HOW THE BRAZILIAN INVESTMENT PARTNERSHIPS PROGRAM (PPI) IS FOCUSING ON SUSTAINABLE PROJECTS

NOVEMBER 2021
### Brazil in context

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>12th largest economy</td>
<td>GDP USD 1.4 trillion</td>
</tr>
<tr>
<td>5th largest land area</td>
<td>8,511,767 km²</td>
</tr>
<tr>
<td>6th largest population</td>
<td>212.6 million people</td>
</tr>
<tr>
<td>Clean energy matrix</td>
<td>83% renewable sources</td>
</tr>
<tr>
<td>2nd largest global production of biofuels</td>
<td></td>
</tr>
<tr>
<td>Wide forest coverage</td>
<td>58% of the national territory</td>
</tr>
<tr>
<td>Largest water reserve</td>
<td>12% of world reserves</td>
</tr>
</tbody>
</table>

**Greatest biodiversity in the world:**
- **almost 50 thousand** flora species recognized
- **more than 120 thousand** species of invertebrates and **approximately 8930 vertebrate species**

<table>
<thead>
<tr>
<th>Species</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammals</td>
<td>734</td>
</tr>
<tr>
<td>Birds</td>
<td>1982</td>
</tr>
<tr>
<td>Reptiles</td>
<td>732</td>
</tr>
<tr>
<td>Amphibians</td>
<td>973</td>
</tr>
<tr>
<td>Marine fish</td>
<td>1358</td>
</tr>
<tr>
<td>Continental</td>
<td>3150</td>
</tr>
</tbody>
</table>

**Wide forest coverage:**
- 58% of the national territory

**Largest water reserve in the world:**
- 12% of world reserves
The PPI Council is chaired by the Minister of Economy. The Special Secretary is the Executive Secretary of the PPI Council.
PPI works as a hub for investments

*Adds on efficiency and value to the process*
Governance, coordination, monitoring and oversight

Transparency, dialogue, credibility and predictability

Well-designed projects

Technical and legal framework enhancement
PPI Main deliveries 2019/2021

119 AUCTIONS/PROJECTS

Expected Investments
USD 121.4 bi

Concession fees
USD 26.4 bi

PREMISE: SUSTAINABLE DEVELOPMENT
Transportation projects
Assets auctioned/signed contracts (2019-2021)

<table>
<thead>
<tr>
<th>Transportation modes</th>
<th>Investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port terminals (29)</td>
<td>USD 613 million</td>
</tr>
<tr>
<td>Solids, liquids, general and containerized cargo</td>
<td></td>
</tr>
<tr>
<td>Airports (34)</td>
<td>USD 1.9 billion</td>
</tr>
<tr>
<td>Highways (6)</td>
<td>USD 7.5 billion</td>
</tr>
<tr>
<td>Railways (5)</td>
<td>USD 6.2 billion</td>
</tr>
<tr>
<td>Total (74)</td>
<td>USD 16.2 billion</td>
</tr>
</tbody>
</table>
Energy
Assets auctioned/signed contracts (2019-2021)

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy - Generation (8)</td>
<td>USD 4.1 billion</td>
</tr>
<tr>
<td>1,733 MW medium</td>
<td></td>
</tr>
<tr>
<td>Energy – Transmission (14)</td>
<td>USD 2.58 billion</td>
</tr>
<tr>
<td>Total (22)</td>
<td>USD 6.68 billion</td>
</tr>
</tbody>
</table>
### Other projects

Assets auctioned/signed contracts (2019-2021)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT – 5G (1)</td>
<td>USD 8.4 billion</td>
</tr>
<tr>
<td>Sanitation (4)</td>
<td>USD 6.7 billion</td>
</tr>
<tr>
<td>Public lighting (9)</td>
<td>USD 248 million</td>
</tr>
<tr>
<td>Parks for visitation (3)</td>
<td>USD 85.4 million</td>
</tr>
<tr>
<td>Fishery terminal (1)</td>
<td>USD 46 million</td>
</tr>
<tr>
<td><strong>Total (18)</strong></td>
<td><strong>USD 15.4 billion</strong></td>
</tr>
</tbody>
</table>
PPI next auctions 2021

### Port Terminals (5)
- 2 in Santos/SP  
  - November 19
- 1 in Itaguaí/RJ  
  - November 19
- 1 in Imbituba/SC  
  - November 19
- 1 in Porto Alegre/RS  
  - November 19

