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# Infrastructure Investment in Brazil

AN ABUNDANCE OF OPPORTUNITY



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Associação Brasileira de  
Private Equity & Venture Capital



# Preamble

This paper provides an overview of the Infrastructure sector in Brazil and assesses the current landscape of opportunities that may be available to private capital investors. We examine Brazil's level of infrastructure investment relative to other emerging economies and review potential needs by subsector. We also highlight certain actions, developments and programs that have aimed to support private investment within the sector and review key characteristics of infrastructure investments that attract interest in the asset class globally. Finally, we share a few case studies demonstrating the attractiveness of infrastructure investments in Brazil.

# Executive Summary

Brazil has the world's fifth largest population, and its gross domestic product places it among the 10 largest economies. Brazil benefits from an abundance of natural resources, and this abundance positions the country as a global leader in the production and exportation of several key commodities. The country also has the 10th largest industrial production in the world.

Yet, despite the country's position in the global economy and its expanding, urban-concentrated population, Brazil's investment in infrastructure has lagged behind that of other large countries and emerging economies. Brazil's infrastructure ranks 73rd in the world, according to the World Economic Forum's Global Competitiveness Index. This disparity between Brazil's infrastructure and the country's broader demographics and economic standing may indicate a significant incremental opportunity for private capital investors across virtually all relevant subsectors, including Energy, Logistics, Telecom, Sewage and Water.

Private capital investment in infrastructure continues to be supported by economic policies and programs sponsored by the Brazilian government, and recent policy changes at Brazil's development bank O Banco Nacional do Desenvolvimento are expected to result in expanded private market activity going forward.

Private investment in the Brazilian Infrastructure sector has emerged over the past couple of decades, with several domestic and global alternative investment managers entering the market.

Given the disparity that persists in Brazil's level of infrastructure investment today, the opportunity for private investors within the sector may continue to accelerate going forward.



SECTION 1

# The Infrastructure Landscape in Brazil

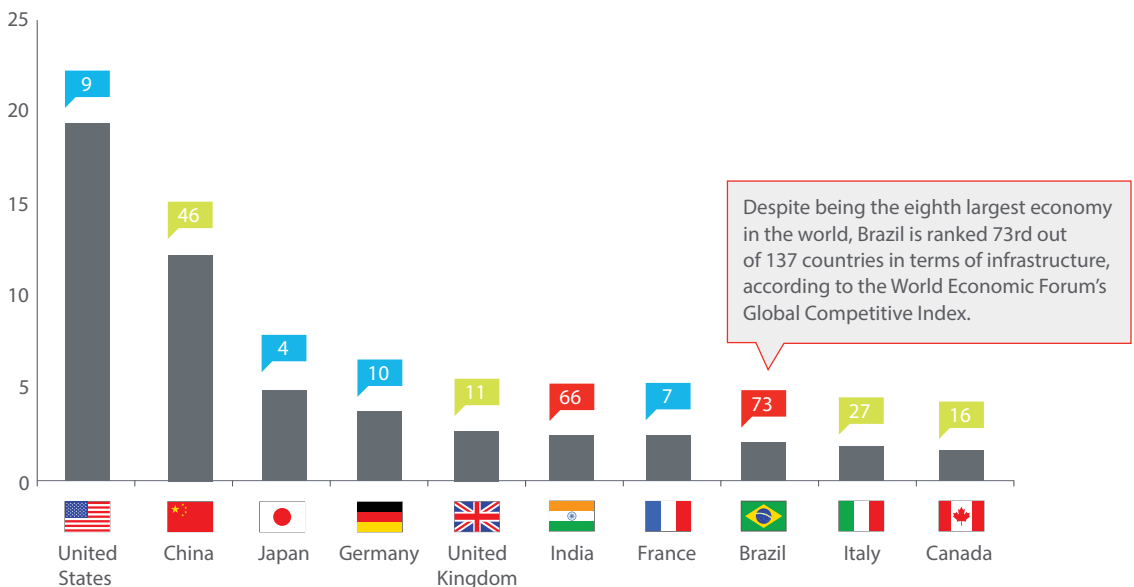
An examination of the Infrastructure sector in Brazil reveals a significant disparity between the level of infrastructure investment and the size of the country's economy – and such disparity may present an attractive opportunity for investors.

Brazil has the fifth largest population in the world, and its gross domestic product (GDP) of approximately \$2.1 trillion<sup>1</sup> places the country among the 10 largest economies. With more than 140 million hectares of productive land, Brazil's abundance of natural resources positions the country as a global leader in the production and/or export of several commodities, including coffee, iron ore, meat, orange juice, pulp and paper, soybeans and sugar.<sup>2</sup> Brazil's industrial production ranks 10th globally, and the country's pharmaceutical and information technology markets are the seventh and eighth largest in the world, respectively.

As Brazil emerges from a recent recession, GDP is forecasted to expand approximately 2.6% per year, on average, between 2019 and 2022.<sup>5</sup> The country's population of more than 200 million, over 80% of which resides in urban areas, is expected to peak at 233 million in 2047 and stabilize at 228 million by 2060.<sup>6</sup> However, despite the country's expanding population and position in the global economy, Brazil's investment in infrastructure has lagged behind that of other large countries and emerging economies.

The Global Competitiveness Index (GCI), developed by the World Economic Forum, measures the performance of 137 countries in 12 areas of competitiveness. In the World Economic Forum's 2017-2018 Global Competitiveness Report, Brazil's infrastructure competitiveness, as measured by the GCI was ranked 73rd.<sup>7</sup>

**Top 10 Countries by GDP (Trillions of \$) and Global Competitiveness Index Infrastructure Rank**



Source: World Bank and Global Competitiveness Index

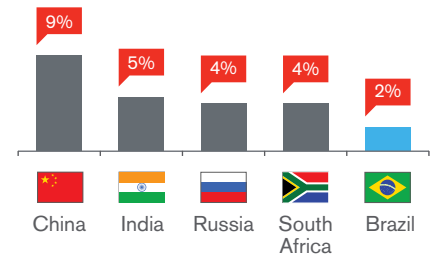
- World Bank, 2017.
- Folha de São Paulo. Available at <https://www1.folha.uol.com.br/mercado/2018/05/brasil-assume-lideranca-mundial-na-producao-de-soja-segundo-eua.shtml>.
- Overview of the Brazilian Private Equity and Venture Capital Industry.
- Overview of the Brazilian Private Equity and Venture Capital Industry.
- Brazilian Central Bank's Market Expectation System.
- Instituto Brasileiro de Geografia e Estatística.
- World Economic Forum – The Global Competitiveness Report 2017-2018.

A closer assessment of Brazil's investment in infrastructure relative to other emerging economies indicates a similar disparity. Between 2000 and 2013, Brazil's average annual investment in infrastructure as a percentage of GDP, approximately 2%, ranked behind other countries in the body known as "BRICS" (Brazil, Russia, India, China and South Africa).

Between 2011 and 2016, Brazil invested an average of 2.2% of GDP in the Infrastructure sector.<sup>8</sup> In 2017, as Brazil's economy began to recover from a deep recession, infrastructure investment declined further to 1.4% of GDP, or R\$87 billion. Such a level of investment did not fully cover the annual depreciation of existing infrastructure assets, which was estimated at R\$91 billion.<sup>9</sup> To merely return to levels achieved between 2011 and 2016, it is estimated that investment of R\$323 billion would be required between 2018 and 2019,<sup>10</sup> two-thirds of which would compensate for depreciation alone.

