

Country Infrastructure Briefs: Southern Cone

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POLICY BRIEF N°
IDB-PB-315

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April 2019



Cataloging-in-Publication data provided by the
Inter-American Development Bank

Felipe Herrera Library

Country infrastructure briefs: Southern Cone / Soledad Feal-Zubimendi, José Alejandro Quijada, Gabriel Sánchez, Virginia Queijo, Sebastián Miller, Santiago Massia, Florencia Pietrafesa.

p. cm. — (IDB Policy Brief ; 315)

Includes bibliographic references.

1. Infrastructure (Economics)-Southern Cone of South America-Finance. 2. Public-private sector cooperation-Southern Cone of South America. 3. Economic development-Southern Cone of South America. I. Feal-Zubimendi, Soledad. II. Quijada, José Alejandro. III. Sánchez, Gabriel. IV. Queijo von Heideken, Virginia. V. Miller, Sebastián. VI. Massia, Santiago. VII. Pietrafesa, Florencia. VIII. Inter-American Development Bank. Department of Research and Chief Economist. IX. Inter-American Development Bank. Country Department Southern Cone. X. Series.
IDB-PB-315

<http://www.iadb.org>

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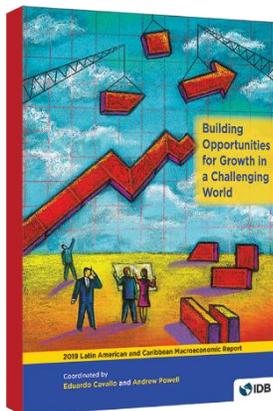


Abstract

This policy brief summarizes challenges in the infrastructure sectors of Argentina, Brazil, Chile, Paraguay and Uruguay. It also includes recommendations to overcome these challenges, along with an overview of the PPP framework, national development plans, and ongoing initiatives.

Key Words: Infrastructure, Capital, Public Goods, Public-Private Partnerships, Economic Growth, Transportation, Water and Sanitation, Energy, Environment, Telecommunications

JEL Codes: D24, H41, H54, L32, L90, O18, Q53



This policy brief is released as complementary documentation to the 2019 Latin American and Caribbean Macroeconomic Report: Building Opportunities to Grow in a Challenging World. To download the full report, please access: www.iadb.org/macroreport2019

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Argentina

Gabriel Sánchez and Santiago Massia

1. INFRASTRUCTURE CHALLENGES

Argentina is lagging behind in global rankings of infrastructure competitiveness. In the World Economic Forum's 2018 Infrastructure Ranking, Argentina is 68th among 140 countries, trailing Latin American peers such as Chile (41), Mexico (49) and Uruguay (62). Infrastructure investment stands at 2.5 percent of GDP,¹ and the quality of infrastructure stock is lower than expected given the country's level of development.² In order to close the infrastructure gap, the country should double the level of investment as a percentage of GDP for the next 15 years. This is anticipated to result in per capita GDP growth of 3 percent over a five-year span.³

Given its income level, as proxied by its GDP per capita, Argentina is below the expected level of development in the transport sector but slightly exceeds expectations in the energy and telecommunications sectors.⁴ The water and sanitation sector exhibits a positive and significant gap at the national level but is significantly below norm in several regions, including the Greater Buenos Aires Area.

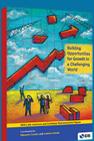
- **Transportation.** Each indicator within this sector displays significant gaps, the largest being the stock of railway lines, paved routes and infrastructure quality as surveyed by the World Economic Forum (WEF). The total stock of roads and the quality of port infrastructure are also deficient, though to a lesser extent. The country faces significant challenges in terms of transport and logistics. The 2017 World Enterprise Survey reveals that in Argentina a significant percentage of companies (22.8 percent) identify transportation as a major restriction on their activities. In the World Bank's Logistics Performance Index for 2018, Argentina ranks 61 out of 160 countries, below regional peers like Chile, Brazil, Colombia and Mexico. According to this index, Argentina exhibits significant deficiencies in the areas of customs (ranks 98), logistics quality and competence (ranks 68) and infrastructure (ranks 62).
- **Energy.** The country has positive gaps in terms of access to electricity and private participation in sectoral investment. However, there are still electrical outages that generate economic losses above those expected for a country of its level of development. While per capita energy consumption is appropriate to the country's degree of development, insufficient availability of energy is an active restriction on long-term growth, as are inadequate available quantities of energy and high marginal costs. Although in 2016 the government started a tariff normalization process that seeks to converge to the coverage of long-term costs by users, a significant portion of energy consumption is still financed by public subsidies. Evidence presented in the 2017 World Enterprise Survey shows that, relative to its regional peers, Argentina is the country in which the highest

¹ According to Infralata (http://www.infralata.info/).

² Izquierdo, Pessino and Vuletin (2018).

³ Rubio, Barafani and Giarrizzo (2016).

⁴ The sectoral development gaps are estimated following the methodology proposed by Borensztein et al. (2014).



percentage of companies (47.2 percent) identify electricity availability as the greatest restriction on production.

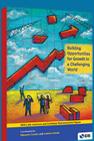
- Telecommunications.** Argentina shows a positive and significant gap in the number of Internet and mobile telephone users. On the other hand, the number of broadband Internet subscribers is in line with the level predicted by the country's GDP per capita. However, when considering an indicator closely related to productivity enhancement, such as the level of technology absorption by firms, there is a significant negative gap. Additionally, Argentina shows relatively favorable indicators related to ICT access but performs poorly in terms of quality and cost of these technologies. According to the Technological Development Index of the International Telecommunications Union (ITU), Argentina is in a relatively favorable position, ranking above the averages of its regional peers and the developing countries. The ITU data shows that Argentina leads Latin America in terms of Internet access, at 63% of households, but below the 84 percent and 89 percent registered in the United States and Canada, respectively. Castro et al. (2015) show that, although Argentina has one of the highest rates of mobile telephone penetration in the region, the operation of the network presents severe congestion problems. On the other hand, evaluations carried out for 2016 by the Regional Dialogue on the Information Society (DIRSI) show that in Argentina the cost of broadband connections is much more expensive than in the rest of Latin America.

2. RECOMMENDATIONS TO OVERCOME CHALLENGES

Boosting the country's infrastructure requires a combination of policy actions, ranging from developing an adequate system of investment-attraction mechanisms and guaranteeing macroeconomic stability to exploring key interventions in subsectors with high growth-potential.