### Highways (1)
- BR-381/262 (MG/ES)  
  - December 20

### Parks and Forests (2)
- Iguaçu (PR) (tender protocol)
- Humaitá (AM) (tender protocol)

### Urban mobility (1)
- Line 2 of Belo Horizonte subway (tender protocol)

### Power energy (1)
- 1 Transmission auction  
  - December 17

### Oil and gas (2)
- 2 Blocks - Sépia and Atapu – Transfer of Rights  
  - December 17

### Privatizations (4)
- CEASAMINAS (tender protocol)
- CBTU-MG (tender protocol)
- EMGEA
- CODESA (tender protocol)

### Subnationals (7)
2 Concession projects of water and wastewater services
- State of Alagoas (blocks B e C)  
  - December 13
- State of Rio de Janeiro (CEDAE’s remanescent block)  
  - December 29

5 Public lighting PPPs
- Campinas (SP)  
  - November 29
- Patos de Minas/MG  
  - December 15
- Curitiba/PR
- Camaçari/BA
- Caruaru (PE)

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**2021 23 assets**

**USD 44.6 Billion of investments**
Environmental legislation

How can infrastructure development and environmental protection go hand in hand?
Acts under debate or approved in the current government

- **Law 14026/2020**
  New Sanitation Framework: opens the sector for private investments

- **Decree 10800/2020**
  Integrated and Sustainable Amazon Program

- **Decree 10526/2020**
  Interministerial Committee for Infrastructure Planning and the Integrated Long-Term Infrastructure Plan

- **Law 14119/2021**
  National Policy on Payment for Environmental Services

- **Bill 11276/2018**
  National Fire Management Policy

- **Bill 4199/2020**
  New Cabotage Law

- **PM 1065/2021 and Bill 261/2018**
  New legal framework for railways (Railway Authorization)

- **Bill 528/2021**
  Carbon Market
Law 14.026/2020
New Sanitation Framework

BEFORE

- More than 35 million people without access to treated water in Brazil (83.3% of Brazilians are served with treated water)
- More than 100 million people without access to sewage collection (only 51% of Brazilians have access)
- Less than 45% of the country’s sewage is treated
- Brazil in the 123rd position in the sanitation ranking
- Regional disparities: of the USD 2.2 Bi invested in 2014 (year of high investments), half were only in 3 states (SP/MG/PR).

NOW

- massive private investment in the sector
- reduction of regional differences
- universalization of water and sewage services by 2033
The contracting of payment, in view of the ecological importance of the area, will prioritize services provided by traditional communities, indigenous peoples, family farmers and rural family entrepreneurs.

Environmental services:
individual or collective activities that favor the maintenance, recovery or improvement of ecosystem services

LAW 14119/2021 - National Policy on Payment for Environmental Services

Support Services
- nutrient cycling
- waste decomposition
- production, maintenance or renewal of soil fertility
- pollination
- seed dispersal
- control of potential pests populations and potential vectors of human diseases
- protection against solar ultraviolet radiation
- maintenance of biodiversity and genetic heritage

Provision services:
- Water
- Foods
- Wood/Fibers and Extracts

Regulation services:
- Carbon sequestration
- Air purification
- Moderation of extreme weather events
- Maintenance of the balance of the hydrological cycle
- Minimization of floods and droughts
- Control of critical erosion and slope slide processes

Cultural services:
- Recreation
- Tourism
- Cultural identity
- Spiritual and aesthetic experiences
- Intellectual development

MODALITIES OF ECOSYSTEM SERVICES

Environmental services:
individual or collective activities that favor the maintenance, recovery or improvement of ecosystem services

Provision services:
- Water
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Cultural services:
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- Tourism
- Cultural identity
- Spiritual and aesthetic experiences
- Intellectual development
National Fire Management Policy
Bill 11.276/2018

Multi-agency Integrated Center for Federal Operational Coordination (Ciman Federal), with the following attributions:

• forest fire monitoring;
• promote, in a single situation room and from a unified command, the sharing of information on ongoing operations

Operability

Governance Structure

National Committee for Integrated Fire Management

Information Management

National System of Fire Information (Sisfire) as a tool management of information about forest fires, controlled burnings and prescribed burnings in the territory national.
**Cabotage Incentive Program**

Bill of Law Nº 4199/2020 - New Cabotage Law

**CABOTAGE:** Shipments between two or more ports of the same nation using maritime or river routes.

**OBJECTIVES**

- Increase the offer (including fleet availability and new routes) and quality of cabotage transport;
- Encourage competition and competitiveness;
- Support the training and professional qualification of national seafarers;
- Stimulate the development of the national naval industry of cabotage;
- Review the binding of the cabotage navigation policies with the shipbuilding policies.

