparity in the quality of these road networks. Despite constituting 68 percent of Brazil's transport needs, only 12 percent of the country's 1.6 million kilometers of roads are paved.<sup>20</sup> The consequence of these infrastructure deficiencies is slower

and more expensive transport – costs can be up to 35 percent greater on unpaved roads.<sup>21</sup> This affects the booming agricultural sector greatly, as many of the goods are produced in remote locations with poor road conditions.

Unfortunately, much of the population is dependent on automobiles. The country's advancement in the field of alternative fuels – most notably ethanol – is a mixed blessing. Brazil is one of the world's leading producers of ethanol, as it can harvest sugar

***In Brazil, half of all motorized urban travel occurs on public transport, the vast majority of it buses... Brazil is planning nearly 300 miles of [bus rapid transit] corridors for the 12 World Cup cities.***

cane and transform it with increasing automation and efficiency into a fuel source. Ethanol from sugar cane is roughly five times as efficient as ethanol from corn (used in the United States) and sells for about half the price at the pumps. 90 percent of all automobiles sold in Brazil are classified as "Flex Fuel" vehicles, capable of running on up to 85 percent ethanol.<sup>22</sup> Consequently, about 25 percent of the gas purchased at the pump is ethanol.<sup>23</sup> As the country continues to streamline its ethanol production processes, the price may drop further, which would only encourage the use of personal automobiles. The combination of the automobile culture and the poor roadway infrastructure leads to terrible congestion. The construction of new roads around already crowded cities –

like the new ring road being completed around São Paulo – and the subpar public transit system compound the problem.<sup>24</sup> According to a Time Magazine article in 2008, São Paulo has some of the world's worst congestion. "More cars were sold [in 2007] than during any [other year] in history, and close to 1,000 new vehicles takes to the streets each day."<sup>25</sup>

To be fair, Brazil is "much less dependent on cars than the United States, where public transportation accounts for only about 5 percent of urban travel. In Brazil, half of all motorized urban travel occurs on public transport, the vast majority of it buses... Brazil is planning nearly 300 miles of [bus rapid transit] corridors for the 12 World Cup cities."<sup>26</sup> Brazil is also utilizing the latest in technological advancements to design a transportation network of buses. Nevertheless, whether the public travels by personal automobile, taxi, or bus, the roadway infrastructure in Brazil is in need of significant investment. The 2007 PAC infrastructure plan included R\$33 bn (\$19.6 bn USD) for roadways, yet the results of this investment have been mixed and many projects have not yet been completed.<sup>27</sup> Paulo Resende, a specialist in infrastructure at Fundação Dom Cabral, a Brazilian business school, acknowledged the lack of government focus on improving the highway system: "Highways in Brazil during the past 20 years took a secondary position, and deteriorated so much that we began this decade with a ruined system."<sup>28</sup>

### C. Rail

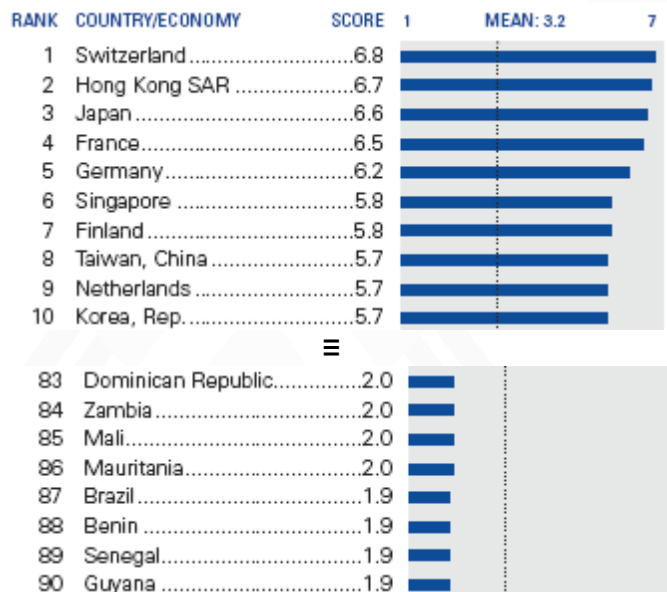
Brazil’s national rail network consists of approximately 28,000 kilometers of track, and most of it is operated by private concessionaires. These concessions have been utilized for 12 years, and the government is reviewing its concession model to make better use of the rail network. “One of the main objectives of the changes is to put abandoned or low-capacity stretches back into operation.”<sup>29</sup> As part of the Ministry of Transport’s National Plan, Brazil will consolidate a new rail network, developing almost 12,000 additional kilometers of track.<sup>30</sup> These rail lines will serve areas of agricultural and mineral productivity and enable the increased transfer of cargo between transportation modes. Additionally, the rail lines will be implemented in planned corridors that are specifically designed to link production and consumption regions, as well as production and shipment areas (like ports). The MOT is also studying the feasibility of a corridor that will link railways from Brazil, Paraguay, Argentina, Bolivia and Chile.<sup>31</sup> (A graphical depiction of the planned railway expansion in Brazil is included in the Appendix as Exhibit I.)