The infrastructure gaps unveiled here largely stem from an inadequate contract environment following the discretionary changes in sectoral regulations and pricing regimes that ensued the end of Convertibility in 2001-2002. These changes resulted in distorted prices that discouraged investment, despite growing government subsidies, and led to increasing waste and misuse. Subsidies were also subject to leakages that favored high-income users. Additional difficulties included the destruction of the energy wholesale market, poorly functioning regulatory agencies and other institutional deficiencies. Public investment in infrastructure was also subject to sizable corruption that hurt the availability and quality of infrastructure. There is additionally an important restriction arising from insufficient availability of public and domestic private savings to finance investment in infrastructure, together with domestic capital markets' unsatisfactory performance in channeling domestic savings to financing investment in infrastructure. Given these constraints, policy actions should seek to attract foreign capital to invest in these sectors, which in turn calls for developing mechanisms such as guarantee funds, adequate mechanisms for risk allocation, contract standardization, and provision of sector-specific information.

The current government has made infrastructure investment a central issue in its agenda. To this end, it has corrected to a great extent the utility price misalignments, it has introduced guarantee programs (like the Programa Renovar for renewable energy investments) and has sought to recreate an environment that favors investment in these sectors and enhances its impact and efficiency. The government has also made the financing of sustainable infrastructure one of the priorities of the agenda of the 2018 G20 meeting, which was chaired by Argentina. More specifically, the government carried out institutional reforms aimed at improving the process of selection, prioritization and management of public infrastructure projects, simplifying the system and improving its accountability at the same time. In this sense, since 2017, the Chief of Staff is responsible for the National System of Public Investment in order to achieve a systemic and



integral approach for the formulation, evaluation and monitoring of public investment, and to identify intersectoral synergies and articulate strategic plans. Likewise, the Bank of Public Investment Projects (BAPIN) was consolidated as the only channel for including investment projects in the National Budget, thus providing for homogeneous and standardized information on all investment projects.

Despite these efforts, the government, forced to accelerate fiscal consolidation, had to cut public investment for the coming years (the federal government capital expenditures would go from 2.4 percent of GDP in 2016 to 1.3 percent of GDP in 2019). This is a shortcut for achieving fiscal balance that cannot be sustained over time, as capital expenditures have a much larger multiplier (1.03) than current spending (0.18).⁵ While these measures contract public investment in the short run, they are part of a greater effort to ensure macroeconomic stability, a key element of the policy mix that seeks sustainable long-run investment and growth. According to the National Budget, a part of the federal government's cap expenditures could be replaced by greater private sector involvement through public-private partnerships (PPPs) and by investment on the part of provincial governments.

In regard to sector-specific interventions, agribusiness displays notable potential, as it offers significant payoffs in terms of growth given its large income and export shares, as well as its production linkages. Challenges for the expansion of this sector include the adoption of digital technologies in production, commercialization, financing, logistics and risk management (at the primary level). Additionally needed are trade policies and agreements for improving valued added exports, together with investment in infrastructure that reduces transport costs and improves exporting capacity for differentiated agricultural goods. Finally, continuous investment in biotechnology applied to plants and animals is required.

Another area that may benefit from is knowledge-based services (software, business services, and cultural goods). Argentine exports of knowledge-based services have been growing faster than world exports, which in turn are the fastest-growing item worldwide. Argentina exports significantly more ICT services than is expected for its income level. This sector already represents the country's fourth largest export and offers significant spillovers, agglomeration economies and potentially large linkages with the rest of the economy. However, the sector faces obstacles to continuous expansion including limited availability of digital skills, digital infrastructure, financing, and local adoption of digital solutions; according to the World Economic Forum, Argentina fares very poorly in terms of firms' readiness for technology adoption.

Finally, Argentina enjoys a large latent comparative advantage in shale gas and oil production in the Vaca Muerta field, considered the second largest reserve in the world after U.S. reserves. Investment in this area is already taking place and is expected to boom in the next few years, generating large payoffs in terms of increasing GDP growth and lowering energy costs. Potential bottlenecks in fully profiting from exporting excess natural gas to neighboring countries include the current lack of liquifying plants and a potential lack of sufficiently large cross-border pipelines.

3. PUBLIC-PRIVATE PARTNERSHIPS FRAMEWORK: QUALITY AND IMPLEMENTATION

The government's efforts to boost investment in infrastructure have included improving conditions for private sector participation, particularly in the form of public-private partnerships (PPPs). In the fourth quarter of 2016 Argentina approved a PPP Law, one of whose main goals was implementing a National Transport Infrastructure Plan with investment projects totaling US\$35

⁵ Puig (2014).



billion. The first phase of the implementation plan involved the tender of six highway PPP projects with a combined value of US\$6 billion. The IDB Group provided advisory services to the Government of Argentina (GOA) to support the structuring and design of the international public tender for the projects. This support was requested by GOA, as these were the first PPP proposals inputs required to design the PPP contract and tender documents. The bidding process was launched in the first quarter of 2018 and awarded in July 2018. According to the Infrascopes index of implementation quality, Argentina ranks near the bottom of the region, only above Venezuela. This seems to reflect the country's lack of experience in this area.

Investment in quality infrastructure (public or private via PPP) is bound to have sizable growth effects via improvements in private sector productivity and international competitiveness. Argentina currently has large infrastructure deficits, especially in transportation. According to the World Economic Forum's Global Competitiveness Index, from 2006 to 2018 Argentina's rank in infrastructure quality fell from 61 to 68. Gap analysis, moreover, finds that transportation infrastructure presents one of the largest sectoral gaps. Additionally, the Priorities for Productivity and Income analysis prepared by Izquierdo et al. (2016) finds investment in infrastructure is required in order for Argentina to move to a higher-income cluster of countries.

4. NATIONAL DEVELOPMENT PLANS ON INFRASTRUCTURE

Besides the National Transport Infrastructure Plan described above, the government has launched an ambitious program for the exploitation of Vaca Muerta. The New Gas Plan similarly encourages investments in unconventional reservoirs in the Neuquen basin, guaranteeing a minimum price for gas sold in the local market, and an agreement was reached by the Provincial Government of Neuquen, oil companies and unions in order to enhance competitiveness in Vaca Muerta and reduce labor costs. In addition, import tariffs on machinery used for the exploitation of hydrocarbons was reduced. The benefits are added to those established in the Hydrocarbons Law of 2014 (Law No. 27007) that extends exploration periods (two periods of 4 years, with an extension of 5 additional years) and allows concessions of 35 years, with the possibility of adding 10 more years for unconventional hydrocarbons. The law further establishes a 12% royalty, with an additional 3% for each extension of a concession up to a maximum royalty of 18% maximum.