**EXPECTED RESULTS**

- Expansion of the offer of cabotage vessels in 40%
- Growth of the volume of containers transported per year until 2022 in 65%
- Cabotage growth potential per year: 30%

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**GUIDELINES**

- Regulatory stability
- Regularity of provision of transport operations
- **Balance the Brazilian logistics system**
- Encouraging private investments
- Promotion of free competition
- Optimizing the use of public resources
- **Innovation, scientific, technological and sustainable development**

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**Comparison between modes, according to efficiency indicators**

<table>
<thead>
<tr>
<th>INDICATORS</th>
<th>TRANSPORTATION MODES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equivalents units</td>
<td>Vessel of 6,000 t</td>
</tr>
<tr>
<td>Average fuel consumption to transport one ton</td>
<td>2.9 Hopper trains, 86</td>
</tr>
<tr>
<td>per thousand kilometers</td>
<td>wagons of 70 t</td>
</tr>
<tr>
<td></td>
<td>172 trucks of 35 t</td>
</tr>
<tr>
<td>Carbon dioxide emission (gCO₂/tkm)</td>
<td>4.1 liters</td>
</tr>
<tr>
<td></td>
<td>5.7 liters</td>
</tr>
<tr>
<td></td>
<td>15.4 liters</td>
</tr>
<tr>
<td>Average cost of transport, general cargo per 1,000 km (USD/t)*</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>23.3</td>
</tr>
<tr>
<td></td>
<td>101.2</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>13.5</td>
</tr>
<tr>
<td></td>
<td>47.94</td>
</tr>
</tbody>
</table>

Brazil has a strong legal framework, which comprises a specific chapter about environmental licensing enshrined in the 1988 Federal Constitution.

Even before the Constitution, Brazil had already established an Environment National Policy (1981).

The main purpose is making social, economic development compatible with preserving environment quality and ecological balance.

Environmental licensing is the main control mechanism in the Brazilian legislation and is required for carrying out any activity that, effectively or potentially, could result in environmental degradation.

Brazil is the most biodiverse country on Earth and that implies a major responsibility.
3 STAGES OF ENVIRONMENTAL LICENSING

PRELIMINARY LICENSE (LP)

- Preliminary planning phase
  - Approves location and design
  - Attests environmental feasibility
  - Establishes basic conditioning requirements for the next steps

INSTALLATION LICENSE (LI)

- Authorizes the installation of the project
  - According to the specifications of the approved project, including environmental control measures and other conditions

OPERATION LICENSE (LO)

- Authorizes the operation of the enterprise
  - After compliance with the requirements of LP and LI and other environmental control measures and conditions determined for the operation
Stages of dialogue with indigenous and tribal communities

WORK PLAN

STUDY

MITIGATION AND COMPENSATORY MEASURES
Environmental Impact Assessment

1. Impact Assessment
2. Prevention
3. Mitigation
4. Compensation
Highway BR-158 Mato Grosso
HORIZONTAL ALIGNMENT IMPROVEMENTS TO PROTECT INDIGENOUS LAND

ORIGINAL ALIGNMENT

IMPROVED ALIGNMENT
Highway BR-080 Mato Grosso
HORIZONTAL ALIGNMENT IMPROVEMENTS TO PROTECT CONSERVATION UNIT

ORIGINAL ALIGNMENT

IMPROVED ALIGNMENT
Better Designed Transmission Lines

BUSINESS AS USUAL:  
+ DEFORESTATION

BETTER DESIGN:  
- DEFORESTATION

IMPROVED ASSEMBLING METHODS
Environmental Licensing
Ex: Tocantins River Waterway

PROJECT DATA
• Dredging and underwater rock blasting project of the Tocantins River, in the stretch from Marabá/PA to Baião/PA.
• Total length: 212 km.
• Target: final decision by the environmental agency (Ibama) on the Preliminary License (LP).
• The implementation of the waterway in the section between Marabá and Baião will provide safety to large vessels, economic and social development in the region.
• Reduction of transportation logistics costs.
• It is estimated that the Project execution could reduce CO2 emissions by 67.32% through the 1,188 kilometers that separate Peixe/TO from Marabá/PA (DNIT/UNB, 2018).