One of the concessionaires and the regulatory agency for land transportation, ANTT, notes that only about 10 percent of the rail network is fully utilized, and 18,000 kilometers are significantly underused.<sup>32</sup> Only about 1,600 kilometers, or 6 percent, of the rail is electrified.<sup>33</sup> The quality of Brazil’s rail network is also significantly

behind. The WEF survey ranked Brazil’s rail quality at 1.9 points out of 7.<sup>34</sup> (A portion of the rankings is shown below.) These rail lines have clearly been underfunded in previous decades. Perhaps as a result, investment in railways is expected to grow 12.7 percent annually for the next four to five years.<sup>35</sup>

#### Quality of Railroad Infrastructure

How would you assess the railroad system in your country?  
[1 = extremely underdeveloped; 7 = extensive and efficient by international standards] | 2009–10 weighted average



Source: WEF Survey

Ambitiously, the Brazilian government is moving forward with feasibility studies for high-speed rail (HSR) service in the country.

In March 2010, Lula outlined aggressive infrastructure plans that include three HSR lines covering almost 2,000 kilometers.<sup>36</sup> The highlight of this new service is a bullet train linking the two largest cities in the

country, São Paulo and Rio de Janeiro, which would reduce the journey time to less than two hours. Originally envisioned as being completed in time for the 2014 World Cup, the project has been delayed sufficiently to make impossible the achievement of this goal. A revised target of the 2016 Olympics is already being viewed by many as a stretch. Yet the construction of any HSR line – especially in areas that are already developed and thus present obstacles to the construction of the physical infrastructure, providing for the requisite safety measures including signage, safe distance, elevated grade crossings, etc. – is incredibly difficult and costly. The proposed HSR line between these two cities in Brazil is certainly no exception. At a cost of more than R\$34 billion (\$20 billion USD), the challenge of construction is compounded by the topography of the country. To be sure, the altitude change from Rio (sea level) to the final stop of Campinas in São Paulo (660 meters, or almost 2,000 feet) is one factor, and more than 130 kilometers of bridges and tunnels will be required along the route.<sup>37</sup>

#### **D. Ports**

A country the size of Brazil faces tremendous cost to ship goods and raw materials – many of them bulky – across great distances. The country has thus relied upon its ports for the historic movement of

these goods; roughly 95 percent of the country’s trade passes through its ports. There are 34 main ports in the country, and the largest, at Santos, near São Paulo, was ranked as the leading port in Latin America by the United Nations Economic Commission for Latin America in 2009. Notwithstanding this accolade, the port is still much smaller than many Asian ports, such as Hong Kong’s, which is ten times as large.<sup>38</sup>



Brazil has undertaken efforts to enlarge the capacity of Santos and construct new ports. Lula committed R\$5.1 bn (\$3.0 bn USD) to investment in 21 ports in the second stage of the PAC; R\$1.4 bn will go to the port of Santos alone.<sup>39</sup> “The BNDES, Brazil’s development bank, forecasts R\$9bn will be invested in new port facilities in the next four years, with a doubling of current investment in the entire sector to R\$15bn, including extending existing port facilities.”<sup>40</sup>

## **E. Summary**

As might be expected, the benefits that will be realized through infrastructure investment in any one sector are largely dependent upon the simultaneous investment in others. For example: improving ports so that they can handle larger shipments will be of little value if the goods cannot be efficiently transferred to a ground transportation method for expedient distribution (or vice versa). A rail or highway network must be established to provide for seamless transitions and to enable the complete supply chain to function as desired. Such intermodal connections can be incredibly complex and require tight coordination between the various stakeholders.

The government's establishment of the PAC several years ago indicates their recognition of the need for such coordination. Yet this commitment alone will not ensure that the necessary investments are made. Active management of the PAC will be required, and Rousseff will need to be willing to hold agencies and individuals accountable, establishing clear and firm penalties for failures to meet investment thresholds, conditions, and deadlines. Already, she announced in mid-2010 that only 60-70 percent of PAC projects were likely to be completed by the end of the year.<sup>41</sup> (See Exhibit 2 in the Appendix for a graphical depiction of the progress on PAC.) Although the program is receiving significant attention and support, it reflects a monumental undertaking that will present

serious challenges to on-time completion. Likewise, the update of PAC reiterates this commitment. Adjustments to investment allocations were also made, as funding for railways is specifically identified. (See Exhibit 3 in the Appendix for a summary of PAC-2 investment by area.) Progress to resolve the above issues is being made, slowly but surely. The question is whether this progress will occur quickly enough.

## **III. SPECIAL FACTORS**

Beyond the need to fund vast infrastructure investment deficits – a challenge shared by many countries, including the United States – Brazil faces several additional, country-specific challenges. These factors further complicate the tasks of identifying all stakeholders, gaining support, and coordinating the investment process. In some cases, they also underscore the importance of advancing the country's infrastructure, as the consequences of failure are much larger and more visible to the rest of the world.

### **A. The World Cup and Olympic Games**

Brazil faces the daunting task of readying for two of the largest and most public international sporting competitions: the World Cup and the Olympic Games. For the 2014 World Cup, almost 3 million visitors are expected to travel to Brazil to see the country host the competition for the first time in 64 years.<sup>42</sup> The Olympics, which will also attract millions of visitors,

are being hosted by a South American country for the first time ever.