5. POLICIES AND INTERVENTIONS UNDER CONSIDERATION

A guarantee scheme using the IDB's Flexible Guarantee instrument is being implemented in which the IDB guarantees public commitments in PPP contracts to recipients such as special purpose vehicles, investors and financiers.

The government currently does not have specific policies to further promote agribusiness, instead relying on the country's strong comparative advantage to extract revenues via export taxes. Horizontal policies, such as the Ley de Emprendimiento Productivo, however, may provide some support to agtech startups. Additional support may come from the provision of sector-specific public goods by INTA, the National Institute of Agricultural Technology.

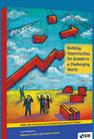
Other policies promote knowledge-based services in general, and software in particular. These include provision of public goods as in the Software Law, Programa 111.000 (public training of 111,000 programmers of different skill levels), and the recent Entrepreneurship Law. These policies, however, appear to have had limited impact in both scope and effectiveness. The biggest



support comes from the provision of education in relevant fields such as engineering and programming.

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Brazil

Jose Luiz Rossi Júnior

1. INFRASTRUCTURE CHALLENGES

Gap-analysis exercises performed by the IDB Group show that the problems affecting Brazil's infrastructure sector are systemic in nature.⁶ They include deficient long-term planning, the need for an integrated strategic vision, and improvement in project guidance and screening to support construction of a quality pipeline. In addition, critical sectors face regulatory risk, which affects profitability, while procurement and environmental permitting practices need to be improved to support swift project implementation and operation. Long-term infrastructure financing options are very limited due to incentive misalignment and shortcomings in the regulatory environment, issues exacerbated by the current fiscal situation.

Enhancing infrastructure, particularly in the transport sector, is key for improving Brazil's growth and productivity prospects. IDB Group analysis has identified shortcomings in indicators of quality, coverage and total spending. In 2017 Brazil invested close to 1.5 percent of GDP in infrastructure. According to the World Economic Forum, Brazil requires an infrastructure investment level of 3.2 percent of GDP over 2019-2024 to meet the country's development needs.

- Transportation.** Brazil's paved road network is small relative to the size of the country, and it suffers from problems related to signage, pavement quality, and engineering. The country has one of the largest road networks in the world in absolute terms at approximately 2 million kilometers, but only 12.3 percent of the network is paved, and 28 percent is in poor condition. The operating cost of the country's paved roads network is unusually high, some roads have strongly negative environmental impact, and the high rate of road accidents imposes significant social costs. Brazil's heavy reliance on trucking, moreover, increases the cost of freight transportation. The railroad network is limited and suffers from operational bottlenecks. Obsolete equipment, limited multimodal terminals, and capacity deficits reduce the efficiency of the country's port system. Despite Brazil's vast network of rivers, the development of waterway transportation is still in its early stages and suffers from low-quality infrastructure and facilities. Infrastructure deficiencies and operational limitations are major challenges in some airports.
- Energy.** The electricity sector needs to increase capacity and diversify the energy mix. Brazil's electricity matrix is highly dependent on hydropower, a clean and low-cost renewable source of energy, but one vulnerable to climate change. Ideally, additional generating capacity should come largely from renewable sources other than hydropower, such as wind and solar systems. Wind power has the potential to generate as much as 350 gigawatts, more than doubling the country's total power generation in 2015. Solar energy also offers considerable potential, as annual irradiation in Brazil varies between 1,200 and 2,400 kilowatt hours per square meter. In particular, the Northeast region has significant solar potential, and leveraging it could promote growth and income generation in less-developed areas.
- Water and Sanitation.** Brazil faces significant deficiencies in sanitation. Eighty-three percent of the total population has access to potable water, and 93 percent in urban areas.

⁶ IDB (2018).

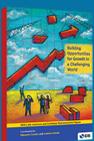


Forty-three percent of Brazil's urban population has access to sewage collection and treatment, and 12 percent use a self-contained system. Eighteen percent have their sewage collected but not treated, and 27 percent receive no sanitary sewerage service. The sanitation sector suffers from significant governance problems and regulatory uncertainty. According to the Brazilian Association of Regulatory Agencies (Associação Brasileira de Agências de Regulação, ABAR), there were 49 basic sanitation regulatory agencies in 2016, including 23 municipal, 23 at the state level, and 3 intermunicipal agencies.

- **Telecommunications.** Brazil faces significant challenges in the telecommunications sector. Given Brazil's vast size, expanding access to remote regions requires well-designed, cost-effective public policies. Currently, the share of households with internet access ranges from 40 percent to 60 percent. Cellphones are critical to digital inclusion and internet access, and 94 percent of Brazil's internet users rely on cellphones. 4G technology, however, is available in only 51 percent of Brazilian municipalities, and there is a pressing need to expand access in the most remote parts of large urban centers as well as in many rural areas. Despite the presence of large international firms in the telecommunication sector, investment rates remain low, and some investment projects (particularly in rural areas) may not be profitable without government incentives. Deficiencies in the regulatory framework discourage investment in new technologies.

2. RECOMMENDATIONS TO OVERCOME CHALLENGES

- **Transportation.** Measures to improve the transportation system include building multimodal transportation systems that reduce logistics costs and foster strategic transportation plans that integrate modes. Other measures include modernizing and expanding rail infrastructure, upgrading port and airport infrastructure and improving operational efficiency. In particular, port operations should be streamlined, and infrastructure should be upgraded to service larger vessels in strategic terminals. Strengthening connections between ports and domestic rails, roads, and waterways would reduce logistics costs and enhance transportation efficiency.
- **Energy.** Recommended policy actions include adapting the regulatory framework for a distributed generation (DG) system and supporting innovation to increase competitiveness in wind and solar power segments.
- **Water and Sanitation.** To encourage investment in the sector, it is key to improve governance and clearly define how responsibilities for water and sanitation services are shared between municipalities in metropolitan regions. In addition, the country should improve the regulatory framework by creating a unified regulatory model that can adequately accommodate differences between municipalities.
- **Telecommunications.** The country should support private-sector investment in telecommunications infrastructure, building a comprehensive plan to encourage additional investment in critical infrastructure, especially in rural areas. Reforms to the regulatory framework are also critical to increase coverage and improve connectivity.