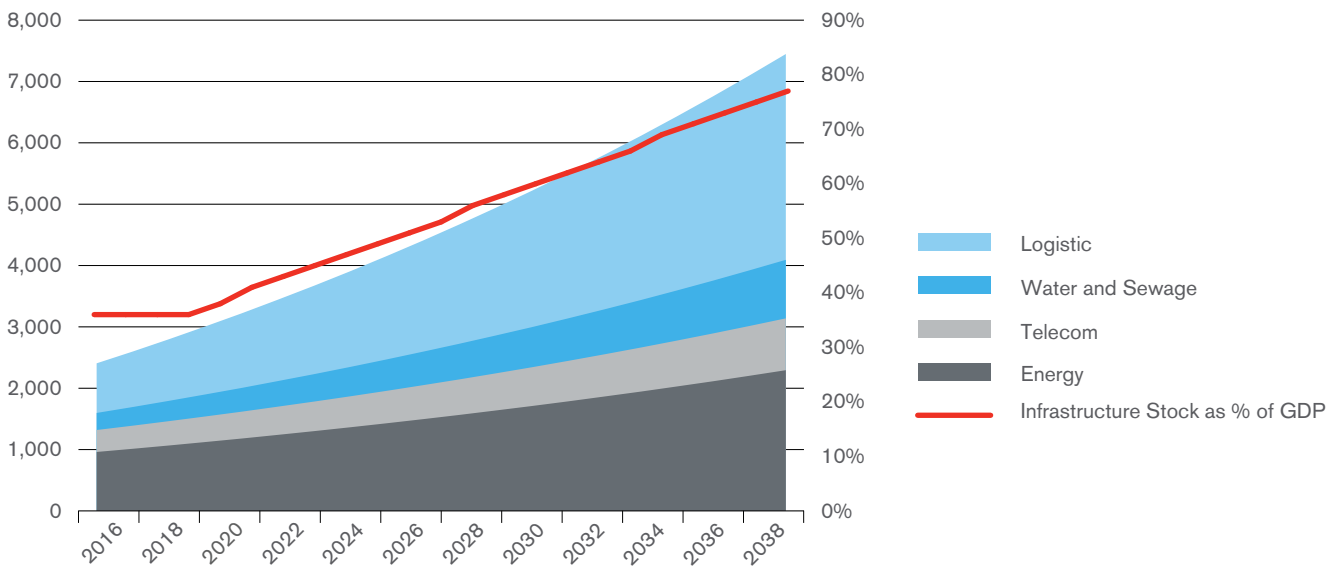
According to the January 2018 report "Projeto Infra2018, Consulta Pública 01" (the "Infra2018 Report"), Brazil's infrastructure stock, a measurement of a country's infrastructure assets as a percentage of GDP, was approximately 36% in 2017.<sup>11</sup> The Infra2018 Report estimates that Brazil would need to increase its infrastructure stock to approximately 77% over the next 20 years to rank among the top 20 according to the GCI on infrastructure.<sup>12</sup> To achieve such levels, it is estimated that annual infrastructure investment as a percentage of GDP must increase to 6.5% in 2018. Such improvement would require as much as R\$8.8 trillion in incremental infrastructure investment over the next 20 years.<sup>13</sup>

Average Investment as % of GDP From 2000 to 2013



Source: World Bank

Infrastructure Stock Projection by Type in Brazil (R\$ billion)

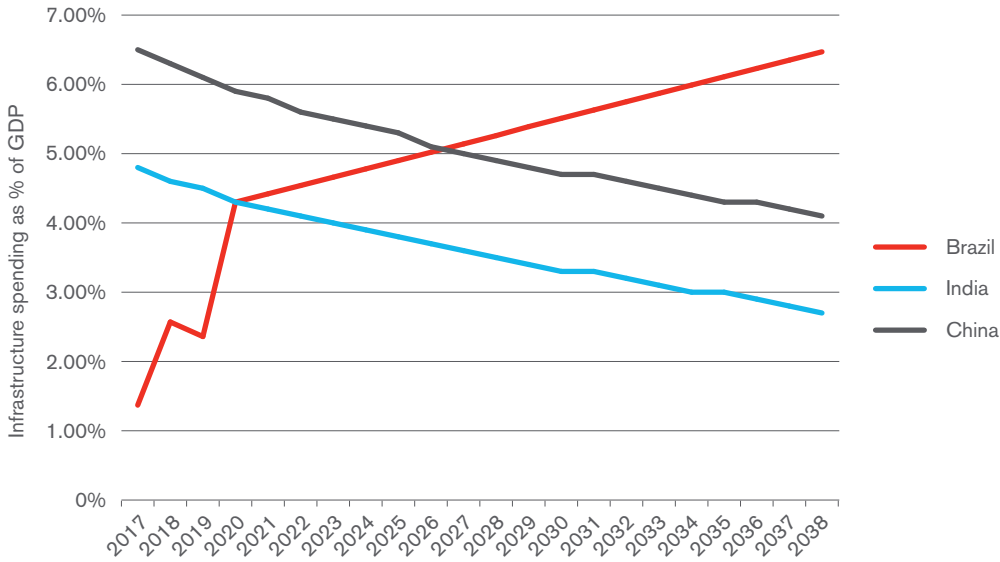


Source: Infra2018 Report

8. According to Infraestrutura e Regulação report by Oliver Wyman – 2018.  
 9. Projeto Infra2018. Consulta Pública 01 – January 2018.  
 10. Projeto Infra2018. Consulta Pública 01 – January 2018.  
 11. Projeto Infra2018. Consulta Pública 01 – January 2018.  
 12. Throughout this paper, we will include references to the Infra2018 Report and its estimates of the incremental investment in infrastructure required for Brazil to achieve a ranking among the top 20 countries according to the GCI on infrastructure to further illustrate the potential investment opportunity within the asset class.  
 13. Projeto Infra2018. Consulta Pública 01 – January 2018.

During the same time period, infrastructure spending as a percentage of GDP is expected to decline in both China and India, further underscoring the potential for a growing investment opportunity within the sector in Brazil.

**Estimated Infrastructure Investment (% of GDP)**



Source: Brazil: Infra2018; China and India: Global Infrastructure Outlook

# Infrastructure by Sector

According to the Infra2018 Report, nearly three-quarters of Brazil's infrastructure stock as of 2017 comprised assets in the Energy and Logistics sectors.

Total Required Investment by Sector to Achieve Top 20 Infrastructure Ranking by 2038, According to the Global Competitiveness Index (R\$ billion)