All of the above transportation modes will experience significant surges in demand prior to and during these events. An estimated six million passengers are expected to pass through the country's airports during the World Cup, which is spread across 12 cities.<sup>43</sup> According to Mario Augusto Lopes Moyses, the Vice Minister of Tourism for Brazil, the country is still budgeting R\$25 billion to spend on the HSR between Rio and São Paulo. The country also plans to invest approximately R\$950 million into the Port of Rio for the 2014 World Cup. These figures do not include private investments that will be made alongside, such as those to be made by billionaire Eike Batista and his company EBX.<sup>44</sup>

Thus, the government must not only continue to upgrade its already strained transportation network, but it must also construct additional facilities, such as stadiums, hotels, and roadways. "The state government of Rio de Janeiro estimates that investments from 2010 through 2016 will reach US\$50 billion for construction of sports and transportation infrastructure, public security, education and training, etc."<sup>45</sup> And it must do so with fixed

deadlines. On a continent with a culture that is largely known for its "relaxed" sense of punctuality, delays and missed project milestones will be especially problematic given the weight of the consequences for the country's failure to meet a required state of preparedness.



In addition to the investment and execution of infrastructure construction, an inordinate amount of time and energy must be dedicated to the planning and coordination of these efforts. Despite having more than three years before the World Cup, local officials and FIFA executives are "lamenting that the timetable for preparations is already lagging."<sup>46</sup> Perhaps as a result, President Rouseff recently created on January 20, 2011 a "special presidential council on infrastructure development, with a mandate to coordinate projects needed for the 2014 Soccer World Cup soccer tournament and the 2016 Olympics."<sup>47</sup> The council is expected to include

representatives from all key areas, including transportation.

## B. Demographic Shifts

Apart from the demand generated by the two major sporting competitions, Brazil is facing rapidly increasing demand internally. In the past five years, “Brazil’s middle and high-income population has increased by 50%, raising an additional 32 million people with the spending power to drive greater consumption and a more robust economy.”<sup>48</sup> As this segment of the population grows larger, so too will the need for infrastructure to transport materials, goods, and people. Indeed, Brazil’s economic progress will be dependent on the country’s ability to satisfy the needs of its own population. These individuals will demand more energy, telecommunications, sanitation, housing, and transportation. It is estimated that Brazil would need to invest R\$100 billion annually to meet these needs.<sup>49</sup>

## C. Political and Regulatory Risks

Brazil’s ability to execute its planned infrastructure improvements is largely influenced by the country’s political climate. The WEF survey showed that Brazil ranked low on several measures of government effectiveness and stability, including ethics and corruption, wastefulness of spending, and burden of government regulation – all of which ranked Brazil 111<sup>th</sup> or worse in the world.<sup>50</sup>

However, with the recent election of Dilma Rousseff to the Presidency, certain political risks facing infrastructure investment have been mitigated... at least temporarily. As one of the largest proponents for the PAC, Rousseff appears committed to its execution. Despite the government’s recent announcement regarding budget cuts targeted at fighting inflation, Rousseff has insisted that the PAC program will be spared: “If there are cuts that need to be made, the PAC will be the last thing to be cut”<sup>51</sup>. Such outward support for the program and assurance to the investor market is a positive sign of the government’s transition in recent years.

From an investor’s perspective, the country has improved as a result of decreased political and regulatory risk. Hurdles still remain, however. These include complicated laws, high taxes, and outdated and inflexible laws. Yet the country has made significant progress, to the point where many are recognizing the true investment potential in Brazil. Overall, the investment environment is markedly improved.

***From an investor’s perspective, the country has improved as a result of decreased political and regulatory risk. Hurdles still remain, however.***

## D. Other

Brazil is also well-known for having slow processes relating to environmental

approvals and permitting and licensing. These processes, combined with “heavy bureaucracy,” have led to “snail-paced project development” that frustrates both public and private sectors.<sup>52</sup> To be sure, environmental issues are one of the biggest causes of delay and frustration in the implementation and financing of infrastructure projects in any location; in Brazil, many agencies have overlapping jurisdiction, which increases the number of approvals required and makes it difficult to streamline the process.<sup>53</sup>

One of the biggest challenges is simply getting a license, due in large part to the desire to protect the country’s natural resources:

“It seems that everyone -- from developers to government officials -- recognize that the process for awarding environmental licenses for construction is flawed. The goal is to protect Brazil's natural resources -- from the dunes and estuaries of the Northeast to the Amazon jungle and coastlines of southern Brazil -- but the main problem, according to observers, is that the law does not clearly spell out the responsibilities of the local, state and federal government. Developers can get confused by not knowing which body to turn to, and in turn government itself does not know whose job it is to evaluate applications and issue licenses.”<sup>54</sup>

As a result, projects take longer to implement. According to Dr. Paulo

Resende, a logistics expert based in São Paulo, “it generally takes three years for authorities to approve airport projects, and then another two years to implement them.”<sup>55</sup> Should this continue, this will threaten the completion of the PAC projects on-time, as well as the projects specific to the World Cup and Olympic competitions. The government will have to address these competing objectives (natural resource preservation and efficient infrastructure development) and resolve the issue if it wishes to maximize its progress. Perhaps fortunately, this is more of an internal, political issue, rather than an international and/or financial issue, which could be more arduous and time-consuming to overcome.