3. PUBLIC-PRIVATE PARTNERSHIPS FRAMEWORK: QUALITY AND IMPLEMENTATION

The authorities have been pursuing important initiatives to further promote public-private partnerships (PPPs). In 2016, the government created the Investment Partnership Program (PPI) with the purpose of expanding and strengthening the interaction between the state and the private sector through partnership contracts and concessions. Recently, the PPI launched tender notices for 12 airports, 4 ports and a railroad for a total amount of R\$6.4 billion in investment projects and R\$1.5 billion in revenues. Yet, there are still some challenges for the development of PPPs in Brazil. The country should strengthen PPP planning and pipeline development, and the PPP project pipeline should reflect a long-term strategic vision for infrastructure investment. In addition, Brazil should streamline the PPP process and enhance its transparency. It is necessary to build institutional capacity for PPP design and implementation, especially among subnational governments. Finally, the country should improve the fiscal management of PPPs.

4. NATIONAL DEVELOPMENT PLANS ON INFRASTRUCTURE

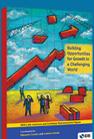
According to the new government plan, the infrastructure sector will be key to generating jobs and improving productivity. Reduction of bureaucracy, simplification of processes, privatization, strategic planning and an integrated vision will change the sector from a bottleneck to a solution for growth. Brazil has made a concerted effort to implement PPPs over the past 20 years. PPPs accounted for about 60 percent of all private investment between 1990 and 2017, with most projects focusing on transportation, energy, and telecommunications. Brazil ranked 4th out of 19 countries on the 2018 Infrascope, which evaluates the environment for public-private partnerships. Between 1990 and 2016, at least 900 projects in the energy, transportation and water sectors reached financial closure.

In addition to the general challenges facing infrastructure development in Brazil—including the scarcity of long-term financing and cumbersome bureaucratic processes, among others—PPPs and public concessions lack a systematic planning process and must navigate a complex multilevel governance structure. Weaknesses in investment planning are at the core of governance and management failures at late stages of the infrastructure project cycle. Moreover, capacity constraints within the public sector limit its ability to develop projects with private participation.

5. POLICIES AND INTERVENTIONS UNDER CONSIDERATION

The authorities have been pursuing important initiatives to further promote PPPs. In 2016, the government created the Investment Partnership Program (PPI) with the purpose of expanding and strengthening the interaction between the state and the private sector through partnership contracts and concessions.

The IDB is supporting the country to optimize the use of resources as guarantees (collateral) for direct and contingent liabilities assumed by procuring authorities. This initiative has produced recommendations for policy as well as proposed IDB interventions in the future structuring of guarantees, with resources from its windows as well as sovereign counter-guarantees. In addition, the IDB is assisting the country in implementing a facility with the Brazilian Federal Government to prepare water and sanitation projects in partnership with Caixa Econômica Federal and the Project Structuration Fund (Fundo de Estruturação de Projetos, FEP). This will provide



US\$1.400.000 in assistance for a revolving fund to mobilize technical services that will help municipalities to implement PPPs.

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Chile

Sebastián Miller

1. INFRASTRUCTURE CHALLENGES

Chile exhibits different degrees of infrastructure gaps depending on the sector considered.⁷ For transportation the largest gaps appear in terms of percentage of paved roads, followed by density of roads (over arable land) and the overall quality of infrastructure. In the case of energy, by far the largest gap derives from low energy consumption (electric and overall), very closely followed by losses from blackouts. For water and sanitation there is a small gap in access to improved water quality, and finally, in the telecommunications sector, there are large gaps in broadband and internet subscriptions.

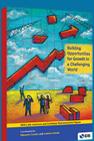
According to recent country development challenges analysis conducted by the IDB, the main challenges in transportation infrastructure are implementation bottlenecks, a key factor in slowing infrastructure investment. This slowdown reflects challenges in planning and execution capacity, including long approval processes for new projects and low productivity within the construction sector. In the energy and transport sectors, the inefficiency of project approval processes, the lack of clarity in administrative processes and a growing degree of complexity in interaction with communities constitute key challenges.

Transportation. The quality of transport infrastructure slows down the movement of goods and people and weakens logistics performance (logistics costs in Chile are twice as high as in the average OECD economy). Infrastructure is the most lagging component of Chilean logistics, with railroads ranking the lowest in infrastructure quality, followed by air transport, ports and roads. The use of rail for transporting cargo is still relatively low, and current railways connecting ports require transferring freight to trucks for the last tranche, eliminating the integration advantage. Current excessive port regulation imposes entry barriers for FDI, and Chile has a foreign equity limit of 49 percent for registering maritime vessels; furthermore, foreign participation in the cabotage market is restricted. Trade competitiveness is additionally affected by poor infrastructure and weaknesses in land border crossing systems.

Climate change. Intensive hazard events and climate change affect the country's infrastructure, especially in the hydrological system (basins). The most vulnerable region is the central zone, where most of the population is concentrated and where climatic and hydro-meteorological problems are expected to intensify, including droughts, floods, frosts, tidal waves, fires, heat waves, and increases in the frequency of extreme events. Rainfall levels in the north macrozone are very low, making water availability one of the most important constraints on human development. Drawing on underground systems has provided additional fresh water, but further solutions will be needed in the future.

Telecommunications and connectivity. Insufficient connectivity, low internet speed and lack of affordability are sources of regional imbalances and widen the digital gap. Segments of the population residing in rural areas are becoming increasingly difficult to reach with traditional technologies such as fixed copper or cable, given the country's challenging topography. As of 2015, the average ICT penetration index was only 42 percent in rural municipalities, compared to 70 percent in the main cities. This limited connectivity in rural areas, especially in indigenous

⁷ The identification of the challenges is based on the Borensztein et al. (2014) development gap methodology.



territories, prevents the adoption of digital solutions requiring large volumes of information and the development of analytic capabilities within data centers. Currently only 5 percent of households have fiber optic connections, less than leading countries in the field.

