



INFRASTRUCTURE INVESTMENT IN NORTHEASTERN BRAZIL

CHALLENGES AND OPPORTUNITIES IN A DEVELOPING REGION

August 12, 2013

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CHALLENGES AND OPPORTUNITIES IN A DEVELOPING REGION

SUMMARY

- *The Northeast region is growing faster than the national average due to a high performing service sector, retail sales, and tourism.*
- *Brazil's current infrastructure deficit is the result of several decades of declining public and private investment.*
- *To lessen this deficit, the Brazilian Federal Government has launched two national Growth Acceleration Programs (PACS 1 and 2) since 2007 to remedy insufficient physical infrastructure, especially in the energy and transportation sectors.*
- *Transportation investments focus primarily on road and rail improvements, but the new port concession law should attract increased private sector investment to an expanding list of ports.*
- *Public investments in airport expansion are needed to confront the immediate challenge of the 2014 FIFA World Cup and the long-term growth in passengers and the tourism industry.*
- *Energy investments in the region are concentrated in oil refineries, thermoelectric plants, wind energy farms, and expansion of the transmission system.*
- *The private sector must take a greater role in expanding and improving transportation and energy infrastructure throughout the region to guarantee sustained economic growth.*

NORTHEAST OUTPACES NATIONAL GROWTH RATE

Since 2002, the Northeast region of Brazil has outpaced national economic growth. From 2002 to 2008, the national rate averaged 2.85 percent annual growth while the Northeast achieved a 3.2 percent rate.¹ Although the sparsely populated Center-West and North regions expanded at even faster rates during this period, the Northeast's much larger population, approximately 53 million or 28 percent of the national population,² combined with its lowest per capita earnings in Brazil³ makes its recent growth and development a new engine of national economic activity. The Northeast's economic performance continues to exceed expectations and surpass the national growth rate following the global financial crisis of 2008, the country's subsequent recession in 2009, and the recent slowdown of the national economy since the 7.5 percent national rate of expansion in 2010. While the national economy cooled in 2011 and 2012, the region's economy remained hot. The three largest state economies of the Northeast – Ceará, Pernambuco, and Bahia – grew at rates near or above three percent – 3.7, 3.1, and 2.3, respectively – in 2012, well above the national level.⁴ The Northeast's economic performance is expected to continue to outpace the national average during the coming years, but the pace and scope of economic development will increasingly be dependent upon the successful planning and completion of a growing number of infrastructure projects.

The question for most of the region's population is whether the pace and scope of economic development, especially the infrastructure projects, will be enough to eliminate all but the most entrenched poverty in the region?

Despite recent economic growth, the Northeast region is host to the most deep-seated poverty in the nation. In 2010, the absolute poverty rate for the Northeast was 41.8 percent of the overall population while Brazil's national average had fallen to 20.9 percent.⁵ Although extreme poverty has fallen rapidly in Brazil during the past two decades, especially with the implementation of the *Bolsa Família* cash assistance program,⁶ the poorest compose 24.9

¹ Barros, Alexandre and Diloá Athias. "Salário mínimo, Bolsa Família e desempenho relativo recente da economia do Nordeste." *Revista de Economia Política*. Vol. 33, No. 1 (130) January-March, 2013: 179.

² IBGE. "Sinopse do Censo Demográfico 2010; Tabela 1.4 População nos Censos Demográficos, segundo as Grandes Regiões e as Unidades da Federação." Accessed on June 25, 2013 at: <http://www.censo2010.ibge.gov.br/sinopse/index.php?dados=4&uf=00>.

³ Porsse, Alexandre A., Marianne Z. Stampe, Marcelo S. Portugal, and Eduardo S. de Almeida. "Demographic Change and Regional Economic Growth in Brazil." TD Nereus 03-2012. São Paulo, 2012: Table 1, p.p. 8 and accessed on June 25, 2013 at: http://www.usp.br/nereus/wp-content/uploads/TDNereus_03_12.pdf.

⁴ Análise XII CEPLAN, Análise Ceplan. March 2013. <http://www.ceplanconsult.com.br/analiseceplan/interna.php?id=53&periodo=14>

⁵ Instituto de Pesquisa Econômica Aplicada (IPEA). "Dimensão, Evolução e Projeção da Pobreza por Região e por Estado no Brasil. Rio de Janeiro. 13 de Julho, 2013.

⁶ See Alexandre Rands Barros and Diloá Athias. "Salário Mínimo, Bolsa Família e Desempenho Relativo Recente da Economia do Nordeste." *Revista de Economia Política*, vol. 33, no 1 (130), pp. 179-199, janeiro-março/2013.

percent of the region's population, but only 10.5 percent of all Brazilians.⁷ IPEA estimates that by 2016 approximately half of all poor Brazilians will reside in the Northeast.

The Northeast's future growth and poverty rate will in large measure be determined initially by the public sector's financing and coordination of infrastructure projects, but future success will also depend on growing investments from the private sector, including foreign direct investment, to close the infrastructure deficit and increase the productivity of the poorest segments of the workforce. This [BrazilWorks](#) briefing paper provides a partial, exploratory analysis of infrastructure in the Northeast to further an understanding of the region and contribute to the policy debate.

THE INFRASTRUCTURE DEFICIT

Brazil's current infrastructure deficit is the result of several decades of declining public and private investment relative to Gross Domestic Product (GDP). Lanzana and Lopez report that while infrastructure investment peaked in the 1970s at approximately 5 percent of GDP with overall investment reaching 22 percent under the authoritarian rule of successive military governments.⁸ Since the 1970s, infrastructure investment rates declined by 3 percent as a proportion of the national economy and currently constitute approximately 2.1 percent of all economic activity.⁹ The gradual, but significant decline contributes to an explanation of Brazil's lower growth rates until the mid-2000s as the infrastructure deficit deepened to raise production and logistics costs throughout much of the national economy, especially in such poor regions as the Northeast. Lanzana and Lopes forecast that infrastructure investments alone would need to rise to 2.5 to 3.0 percent of GDP to achieve a 21 to 23 percent investment rate and annual growth at or above 5.0 percent.¹⁰ Such growth in infrastructure investment is made more difficult by the fiscal transfers of the federal government to poorly administered state and local jurisdictions.