### Water and Sewage



R\$942 billion

### Telecom



R\$1.447 billion

### Energy (excludes Oil and Gas)



R\$2.339 billion

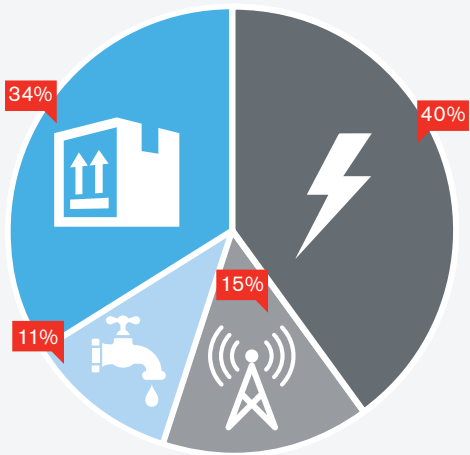
### Logistics



R\$4.101 billion

Source: Infra2018 Report

### Infrastructure Stock by Sector



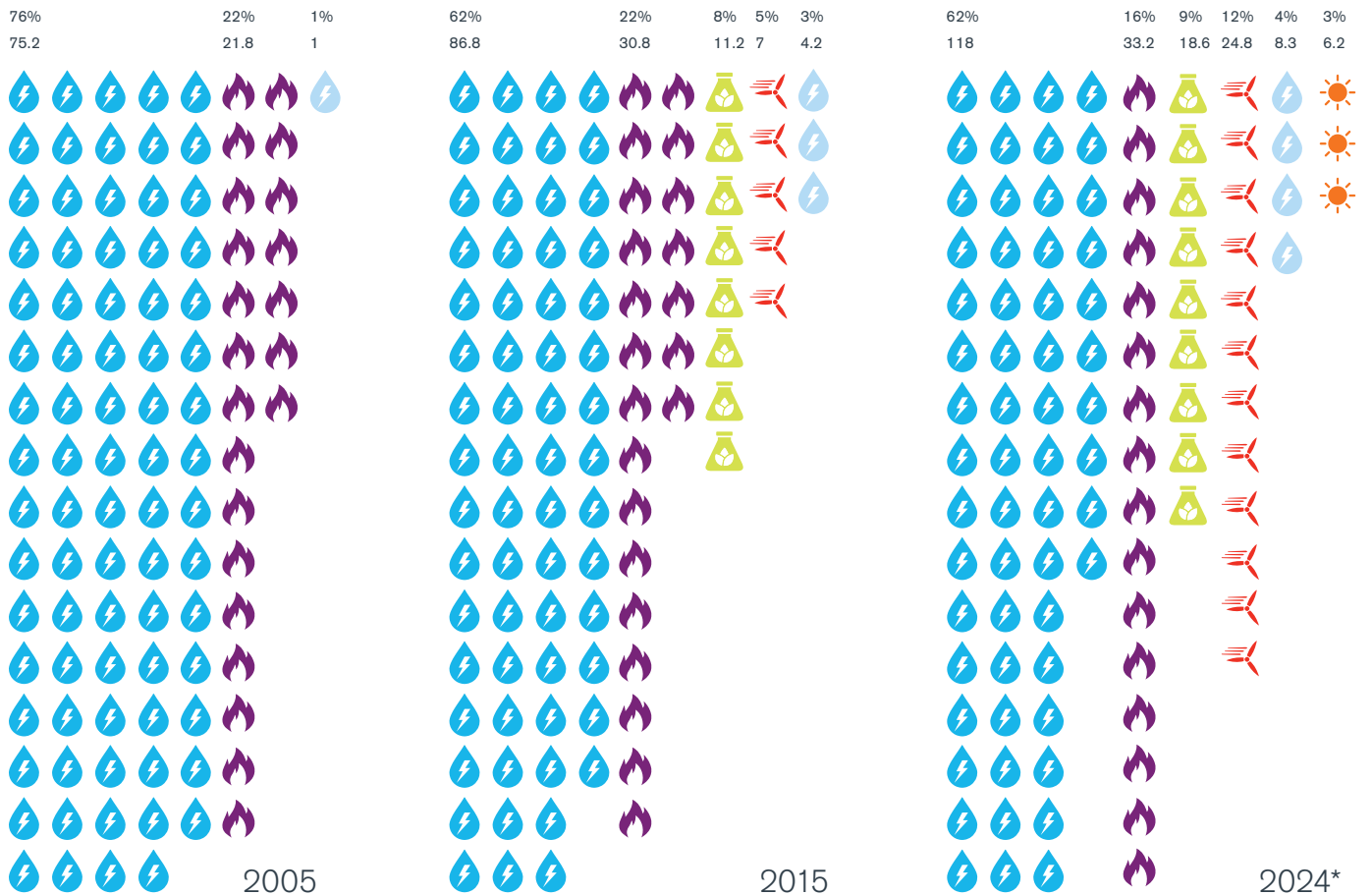
Source: Infra2018 Report



# Energy

The Energy sector in Brazil is expected to continue to demand significant investment over the medium to long term. Energy demand in Brazil is expected to increase by 22% over the next eight years, with installed capacity forecasted to expand to 209.1 gigawatts by 2024 from 98 gigawatts in 2015.<sup>14</sup>

Electric Energy Matrix (%) and Installed Capacity (GW)



Hydropower 
 Thermal 
 Small Hydropower 
 Biomass 
 Wind 
 Solar 
 \* Expected

Source: Strategy&s Os Desafios do Sistema Elétrico Brasileiro report

Brazil generates a majority of its energy through hydropower assets, and investment within this subsector has been quite strong in recent years, as evidenced by the development of the Belo Monte hydropower plant, the third largest of its kind in the world. The plant is estimated to have cost more than R\$30 billion.<sup>15</sup>

By 2026 renewable wind and solar generation capacity are expected to increase from 6% to 10% of total installed capacity.<sup>16</sup>

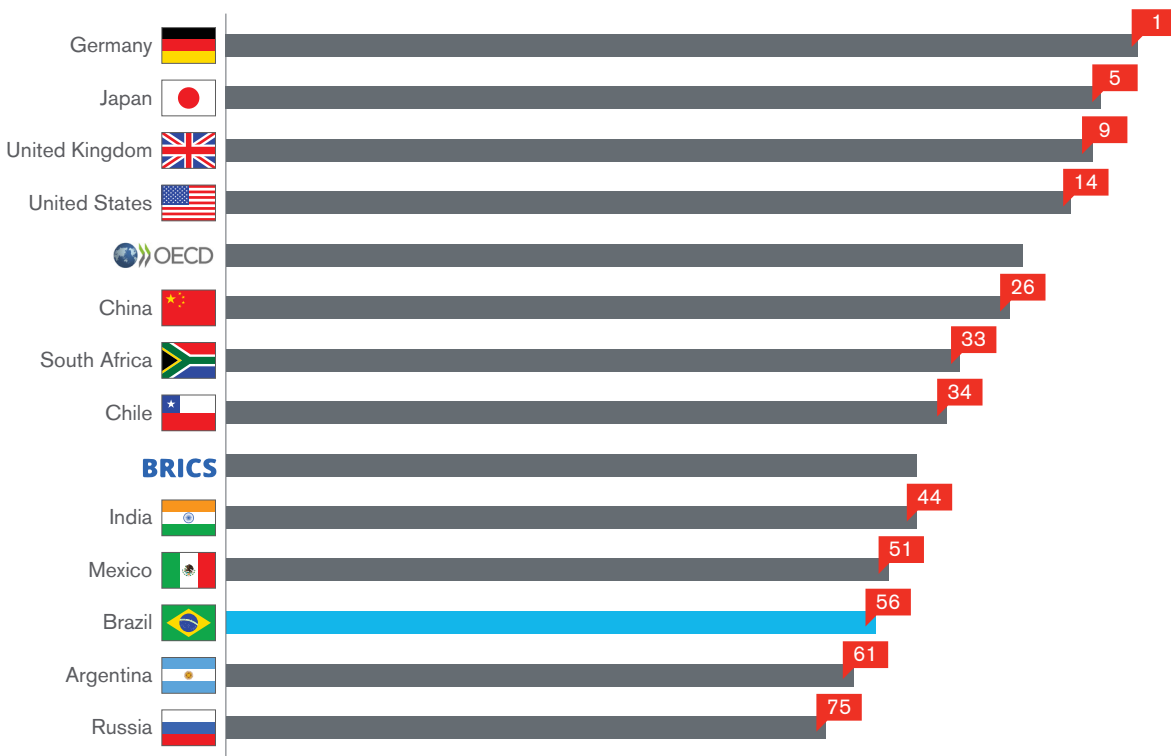
According to the Infra2018 Report, for Brazil's infrastructure to achieve a top-20 ranking by 2038 in the World Economic Forum's GCI, approximately R\$2.339 billion in investment within the Energy sector would be required over the next 20 years.<sup>17</sup>

14. Empresa de Pesquisa Energética a Brazilian governmental agency.  
 15. According to Gazeta do Povo newspaper Da Índia Tuíra à Lava Jato: Belo Monte coleciona polêmicas há mais de 40 anos. Available at <https://www.gazetadopovo.com.br/politica/republica/da-india-tuira-a-lava-jato-belo-monte-coleciona-polemicas-ha-mais-de-40-anos-77or1lqx7sv4f4us0b0vvy3ic/>  
 16. Empresa de Pesquisa Energética a Brazilian governmental agency.  
 17. According to Infra2018 Report estimates to reach rank 20 of infrastructure criteria of World Economic Forum's Global Competitive Index by 2038.

# Logistics

Logistics infrastructure plays an important role in all countries but is of particular importance in Brazil given the country's growing population, geographic expanse and position as a leading global exporter of key commodities. According to the World Bank's Logistics Performance Index, Brazil's logistics infrastructure ranked 56th out of 160 countries as of 2018.

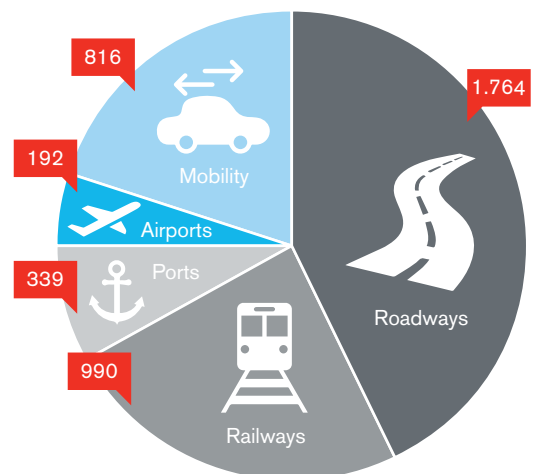
Logistics Performance Index by Performance, With Rank Displayed (2018)



Source: World Bank

The Infra2018 Report estimates that approximately R\$4.1 trillion in logistics investment would be required over the next 20 years for Brazil's infrastructure to achieve a top 20 ranking in the GCI<sup>18</sup>.