SECTIONS
• Section 1: between Marabá and Itupiranga (52 km) – Execution of dredging works;
• Section 2: between Santa Terezinha do Tauri and Ilha do Bogéa (35 km) – Execution of rock blasting (Lourenço’s rocks); and
• Section 3: between Tucuruí and Baião (125 km) – Execution of dredging works.
How we protect our ecosystems

334 Federal Conservation Units

171,424,192 ha protected by ICMBIO

78,763,278 ha of continental area under protection
Total continental area: 851,600,000 ha

92,660,914 ha of marine area under protection
Total marine area: 364,651,400 ha

Pending land regularization
55,913,956,48 ha

Estimated required resource
USD 1 = BRL 5
USD 84 million
How we protect our vegetation

**Law n. 12651/2012**
Native vegetation protection

**Permanent Preservation Areas - PPA**

- Hilltop and mountain top
- "Vereda" wetlands
- Reservoir margins
- High altitude (> 1.800 m)
- Lake margins
- Plateau inner margins
- Steep slope
- Spring surroundings
- River margins
- Coastal dune and mangrove stabilizing vegetation

**“Legal reserve” (rural area)**
Part of a private property that must be preserved with native vegetation.
The percentage to be preserved varies according to the biome.

<table>
<thead>
<tr>
<th>Biome</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon</td>
<td>80%</td>
</tr>
<tr>
<td>Amazon-Cerrado</td>
<td>35%</td>
</tr>
<tr>
<td>Cerrado, Atlantic Forest, Caatinga, Pantanal and Pampa</td>
<td>20%</td>
</tr>
</tbody>
</table>

Permanent Preservation Areas (PPA) - Law n. 12651/2012

- Legal reserve (rural area)
  - Part of a private property that must be preserved with native vegetation.
  - The percentage to be preserved varies according to the biome.

- Reserves are established in coastal areas with mangrove vegetation.
How infrastructure contributes to our forests

Environmental compensation for infrastructure with significant environmental impact

Law n. 9985/2000
National System of Conservation Units

Decree n. 4340/2002
Regulates the National System of Conservation Units

± 0.5% of the value of the investment in infrastructure

Order of priority for applying environmental compensation resources:

I. land tenure regularization and land demarcation;

II. preparation, review or implementation of a management plan;

III. acquisition of goods and services necessary for the implantation, management, monitoring and protection of the unit, including its buffer area;

IV. development of studies necessary for the creation of a new conservation unit; and

V. development of research necessary for the management of the conservation unit and buffer area.

Pro-trilhos: New Railway Authorization Program

<table>
<thead>
<tr>
<th>ESTIMATED INVESTMENTS</th>
<th>ESTIMATED COMPENSATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD 25 BI</td>
<td>USD 125 MI</td>
</tr>
</tbody>
</table>
INFRAESTRUCTURE PLANNING
ESG Guidelines

**Environmental**
*(renewable energy, management of solid waste/sanitation, reduction of emissions, protection of natural resources)*

- Rebalance of the Transportation system (more railways and waterways)
- Concessions for greater protection of natural resources (forests, parks)
- Auctions of energy generation based on renewable sources (hydroelectric, wind, solar photovoltaic and biomass)
- Sanitation concessions and their positive impacts in reducing pollution
- Social and environmental impacts assessment (support to environmental processes)

**Social**
*(Public policies, social rights)*

- Fostering private investments to expand and improve the provision of public services: better quality at lower prices
- Compliance with the guidelines of Convention 169/1989 of the International Labor Organization (ILO): the right of indigenous and tribal peoples to be informed and previously consulted
- Sanitation concessions and their positive impacts on health and educational indicators

**Governance**

- PPI Governance
- Balance in the distribution of risks and responsibilities in concession contracts
- Legal security
- Transparency in project structuring
National Standards

**Law n. 13971/2019**
Establishes the Multiannual Plan for the period 2020-2023

**Decree n. 10526/2020**
Interministerial Committee for Infrastructure Planning and the Integrated Long-Term Infrastructure Plan within the scope of the Federal Government.