The 1988 Federal Constitution and subsequent fiscal regime abolished designated taxes to generate revenue for federally financed infrastructure in energy, transport, telecommunications and electricity.¹¹ The absence of these dedicated revenues, partially responsible for the high infrastructure investments of the 1970s, has undercut the federal government's financial capacity to plan and implement infrastructure projects, especially in

⁷ Instituto de Pesquisa Econômica Aplicada (IPEA). "Dimensão, Evolução e Projeção da Pobreza por Região e por Estado no Brasil. Rio de Janeiro. 13 de Julho, 2013.

⁸ Lanzana, Antonio and Luiz Martins Lopes. "Desafios da Infraestrutura e Expansão dos Investimentos: 2011/2014." *Temas de Economia Aplicada*, FIPE. September, 2011:33.

⁹ Ibid.

¹⁰ Lanzana, Antonio and Luiz Martins Lopes. "Desafios da Infraestrutura e Expansão dos Investimentos: 2011/2014." *Temas de Economia Aplicada*, FIPE. September, 2011:33.

¹¹ Annabelle Mourougane and M. Pisu, "Promoting Infrastructure Development in Brazil," OECD Economics Department, Working Paper No. 898, *OECD*, October 21, 2011:8.

the face of the growing economic instability and hyperinflation of the late 1980s and early 1990s. Concurrently, the constitution also mandates expanding revenue-transfers from the federal government to state and local jurisdictions, many of which lack the experience in project management and public finance to effectively apply new and growing revenues to larger, more complex and integrated infrastructure projects.¹²

This fiscal dynamic steers resources away from federal agencies prepared to plan and administer large, integrated infrastructure projects and toward smaller governmental units without the expertise or experience in project management, pushing the infrastructure investment rate further downwards until it reached its nadir of only one percent of GDP by 2004.¹³ This dynamic was more pronounced in Brazil's poorest regions, such as the Northeast, where from 1990 to 1995 the region's public and private investments contracted by 1.7 percent while the national average grew 4.2 percent annually.¹⁴ Despite growth in private sector fixed capital formation, the public sector's contribution fell by 6.3 percent during this critical five-year period and remained stagnant until the introduction of the federal government's first Growth Acceleration Program (PAC) in 2007.¹⁵

PROMOTING GROWTH THROUGH INFRASTRUCTURE INVESTMENT

"Thanks to thousands of projects financed by the PAC, formal employment in the infrastructure sector grew by 7.9 percent annually from 2011 to April of 2013. Moreover, of the 50 largest infrastructure projects around the world in ports, transportation, electricity generation and transmission, and oil and gas, 14 are Brazilian... Brazil has relearned how to plan and implement large projects after decades of stagnation and will continue to be a global pole for continued investments in infrastructure."¹⁶

Brazilian President Dilma Rousseff

The Brazilian Federal Government launched an ambitious economic stimulus package in 2007, called the Growth Acceleration Program or PAC. The PAC featured plans to invest approximately \$250 billion USD in four years.¹⁷ These investments were loaded up in energy, social development, and transportation related projects. The PAC demonstrated the growing

¹² Ibid.

¹³ Annabelle Mourougane and M. Pisu, "Promoting Infrastructure Development in Brazil," OECD Economics Department, Working Paper No. 898, OECD, October 21, 2011.

¹⁴ Lima, J.P.R. "Traços Gerais do Desenvolvimento Recente da Economia do Nordeste." Revista Econômica do Nordeste. Fortaleza. Vol. 36, No. 1 (January-March 2005) as cited by Dominques, Edson Paulo, Francisca Diana Ferreira Viana and Heder Carlos de Oliveira. "Investimentos em Infra-Estrutura no Nordeste: Projeções de Impacto e Perspectivas de Desenvolvimento." Texto para Discussão, No. 319. UFMG/CEDEPLAR. September, 2007:13.

¹⁵ Ibid.

¹⁶ Interview with President Dilma Rousseff. "Na Conversa com a Presidenta, Dilma fala sobre investimento em infraestrutura e para agricultura familiar." July 16, 2013 and accessed at: <http://blog.planalto.gov.br/na-conversa-com-a-presidenta-dilma-fala-sobre-investimento-em-infraestrutura-e-para-agricultura-familiar/>.

¹⁷ Domingues, et. al., page 14

resolve of the federal government to spearhead, finance, and coordinate public and private investments critical to economic growth. Although the PAC did not feature regional development strategies, it did serve to address the infrastructure deficit and create new opportunities for private sector investment and growth. Moreover, the PAC served to renew the federal government's primary role in confronting the infrastructure deficit with a cascading list of projects and a commitment to work with local governments and private investors to maximize economic growth.

However, the PAC did not represent a comprehensive national development to diminish regional disparities. Rather, PAC's investment ledger leaned toward wealthier states. The Northeast region did collect some 15 percent of the overall PAC spending, but this was far from sufficient to fully address the infrastructure gap.¹⁸ However, Domingues, et. al. (2007) calculate that the PAC's investments in the Northeast could contribute as much as 1.25 percent to economic expansion in the short term and up to 5.65 percent for the longer term. In a more recent study, Domingues, et. al. (2012), forecast that infrastructure investments made between 2008 to 2011 (largely carried out through the PAC) added some 7.63 percent to the regional domestic product, with sanitation (1.57 percent) and housing (1.56 percent) comprising the largest contributions respectively (2012:409). The PAC 2 planned investments of nearly \$500 billion USD over four years will likely have a comparable effect with continued, but even greater emphasis on energy, transportation, and housing ([Minha Casa, Minha Vida](#)).

Table 1, Infrastructure Investment Growth, reports the rapid expansion of infrastructure investment growth for a select set of sectors from 2006 to forecasted amounts for 2014 under both the PAC and PAC 2 stimulus packages. Investments in electricity generation and transmission, sanitation, and logistics all surpass average annual growth rates during the period under study, 2006 to 2014. Moreover, investments in railway, road, and port facilities average 18.6 percent growth per year, double the overall annual growth for infrastructure investment. According to Lozana and Lopes' projections, investments in railway and ports will grow at annual averages of 24.7 percent and 26.6 percent respectively during the period of 2011-2014 (2011:34).