2. RECOMMENDATIONS TO OVERCOME CHALLENGES

Regarding policy recommendations, it is important to design and implement an infrastructure development plan centered on i) climate change in the basins system; ii) logistics, particularly multimodal capacity and connectivity, including port development and access infrastructure; iii) linkages between the tourism sector and other economic activities; and iv) urban and inter-urban infrastructure bottlenecks.

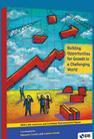
Key recommendations in the transportation sector are i) improving the quality of the railway system and modernizing the organizational structure of the National Railway Firm, EFE; ii) ensuring rail connections between ports and production areas and increasing the interconnection of the railway and port systems; iii) increasing port capacity, including berths at major ports to accommodate ships of greater draft in the long term; iv) exploring new business models for terminal concessions, including the construction and management of port access systems and the possibility of financing complementary services through these concessions, which so far has not been covered in contracts; v) assessing the possibility of liberalizing cabotage to increase competition; and vi) developing an Intercity Transport Master Plan, including a schedule for public and private investment activities. Additionally, national and local governments could consider the private provision of long-term road maintenance services.

In terms of the institutional framework, the main policy recommendations are i) adopting systematic criteria for evaluating the value for money (VfM) and cost benefit of infrastructure projects; ii) increasing coordination in the operations managed by the public sector (mainly SAG and Customs), and digitalizing currently required physical documentation; and iii) strengthening government support to the private sector for effectively mitigating social and environmental risks derived from public-private partnership (PPP) projects (including foreign financing from neighbor countries like those of Alianza Pacifico).

A final recommendation is to increase capacity building at the local level and grant greater participation and autonomy to regional authorities in the definition and execution of long-term investment plans. This would help pinpoint strategic areas for PPPs. The role and competencies of ministries and regional entities in infrastructure planning should be clarified and coordination strengthened.

3. PUBLIC-PRIVATE PARTNERSHIPS FRAMEWORK: QUALITY AND IMPLEMENTATION

Chile has vast experience using PPPs as a vehicle to mobilize investment in infrastructure. From 1994 to 2015, investment in infrastructure through concessions exceeded US\$16 billion in 82 adjudicated projects distributed among interurban highways (54 percent), urban highways and public transportation (31 percent), airports and public buildings (8 percent), and hospitals (6 percent). Currently the “Dirección de Concesiones” of the Public Works Ministry administers most PPPs in transportation and public buildings. However, some notable exceptions exist; for example, some ports and water and sanitation firms have long-term contracts to invest and operate services in certain smaller towns. In addition, there are some subnational PPPs (e.g., underground municipal parking lots) that do not fall under the Public Works Ministry. Other public



institutions involved are the Social Development Ministry, in charge of developing the project evaluation methodologies, and the Environmental Evaluation Service, which supervises environmental impact assessments. Most water and sanitation and all energy and telecommunications providers are private. Water and sanitation and transmission and distribution of energy are regulated as natural monopolies. The telecommunications market is competitive on the consumer side but faces regulations regarding pricing of access costs to other networks.

The PPP framework (Law of Concessions) allows any private project to be considered by the “Consejo de Concesiones” which, if declared of public interest, must undergo further analysis and might be included in the national plan.

According to 2018 Infrascope, Chile ranks second among the analyzed countries in terms of enabling environment for PPPs. Chile falls in the mature category in the dimensions of regulations and maturity, while reaching the developed category in institutions, investment and business climate, and financing. Chile currently has 15 completed concessions, 12 under construction, 49 in operation and 12 in operation and construction.

4. NATIONAL DEVELOPMENT PLANS ON INFRASTRUCTURE

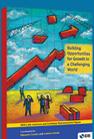
Chile does not have a formal infrastructure plan, although a significant part is administered by the Ministry of Public Works through the “Dirección de Concesiones.” For the 2018-2023 period the Dirección de Concesiones has developed a calendar of tenders to be pursued by year.⁸ This agenda involves tenders for roads, airports, hospitals, urban transport infrastructure, dams, and other public buildings. However, the list is not necessarily a plan, given that it is constantly being updated (projects entering/exiting/changing dates) and does not reflect all possible projects given that not all concessions are reflected here (e.g., ports).

5. POLICIES AND INTERVENTIONS UNDER CONSIDERATION

The main policy under implementation is the Infrastructure Fund (Fondo de Infraestructura), created through a law that was recently approved; normative and operational rules and regulations are under development. The Infrastructure Fund (a state-owned enterprise) will be the owner of the assets of all PPPs under the Law of Concesiones, and it is expected that this may increase available funding for new infrastructure projects, since it allows the firm to obtain financing that is not reflected in the Central Government’s fiscal position. The objective is to generate resources of over US\$9 billion for investment in infrastructure projects that are socially profitable. It is the most relevant public-private investment initiative since the creation of the concession system in the 1990s.

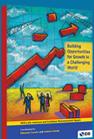
The recent administrations’ other major policy initiative is overhauling the system for obtaining all permits for any major investment project. Although these permits are necessary across many sectors, they tend to be particularly important for large infrastructure project (energy, transport, water and sanitation, etc.). Authorities have estimated that the current system has increased in complexity and, for example, environmental permits have increased their processing time by more than 50 percent, and many projects are being delayed due to the permit system. The Ministry of Economy has established a program that aims at simplifying the permit system, attempting to reduce excessive burdens and digitalizing permits and procedures to reduce processing times and consequently increase investment.

⁸ See http://www.concesiones.cl/proyectos/Paginas/AgendaConcesiones2018_2022.aspx.



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Paraguay

Alejandro Quijada and Soledad Feal-Zubimendi

1. CHALLENGES IN INFRASTRUCTURE

Gaps in the supply and quality of Paraguay's infrastructure appear in the areas of transportation, energy, water and sanitation, and telecommunications. These deficiencies reflect gaps in investment and institutional weaknesses that hinder effective public spending. Investment needs in physical infrastructure would represent more than 70% of 2017 GDP,⁹ but actual investment in public infrastructure hovers around 4% of GDP. Moreover, public agencies responsible for carrying out infrastructure projects are affected by institutional challenges and issues in governance resulting in poor efficiency in public spending across sectors.¹⁰

Transportation: Globally speaking, Paraguay is near last place among countries in terms of the quality of its road, ports, and airports.¹¹ According to data from the World Economic Forum (WEF) Paraguay ranks 136 of 138 countries with respect to its roads, and 132 of 138 in the quality of its airport infrastructure. In addition, the road network is limited by low coverage with one-seventh the average density in Latin America and the Caribbean [LAC] (0.55km/km²). Challenges associated with the ability of the Ministry of Public Works and Communications (MOPC) to perform project planning, management, and execution persist in this area, as well as in coordinating with subnational entities. Consequently, the ability of the MOPC to perform regular maintenance and to undertake new projects for intermodal connectivity is adversely affected.