## **IV. FUNDING MECHANISMS**

Despite the chronic historical underfunding of its infrastructure, Brazil has in recent years demonstrated its commitment to rectifying the situation. The country has invested more than \$240 billion in infrastructure in the past three years and expects to exceed that amount by \$100 billion over the next three years.<sup>56</sup> This section discusses the various investment approaches and instruments that have been implemented thus far.

### **A. Investment Environment**

The aforementioned reduction in political and regulatory risks has notably improved the investment environment in Brazil. According to JP Morgan’s Chief Investment

Officer, Michael Cembalest, market reforms enacted by President Lula have led to “lower inflation, smaller fiscal deficits, privatization, openness to foreign capital and central bank independence.”<sup>57</sup> In fact, since 2008, Brazil has boasted an investment grade sovereign debt rating.

Investors, of course, still acknowledge the prevalent risks associated with the country. Cembalest identifies three main risks: inflation, the financing of consumption, and structural impediments to growth.<sup>58</sup> Given that foreign direct investment is the most stable form of financing, interest rates are critical to maintaining this funding source. Additionally, the government has difficulty in controlling its consumption, as more than 80 percent of its spending is earmarked, or set aside, for specific purposes. Taxes are already the highest in Latin America, so further increases are unlikely. This means that some of the largest expenditures could be ratcheted back if necessary; despite Rousseff’s comments to the contrary, infrastructure spending falls in this group and may be the subject of future cuts.

On the whole, however, other Wall Street investors share Cembalest’s positive sentiments. An analyst at Bank of America Merrill Lynch recently interviewed Bernardo Figueiredo, the President of ANTT. Mr. Figueiredo reiterated the importance of a healthy regulatory environment over the coming years to promote the necessary infrastructure investment. He also gave confidence that the government would not make any

unilateral decisions that would jeopardize the private investment and operation of the rail network through the current concessions.<sup>59</sup>

## **B. Public Finance**

### **i. Bonds**

One of the most common sources of public infrastructure funding for any government is through the issuance of bonds. The global capital markets offer a large pool of attractive, well-capitalized investors, and emerging markets often issue bonds in this arena to support their infrastructure development initiatives.<sup>60</sup> Brazil is no exception, as its program to fund infrastructure development is expected to lead to an increase in the number of public bonds issued. As the Brazilian bond market is still relatively nascent, many of these bonds will be issued in US dollar denomination.

The government is trying to increase the number of local bonds issued to ease the burden at the national level. This effort appears to be having some degree of success. In January 2011, Rio de Janeiro announced its intention to ask President Dilma Rousseff and Finance Minister Guido Mantega to authorize a R\$500 million debt issuance in “Olympic Bonds” to get the city ready for the 2016 games. States and cities in Brazil are required to obtain federal approval for bond issues.<sup>61</sup>

## **ii. Banco Nacional de Desenvolvimento Econômico e Social (BNDES)**

The Brazilian state development bank, BNDES, is playing an important role in the financing of the country's infrastructure. The BNDES' disbursements reached R\$168.4 bn in 2010, a 23 percent increase when compared to the previous year; 31 percent of these disbursements went to infrastructure.<sup>62</sup> The BNDES will serve as a significant financing source for the creation of the high-speed rail line between São Paulo and Rio de Janeiro. In November 2010, the BNDES approved the financing conditions for the project. "The maximum share of public resources for funding will amount to R\$19.977 billion, updated in accordance with the Broad Consumer Price Index (IPCA) and limited, by the Bank, to 80% of eligible items or 60.3% of total investment, whichever is less."<sup>63</sup>

BNDES' balance sheet has expanded rapidly and now totals R\$312 bn (\$178 bn USD). Despite the risk of such a rapid expansion identified by many international investors, US asset manager PIMCO is comfortable that the bank is secure; "even a large rise in nonperforming loans would have a manageable effect on state finances."<sup>64</sup>

## **iii. Taxes**

Tax levels in Brazil have historically been high relative to the rest of the world. In fact, Brazil's tax was twice the Latin

America average from 1990-2005. The higher tax resulted from increases to existing taxes and the introduction of new federal taxes and so-called social contribution programs. "The tax burden in Brazil (34.41 percent in 2008) is greater than developed countries such as Japan (17.6 percent), USA (26.9 percent), Switzerland (29.4 percent), and Canada (32.2 percent)..."<sup>65</sup> In fact, the tax burden forms over 1/3 of the country's gross domestic product.<sup>66</sup>

At the end of 2010, however, the government has initiated reforms to lower select taxes to spur infrastructure development. "On December 31, 2010, Brazil enacted Provisional Measure 517 (MP 517/10) and Decree No. 7.412 (Decree 7412/10), which generally provide several tax benefits intended to foster the development of infrastructure in Brazil and changes in the taxation related to investments in Brazilian financial and capital markets."<sup>67</sup> Through a number of provisions, the new regulations decrease the income and capital gain requirements on select investments in the country.