The implementation of the economic stimulus packages PAC and PAC 2 often confront delays stemming from poor planning and administration, human resource shortages and labor stoppages, and environmental preservation and other social movement protests and litigation. However, the emerging track record of these federal government financed and coordinated efforts is increasingly positive,

¹⁸ Domingues, et. al. 2012

“Seen from the perspective of regional growth and development in Brazil, it is clear that these infrastructure projects represent an indispensable strategy to create the pre-conditions for a new era of accelerated growth of the Brazilian economy wherein regional disparities are effectively reduced.”¹⁹

Table 1: Infrastructure Investment Growth

Sector	2006-2009 (Billions of USD)	2011-2014 (Billions of USD)	Percent Growth	Annual Average Growth
Electricity	104	139	34.0	6.0
Telecommunications	62	72	15.0	2.8
Sanitation	26	41	57.0	9.4
Transportation and Logistics -Railway -Road -Ports	55	129	499.0	18,6
Total Infrastructure	247	380	54.0	9.0

Source: Lanzana, Antonio and Luiz Martins Lopes. “Desafios da Infraestrutura e Expansão dos Investimentos: 2011/2014.” Temas de Economia Aplicada, FIPE. September, 2011:34.

INFRASTRUCTURE INVESTMENTS IN THE NORTHEAST

The mix of public infrastructure spending in the Northeast has rapidly increased employment in the construction industry, improved access to basic public services such as potable water and electricity, and set in motion an expanding list of productive investments by the private sector as well as the federal government-controlled oil and gas company, Petrobras, and electricity utility, Eletrobras. The infrastructure deficit will continue to undermine the region’s promise, but current investments are substantial and are further developing the region’s comparative advantages.

The Northeast’s long, pristine coastline brings domestic and international tourists to beaches year-round. Investments to expand the region’s airports will relieve already crowded terminals and accommodate the growing leisure and conference tourism industry while further developing the Northeast’s dynamic services sector. This same coastline makes the Northeast a potential international trading logistics hub with its proximity to major markets in North and South America, Western Europe, Western Africa, and the Caribbean. The concentration of

¹⁹ Domingues, et. al. (2012:423) and translated from the original Portuguese to English by the authors.

public investments in railway and port facilities will lessen logistics costs and likely increase private sector investment in export-oriented manufacturing, especially for energy intensive industries who will directly benefit from the expansion of the region’s generation-transmission-distribution (GTD) system as well as the installation of alternative electricity generation facilities that promise to fuel the region’s low carbon development path.

Table 2 reports the distribution of PAC 2 funds across states in the region; and in relation to regional population and regional GDP. Pernambuco receives the largest share of funds – with 29.9 percent, while Alagoas, the recipient of the smallest share, receives no more than 3.6 percent. Bahia and Ceará received the second and third most; the top three states have more than one half the investment. They also host the flagship infrastructure projects of the Northeast, including the Suape Port Complex located in the state of Pernambuco (see sidebar-page 13).

Table 2: Northeast Regional Population, Regional GDP, and Relative Distribution of the Northeast Region PAC 2 Funds by State

State	1) Percent of Regional Population by State (2010)	2) Percent of Regional Gross Domestic Product by State (2009)	3) Forecasted Relative Distribution of PAC 2 Funds in the Northeast by State (2011-2014)
Alagoas	5.9	4.9	3.6
Bahia	26.4	31.3	20.8
Ceará	15.9	15.0	12.9
Maranhão	12.4	9.1	7.8
Paraíba	7.1	6.6	5.0
Pernambuco	16.6	17.9	29.9
Piauí	5.9	4.3	5.7
Rio Grande do Norte	6.0	6.4	10.4
Sergipe	3.9	4.5	4.0

Sources: 1) Ferrari, Jurandyr Carvalho and Kamile Leão de Souza. “O Novo Perfil do Nordeste Brasileiro no Censo Demográfico 2010.” Banco do Nordeste. 2012:15; 2) Lima, Leonardo Dias. “A Região Nordeste nas Contas Regionais do Brasil, 1995-2009.” Escritório Técnico de Estudos Econômicos do Nordeste – ETENE Central de Informações Econômicas, Sociais e Tecnológicas – CIEST. Banco do Nordeste. 2012: Table 4; 3) these figures were calculated from the individual state reports of the 6-Balanco, Ano 2 PAC 2 Relatório, accessed at: <http://www.pac.gov.br/pub/up/relatorio/5762ec2c69a365f6c9218e937145d64c.pdf>.

Table 3 reports a Forecast of the Northeast Region’s Annual Investments in Infrastructure by Sector or Activity as a Percent of Regional GDP from 2008-2011. This cross-section of infrastructure investment is largely led by PAC and PAC 2 funds, but also includes substantial state and local public sector investment. These investments include the improvement of basic public services, including *Luz para Todos* (electricity distribution to the

poor), urban transportation, sanitation and housing as well as infrastructure to accelerate private sector investment and economic growth, including electricity generation and transmission, logistics, hydro resources, roads, and telecommunications. According to Mourougane and Pisu,

“Water and sanitation is the sector where investments are probably needed the most. This situation is particularly critical for sewerage, as only 47 percent of the population—concentrated in the South-Southeast region, benefit from sewage collection and approximately 20 percent of collected sewage is treated.”²⁰

Because of the stark need for the expansion and improvement of basic public services, infrastructure investment in public services is disproportionately larger as a portion of regional GDP than in Brazil’s more developed regions, the South and Southeast. Basic public services such as *Luz para Todos*, urban transportation, sanitation and housing comprise over well over three percent of the average annual regional GDP.

Table 3: Forecast of the Northeast Region’s Annual Investments in Infrastructure by Sector or Activity as Percent of Regional GDP, 2008-2011

Sector or Activity	Percent of Regional GDP, 2008-2011
Electricity	0.83
Luz para Todos	0.75
Logistics	0.54
Hydro Resources	0.76
Roads	0.53
Telecommunications	0.95
Urban Transportation	0.16
Sanitation	1.57
Housing	1.56
Total	7.63

Source: Domingues, Edson Paulo, Francisca Diana Ferreira Viana and Heder Carlos de Oliveira. “Investimentos em Infra-Estrutura no Nordeste: Projeções de Impacto e Perspectivas de Desenvolvimento.” Texto para Discussão No. 319. UFMG/Cedeplar. September 2007: Table 1, page 17.

²⁰ Mourougane, Annabelle and Mauro Pisu. “Promoting Infrastructure Development in Brazil.” OECD Economics Department Working Papers, No. 898. 2011:25.