Energy: Gaps exist in electrical power transmission (power lines) and distribution (transformer stations), and they result in long and frequent interruptions in electrical service.¹² The biggest challenges are poor planning and coordination arising from the many institutional actors in the sector who lack a common strategic vision for the medium term. Compounding these issues, the financial posture of the National Electrical Power Administration (ANDE) is worsening as a consequence of a mismatch in electricity rates and losses in power generation.

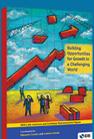
Water and Sanitation: Paraguay's water supply and sanitation suffer from poor quality and uneven coverage. 52.6% of all homes have access to improved drinking water sources (71.7% in

⁹ The updated Master Plan for Transportation Infrastructure and Services in Paraguay, 2018-2028, identifies investment needs for construction and upgrades in road, river, air, and rail transportation at 40.6% of 2017 GDP. The Master Plan for Power Generation, Transmission, and Distribution of the National Electrical Power Administration (ANDE), 2018-2025, set investment requirements for generation, transmission, and distribution at 15.8% of GDP. The National Water Supply and Sanitation Plan, 2010-2030 identifies investment needs equivalent to 15.3% of 2017 GDP.

¹⁰ According to IMF estimates, Paraguay is situated at 40% below the efficiency frontier in terms of converting public spending into physical infrastructure.

¹¹ Almost 58% of the road network is in fair to poor condition. In logistics, the lack of dredging and signage in the river ways (Paraguay-Paraná) adversely affects cargo transportation. Poor intermodal integration (between roads and ports) hurts the efficiency of productive chains and boosts the costs of exports (US\$ 1,850 per container vs. US\$ 1,287 in LAC).

¹² In 2016, average overall length of power outages was 28.9 hours per customer, and the average number of service interruptions per customer was 23.8 hours. Consequently, Paraguay ranks 102 of 188 countries in the electric power accessibility index of the World Bank (25 of 32 in LAC).



LAC), whereas 10% have access to improved sanitation (52.2% in LAC).¹³ The challenges are concentrated in the low capacity for planning and coordination of the lead agency for the sector, in tandem with high fragmentation among service providers, elevated rates of arrears and mismatched rates, which in turn undermine the financial sustainability and quality of the services delivered.

Telecommunications: International connectivity in terms of internet band width *per capita* is low (21kbps per consumer), as compared to the average for Southern Cone countries (80kbps) and LAC (72 kbps). Band width coverage is limited (2.9% of the population, as opposed to 10.2% in LAC), thus internet use in productive activities is negligible.¹⁴ The major challenges in the sector are its obsolete regulatory framework, which has not been updated for new digital technologies, and limited coordination between regulatory bodies and sector investment promoters, which poses a constraint on the potential supply of services, especially in rural areas.

2. RECOMMENDATIONS TO OVERCOME CHALLENGES

Among potential interventions geared toward overcoming the aforementioned challenges, the following stand out:

Transportation: Prioritizing investment is essential in order to optimize the movement of goods and services, such as building the interoceanic corridor, upgrading and building international bridges, dredging the river and introducing signage (buoys and beacons) to facilitate river navigation, and investment to develop intermodal connectivity between highways, ports, and airports. In addition, the MOPC needs to strengthen its capacity for project planning and execution.

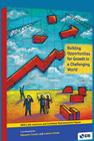
Energy: The institutions in the sector should be strengthened with particular attention to their long-term strategic vision, addressing deficiencies in transmission and distribution, promoting budget execution; and correcting market failures in order to promote clean energy alternatives. Finally they also need to resolve the financial situation of the National Electrical Power Administration (ANDE).

Water and Sanitation: Addressing challenges in this sector will require strengthening the regulatory and control functions of the lead agency; i.e., strategic planning, enhancing efficiency in the management of private operators, updating tariff schedules to reflect the real costs of services and usage, and an increase in investment in sewerage and water treatment, particularly in major urban areas.

Telecommunication: It is important to create investment to increase international connectivity and the domestic network; for example, to ensure strong bandwidth for cross-border connections, to improve the domestic broadband network, and to set up centers for collective internet access. These steps will require a stronger regulatory and institutional framework in the sector.

¹³ These challenges are significant in rural areas where access to improved water and sanitation is 43.7% and 1.3%, respectively.

¹⁴ Paraguay is second to last of countries in the region for internet use for communication between companies, and fifth lowest of countries in the region for companies' internet use for customer communications.



3. PUBLIC-PRIVATE PARTNERSHIPS FRAMEWORK: QUALITY AND IMPLEMENTATION

The PPP regulatory framework consists of Law 5.102 of 2013 for Promotion of Investment in Public Infrastructure and Enhancement of State-Sponsored Goods and Services, and Regulatory Decree 1.350 of March 12, 2014. This regulatory framework provides for interventions in transportation infrastructure.

Law 5.074 for infrastructure financing, under the modality of Public Works with Financing, provides for the contractor to finance 100% of the works with their own resources and those from the financial system, by which the State funds the costs of investment and financing once the works have been finished.

According to data from *Infrascope 2018*, Paraguay ranks 12 out of 19 LAC countries in its enabling environment for project implementation under PPP. According to this assessment, the biggest challenges are to improve the operational maturity of the projects, to encourage an investment climate for private companies, and to establish financial facilities to support this mechanism. This assessment reflects Paraguay's stage in the consolidation of institutional fitness for PPP. Coordination among key agencies (e.g., Ministry of Finance, Technical Planning Secretariat, line ministries) remains weak and the technical competence to structure contracts is lacking.