These reforms appear to be a step in the right direction, as the government must temper its desires to fund the national coffers through the traditional means of tax collection with the conditions necessary to attract sufficient international funding for its broad infrastructure development. Given the relative newness of these reforms, we will need to wait to see whether they achieve the desired effects.

### **C. Private Finance**

Over the past few decades, private financing has played an increasing role in the development of transport infrastructure around the world. Much of this has come through the form of public-private partnerships, where private sector investors and stakeholders work with government entities to share risk and capital expenses. The P3 model is well-established internationally in the developing world by countries in Europe, Australia, and Canada, and emerging economies such as India and China are turning to the P3 model as well for its advantages in risk and capital requirement reduction, as well as project acceleration.

Much of the success of private sector financing in Brazil will be dependent upon receiving support from the government. To that end, Rousseff indicated prior to assuming the Presidency her intention to have the private sector play a greater role in infrastructure projects.<sup>68</sup> In fact, at the end of November, Brazil's finance minister noted that the government would halve the loans it provides to BNDES (worth about R\$61 billion in 2010), given the government's belief that these loans were impeding private financing.<sup>69</sup> Ultimately, the government hopes to create a secondary market for infrastructure-linked corporate bonds and project bonds. This would reduce the amount of federal funding required, increasing both local and private sector funding.

### **i. Public-Private Partnerships**

Some have argued that P3s have greater potential in Latin America due to the fact that these countries, as emerging economies, have a wider gap between current conditions and those that are achievable under private operation. In other words, there is greater room for improvement because of the especially low quality of service prior to privatization.

Brazil has demonstrated an openness to the privatization of its transport infrastructure. As mentioned earlier, the rail network has operated largely under a concession model for the past 12 years. Ports, as well, have been exposed to privatization since the early 1990s. The state was able to retain its role in port management through entities such as Codesp, the São Paulo port authority.<sup>70</sup>

Privatization has also occurred in the road sector, where about 7 percent of Brazil's 215,900 kilometers are operated by private entities.<sup>71</sup> In 2008, concessionaires paid almost R\$3.5 bn to São Paulo's government for the concession of five highways.<sup>72</sup> One such major company is CCR, which is responsible for 2,437 kilometers of highways in São Paulo, Rio de Janeiro, and Paraná. (CCR also signed the nation's first P3 for a subway line – Line 4 of the São Paulo Metro in 2006.<sup>73</sup>)

Starting in 2010, UBS analysts expect at least R\$115 bn of projects in the toll road

and urban transportation sectors. Further, potential cuts in the federal budget may require a higher participation by the private sector.<sup>74</sup>

Airports may eventually offer significant investment opportunity for the private sector as well. President Rousseff has decided that private investors should build and operate the new passenger terminals at Guarulhos and Viracopos airports in São Paulo.<sup>75</sup> As far as complete airport privatization is concerned, six regional airports are already in the hands of private investors.<sup>76</sup> The government is still considering a concessionary model for major airports, which would provide much-needed investment but would create political difficulties, such as labor disputes and protests. The government has completed one concession at an airport in Natal, in northeastern Brazil. The 28-year contract requires investments of about R\$650m and the airport, not yet open, is expected to start operations by 2013, with a primary focus on cargo.<sup>77</sup> Should the government pursue the concessionary model more aggressively, Infraero may become a concession operator.

## **ii. Corporate Development**

Another form of private sector infrastructure investment in Brazil is the development advanced through the direct efforts of corporations. Brazil has several major multinational firms, including Vale, Petrobras, Banco de Brasil, and Embraer, that can play a vital role in developing

transport infrastructure to enable and support their primary business activities. For example, energy company Vale has formed several partnerships and made significant investments to construct new infrastructure. Much of this development seems to occur outside of the country of Brazil – perhaps due simply to the greater deficiency of infrastructure in the areas of its mining. For example: Vale is conducting mining activities in Africa, and recently executed an agreement with the Republic of Liberia. Under this agreement, a subsidiary of Vale will “implement an infrastructure project in Liberia comprising principally the development, financing, operation, maintenance and use of a new railway and a new port... whose main purpose will be to enable the transshipment through Liberia and export from Liberia of iron ore products originating in Guinea from Vale BSGR's iron ore projects in the Simandou area.”<sup>78</sup> Impressively, Vale does not allow limiting factors such as infrastructure conditions to dictate where it will conduct its business operations. If infrastructure is necessary to extract, process, and transport its products, Vale often undertakes this development.