TRANSPORTATION AND LOGISTICS

The Northeast region's future development as an international gateway for a growing list of exports and a rising number of tourists depend in large measure on lowering transportation and logistics costs. Unlike comparable nations, such as Australia, China, and the United States, Brazil's commercial transport sector is overly dependent upon trucking with approximately 58 percent of all cargo shipped over this nation's precarious roads while railways and water ways account for only 25 percent and 13 percent respectively.²¹ A number of studies have estimated that Brazil's overreliance on a poorly maintained, low quality road system may raise cargo transport costs some 28 percent.²² Without significant improvement in Brazil's commercial and passenger transport systems, the Northeast region's comparative advantages are likely to remain a promise rather than a source of growing productivity advances.

Roads

Brazil's road system undermines development and is most evident in the Northeast where the percentage of paved roads falls behind the national average of 13.8% in 2008.²³ According to the [Banco do Nordeste](#), the region's roadways feature worse conditions than the national average and fewer private sector concessions, thereby discouraging investment in this critical infrastructure sector.²⁴ Since the 1990s federal and state governments have granted highway concessions to an increasing number of private sector firms, numbering over 50 by 2009 with recent studies indicating that highways under private concession are on average in good or very good condition, and far better than government operated highways.²⁵ Up to April of 2013, PAC 2 road system investments have led to an increase in 1,889 kilometers of roadways with another 7,249 kilometers under construction (2,654 Km to be widened for greater traffic flows and another 4,695 Km to be paved).²⁶ For the underserved Northeast region, recent infrastructure efforts have focused on both expanding the highway system and improving road surface.

The largest road project underway in the Northeast is BR-101, which cuts through three states in the region: Sergipe, Alagoas, and Bahia. A major highway running North-South, it has been under construction since 2005, has exceeded expected costs, and was the subject of a corruption investigation. In April 2013 the concession was awarded to build 475.9 km of

²¹ Banco do Nordeste. "Panorama da Infra-estrutura de Transportes no Nordeste." Informe Sectorial. ETENE. Janeiro, 2010:4).

²² Mourougane and Pisu, 2011:24.

²³ Mourougane and Pisu, 2011:24.

²⁴ Banco do Nordeste, 2010:4.

²⁵ Mourougane and Pisu, 2011:24.

²⁶ Agência CNT de Notícias. "PAC 2 investiu R\$ 32,9 bi em transportes até abril deste ano." June 12, 2013 and accessed at: http://www.cnt.org.br/Paginas/Agencia_Noticia.aspx?noticia=PAC-obras-transporte-rodovias-ferrovias-portos-aeropostos-mobilidade-urbana-12062013.

roadway, with an expected investment of approximately \$1 billion USD. The Department of Transportation and the Army will construct (or widen) 43.9 km of roads by December 2014.²⁷ Other roadwork throughout the region will connect ports, add new lanes, or repave deteriorated roads impassable in the rainy season. Bahia will receive the most funding, and roadwork in Pernambuco and Ceará will amount to nearly \$1 billion USD and \$800 million USD respectively. In these two states roads will be built providing access to the ports of Suape, Pecém, and the Port of Fortaleza.

Inter-American Development Bank:

Brazil's Ceará State to receive \$400 million loan to improve logistics infrastructure

The Brazilian northeastern state of Ceará will receive a \$400 million loan from the Inter-American Development Bank (IDB) to improve highways and logistics infrastructure, enhancing connectivity between productive regions and consumer markets, and regional ports and airports.

The program will finance the rehabilitation of 560 kilometers of roads and the paving of another 410 kilometers of highways, improve the system's efficiency. This will allow drivers to stop using secondary roads, shortening the distance to get to their final destination and lowering transport costs. The project will interconnect highways with productive development areas.

In the stretch of highway CE-060, an important road that connects two cities in the state, Fortaleza and Crato, a rehabilitation and result-driven maintenance pilot project will be implemented. This project will help the government evaluate the benefits of a new highway maintenance management standard through an ongoing evaluation of quality indicators.

Railway

Since 1997, Brazil's railway system has received substantial investments, largely as the result of private concessions, but also through federal government funding of improvements to stop the system's overall contraction amidst the growing reliance on road for commercial cargo transport. Between 1997 and 2012, private sector investment in the railway system grew at 79 percent per year.²⁸ Initially these investments were concentrated on the recuperation of the physical infrastructure of the system, but recent investments have been made in improving operational efficiency. During this period, the acquisition of locomotives and train cars accounted for some 40 percent of all private sector investments, with some

²⁷ 7º Balanço de PAC 2, June 2013 and accessed at: http://www.pac.gov.br/pub/up/pac/7/PAC_7WEB.pdf

²⁸ Confederação Nacional de Transportes. "O Sistema Ferroviário Brasileiro." Brasília. CNT. 2013:27.

31 percent devoted to expansion of the rails.²⁹ On the public sector side, the federal government has invested approximately \$5 billion USD during the period accounting for approximately 23 percent of the total investment in the railway system. Given the Northeast region's recent development and accelerated growth pattern, further private and public sector investments in railway are needed to create the conditions for an expanding set of productive private sector investment projects in the region.

A critical project for strengthening the region's railway system is the Transnordestina Railway. At a cost of approximately \$4.1 billion USD, the project will see 1,728 kilometers of track laid between the port of Pecém (Ceará), the port of Suape (Pernambuco), and the municipality of Eliseu Martins (Piauí).³⁰ The Transnordestina will be a dedicated commercial cargo line and may reduce the logistics costs of important Brazilian exports, including iron ore and other minerals, soy and sugar, and possibly an increasing basket of transportation fuels such as ethanol and biodiesel. This line will eventually connect in Estreito (in the state of Maranhão) to the North-South line that serves the spine of the country's railway system. So far the project has faced major delays and disputes over cost. In 2006, the Ministry of Transportation estimated that the project would be concluded by 2010 at a cost of approximately \$2.5 billion USD; but now the Transnordestina will not be finished until 2015 at nearly twice the original cost estimate. The federal government is financing most of the project and has awarded the concession to Transnordestina Logística S/A with Odebrecht carrying out most of the construction. The concessionaire claims that the slow progress is due to work stoppages and labor relations issues that require further expenditures to complete the railway. This budget and labor impasse now stands poised to further increase costs and slow progress, a common challenge that Brazil and the Northeast region face in implementing many of the largest infrastructure projects so essential to future growth.