**Total Investment Needed per Logistics Segment to be One of the Top 20 Best Countries in Infrastructure by 2038 (R\$ billion)**



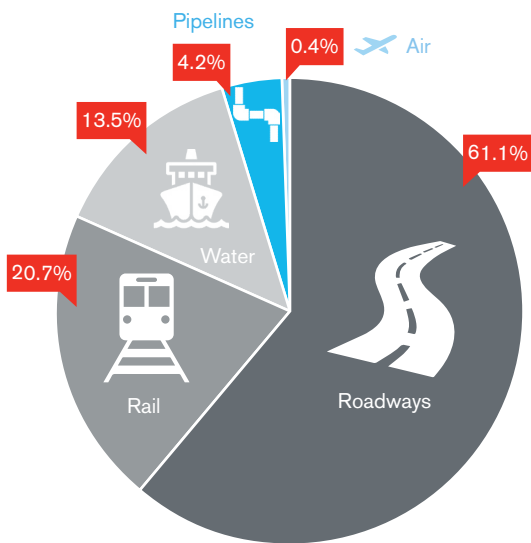
Source: Infra2018 Report

18. According to Infra2018 Report estimates to reach rank 20 of infrastructure criteria of the World Economic Forum's Global Competitive Index by 2038.

## ROADWAYS

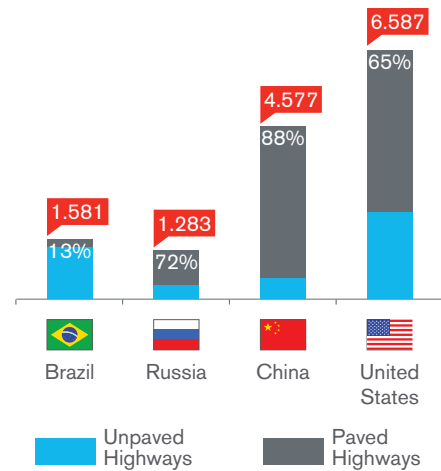
More than 60% of freight transportation in Brazil occurs over roadways.<sup>19</sup> However, only 13% of Brazil's 1.6 million kilometer (km) road network is paved – a much smaller percentage compared to that of Russia, China or the United States.<sup>20</sup>

Freight Transportation Matrix in Brazil



Source: Confederação Nacional do Transporte

Total Highway Length (km thousand) and Paved Highway Participation (%) by Country



Source: CIA's World Factbook

Although the opportunity to expand and enhance Brazil's roadway network appears to be significant, only approximately 19,000 kilometers of the existing network are currently under concession to the private sector<sup>21</sup> (totaling approximately R\$35 billion in investment since 1995<sup>22</sup>).

According to the Infra2018 Report, for Brazil's infrastructure to achieve a top 20 ranking by 2038 in the World Economic Forum's GCI, approximately R\$1.764 billion in investment in the Roadways sector would be required over the next 20 years.<sup>23</sup>

19. Pesquisa CNT de Rodovias – 2015.

20. CIA's World Factbook.

21. Nexo Jornal.

22. According to Brazilian Trade and Investment Promotion Agency.

23. According to Infra2018 Report estimates to reach rank 20 of infrastructure criteria of the World Economic Forum's Global Competitive Index by 2038.

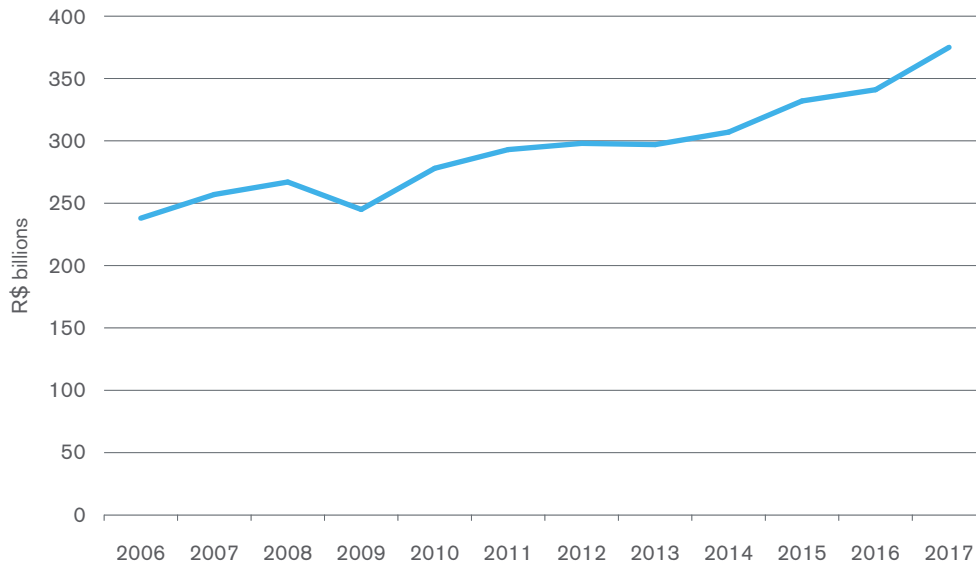


## RAILWAYS

Brazil's railway network of more than 29,000 kilometers is the ninth longest in the world.<sup>24</sup> Since 1992, the Brazilian government has supported a concessions program for the development of the railway system. There are currently 14 railways in Brazil that are under concession (equivalent to approximately 25,000 kilometers of railway),<sup>25</sup> and new expansions were announced in July 2018, including Ferrovia de Integração do Centro-Oeste, a 383-kilometer railway between the states of Mato Grosso and Goiás to be built by the private sector for approximately R\$4 billion.<sup>26</sup> The Ferroanel de São Paulo, with 53 kilometers, is another railway to be built by the private sector, for an estimated R\$5 billion.<sup>27</sup>

Between 2006 and 2017, railway production<sup>28</sup> increased by 57.4%.<sup>29</sup>

### Railway Production per Year (tons transported)\*



Source: Agência Nacional de Transportes Terrestres

\*Railway production is a measurement of physical effort usual to the sector. It is obtained by multiplying the weight transported by the distance.

According to the Infra2018 Report, for Brazil's infrastructure to achieve a top 20 ranking by 2038 in the World Economic Forum's GCI, approximately R\$990 billion of railway investment would be required over the next 20 years.

24. Ferrovias de Carga Brasileiras: Uma Análise Setorial, by BNDES.

25. Agência Nacional de Transportes Terrestres.

26. Agência Brasil Governo anuncia parcerias com Vale e MRS para construir ferrovias. Available at <http://agenciabrasil.ebc.com.br/economia/noticia/2018-07/governo-anuncia-parcerias-com-vale-e-mrs-para-construir-ferrovias>.

27. Estadão newspaper Governo Antecipa Renovação de Concessões. Available at <https://economia.estadao.com.br/noticias/geral/governo-antecipa-renovacao-de-concessoes,70002382861>

28. Railway production is a measurement of physical effort usual to the sector. It is obtained by multiplying the weight transported by the distance.

29. Agência Nacional de Transportes Terrestres.



## MOBILITY

Given the completion of new subway lines in São Paulo and Rio de Janeiro, in addition to the development of Rapid Bus Transport in Rio de Janeiro and Belo Horizonte Minas Gerais, investment in mobility infrastructure has been quite active over the past few years. It is anticipated that approximately R\$235 billion of incremental investment in mobility infrastructure would be required to address capacity constraints in the 15 largest metropolitan areas.<sup>30</sup>

Further, according to the Infra2018 Report, for Brazil's infrastructure to achieve a top 20 ranking by 2038 in the World Economic Forum's GCI, approximately R\$816 billion of mobility infrastructure investment would be required over the next 20 years.<sup>31</sup>



## PORTS AND AIRPORTS



Investment in the continued development of Brazil's ports, a significant portion of which has come from the private sector historically, is expected to increase substantially over the next two decades. Capacity is expected to increase by 92% between 2015 to 2042, and such expansion could require as much as R\$51.3 billion in incremental investment over this time period.<sup>32</sup>

Over the past several years, the private sector has also increased its investment in Brazil's airports. In 2011, the federal government made the first concession of an airport project in Natal Rio Grande do Norte. Since then, nine additional concessions were granted, including major projects in Brasília Distrito Federal, Galeão Rio de Janeiro and Guarulhos São Paulo. Combined, the airport concessions have increased Brazil's airport capacity by 71.5%.

According to the Infra2018 Report, for Brazil's infrastructure to achieve a top 20 ranking by 2038 in the World Economic Forum's GCI, approximately R\$531 billion of investment in ports and airports would be required over the next 20 years.

30. According to Valor Setorial magazine – June 2018.

31. According to the Plano Nacional de Logística Portuária (PNLP).

32. UOL Economia Após privatização, aeroportos pioraram ou melhoraram? Especialistas avaliam... Após privatização, aeroportos pioraram ou melhoraram? Especialistas avaliam.... Available at <https://todosabordo.blogosfera.uol.com.br/2017/08/31/aeroporto-privatizacao-concessao-guarulhos-confins-galeao-brasilia>.