Vale also conducts this development domestically. The company announced in April 2010 its intention to spend R\$60m this year to develop and implement new technologies at its ports and on the railways that carry iron ore and other products to them.<sup>79</sup> Vale also develops projects in partnership with other industry leaders, including foreign multinationals. In

November 2010, Vale and GE signed an agreement to “establish joint projects related to the development of infrastructure in Brazil.”<sup>80</sup> Such a joint venture enables collaboration and brings together a complement of skills that should accelerate infrastructure development. The two companies plan to share information and develop products and services “to support economic growth and necessary infrastructure, enabling research and development concerning a range of technologies such as new locomotives, railroad services and operations, signaling systems, energy storage and electrification, among others.”<sup>81</sup>

### iii. Possible Lessons for the United States

The environment for private investment in Brazil may not be perfect, but there are undeniably elements that could be incorporated into US infrastructure investment. For example: public-private partnerships in Brazil are governed by a specific P3 law, which includes, among other things, limitations on contract duration and provisions for profit sharing given a change in financial conditions.<sup>82</sup> Surprisingly, this is not a new law, but rather one that was created in 1993. The regulation is an important distinguishing factor between the market for private infrastructure investment in Brazil and the United States. In the latter, there is no national law that regulates and establishes common terms for P3s. Instead, P3s are largely regulated on a state-by-state basis, and deals may also subject to specific

restrictions imposed by localities and project sponsors. Notwithstanding this complexity, P3s have occurred on transport infrastructure (and much more so in the utility sector), but much less than on the international scale.

P3s often face political challenges, as unions fight the privatization of the infrastructure assets. Financial challenges, such as structuring the deal to provide for both public and private benefit without incurring undue risk, are also present. If the US were to implement a national law on P3s, it may address some of these issues. Coordination across states and industries would help to promote a sense of equitability, decrease the public’s aversion to P3s, and increase the speed and effectiveness with which P3s are proposed, procured, and consummated in the US.

***The country’s P3 law also includes provisions that limit the duration of P3 agreements to 30 years... a far more realistic timeframe than some that have been used in the United States, such as 75 or 99 years.***

Beyond the benefits of establishing a standard and promoting coordination across industries and project sponsors, the law also includes provisions that limit the duration of P3 agreements to 30 years. While still a long timeframe for which private investors are expected to estimate demand for the asset, 30 years is far more realistic than some of the timeframes that have been used in the United States, such as

75 or 99 years. Finally, procurement for highway concessions in Brazil is based upon providing the lowest possible tariffs (toll rates) for road operation. This is an advantageous approach, in that it minimizes the cost to the public, and should have the effect of increasing public acceptance of the transaction. While such a provision may possibly have the unintended consequence of limiting overall investment by the private sector, it limits private sector bidding to only the most efficient parties.

It can be argued that the United States would also benefit greatly by encouraging (or even mandating) corporations to play a larger role in the development of necessary infrastructure. For example, automobile manufacturers are heavily invested – both literally and figuratively – in the state of our roadway system, yet they seemingly make little active investment and take little development action. Apart from lobbying for fuel subsidies, the minimization of relevant taxes, import quotas, etc. these companies make little monetary and physical investment in the direct development of our country. Roads and bridges are falling apart, congestion is a perpetual problem. These automobile companies have an opportunity to bring innovation and capital to our infrastructure, proposing new traffic mitigation systems, new roadway alignment, new interchanges, and new approaches to transportation management. Physical development should also increase as well. Instead of receiving subsidies for their products, and perpetuating travel challenges such as

congestion (which cost US travelers \$114.8 billion in time and fuel in 2009)<sup>83</sup>, these manufacturers should be required to contribute capital and construction. Although we are not encouraging the construction of new roads, there is a significant responsibility associated with the maintenance of existing roads. Poor road quality costs US drivers \$67 billion annually, an average of \$335 per motorist, according to a study by the U.S. Public Interest Research Group. This cost comes largely in the form of tire and suspension damage from rough roads. Costs in cities are higher (e.g. New York City experiences costs per driver of \$638 per year).<sup>84</sup>

Similarly, companies such as Amtrak have a vested interest in the future of passenger rail in the country. As we play “catch-up” and develop rail lines that should have been implemented long ago, in an effort to transform our transport mix to something more environmentally friendly and sustainable, Amtrak should be playing a more active role. As the single largest passenger rail company in the country, and the clear national leader in the industry, Amtrak has a responsibility to be part of this development. To be fair, Amtrak is certainly cooperative in development initiatives, and it has commissioned and funded studies on the advancement of passenger rail in the United States. Yet, there is much more that can be done as the US attempts to make up for its decades-old decision to rely on a massive highway network, instead of more sustainable forms

of surface transportation such as rail and transit.

## V. CONCLUSION

The challenges faced by the Brazilian government cannot be understated. In a country the size of the contiguous United States, with far less political and economic efficiency and the deadlines of major global competitions looming, the needs of the transportation infrastructure sectors are easily more daunting than those faced in developed economies.

Like many other countries around the world, including the United States, Brazil faces large funding requirements and must overcome deficiencies with respect to its transport infrastructure resulting from historic underinvestment. Compounding its challenges, the country has several additional issues that not only establish hard deadlines for the accomplishment of certain milestones, but create irreparable consequences for failure. In short, the need is great, and the stakes are high.