Ports

For years, Brazil's ports were neglected and poorly administered, but under the PAC and PAC 2 significant public sector investments have renovated and expanded port facilities and the new Port Administration Law passed in June of 2013 promises to boost private sector investment in port facilities and associated industries around the country.

²⁹ Ibid.

³⁰ "Transnordestina pode ganhar nova engenharia financeira em 30 dias," *Diário de Pernambuco*, January 15, 2013. http://www.diariodepernambuco.com.br/app/noticia/economia/2013/01/15/internas_economia.418064/transnordestina-pode-ganhar-nova-engenharia-financeira-em-30-dias.shtml.

Suape Port-Industrial Complex

The Port-Industrial Complex of Suape, located in the Recife metropolitan area in Pernambuco, is a main hub of development in the Northeast. The 30 year old site is already established as a major port and industrial complex: close to 100 companies are located in the site, working mostly within the petroleum supply chain; private investment reaches approximately US\$18 billion; and 30,000 people work in production or construction around the port complex.³¹ According to SuapeGlobal, the PAC and PAC 2 investments in the Suape Port-Industrial complex will reach \$2.3 billion USD during the period of 2007 to 2014, including projects such as pier construction, road and railway improvements and expansion, port dredging, and electricity substation and transmission line construction.³²

Port

Situated on the northeast shoulder of Brazil, Suape has direct shipping lanes to Africa, America, and Europe. Goods can reach New York in a week and Rotterdam in nine days, faster than they would from Rio de Janeiro or São Paulo.³³ In 2011, the Port of Suape shipped 11.2 million tons of cargo.³⁴ Suape Global, the managing company of the complex, estimates that total cargo shipped will rise to 30 million tons by 2014 and to 90 million tons by 2030. Examples of cargo passing through the port include oil and gas, agricultural commodities, textiles, building materials, automobiles, and food and beverage products. One of several projects underway will make the port deeper to allow for larger cargo ships. According to a federal report released in February 2013, R\$243.7 million of PAC 2 funds will be spent from 2011 to 2014 on draining the external canal. Several other drainage projects, including of two docks, are in a preliminary phase. Expanded highways will also help more goods reach port more efficiently.

Shipyard

To accompany expanded national oil production, Brazil is revitalizing its shipbuilding industry under the PROMEF (*Programa de Modernização e Expansão da Frota da Transpetro*) and through the PAC 2 investments. In the first phase 23 ships will be built, and in the second phase 26. Most of this planned ship building will take place at the Suape complex, including: 10 Suezmax tankers -- midsize, versatile ships that can access most ports in the world; 5 Aframax tankers - slightly smaller ships than Suezmax, Aframax are used for shorter hauls; and "7 vessels for Petrobras probes," all to be constructed by Atlântico Sul shipyard in Suape.³⁵

At the Promar shipyard another eight gas tankers and additional supply boats will be built for Transpetro. According to Suape Global, US\$1.38 billion of private investment will go into the Atlântico Sul shipyard and US\$1.67 billion will be invested in Promar. The third shipyard at Suape is CMO, a joint venture by Construcap, McDermott International, and Orteng, will focus on the "construction and integration of modules for offshore platforms."³⁶

³¹ Suape Global. <http://www.suape.pe.gov.br/home/index-en.php>

³² "Suape Projects and Opportunities." SuapeGlobal. APEX Seminar: Investing in Brazil's Oil and Gas Supply Chain." Houston, Texas. May 2, 2012 and accessed at: <http://www.ftbusiness.com/OTC2012/images/pdfs/suapeglobalproject.pdf>.

³³ "Suape Projects and Opportunities." Suape Global, presented at the APEX Seminar in Houston, TX, May 2, 2012. <http://www.ftbusiness.com/OTC2012/images/pdfs/suapeglobalproject.pdf>

³⁴ *Ibid.*

³⁵ Information about tanker size comes from "Types of Tankers," General Maritime Corporation. <http://www.generalmaritimecorp.com/the-industry/types-of-tankers.aspx>

³⁶ "Suape Projects and Opportunities." Suape Global, presented at the APEX Seminar in Houston, TX, May 2, 2012. <http://www.ftbusiness.com/OTC2012/images/pdfs/suapeglobalproject.pdf>

According to Alexandre Ditzel Faraco of Levy & Salmão Advogados,

“The law settled one of the sector’s main legal disputes concerning the handling by private terminals of cargo belonging to third parties. The former Port Law (Law No. 8.630/93) was unclear on this and was construed by some as requiring private terminals to handle principally their own shipments. Law No. 12.815/13 now clearly states that private terminals outside established ports are authorized to handle any type of cargo, including those of other companies, thus increasing competition among port operators and boosting greenfield site development via new investment, as the new regulations stipulate.”³⁷

The new port law will substantially increase private sector interest and investment to manage in public port authorities through concession contracts and construct and manage private cargo terminals and related infrastructure for an increasing range of Brazilian exports. This likely wave of private sector investments will follow substantial federal government outlays to improve port facilities throughout the Northeast region. Under the first PAC, the federal government spent approximately \$1 billion USD on port improvements, some \$900 million of which was devoted to the National Dredging Program.³⁸ PAC 2 diversified the range of port related projects, with investments in international passenger terminals, cargo terminals, and port access improvements. Table 4: PAC 2 Spending on Northeast Region Ports reviews the current projects and reports a total federal government investment of \$775.2 million USD in the region alone. These PAC 2 expenditures will improve ports across the region, but with a decided emphasis on the critical ports of Pecém and Fortaleza (mostly for tourism) in Ceará and the Suape port complex in Pernambuco where nearly half of all the PAC 2 port spending in the region will be devoted.

A burgeoning port system in the Northeast should ameliorate the overdependence on the primary ports of the Southeast and further develop the Northeast’s export-led and tourism-based economy. The Suape port facility, part of the flagship development in Pernambuco along with the Abreu e Lima petroleum refinery and a petrochemical plant, will allow the Northeast’s goods faster access to Europe and the United States, reducing shipping costs and time (see sidebar-page 13).