# Telecom

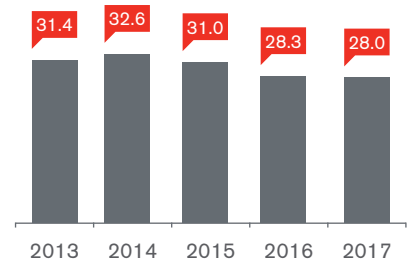
Brazil's Telecom sector constitutes approximately 10% of GDP.<sup>33</sup> Investment in the sector reached R\$28 billion in 2017, which was flat relative to 2016 but below investment levels in 2013-2015.<sup>34</sup> Investment levels for 2013-2015 were elevated due in part to Brazil's hosting of the FIFA World Cup in 2014 and the Summer Olympics in 2016, among other events. Such events played an important role in the modernization of Brazil's telecom infrastructure.

Despite Brazil's ranking as the fourth largest internet user in the world, the country's average broadband speed is below that of other emerging countries in Latin America, including Chile, Mexico and Uruguay.<sup>35</sup>

In the past five years, Brazil has seen considerable enhancements in its mobile connectivity, as the number of cities with 4G networks grew from 119 to 4,071, reaching 94% of the population.<sup>36</sup> Mobile connectivity is very important in Brazil since 77.3% of households have access to the internet through mobile devices, whereas 71.4% of the households have access to fixed broadband connections.<sup>37</sup>

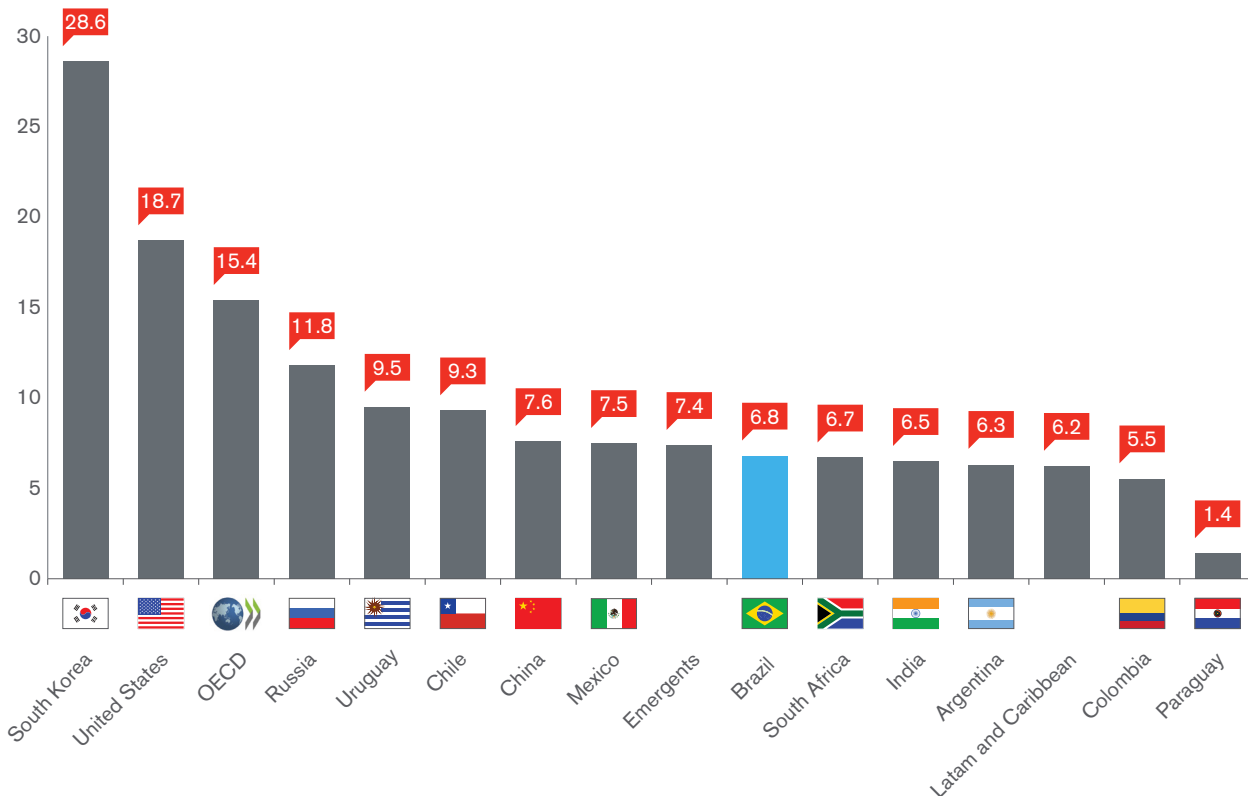
According to the Infra2018 Report, for Brazil's infrastructure to achieve a top 20 ranking by 2038 in the World Economic Forum's GCI, approximately R\$1.447 billion of investment in telecom would be required over the next 20 years.<sup>38</sup>

Annual Telecom Investment (R\$ billion)



Source: Telebrasil

Average Broadband Speed (Mbps, 2017)



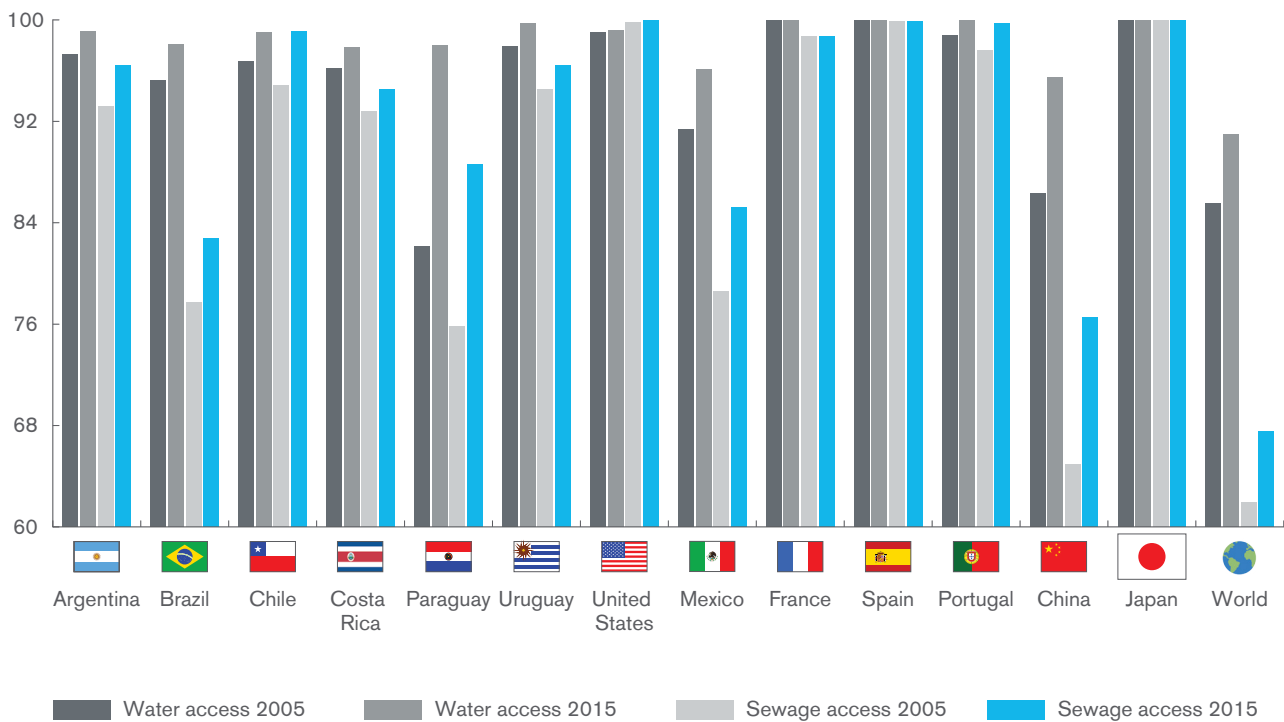
Source: Infraestrutura e Regulação report by Oliver Wyman

33. Associação Brasileira de Telecomunicações.  
 34. Tabela Referência de Indicadores Para Análise – June 2018 from Associação Brasileira de Telecomunicações.  
 35. According to International Telecommunication Union (UN) statistics in 2016. Available at <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>  
 36. Tabela Referência de Indicadores Para Análise – June 2018 from Associação Brasileira de Telecomunicações.  
 37. Associação Brasileira de Internet. Available at <http://www.abranet.org.br/Noticias/PNAD-IBGE:-cerca-de-70%25-dos-domicilios-tem-acesso-a-Internet-1787.html>  
 38. According to Infra2018 Report estimates to reach rank 20 of infrastructure criteria of the World Economic Forum's Global Competitive Index by 2038.