The country has not gotten off to a great start, as evidenced by the slow progress on the projects from the first PAC. The government is also heavily dependent upon domestic and international support for its initiatives. Two largescale flagship projects, the HSR and the Belo Monte hydropower project, are struggling to maintain support. This has “damaged confidence in public procurement of infrastructure and could

end up being a substantial waste of public money.”<sup>85</sup>

So what would be the consequences of failure to complete the necessary transport infrastructure improvements? On the surface, an unprecedented level of global embarrassment would likely result from a failure of readiness for the World Cup and/or the Olympics – or worse yet, a relocation of either competition due to this failure as the competition approaches. While the embarrassment itself might be unquantifiable, the ramifications on the investment market and the Brazilian economy would not be.

Brazil’s economy is merely at the beginning of what will likely be an extraordinary climb over the coming decade. However, the country is heavily reliant on international funding. Investors are monitoring not only the political climate, but the growth of the economy and Brazil’s growing importance in the global business environment, as measured by trade volumes and value, multinational firms’ decisions to locate in Brazil, and involvement in economic decisions made by the world’s leading countries, among other factors. As discussed above, developing the requisite transport infrastructure will be a critical factor to the country’s economy. “It will take Brazil to the next level of economic development that will lessen reliance on commodities and diversify the engine of sustainable economic growth towards internal consumption.”<sup>86</sup> Even the country’s top financial executives recognize the

importance of the linkage between infrastructure development and economic success. The Chief Executive of the Brazilian Securities, Commodities, and Futures exchange said that problems with infrastructure development could make economic growth take longer: "... instead of four or five years it could take ten or eleven' for Brazil to become one of the world's top economies."<sup>87</sup>

President Rousseff must be diligent in her efforts to advance the infrastructure of the country. At times, this will likely require the use of political weight and power to force companies and individuals to move forward despite a complete lack of agreement. Rousseff's plan must gain sufficient support, both internally and externally, to keep attracting much-needed funding. Rousseff should also not be shy about asking for international assistance. Many developed countries have significant experience in carrying out large-scale infrastructure

improvements, especially through the use of public-private partnerships and other innovative funding approaches. These countries have a vested interest in the rise of Brazil, as another competitive economy will only serve to open the global market further, enhancing the availability and affordability of raw materials and finished goods.

So, will Brazil be successful in rectifying the state of its transport infrastructure? It will almost certainly depend on how you define success, as the conditions and needs for infrastructure are continually changing. Perhaps one appropriate measure is the growth of the Brazilian economy and over the coming decade. Off to a good start, this economy and the country's success are heavily dependent on a diverse, reliable transport infrastructure network. While the outcome will remain uncertain for several years, it is undoubtedly the case that the world is watching with great anticipation.



Nexus Infrastructure LLC ("Nexus") is a boutique advisory firm providing services for public-use transportation assets such as roadways, transit, rail, airports, and ports. Our professionals bring more than 250 years of advisory experience in the public and private sectors.

Nexus applies private sector capital and efficiency to address public sector challenges with respect to the development, operation, and maintenance of infrastructure. Our expertise spans a variety of disciplines, and our services include financial analysis and modeling; preparing funding plans and grant applications; and providing management advisory services to increase performance and efficiency, among others.