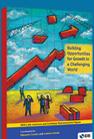
4. NATIONAL DEVELOPMENT PLANS ON INFRASTRUCTURE

The Paraguay 2030 National Development Plan (PND) hinges on three strategic axes and four crosscutting lines. The axes correspond to: i) poverty reduction and social development; ii) inclusive economic growth; and iii) appropriate integration of the country with the rest of the world. The crosscutting lines concern: equality of opportunities; efficient and transparent public management; environmental sustainability; and land management and development.¹⁵ The PND is a useful guide to design and implement public projects and interventions at the national and subnational levels. Its execution will depend on sector investment plans and annual budget programming.¹⁶

The Government of President Mario Abdo Benítez, which came to power in August 2018, has set its priorities for the next five years in 11 strategic areas: education, health, social welfare, employment, infrastructure, international connectivity, improvement of urban centers, public safety, energy, forest production and environment, and the digital agenda.

¹⁵ The PND was approved in 2014 after a broad consultative process with civil society, the private sector, academia, and the communities.

¹⁶ Sector plans include cost estimates for investments. Among the most notable sector plans are: the Master Plan for Transportation Infrastructure and Services of Paraguay, (2018-2023); the Master Plan for Power Generation, Transmission, and Distribution of the National Electrical Power Administration (ANDE), 2018-2025; the National Water Supply and Sanitation Plan; and the National Plan for Information and Communications Technologies (Agenda Digital).



5. POLICIES AND INTERVENTIONS UNDER CONSIDERATION

Transportation: In 2017, the updated Master Plan for Infrastructure and Transportation Services in Paraguay (2018-2028) identified investment needs for the construction of and improvements in road, river, air, and rail transportation, at a level of 40.6% of GDP. Priority investments include paving asphalt roads; rehabilitating and maintaining the highway and road network at the national, departmental, and neighborhood levels; construction of international bridges with Brazil and Argentina; the modernization of the Asunción airport system; and improving navigation on the Paraguay River.¹⁷

Energy: In 2017, the Master Plan for Power Generation, Transmission, and Distribution of the National Electrical Power Administration (ANDE), 2018-2025, set investment requirements for generation, transmission, and distribution at 15.8% of GDP. Priority investments include the refurbishment and construction of new hydroelectric power plants, the construction of photovoltaic solar parks, and the reinforcement and construction of transmission and distribution systems.¹⁸

Water Supply and Sanitation: The National Water Supply and Sanitation Plan, 2010-2030 identifies investment needs equivalent to 15.3% of GDP. Among other areas, investments are targeted at: providing drinking water and sanitation systems in districts of the Alto Paraná Department and in the Asunción metropolitan area, as well as the integrated clean-up of the Lake Ypacarai watershed.

Telecommunications: The National Telecommunications Plan, 2016-2020 prioritizes activities to improve broadband connectivity for enterprises, and institutions of education, health and government. At the same time the plan calls for the deployment of last-mile networks and wireless networks. According to estimates of the Ministry of Information and Communications Technologies, investments on the order of US\$ 100 million are called for to increase the connectivity of institutions (health, security and public safety) and to improve international connectivity.¹⁹

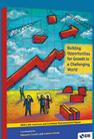
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¹⁷ In the road system, the major investments are geared toward paving Routes 1 and 9; in integration and logistics, bridge construction over the Paraguay River (Carmelo Peralta-Puerto Murtinho) and the Apa River (San Lázaro-Puerto Murtinho).

¹⁸ Major power generation projects are the repowering of the Acaray hydroelectric power station. With respect to transmission, construction is planned for 548 km of lines for the Metropolitan System and 199 km of lines for the Central System. With respect to the distribution area, construction, expansion, and replacement of medium- and low-tension network conductors, and introducing increases in electrical power with the installation of new distribution posts, and improvements in lighting for public areas.

¹⁹ Investments in the sector have traditionally come from private sources. Between 2008 and 2013, private investment in connectivity topped US\$ 990 millions.



Uruguay

Virginia Queijo and Florencia Pietrafesa

1. INFRASTRUCTURE CHALLENGES

Uruguay presents several negative gaps in infrastructure compared to countries with similar income per capita.²⁰ The largest negative gap is related to transportation. Although energy displays a small positive gap, energy prices remain high. The country is well positioned in water and sanitation, but there are challenges in the provision of sanitation services. In telecommunications, Uruguay is particularly well positioned in digital connectivity indicators such as internet users, fixed broadband Internet subscribers, and mobile cellular subscriptions.

Transportation. The country faces challenges in transportation infrastructure and logistics that limit its productivity gains and competitiveness. The increase in agricultural and forestry production and the installation of pulp mills in the southwestern part of the country have created pressures on the country's transportation and logistics infrastructure and services, especially on the road network, which exhibits considerable if uneven deterioration. The growth of traffic has affected the quality of service on national routes and road safety. According to 2018 World Economic Forum figures, Uruguay ranked 99th out of 140 countries in terms of quality of roads. Despite the increase in demand, investments in capacity have not been undertaken (except for some areas in the metropolitan region of Montevideo). As for railway infrastructure, it is inadequate and in poor condition. The logistics industry similarly experiences deficiencies; for example, 50 percent of trucks return empty after a delivery. The World Bank's Logistics Performance Index (2018) placed Uruguay in a lagging position (85/160).

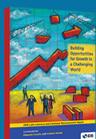
Energy. Uruguay has made important changes in its energy matrix and is at the forefront worldwide in this area, but high energy prices have a negative impact on competitiveness. In the last decade, the country has doubled its installed capacity and gone from being a net importer of electricity to a net exporter. In addition, 97 percent of electric power comes from renewable sources. However, these changes have not translated into lower energy prices, especially for electric power, which is higher than the average of the region. Moreover, exportable energy surpluses could be sold to Argentina and Brazil at higher prices should some regulatory barriers be overcome. While no new generation is estimated to be required in the short term (at least until 2023), power expansion plans are recommended for the medium term in light of alternative demand scenarios.

Water and sanitation. Although Uruguay enjoys high levels of water and sanitation infrastructure coverage,²¹ the sector faces issues that, if not addressed in the years ahead, will have negative consequences in terms of sustainability and inclusiveness. Only 45 percent of the households have access to what is considered safe sanitation,²² and there are differences between the percentage of the population with access to safe sanitation in Montevideo (65 percent) and the rest of the country (32 percent). Additionally, in new sewerage networks the connection rate

²⁰ This analysis follows the methodology of development gaps set forth by Borensztein et al. (2014).