# Sewage and Water

As of 2017, more than 30% of Brazilian households did not have access to a sewage network,<sup>39</sup> and approximately 14.3% of households did not have access to the general water distribution network as a primary source of clean water.

Water and Sewage Access (% of population)

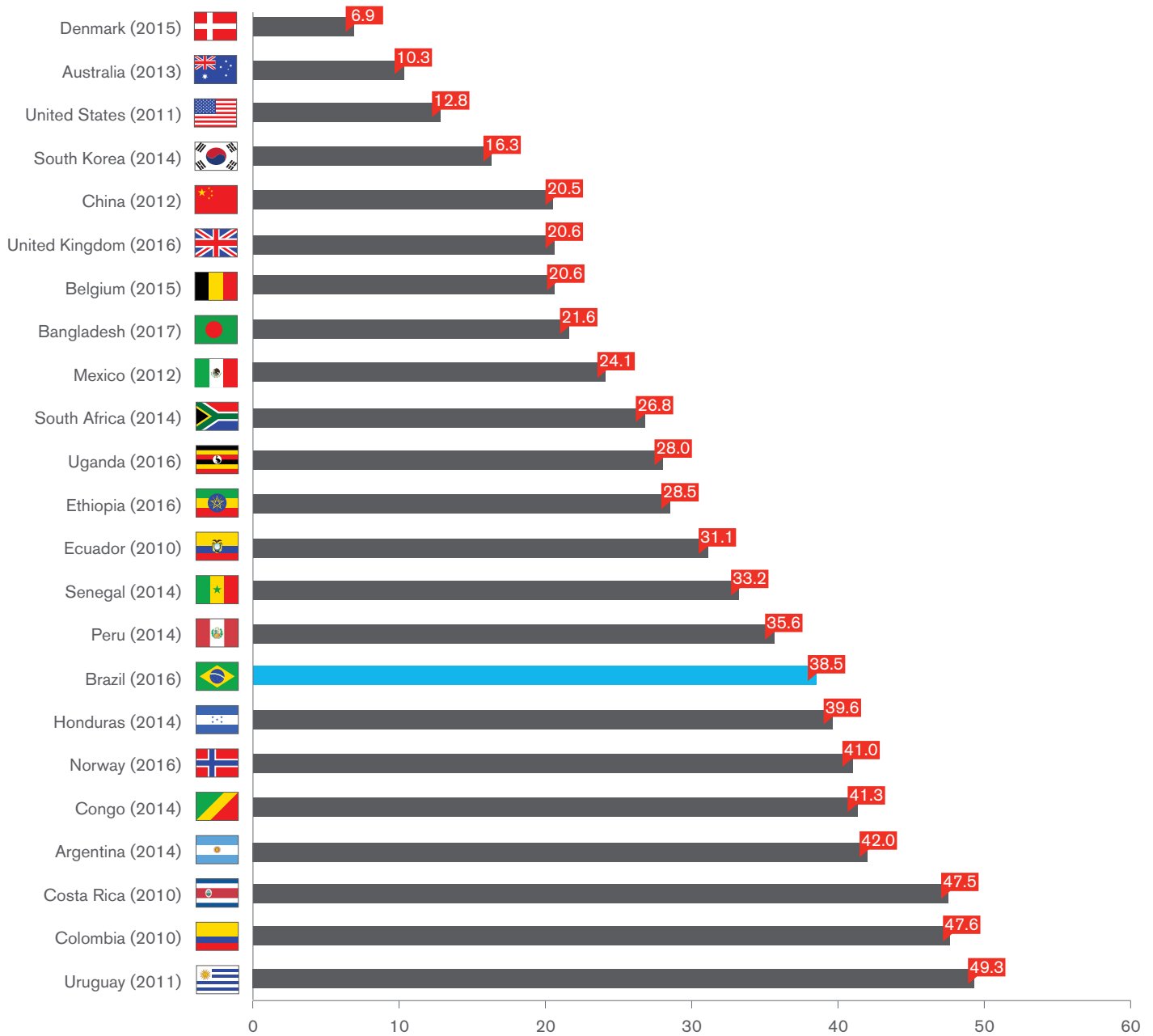


Source: Pesquisa Nacional por Amostra de Domicílios Contínua 2017

Despite improvements in access to water and sewage over the past 10-15 years, opportunities for continued enhancements and incremental efficiency still exist. Brazil's water network of approximately 602 km is more than double the length of its sewage network (284 km),<sup>40</sup> and only one-third of water consumed in households was treated prior to returning to the environment, as of 2015. Furthermore, Brazil experienced approximately 38% treated water loss in 2016 (which represented an annual loss of more than R\$10 billion<sup>41</sup>) – more than double the average treated water loss rate for developed countries (15%).<sup>42</sup>

39. Pesquisa Nacional por Amostra de Domicílios Contínua – 2017.  
 40. Benefícios Econômicos e Sociais da Expansão do Saneamento No Brasil, from Instituto Trata Brasil.  
 41. Instituto Trata Brasil.  
 42. World Bank.

International Treated Water Loss Index (%)



Source: Instituto Trata Brasil

According to the Infra2018 Report, for Brazil's infrastructure to achieve a top 20 ranking by 2038 in the World Economic Forum's GCI, approximately R\$952 billion of investment in water and sewage infrastructure would be required over the next 20 years.<sup>43</sup>

43. According to Infraestrutura e Regulação report by Oliver Wyman – 2018.



# Potential Catalysts for Private Investment

## **UNDERFUNDED PUBLIC PROGRAMS**

In 2015, during the depths of Brazil's recession, only 37% of mandated public infrastructure programs were ultimately funded.<sup>44</sup> In 2017, the funding level of such programs reached 60% of their mandate, indicating that a significant funding gap remains.

## **FOREIGN EXCHANGE RATE TRENDS**

Recent fluctuations in the exchange rate for the Brazilian real and the resulting potentially favorable entry point to Brazilian infrastructure investments may attract the attention of foreign investors. By the end of 2018, the U.S. dollar was valued at 3.87 Brazilian real – approximately 20% and 70% below the five-year and 10-year median exchange rates, respectively. This movement provides a positive, long-term background for foreign investments in infrastructure, mitigating the devaluation risk that is frequently a consideration in cross-border transactions. The recent depreciation of the Brazilian real has been attributed to political uncertainties both national and abroad, including those involving upcoming Brazilian presidential election and changing international trade policies – more specifically, those between the U.S. and China.

The Brazilian Central Bank has also reaffirmed its commitment to ease volatility in the foreign exchange market, using multiple instruments at its disposal (including currency swaps and, potentially, outright sales from its nearly R\$400 billion foreign exchange reserves) to enhance market liquidity and smooth exchange rate movements.

According to the Brazilian Central Bank, Brazil's exchange rate is expected to stabilize over the short term, at around 3.83 Brazilian real per U.S. dollar until 2020, and reach 3.80 reals to dollars by 2023.

It is also important to highlight that given the inflation indexation of most revenue contracts in the Infrastructure sector, and the positive correlation between foreign exchange devaluation and inflation, it is expected that in the long run, results would converge back to original levels, even following a moderate currency devaluation episode.

## **BNDES INTEREST RATE POLICY CHANGES**

Brazil's development bank, Banco Nacional de Desenvolvimento Econômico e Social (or BNDES), has historically been a major player in the financing of large-scale infrastructure projects within the country. In 2017, the federal government began to shift its strategy regarding BNDES' financing policies in an effort to narrow the disparity between bank-offered interest rates (which were subsidized) and rates available through the private markets. Over the medium to long term, the change in policy is expected to increase private sector financing activity for Brazilian infrastructure projects.<sup>45</sup> One example of such a project is the Porto de Sergipe I Thermoelectric Complex, a gas-powered electric plant in the state of Sergipe that will be the largest of its kind in Latin America when completed in 2020. The project's development was supported by investments from the International Finance Corporation, World Bank division, and the Inter-American Development Bank and the issuance of nonconvertible debentures.