**Decree n. 10531/2020**
The Federal Development Strategy for Brazil in the period 2020-2031, containing macroeconomic scenarios, guidelines, challenges, key indexes and targets.

**INFRASTRUCTURE AS STATE POLICY**

**CONSIDERING THE BALANCE OF EMISSIONS IN ALL PHASES OF STRUCTURING PUBLIC POLICIES**

Recognized as a good practice by the Federal Court of Accounts
Energy planning

- **Long term studies (up to 30 years)**
  - National Energy Plan
    - Ten-Year Energy Expansion Plan
      - Monitoring (1 to 3 years)
        - Auction design and schedules
          - Energy Generation (A-1 to A-7)
          - Transmission capacity
          - Oil and Gas

Strategy for formulation of long-run energy policy

Identify trends and propose actions for formulation of energy policy in medium and short terms
Logistic planning

**PNT and PNL Principles:**

a) Respect for life;
b) Institutional excellence;
c) Territorial planning and integration;
d) Sustainable infrastructure;
e) Logistics efficiency;
f) Economic, social and regional development;
g) Social and environmental responsibility; and
h) Integration and international cooperation
In the implementation of the portfolio of projects currently in progress, the share of rail freight transport already tends to rise from 17.69% to 30.71%.

Completing other planned projects, such as the second segment of FICO, from Água Boa/MT to Lucas do Rio Verde/MT, the modal share exceeds 34%.
How can a new Infrastructure Project respect the environment?
Railways - Ferrogrão

**PROJECT**

- **Section**: from Sinop (state of Mato Grosso) to Miritituba (state of Pará) - 933 km
- **Concession period**: 69 years, extension is prohibited
- **Auction criterion**: highest concession fee amount (USD 3.6 million minimum)
- **Gauge**: 1.60 m
- **Train type**: 3 locomotives and 160 wagons

**FINANCIAL ASPECTS**

- **CAPEX**: USD 1.68 bi (implementation) + USD 2.62 bi (maintenance capex)
- **OPEX**: USD 12.74 bi
- **Demand**: 20.7 mi net tons (2030); 48.6 mi net tons (2060)
- **Soybean and corn tariff**: USD 16.28 / net tons (Sinop-Miritituba)
- **Total Revenue**: USD 35.36 billion
- **Year 10 revenue**: USD 400 million
- **WACC**: 11.04% per year (in real terms and net of tax)
- **Ebitda margin after ramp up**: 59% (year 2037)

**SOCIAL ASPECTS**

- The railroad route does not overlap with Indigenous Lands or Quilombola communities
- The nearest indigenous lands are located at a distance of 4 km (Praia do Mangue) and 7 km (Praia do Índio), in Itaituba
- The railway’s reference layout does not cross any Conservation Unit
- **Reduction of USD 3.84 billion in freight costs** compared to the highway mode

Social and environmental compensations estimated at more than R$ 700 million - R$ 29 million just for SNUC
Railways - Ferrogrão

- 50% reduction in the total CO₂ emissions generated on the BR-163 highway
- USD 1.22 billion reduction in externalities (accidents, congestion...)
- Installation of 483 fauna crossings
- Recovery of 723 pre-existing degraded areas
- Reforestation with 1.5 million seedlings in 700 ha
- Socio-environmental compensations estimated at more than USD 140 million (5.8 for conservation units)

Characterization of the directly affected area

- Anthropized area: 37%
- Native vegetation: 62%
- Water body: 1%
Highway BR-319/AM

**PROJECT**

*Location:* located in the State of Amazonas, northern region of Brazil

*Implementation and Paving:* 70s, inaugurated in 1976

*Section:* 885 km, being the only overland interconnection between Manaus/AM and Porto Velho/RO and the only connection to the rest of the country

*Middle section (km 250 - km 655.7):* environmental feasibility analysis for repaving (EIA/RIMA completed)

**SOCIAL ASPECTS**

The “Middle section” is almost entirely surrounded by Federal and State Conservation Units. **The presence and maintenance of these areas greatly reduce the chances of deforestation in the region, preserving the fauna and flora.**

The highway route does not overlap with Indigenous Lands

The nearest indigenous lands are located at a distance of 21 km (Lago Capanã) and 22 km (Ariramba)

The highway layout **does not cross any Conservation Unit.**

Departing from Manaus to Porto Velho, via Madeira River, the trip takes about 5 days, covering 1,239 km. With the paving of the BR-319/AM, the travel time will be much shorter, between 10 and 12 hours, and much safer.