Of the \$800 million USD invested in regional ports through PAC 2 funds, \$330 million will go to Suape. That port has been drained, allowing deeper ships to enter, refuel, and load and unload goods. The ports of Fortaleza (Ceará), Natal (Rio Grande do Norte), and Itaquí (Pernambuco) were also drained and deepened. In Recife, Natal, Fortaleza, and Salvador

³⁷ Faraco, Alexandre Ditzel. “Brazil’s New Port Law.” Lexology. June 20, 2010 and accessed at: <http://www.lexology.com/library/detail.aspx?g=075b5ea7-a1ed-4e19-b75d-0c44b8cf2cb3>.

³⁸ Martins, Augusto Wagner Padilha, Vice-Minister of Ports, Brazilian National Government. “Brazilian Port Sector: New Model for Port Development.” Brazil- U.S. Business Council. Washington, D.C., April 23, 2010.

larger passenger terminals are under construction. Port expansion is having a significant effect on exports. Pecém, one of the largest ports in the region, moved 22 percent more goods in 2012 than the previous year and accounted for the shipping of 41 percent of total national steel and iron exports and 29 percent of national fruit exports.³⁹

Table 4: PAC 2 Spending on Northeast Region Ports

Port	State	Projects	PAC 2 Spending (USD)
Itaqui	Maranhão	Grain Terminal	\$155.5 million
Pecém	Ceará	2 Berths for Solid Cargo	\$111.1 million
Fortaleza-Murucipe	Ceará	Container Terminal	\$33.3 million
		Murucipe International Passenger Terminal	\$61 million
Natal	Rio Grande do Norte	Extension to Wharf	\$60 million
		International Passenger Terminal	\$31 million
Areia Branca	Rio Grande do Norte	Dredging	\$54.4 million
Cabedelo	Paraíba	-	-
Suape	Pernambuco	Solid Bulk Cargo Terminal	\$166.6 million
Recife	Pernambuco	International Passenger Terminal	\$13 million
Maceió	Alagoas	Dredging	\$13.8 million
Salvador	Bahia	Breakwater Extension	\$55.5 million
		International Passenger Terminal	\$20 million
Aratu	Bahia	-	-
Ilhéus	Bahia	-	-
Total			\$775.2 million

Source: Martins, Augusto Wagner Padilha, Vice-Minister of Ports, Brazilian National Government. "Brazilian Port Sector: New Model for Port Development." Brazil- U.S. Business Council. Washington, D.C., April 23, 2010.

This increasing investment in the Northeast region's ports and associated infrastructure is also accompanied by greater investment in Brazil's shipbuilding industry, largely for cargo shipping and oil and gas production. 22 oil tankers are slated to be constructed in Pernambuco and Bahia, accompanied by construction of rigs, drills, and docks.⁴⁰ At the Suape Port-Industrial complex (see sidebar on page 13), a number of shipbuilding firms are investing

³⁹ "Porto do Pecém cresceu 28% este ano," *CearáPortos*. March 13, 2013. <http://www.cearaportos.ce.gov.br/index.php/informacoes/listanoticias/517-porto-do-pecem-cresceu-28-este-ano>

⁴⁰ 7º Balança de PAC 2, June 2013. http://www.pac.gov.br/pub/up/pac/7/PAC_7WEB.pdf.

in production facilities, including Estaleiro Atlântico Sul with approximately \$1 billion USD in planned investments along with PROMAR and CONSTRUCAP.⁴¹

Airports

Brazil will need to double the capacity of its existing airports to confront the steady pace of increasing demand for air transportation by 2030, nearly two and half times the number of passengers in 2009.⁴² McKinsey and Company forecast that some \$12-17 billion USD will be required for airport expansion over the next 20 years to meet the accelerating demand for air transport.⁴³ Moreover, a more targeted set of infrastructure investments are necessary to prepare Brazil's major airports and reduce transportation bottlenecks in anticipation of the 2014 FIFA Men's World Cup and the 2016 Summer Olympic Games in Rio de Janeiro. In the Northeast region, PAC 2 funds have included completed projects at Recife's airport as well as at the São Gonçalo do Amarante airport in the state of Rio Grande do Norte where the company Inframérica won a concession to expand and operate this airport for the next twenty-eight years. Terminals in the states of Bahia, Ceará, Maranhão, Pernambuco, and Piauí will all see varying levels of expansion or maintenance over the next four years.

2014 FIFA WORLD CUP

The 2014 FIFA World Cup championship is preceded by a national effort to reform or construct new stadiums and tie them into urban transport systems. Most of the investment will come from the federal government, estimated at nearly 65 percent of the total investments in stadiums and associated infrastructure, with state governments comprising nearly a quarter of all investments.⁴⁴ Four Northeastern cities will host FIFA World Cup matches in 2014: Fortaleza (Ceará), Natal (Rio Grande do Norte), Recife (Pernambuco), and Salvador (Bahia). The timeline for most of these transportation projects is driven by the need to host thousands of visitors for this country-wide, international event. Meeting recent deadlines has proven to be a major challenge. Still, with few exceptions, the government retains responsibility for all related projects – roads, airports, ports, and stadiums– except for hotel construction. For these Northeastern cities, stadium investment is integrated with additional public investments in transportation and private investments in hospitality. Table 5: Northeast FIFA World Cup Stadium Projects reports each city's stadium construction budget estimate and forecasted date of completion.

⁴¹ Suape Projects and Opportunities." Suape Global, presented at the APEX Seminar in Houston, TX, May 2, 2012. <http://www.ftbusiness.com/OTC2012/images/pdfs/suapeglobalproject.pdf>.

⁴² McKinsey and Company. "Estudo do Setor de Transporte Aéreo do Brasil." Rio de Janeiro, 25 de Janeiro, 2010:11) and accessed at: http://www.bndes.gov.br/SiteBNDES/export/sites/default/bndes_pt/Galerias/Arquivos/empresa/pesquisa/chamada3/sumario_executivo.pdf.

⁴³ Ibid, page 18.

⁴⁴ SINAENCO. "PAC da Copa 2014: Arena e Mobilidade Urbana." July 2010 and accessed at: <http://www.sinaenco.com.br/downloads/Relatório%20PAC%20da%20Copa.pdf>.

Table 5: Northeast FIFA World Cup Stadium Projects

City	Project Cost in USD	Forecasted Date of Completion
Fortaleza (CE)	\$259 million	December, 2012
Natal (RN)	\$219 million	December, 2013
Recife (PE)	\$250 million	February, 2013
Salvador (BA)	\$295 million	February, 2012

Source: Information compiled from state PAC 2 reports, February 2013.