44. According to *Infraestrutura e Regulação* report by Oliver Wyman – 2018.

45. According to *Infraestrutura e Regulação* report by Oliver Wyman (2018).

## ASSET SALES FOLLOWING THE CAR-WASH SCANDAL

As a consequence of the so-called car-wash scandal, an ongoing political and corporate corruption inquiry, a number of companies involved in the investigation have pursued asset sales to meet liquidity needs. Such asset sales have included the sale of certain infrastructure assets, for example:

- Engevix's sale of its stake in the Brasília airport.
- Camargo Corrêa's sale of its share of CPFL (an electricity company) and.
- Odebrecht's sale of its majority stake in Odebrecht Ambiental.

## GOVERNMENT PROGRAMS

In 2016, the Brazilian federal government launched the Programa de Parcerias de Investimentos (PPI), an initiative aimed at increasing private investment in infrastructure. To date, 189 projects have qualified for the program, 95 of which have already been completed. The program estimates that since its launch, approximately R\$150 billion has been invested, with an additional R\$238 billion to be invested in future projects.<sup>46</sup> Currently, 94 projects are in development.

 Highway	 Ports	 Energy	 Oil and Gas	 Airports	 Railway
9 in Development	13 Concluded 25 in Development	52 Concluded 22 in Development	5 Concluded 2 in Development	4 Concluded 17 in Development	10 in Development

Source: Programa de Paerceria de Investimentos

The PPI is the third federal government program in the past seven years focused on boosting private investment within the sector, following the Programa de Aceleração do Crescimento 2 from 2011 to 2014 and the Programa de Investimento em Logística from 2012 to 2015.

After the recent election, the new Brazilian federal government appears committed to supporting programs that bolster incremental private sector investments in infrastructure. The new president indicated that through privatizations, he wanted to sell almost R\$1 trillion in assets, with priority given to the Infrastructure and Energy sectors. He also intends to use the existing PPI to generate R\$133 billion in investment (57 PPI existing projects).

46. PPI's website. Available at <https://www.ppi.gov.br/conheca-a-lista-dos-projetos-ja-concluidos-e-os-estao-programados-para-2018>.



SECTION 2

Distinct Characteristics  
of Private Equity  
Infrastructure

Infrastructure investments are often viewed as an attractive asset class due to their ability to generate strong, risk-adjusted returns and stable cash flows; diversification; and downside protection through inflation-hedging characteristics.<sup>47</sup>

### **RISK-ADJUSTED RETURNS AND STABLE CASH FLOWS**

Infrastructure investments typically offer investors strong, risk-adjusted returns and stable cash flows over the long term. Assets are commonly long-lived, with highly visible and predictable cash flows that may be driven by regulation, contractual agreements or relatively unchanging usage patterns under a wide range of economic scenarios.<sup>48</sup>

### **DIVERSIFICATION**

Infrastructure investments are generally viewed as having lower correlation to traditional asset classes, including equities, fixed income and real estate. Furthermore, returns on infrastructure assets may not be as correlated to developments in the broader economy. Therefore, infrastructure investments are typically considered to be relevant alternatives for portfolio diversification.<sup>49</sup>

### **INFLATION-HEDGING**

Many infrastructure investments offer inflation-hedging characteristics, as underlying contracts may link revenues to certain inflation-related benchmarks, thereby offering protection from potential inflation volatility.<sup>50</sup> Such inflation-hedging characteristics may also be driven by concessions or regulatory provisions, among other factors.

### **ILLUSTRATIVE GLOBAL INFRASTRUCTURE RETURNS DATA**

- Median net Internal Rate of Return (IRR) between **7% and 12%** across all vintages since 2007.<sup>51</sup>
- Unlisted infrastructure had an **average net IRR of 10.1%** for vintage 2004-2015 funds behind buyouts (13.5% net IRR) and Venture Capital (10.3% net IRR).<sup>52</sup>
- In the 2014 vintage, the **second highest net IRR, at 13.6%** after buyouts.<sup>53</sup>
- Estimated dry powder as of June 2018 at **R\$36 billion**.<sup>54</sup>

47. Prequin's 2018 Global Infrastructure Report.

48. Mercer – 2016.

49. Prequin's 2018 Global Infrastructure Report.

50. Prequin's 2018 Global Infrastructure Report.

51. Prequin's quarterly update: Infrastructure Q2.

52. Prequin's quarterly update: Infrastructure Q2.

53. Prequin's quarterly update: Infrastructure Q2.

54. Estadão newspaper published on – September 17, 2018.



SECTION 3

Case  
Studies

Case Study

# Advent International: Terminal de Contêineres Paranaguá (TCP)

**Investment Date:** July 2011

**Exit Date:** February 2018

**Status:** Realized

**Sector:** Infrastructure

**Type:** Growth

**Head Office:** Curitiba

**Website:** [www.tcp.com.br](http://www.tcp.com.br)

## COMPANY DESCRIPTION

Second-largest container terminal in Brazil and one of the largest in Latin America

## MARKET OPPORTUNITY

High-growth sector marked by 10% volume CAGR in 12 years prior to Advent's investment and huge bottleneck in all Brazilian ports

## INVESTMENT THESIS

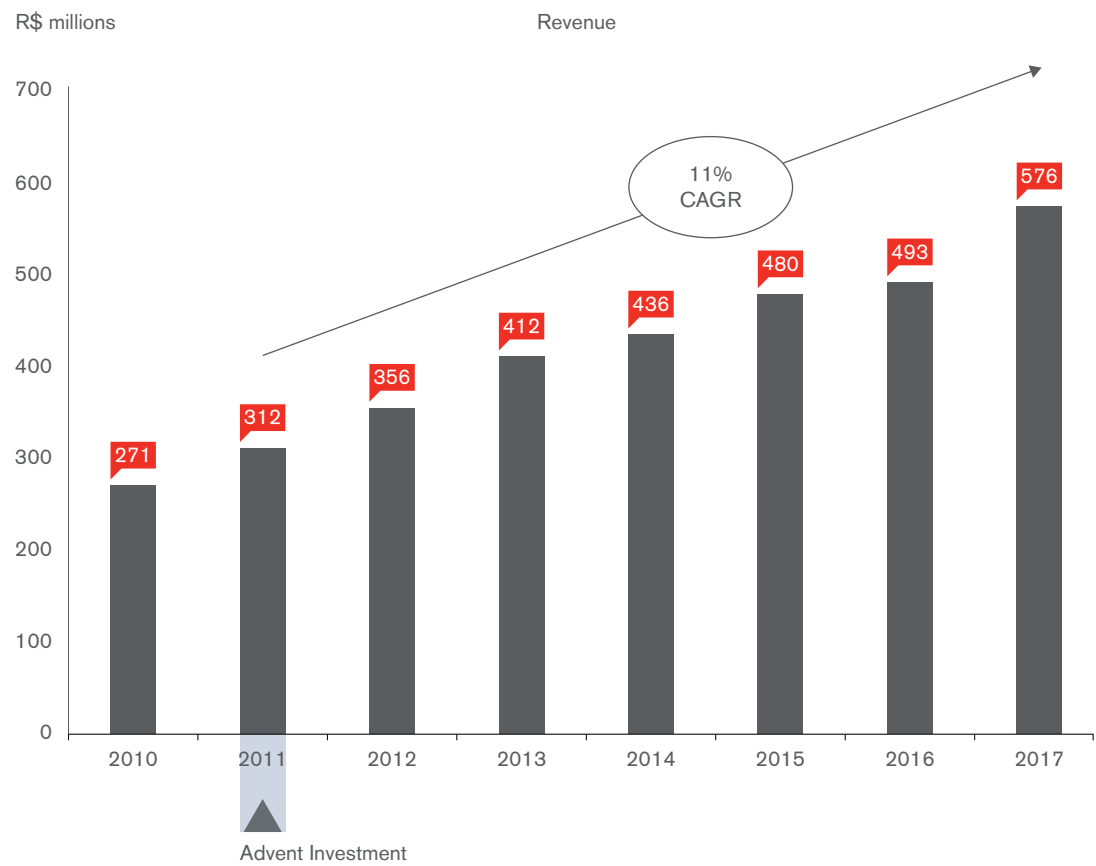
- Expand capacity by building third berth.
- Invest in equipment to increase productivity of the terminal.
- Pursue add-on and adjacent services.

## VALUE-ADD

- Increased capacity 88%, from 800,000 Ton Equivalent Unit (TEUs) per year to 1.5 million TEUs, by building a third berth and buying more equipment.
- Grew volume by increasing market share through premium services and integrating door-to-port logistics services.
- Tripled productivity from ~30 moves per hour in 2010 to ~90 moves per hour as of May 2017.
- Elevated TCP's position from 10th most productive terminal to the second most productive terminal in Brazil.