**ENVIRONMENTAL PROGRAMS**

- Degraded Area Recovery
- Monitoring of wildlife roadkill and of fauna crossings
- Flora Protection
- Water Quality Monitoring
- Environmental Liabilities Recovery

**TOTAL OF 19 PROGRAMS**
BR-319
(SEgment C)

Fonte: ViaFauna
Social and environmental benefits of highway concessions

1) Reduction of wildlife roadkill
2) Fauna rescue
3) Fire control
4) Quick response to accidents involving dangerous products
5) Accident reduction and 24-hour rescue
6) Noise and vibration reduction
7) Maintenance of drainages
Concession of National Parks

**Project Guidelines**

- Protection and development of the Conservation Units;
- Transparency;
- Less complex management of contracts.

**Concession**

- Investments to develop infrastructure and enhance service levels
- Provision of public services to support visits to public areas;
- Modernization, revitalization, operation and maintenance of tourism services;
- Support the conservation, protection and management of the units.

**Allocation of a % of the annual gross revenue of the concession for obligations in socio-environmental development**

- Environmental monitoring and species management;
- Integration with the surroundings and environmental awareness.

**Regulation and Supervision of the contract with performance indicators**

- Waste management obligation;
- Infrastructure maintenance and conservation;
- Visitor satisfaction.
Forests concessions

• **Sustainable Forest Management:** using the forest and keeping it standing to produce again in the future

• **Management:** cycles of 30 to 40 years, divided into Annual Production Units – UPA, in order to allow its complete recovery at the end of the cycle

• **Timeline:** only one UPA is explored per year and will only be explored again after the defined total cycle

• **Concession:** onerous delegation of the right to practice sustainable forest management for the production of forest products and services, in a forest management unit (UMF).
Forest concessions

The concession projects of National Forests of Iquiri, Humaitá, Balata-Tufari, Jatuarana, Pau-Rosa and Gleba Castanho, all in the state of Amazonas; Três Barras and Chapecó in the states of Santa Catarina; and Irati in the state of Paraná have been qualified by the PPI Council as national priorities.

Payments to the Federal Government by the concessionaires are destined to the states and municipalities where the forests are located, to the National Fund for Forestry Development and to ICMBio - Chico Mendes Institute for Biodiversity Conservation.

Computerized system for managing concession contracts. Procedural manuals for sustainable management.

Greater preservation of forests, less deforestation, less fires, greater control and a better fight against illegal activities.
5G Auction

Most important auction on radio frequency spectrum ever held in Brazil.

The main objective of the auction is fostering investments rather than collecting bonus/concession fees. The auction rules establish national and regional compromises as to investments in 5G coverage and backhaul.

**Ministry of Communication requirements:**
- Implementation of PAIS - Integrated and Sustainable Amazon Program
- Implementation of a Federal Private Network
- Program for connecting public schools

<table>
<thead>
<tr>
<th>Waveband</th>
<th>Number of Blocks</th>
<th>Investments (USD)</th>
<th>Minimum concession fee (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 MHz</td>
<td>1</td>
<td>441.18</td>
<td>30.01</td>
</tr>
<tr>
<td>2.3 GHz (50 MHz)</td>
<td>1</td>
<td>963.37</td>
<td>89.11</td>
</tr>
<tr>
<td>2.3 GHz (40 MHz)</td>
<td>1</td>
<td>770.70</td>
<td>71.29</td>
</tr>
<tr>
<td>3,5 GHz (nacional)</td>
<td>4</td>
<td>4,568.52</td>
<td>271.14</td>
</tr>
<tr>
<td>3,5 GHz (regional)</td>
<td>1</td>
<td>1,142.13</td>
<td>8.36</td>
</tr>
<tr>
<td>26 GHz</td>
<td>8</td>
<td>1,266.09</td>
<td>1,266.09</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
<td><strong>9,151.99</strong></td>
<td><strong>1,736</strong></td>
</tr>
</tbody>
</table>