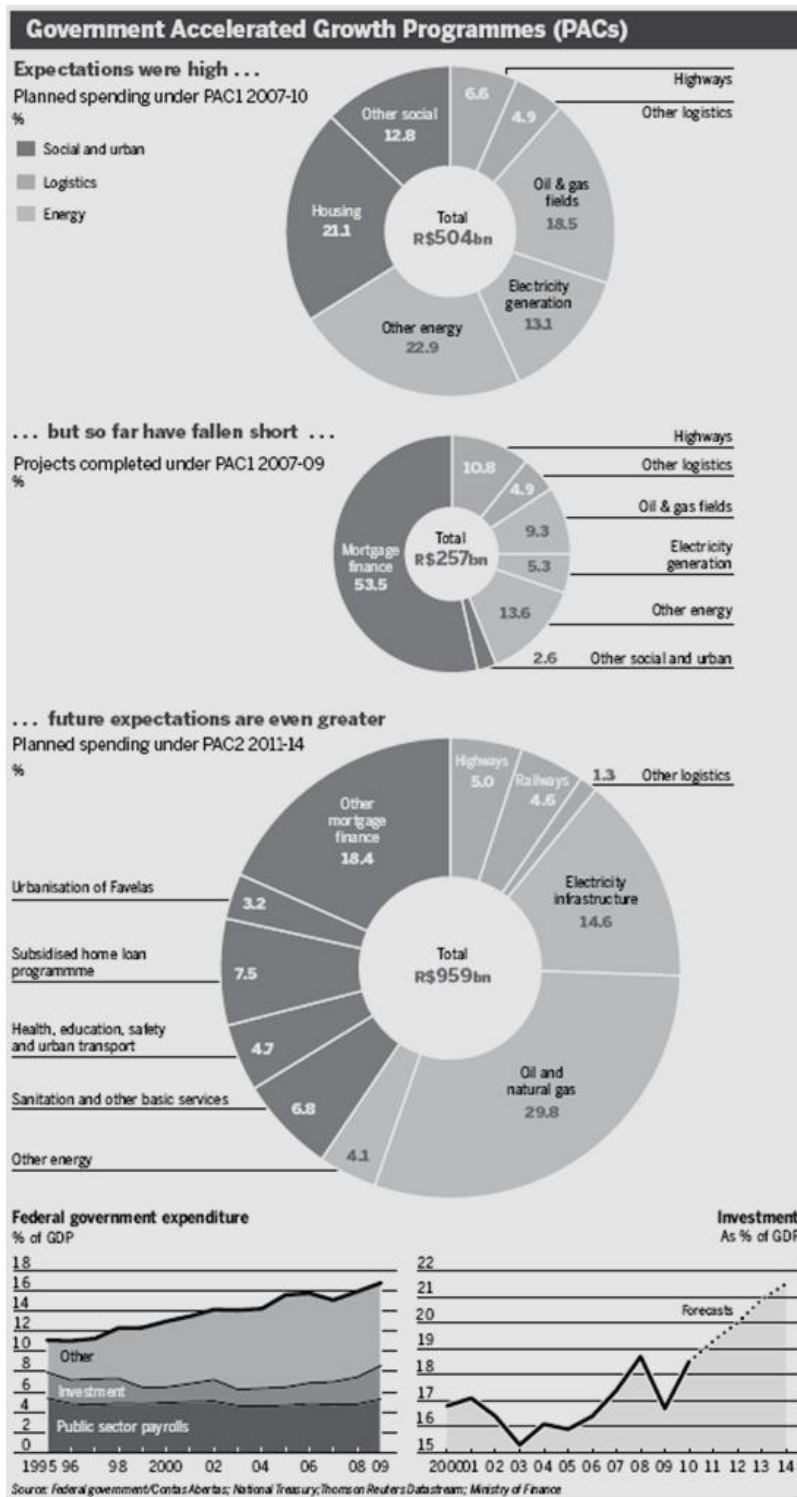
## APPENDIX

### Exhibit I



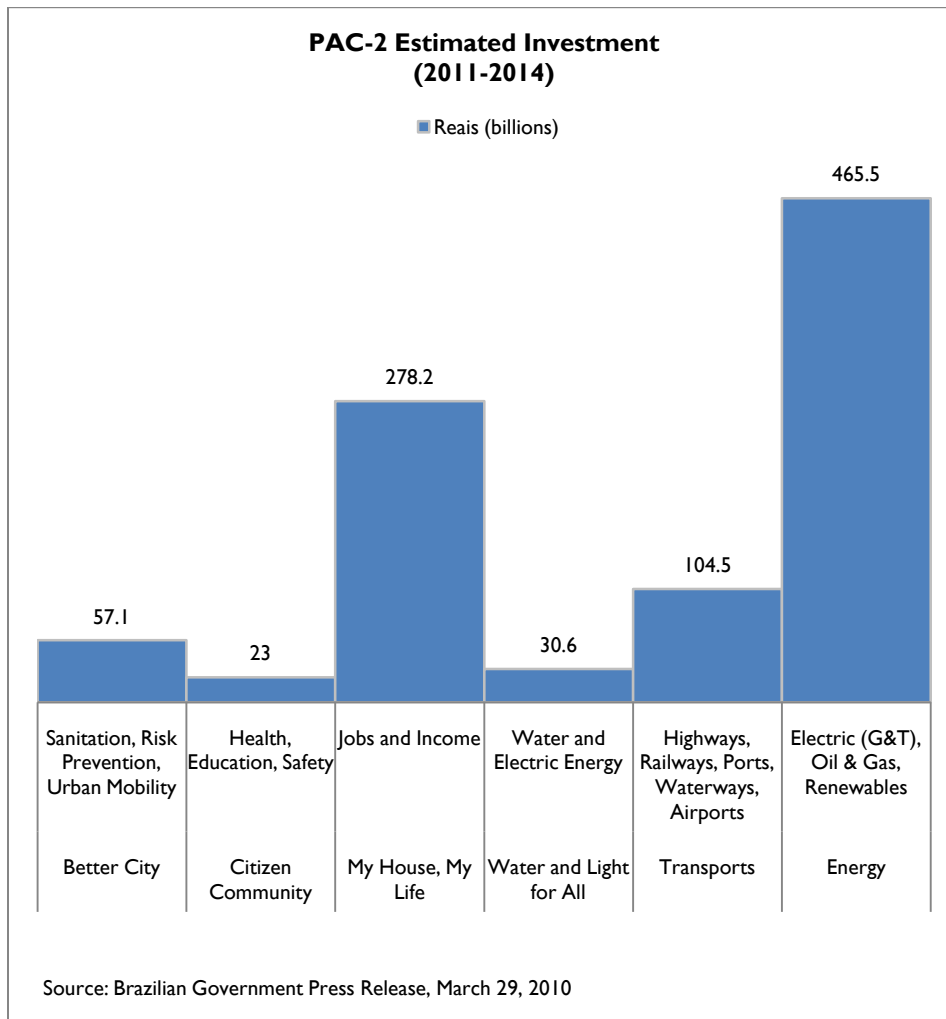
Source: Ministry of Transport

Exhibit 2



Source: FT Infra Report

**Exhibit 3**



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