ENERGY

The Northeast region is targeted for substantial productive and infrastructure investments in energy. Substantial public and private investments will expand the production of electricity, petroleum and its derivatives, and an increasing portfolio of alternative renewables including wind energy in the coming years. In 2013 alone, the federal government-controlled Petrobras (oil and gas) and Eletrobras (electricity) will invest some \$ 9 billion USD in regional energy investments representing approximately one quarter of all national investments.⁴⁵ Most of Petrobras' investments in the region are concentrated in the Abreu e Lima oil refinery at the Suape Port-Industrial complex. Eletrobras' investments are largely distributed to the states of Alagoas, Bahia, and Piauí and couple with PAC 2 investments in expanding and modernizing the transmission system.

Public investment in electricity generation is aimed at the renovation and construction of gas-fired thermoelectric plants that will complement the rapid private sector investment in wind energy, an alternative renewable with great prospects in the Northeast region. Today, most of Brazil's wind energy is produced in the states of Ceará and Rio Grande do Norte in the Northeast and Rio Grando do Sul in the South. In addition, there are a number of new projects under development in the Northeast region which will install another 174 new wind turbines across the region, with the majority in Rio Grande do Norte (79), Bahia (50), and Ceará (37). Of those planned, 18 are finished and 76 are under construction. Also, 27 new electricity transmission lines, mostly short and intrastate but with some longer regional lines, will better connect the region's increasing numbers of wind energy farms and thermoelectric plants.⁴⁶ The public investment in expanding transmission lines is now drawing greater

⁴⁵ Viana, Fernando Luiz Emerenciano and Geraldo Majela Lima Barbosa-Banco Nordeste, Informe Técnico do ETENE. "Previsão de Investimentos Públicos no Nordeste em 2013." April, 2013:11.

⁴⁶ Data compiled from individual state PAC 2 reports from February 2013.

attention to wind energy opportunities in the Northeast and a rising tide of related businesses and private sector investments.

The oil and gas industry coupled with petrochemicals is also a major target of increasing infrastructure and productive investment in the Northeast region. Current public and private investments, led by Petrobras, are aimed at meeting rising regional demand for transportation fuels and setting the foundation for future exports. The Premium I Refinery in Bacabeira (Maranhão) is the largest PAC 2 investment in Brazil. It is slated to process 600 thousand barrels per day (bpd) of nationally produced oil and refine into high quality diesel. The overall estimated cost of the project is approximately \$20 billion USD, most of it is to be spent between 2014 and 2017. The project is now 10 percent completed, according to the most recent PAC 2 report. Petrobras estimates that it will generate more than 100,000 jobs.⁴⁷ In addition, the Premium II Refinery in Ceará is awaiting final approvals, but is forecasted to begin processing 300,000 bpd of oil in December 2017, with three-fifths of the crude being refined for diesel production.

PAC 2's second leading project in terms of cost is Petrobras' Abreu e Lima Refinery in Pernambuco. It is scheduled to be operating by December 2014 and fully completed by the end of 2016. The seventh PAC 2 report, issued in June 2013, notes that construction is 75 percent complete. The refinery will process 230 thousand bpd of heavy crude oil from Brazil and Venezuela. The likelihood of this project being completed in the projected timeline is questionable: only \$2.2 billion USD of \$15 billion has been invested, and 40 percent of that total is marked to come from the Venezuelan state oil company PDVSA, which agreed to share funding responsibilities. The rest of the funding will come from Petrobras. President Rousseff has been trying to reengage with PDVSA to reconfirm their commitment since Venezuela elected Nicolás Maduro president in April 2013.⁴⁸

In Bahia, the Landulpho Alves Refinery (RLAM) – sixty years old and Petrobras' second largest refinery—will be updated and expanded. The majority of the work has already been completed.

The Suape Port and Petrochemical Complex in Pernambuco (see sidebar on page 13), just south of Recife, is one of the largest industrial centers in Brazil. At a cost of some \$3 billion USD, the petrochemical plant is open for private concession and will operate as two separate businesses. One will produce 700,000 tons of terephthalic acid (PTA), which is the main ingredient in producing polyester and other manufacturing components. The second

⁴⁷ "Refinaria Premium I produzirá diesel de alta qualidade," Petrobras, Oct. 14, 2009. <http://www.petrobras.com.br/pt/noticias/refinaria-premium-1-produzira-diesel-de-alta-qualidade/>

⁴⁸ "Dilma garante construção de refinaria em PE," EXAME via Reuters, March 25, 2013. <http://exame.abril.com.br/brasil/noticias/dilma-garante-construcao-de-refinaria-em-pe-2>

part of the plant will have the capacity to produce 240,000 tons per year of partially finished polyester materials for woven and knitted fabrics, polymers used in other parts of the textile industry, and 450,000 tons per year of resin for plastic packaging. The plant should create 1,800 jobs during operation.⁴⁹

Developments in the natural gas industry continue. The expansion of the Malha Nordeste natural gas pipeline, which runs along the Northeast coast has entered its second phase of development. A new terminal at the Bahia regasification plant is three-quarters finished. These and many other investments related to petroleum and petrochemicals will create quality jobs, boost private sector investment in related activities, and guarantee energy security for decades to come.

PRIVATE INVESTMENT

The Northeast region has greatly benefited from public investment in productive infrastructure, largely through the federal government's PAC and PAC 2 spending programs, but also through such state enterprises as Petrobras and Eletrobras as well as state government spending. However, as public investment flows slow, the private sector must take a greater role in expanding and improving transportation and energy infrastructure through the region to guarantee sustained economic growth and close the development gap between the Northeast and the Southern regions of Brazil. At the national level, Brazil has witnessed "a surge" in infrastructure projects in the energy sector since 2004 and a second in the transport sector beginning in 2006.⁵⁰ The rise in private sector investment surpasses that of most of Brazil's neighbors, a result of the country's growing experience and success with concession contracts. New laws adopted to modify the 2004 Public Private Partnership law should also increase private sector investments in airports and ports during the coming years.⁵¹

Most of the recent private sector investment is concentrated in the logistics and port-complex industries. Geographically linked by the Transnordestina and West-East railways, these opportunities include the iron and mineral ore export platform at the Itaqui port in the state of Maranhão. This project alone is forecasted by the Ministry of Finance to attract nearly \$2.3 billion USD from 2014 to 2017.⁵² In addition, the ports of the state of Bahia, including Ilhéus, will attract approximately \$2 billion USD during this same period as well.⁵³ The port at

⁴⁹ Petroquímica Suape. <http://www.pqspe.com.br/site/?d=1&lang=en-us>

⁵⁰ Mourougane and Pisu, 2011:13 and Credit Suisse. "The Brazilian Infrastructure: It's Now or Never." July 29, 2013.