**Investments estimates:**
USD 9 billion
5G PAIS - Integrated and Sustainable Amazon Program

Decree n. 10800/2021

High-capacity optical fiber, along rivers in the Amazon Region, and metropolitan networks in the Municipalities

Contribution to the implementation of public policies that depend on connectivity:

- schools
- health units
- hospitals
- library
- security institutions and
- courts

Technology helps with more effective ways to fight against deforestation!
PPI Projects to Support States and Municipalities

SANITATION PPPs

<table>
<thead>
<tr>
<th>Municipal solid waste (Pilot Projects)</th>
<th>05 projects</th>
<th>2.9 million Benefited population</th>
<th>USD 640 million Capex + Opex estimates (Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitation (Water and Wastewater)</td>
<td>13 projects</td>
<td>14.4 million Benefited population</td>
<td>USD 6.8 billion</td>
</tr>
<tr>
<td>Total</td>
<td>18 projects</td>
<td>17.3 million</td>
<td>USD 7.44 billion</td>
</tr>
</tbody>
</table>
CEDAE - AN EXAMPLE OF SUCCESSFUL PPP:
CEDAE - SANITATION IN RIO DE JANEIRO

CONTEXT OF SANITATION IN RIO BEFORE PPP

<table>
<thead>
<tr>
<th>City</th>
<th>Population (IBGE 2020)</th>
<th>Service Rate</th>
<th>Population without sewage collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rio de Janeiro (sem AP5)</td>
<td>5,020,374</td>
<td>76%</td>
<td>1,204,890</td>
</tr>
<tr>
<td>São Gonçalo</td>
<td>1,091,737</td>
<td>34%</td>
<td>720,546</td>
</tr>
<tr>
<td>Duque de Caxias</td>
<td>924,624</td>
<td>43%</td>
<td>527,036</td>
</tr>
<tr>
<td>Nova Iguaçu</td>
<td>823,302</td>
<td>46%</td>
<td>444,583</td>
</tr>
<tr>
<td>Belford Roxo</td>
<td>513,118</td>
<td>39%</td>
<td>313,002</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>8,373,155</strong></td>
<td></td>
<td><strong>3,210,057</strong></td>
</tr>
</tbody>
</table>

Sewage Collection: 37% of the population
Water supply: 88% of the population

*Reference Form CEDAE 2019
CEDAE - SANITATION IN RIO DE JANEIRO
INFRASTRUCTURE PROJECT WITH GREATER POSITIVE SOCIAL AND ENVIRONMENTAL IMPACT ONGOING IN THE COUNTRY

**BIGGEST CAPITAL MOBILIZATION PROJECT IN BRAZIL**

Direct investments of about **USD 6 billion** in water and sewage infrastructure

**TRANSFORMATION OF THE QUALITY OF LIFE OF THE POPULATION**

**Universalization** of basic sanitation for a population of approximately **12.8 million people** in 12 years, creating conditions for the environmental recovery of Guanabara Bay, Guandu River basin and Barra da Tijuca lagoon system

**INCOME AND EMPLOYMENT GENERATION IN RJ**

Creation of around **46 thousand direct jobs** in carrying out works and operations, in addition to the **income effect** associated with household consumption of around **R$ 34 billion**

USD 1 = BRL 5
CEDAE

10 last year investments made by CEDAE*

First 10 years investments after the PPP

R$ 3,000,000
R$ 2,500,000
R$ 2,000,000
R$ 1,500,000
R$ 1,000,000
R$ 500,000
R$ -


MÉDIA CEDAE 1 2 3 4 5 6 7 8 9 10 MÉDIA BLOCOS

R$ 183,736
R$ 2,188,800

Fonte investimentos CEDAE: SNIS – Indicador FN033 - Investimentos totais realizados pelo prestador de serviços
*Não considera investimentos realizados no período pelo Estado ou municípios
<table>
<thead>
<tr>
<th>Investments of US$ 520 MILLION, in the first 5 years, to reduce the pollution in Guanabara Bay</th>
<th>Social tariff increased from 0.57% to at least 5% of the population</th>
<th>No real increase in the tariff (only inflation adjustment is allowed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least US$ 372 MILLION of investments in the infrastructure of slums and communities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investments of US$ 580 MILLION, in the first 5 years, to reduce the pollution in the Guandu river basin, which supplies most of the Metropolitan Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US$ 50 MILLION TO HELP CLEAN UP THE LAGOON COMPLEX OF BARRA DA TIJUCA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Solid waste

PPP PROJECTS
- 7 projects serving 81 municipalities and covering 4,314,950 inhabitants
- Closing of at least 20 dumping sites

ENVIRONMENTAL BENEFITS
- Increased recycling of dry solid waste >30%;
- Diversion of organic solid waste disposed in landfills >50%;
- Closure of dumps with proper final disposal and waste in landfills;
- Reduction of Greenhouse Gases by capturing methane gas from landfills and solid waste treatment units >55%;
- Energy recovery of urban solid waste.