## KEY OPERATING AND FINANCIAL DATA

### Performance summary



Case Study

# Patria Investimentos: Hidrovias do Brasil

**Investment Date:** October 2010

**Exit Date:** NA

**Status:** Unrealized

**Sector:** Infrastructure/Logistics

**Type:** Startup/Growth

**Head Office:** São Paulo

**Website:** www.hbsa.com.br

## COMPANY DESCRIPTION

Hidrovias do Brasil is a startup created by Patria Investments to develop integrated logistics solutions in Latin America through innovative and competitive projects focused on waterways transportation.

Currently, Hidrovias has two main corridors:

- The South Corridor (started in 2014), which transports iron ore, pulp, grains and fertilizers through the Paraná-Paraguay and Uruguay river systems and a port terminal in Montevideo-Uruguay.
- The North Corridor (started in 2016), which transports grains (mainly soy and corn) and has two port terminals and a set of navigation assets (convoys formed by push boats and barges). The company also operates a bauxite transportation operation in the Trombetas-Amazon operation on the north side of the Trombetas-Amazon river system.

## MARKET OPPORTUNITY

Brazil, despite being one of the largest commodity exporters in the world, still lacks the adequate infrastructure for logistics and transportation, exposing a bottleneck that Patria Investments believes prevented optimization of producers' operations and competitiveness.

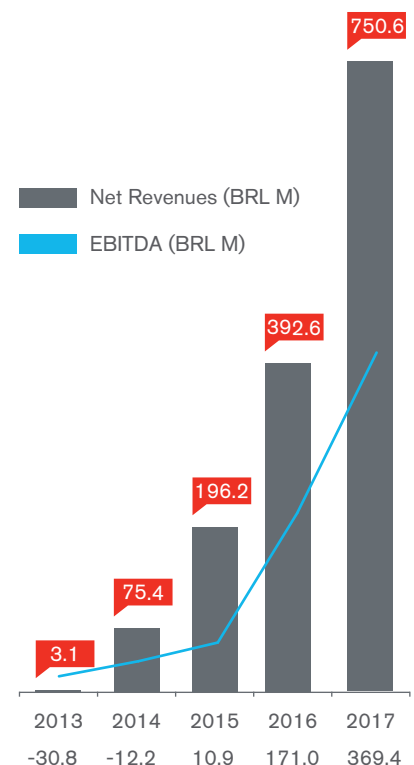
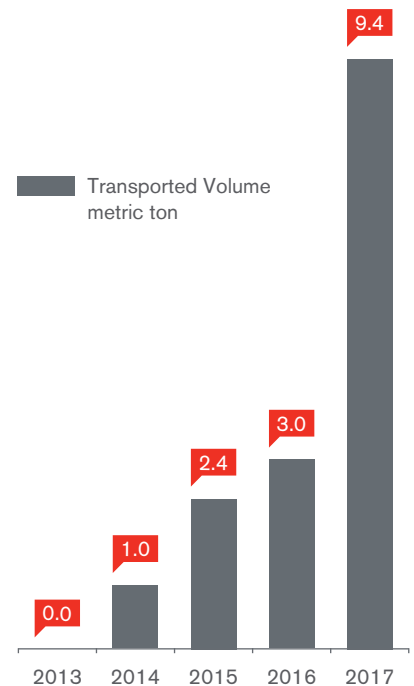
## INVESTMENT THESIS

The Brazilian transportation system is still highly concentrated in roadway transportation, positioning the country among the least efficient in terms of logistics costs. However, it has the largest network of navigable rivers in the world, with less than 15% of cargo transported in this mode.

## VALUE-ADD

Patria has secured long-term contracts with top-tier off-takers before starting each anchor project, leading up to more than 90% of contracted revenues.

- Capex, management will build up a set of R\$1.5 billion in assets, with three port terminals, over 270 barges, over 15 pusher boats, two bauxite vessels and one dry dock. The CAPEX was built on time and on budget.
- Patria built up a team of executives working for five years together, with a full team of over 900 employees.
- Hidrovias was able to plan for a nonrecourse project finance of around R\$700 million to build and operate its assets. Later in 2018, Hidrovias was able to issue an international bond of R\$600 million to refinance its debt at more accretive rates. All original project finances were prepaid, with the exception of the bauxite debt, due to its very accretive conditions (interest and tenor).





## Case Study

# Vinci Partners: Equatorial Energia

**Investment Date:** March 2006

**Exit Date:** May 2015

**Status:** Realized

**Sector:** Electricity Distribution

**Type:** Turnaround/Restructuring

**Head Office:** Maranhão

**Website:** [www.equatorialenergia.com.br](http://www.equatorialenergia.com.br)

## COMPANY DESCRIPTION

Equatorial Energia S.A. ("Equatorial Energia") is a holding company of energy assets focused on distribution and power generation in Brazil. The company is listed in the Novo Mercado segment of the Bovespa. Equatorial Energia currently controls four companies: Companhia Energética do Maranhão ("CEMAR"), Geranorte, Celpa and Sol Energias.

- CEMAR (65% owned): sole electric power distributor in the state of Maranhão and second largest distributor in Brazil's Northeast region, serving approximately 6.2 million people (3.3% of the country's population).
- Geranorte (25% owned): operator of two thermoelectric plants in the state of Maranhão, with joint installed capacity of 330 megawatts.
- Sol Energia (51% owned): energy trading company.
- Celpa (96% owned): electric power distributor in the state of Pará.

## MARKET OPPORTUNITY

- Core asset in severe financial distress, offering a clear turnaround opportunity for a buyer with experience in the Electricity sector.
- Opportunity to invest at a discounted entry price, as most strategic and financial buyers were discouraged by the complexity of the deal and the hurdles of the regulated energy industry in Brazil.
- Opportunity for further financial optimization during second phase of restructuring process, following the privatization of the company.

## INVESTMENT THESIS

- Build a portfolio of diversified energy assets.
- Target state-owned and private companies with poor management or inadequate capital structures.
- Create value through organizational and financial restructuring, as well as operational improvements.
- Implement a return-oriented business model.
- Institutionalize management.
- Leverage deep regulatory understanding of the Energy sector to identify opportunities and mitigate risks.

## VALUE-ADD

From 2004 to 2006, Vinci Partners led the implementation of a substantial restructuring program that included the renegotiation of R\$300 million in debt from Eletrobras, the write-off of R\$300 million in other debts and a reduction in nonfixed expenses from 37% of revenues in 2004 to 18% in 2006.

- Vinci Partners purchased general partner's entire stake in Equatorial Energia in December 2007 through the issuance of R\$200 million of debt at the controlling company.
- From 2006 to 2009, Vinci Partners led the second phase of Equatorial Energia's restructuring program, focused primarily on operational improvements. Upon completion, nontechnical energy losses, which represented Equatorial Energia's main operating challenge, decreased from over 30% to 21%.
- Improved relationship with the regulator and proactively conducted a tariff revision process in 2006, which increased annual EBITDA by approximately R\$80 million.
- Executed a major reorganization of management: 90% of the workforce was dismissed and 80% rehired, management interests were re-aligned through direct ownership in the company, and clear objectives and accountability were instituted for each professional.
- Led acquisition of the Geranorte asset in September 2008, representing Equatorial Energia's entry into the attractive power generation segment.
- Executed acquisition of a 51% stake in Sol Energia in November 2011, completing Equatorial's portfolio with an energy trading company.
- In November 2012, continued the strategy of consolidating the distribution segment, leading to the acquisition of Disco Celpa (Pará State's energy distribution company) out of bankruptcy. Equatorial now controls 96.2% of Celpa.
- Concluded a successful follow-on offering in December 2012, raising R\$1.4 billion to help strengthen Equatorial's balance sheet and providing R\$368 million of gross realized proceeds to Fund I.

## KEY OPERATING AND FINANCIAL DATA

- Equatorial Energia's EBITDA more than doubled from 2005 to 2008.
- In April 2006, following the company's financial turnaround, Equatorial Energia was listed on the Bovespa. In April 2008, with solid governance, controls and operations in place, the company was successfully migrated to the Novo Mercado segment of the Bovespa.
- In 2014, according to the regulatory agency, Equatorial Energia was one of the most efficient companies in its sector, often outperforming industry benchmarks and serving as a reference for tariff policies.



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