⁵¹ See Mourougane and Pisu, 2011 for more information about the 2004 PPP law and for recent private sector interest in infrastructure, see Boadle, Anthony and Leonardo Goy. "Brazil offers better terms for infrastructure investors." Reuters. May 21, 2013 and accessed at: <http://www.reuters.com/article/2013/05/21/us-latam-summit-brazil-infrastructure-idUSBRE94K0WN20130521>.

⁵² Brazil's Ministry of Finance. "Infrastructure in Brazil Projects, financing instruments, opportunities." February, 2010: 70-71.

⁵³ Ibid.

Ilhéus, through a 25-year concession contract, will receive some \$50 million USD to expand cargo storage facilities and passenger facilities in the coming years.

Private infrastructure investments such as these are accompanied by an increasing number of productive private investments throughout the manufacturing sector in the region. In 2001 Kraft Foods inaugurated its first plant in the Northeast – producing chocolate and powdered drinks – at its facility in Pernambuco and Heineken beer now operates a major brewery in Ceará. For the tourism industry, hundreds of new hotels are under construction or recently opened with the greatest concentrations around Salvador, Bahia, Recife in Pernambuco, and Fortaleza in Ceará.⁵⁴ The more private investment in manufacturing and tourism, the greater the likelihood that additional private sector investment will flow toward concession-based opportunities in transport and logistics and advance a sustainable growth path for the Northeast. This flow may be further increased through the successful implementation of the *Brasil Maior* plan⁵⁵ which targets tax credits and favorable financing through the National Government Development Bank, known as BNDES, to private sector enterprises to encourage technological innovation and international competitiveness.

CHALLENGES AND OPPORTUNITIES

1. While infrastructure may be an insufficient condition to rapidly reduce poverty in the Northeast region of Brazil, the narrowing of the infrastructure gap is critical to attracting productive investment, accelerating workforce development, elevating incomes, and providing a sustainable economic foundation that also narrows the regional disparities between Brazilians. Current and planned infrastructure projects in transportation and energy that serve to lower overall production costs could open the door to a new era of regional development that reduces the role of the *Bolsa Familia* cash assistance program so critical to the welfare of the region and its population today, improves financing and the outcomes of public education, and creates well paying jobs fully integrated in global production chains in agricultural and mineral commodities, manufactured goods, and tourism-based services. The challenge is to improve project planning and management in the short run and create concessionary regimes that attract productive investments in all sectors of the region's dynamic economy.

2. In the short term, Brazil must build more and better roads to ship products to markets in Brazil and around the world. However, roads are not the long-term answer to the region's promise of sustainable economic development. **The expansion and deeper integration of**

⁵⁴ IBGE. "2011 Pesquisa de Hospedagem." Rio de Janeiro. 2012.

⁵⁵ See Brasil Maior at: <http://www.brasilmaior.mdic.gov.br>.

Brazil's air, rail, waterway transport systems are essential to lowering logistics costs to take full advantage of the national and regional comparative advantages that underlie the Northeast's recent economic development. The Inter-American Development Bank's recent investment in the state of Ceará's roadways is welcome (see sidebar on page 11), but greater government planning in consultation with public, private, and multilateral bank investors, is necessary to shape a long term, strategic trajectory for transport in the Northeast that positions its major ports, such as Suape, to be key regional transport and manufacturing hubs that serve Brazil, South America, and, increasingly, the South Atlantic.

3. Current regional infrastructure projects in the energy sector are strategic and serve the long-term development goals of Brazil and the Northeast region. The construction or modernization of Petrobras' oil refineries, such as the Abreu e Lima refinery, and infrastructure investments in natural gas distribution are essential to the energy security of Brazil and serve to provide the proper infrastructure foundation for greater productive investments in petrochemicals. Moreover, if the sugar-ethanol industry can develop more productive varieties of sugarcane for cultivation in the mostly arid Northeast, then the region could also make a modest but measurable contribution to the nation's transportation fuel matrix precisely at a time when rising demand for fuels challenges Brazil's capacity to produce and refine gasoline and ethanol. Also, Eletrobras' steady investments in generation and transmission of electricity in the region are quickly leading to a juncture wherein private investors can increase their stakes in the development of wind energy capacity in the region. Expect rising investments in wind energy as the region's transmission system expands and incorporates "smart grid" technologies that open up more and more opportunities to deliver wind-generated electricity at competitive costs.

4. The long-term key to the Northeast's economic development and social inclusion is the promotion of private investment. Current infrastructure projects in transportation and energy make measurable contributions to the regional GDP and offer gainful employment to an expanding, but undereducated workforce. Improved project planning and management could amplify these effects in the short term, but eventually federal and state governments must focus efforts on public education and workforce development to prepare the region's workers for the opportunities that will likely follow these infrastructure investments. Yet, such opportunities are contingent on a strategic mix of public and private sector investment – through the state-controlled enterprises of Petrobras and Eletrobras, national private firms such as Braskem in the petro-chemical sector – and the strategic steering of foreign direct investment toward productive activities in the Northeast that offer greater technology transfer and workforce development opportunities for the region's local firms and people.

5. Increasing private sector investment requires greater consultation among government authorities at all levels, state-controlled enterprises, public and private banks, national and foreign firms, and investors to identify strategic opportunities, draft and implement appropriate regulatory frameworks, and work in coordination to develop firm level competitive advantages that can position the Northeast as a strategic logistics and productive link in a growing number of global production chains.

BrazilWorks provides consulting services to Brazilian and United States based private sector enterprises, civil society organizations, and policymakers interested in Brazilian markets, investment opportunities, public policies and regulations, the national political economy, and international commercial relations. BrazilWorks specializes in agriculture, biofuels, climate change, capital goods, energy, healthcare, local content policies, oil and gas, development and regulatory policy, and international commercial and investment negotiations.

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