²¹ According to Obras Sanitarias del Estado (OSE), in 2016 drinking water coverage was 99.8 percent for Montevideo, 98.8 percent for localities with more than 5,000 inhabitants, and 72 percent in smaller and rural locations. In sanitation, the coverage reaches 98.8 percent of the population, including systems of sewage networks with treatment, as well as collective systems without treatment and individual facilities.

²² Sewage with effluent treatment and with an installation to wash hands with soap and water.



remains low for the first years, reducing the return on public infrastructure investment and therefore its sustainability. Moreover, the lack of integrated planning and institutional coordination (among water supply, sewage, drainage, and transport services) reduces the efficiency of public infrastructure investment. Regarding the management of drinking water utilities, the non-revenue water ratio in the metropolitan area reaches 50 percent (higher than the regional average). It should also be noted that in recent years a loss of water quality has been observed in the main watershed used for drinking water supply. In terms of flood prevention, there is a lack of adequate drainage infrastructure in both urban areas and small towns in the interior of the country. In terms of solid waste management, only 13 percent of the urban population in the country's interior has adequate disposal service, generating serious environmental and social problems. One of the main problems in this area is inadequate governance of the system due to the lack of technical and economic capacities to engage in appropriate management of the waste chain.

Telecommunications. Uruguay occupies a leading position in terms of telecommunications infrastructure, which represents an opportunity for future development. The country is first in Latin America in terms of tele-density in main telephone lines (32 per 100 people) and second in mobile phones (149 per 100 people). Uruguay has nearly 3.7 million mobile broadband services and 930,000 fixed broadband services, making it one of the Latin American countries with the highest ratios of internet users per 100 people.²³

2. RECOMMENDATIONS TO OVERCOME CHALLENGES

Transportation. The use of new technologies for road operations and logistics could bring social and environmental benefits by improving efficiency and reducing the costs of energy consumption and emissions. In urban areas, the public transport system requires restructuring services and improving their quality. In the country's smaller towns, there is an opportunity to use new digital technologies to offer a flexible alternative to the conventional system based on fixed routes with low coverage and frequency. In general, there is a need to plan a resilient and low-carbon infrastructure, which is essential to make efficient use of public resources.

Energy. In light of aging equipment and an increase in distributed generation and self-supply, investments in transmission and distribution are expected to be required in the short and medium term, as well as changes in the way the use of infrastructure is paid. Finally, the governance of state energy companies can be discussed in order to reduce energy prices.

Water and sanitation. Recommendations include the following: i) developing a National Sanitation Plan to prioritize interventions to ensure safe sanitation for 100 percent of the country's population; ii) implementing innovative projects to increase the revenue water ratio to deal especially with commercial losses, iii) adopting an integrated water resources management approach that allows the involvement of the different actors and inter-institutional coordination, iv) incorporating pluvial drainage in urban plans for flood prevention, and v) developing and implementing solutions for the adequate final disposal of solid waste in the interior of the country.

Telecommunications. Solutions based on digital technologies—such as big data, artificial intelligence, sensor networks, internet of things, drones and satellite imagery, and robotics—represent an opportunity for improving the efficiency of processes and hence future growth and development.

²³ URSEC (2017).



3. PUBLIC-PRIVATE PARTNERSHIPS FRAMEWORK: QUALITY AND IMPLEMENTATION

Investment in transport, energy and water and sanitation infrastructure in Uruguay averaged 2.3 percent of GDP between 2008 and 2013, while the Latin American and Caribbean regional average for the same period was 3.4 percent. To overcome some of the infrastructure gaps, the country is complementing public financing with private financing. The current law establishes the legal framework for private investment in public projects in infrastructure, including roads, ports, airports and railroads; prison infrastructure, excluding security, sanitation and prisoner re-education services; educational infrastructure, excluding educational services; health centers, excluding health services; public housing; and energy and waste treatment infrastructure.

Moreover, according to the Infrascope Index, a benchmarking tool that evaluates the capacity of countries to implement sustainable and efficiency public-private partnerships (PPP) in infrastructure, Uruguay ranked 8th among 19 countries in Latin America and the Caribbean. The most critical factors for Uruguay are financing facilities for infrastructure projects,²⁴ conciliation schemes, project preparation facilities and business environment.

At the end of 2018, there was a pipeline of 15 PPP projects totaling US\$1.82 billion, with only 2 projects under construction or finished. The experience with the first PPP highway contract in the country (a 179-kilometer corridor between the cities of Nueva Palmira and Mercedes) shows that the process is still incipient.

4. NATIONAL DEVELOPMENT PLANS ON INFRASTRUCTURE

Improving infrastructure has been a budget priority for the Uruguayan government. The National Plan for Infrastructure Investment 2015-2019 set out a roadmap for the recovery, improvement and updating of the country's infrastructure to meet short and medium-term demands. During the 2015-2017 period, investments in public infrastructure reached US\$6.93 billion and represented 56 percent of the total five-year plan (US\$12.37 billion).²⁵ Investment in telecommunication infrastructure reached the highest level of progress in 2017, followed by investment in ports (which experienced a significant boost in private investment in 2015 and 2016) and in renewable energy generation.²⁶ This plan includes both public and private financing (such as PPP): approximately one third of the total is expected to be privately financed.

5. POLICIES AND INTERVENTIONS UNDER CONSIDERATION

²⁴ Corporación Andina de Fomento–Banco de Desarrollo de América Latina (CAF) launched a US\$350 million infrastructure fund in October 2016 and a US\$500 million infrastructure fund in December 2018 with the goal of structuring debt instruments for the development of infrastructure projects in Uruguay. The fund is managed by a CAF subsidiary, and it plans to lend credit and acquire senior debt of infrastructure projects executed under a PPP model. The two CAF-promoted funds have been joined by institutional investors and insurance companies.

²⁵ The US\$12.37 billion infrastructure plan includes, among other categories, US\$4.23 billion for energy, US\$2.36 billion for roads, US\$750 million for telecommunications, US\$550 million for ports, US\$550 million for water and sanitation, and US\$360 million for railways.

²⁶ MEF (2018).



A law on integrated waste management is currently under consideration at Uruguay's General Assembly. This law provides for the creation of a National Fund for Waste Management (FONAGRES) to finance programs for the management of special waste and support the improvement of waste management by departmental governments.

In addition, a National Sanitation Plan is being formulated, and the electrical regulatory framework is being updated.

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