SOCIAL BENEFITS
- Civil Society Environmental Education;
- Fostering economic development – job and income generation;
- Support for collectors of recyclable and reusable materials – improvement of installation and increase in income.
PPI projects to support Municipalities

STREET LIGHTINING PPPs

LEGEND:
Caixa Projects
BNDES Projects

Projects: 24
Benefited population: 9.3 Mi
CAPEX: 238 Mi
OPEX: 122.2 Mi

Timó (MA) 1
Crato (CE) 2
Olinda* (PE) 3
Alagoinhas (BA) 4
Barreiras (BA) 5
Camaçari* (BA) 6
Consórcio Alto Sertão (BA) 7
Patos de Minas (MG) 8
Colatina (ES) 9
Cachoeiro de Itapemirim (ES)* 10
Nova Iguaçu (RJ) 11
Campinas* (SP) 12
Ipiranga (SP) 13
Foz do Iguaçu* (PR) 14
Toledo (PR) 15
Ribearão Preto (SP) 16
Araçatuba* (SP) 17
Corumbá (MS) 18
Valparaíso de Goiás (GO) 19
Ariquemes (RO) 20
Jaboatão dos Guararapes (PE) 21
Ribeirão Preto (SP) 22
Curitiba (PR) 23
Canoas (RS) 24
Street lighting concessions

- PPI structuring 32 concessions
  - 8 concessions made
  - 24 concessions in progress, benefiting 11.3 million inhabitants
- Technological modernization of public lighting for energy efficiency
- Improvement of public safety
- Increased management of services and reduction of operating and maintenance costs
- Increased energy efficiency (consumption reduction) by 50%, through modernization of the park with LED lamps and telemetering
- Investments in the order of R$1.5 billion in infrastructure
### PPI projects to support States and Municipalities

#### SOCIAL INFRASTRUCTURE PROJECTS

<table>
<thead>
<tr>
<th>Project</th>
<th>Location</th>
<th>Benefited population</th>
<th>Investments estimates (million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daycare units (20)</td>
<td>Teresina/PI</td>
<td>4,875 toddlers</td>
<td>USD 25</td>
</tr>
<tr>
<td>Daycare units (40)</td>
<td>Recife/PE</td>
<td>tbd</td>
<td>tbd</td>
</tr>
<tr>
<td>Prison in Santa Catarina</td>
<td>Blumenau/SC</td>
<td>3,000 places</td>
<td>USD 40</td>
</tr>
<tr>
<td>Prison in Rio Grande do Sul</td>
<td>Erechim/RS</td>
<td>1,125 places</td>
<td>USD 14</td>
</tr>
<tr>
<td>Correctional facilities</td>
<td>Minas Gerais</td>
<td>439</td>
<td>USD 7</td>
</tr>
<tr>
<td>Correctional facilities</td>
<td>Santa Catarina</td>
<td>357</td>
<td>USD 7</td>
</tr>
<tr>
<td>Health</td>
<td>Guarulhos/SP</td>
<td></td>
<td>USD 51</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>USD 144</strong></td>
</tr>
</tbody>
</table>
Reducing emissions in the energy sector

Brazil is one of the world leaders

2nd Largest producer and consumer market of biofuels in the world (2019)

4th Largest automotive fuel market in the world

7th Largest in installed capacity in the world (2018)

2nd Largest in hydroelectric generation in the world (2019)
Renovabio
NATIONAL PROGRAM FOR THE PRODUCTION AND USE OF BIODIESEL

- **Creation**: Law No. 13,576/2017.
- **Main objective**: increase the production and participation of biofuels in Brazil's fuel mix.

- Reduce CO2 emissions to comply with the Paris Agreement
- Boost the production and use of biofuels through market mechanisms
- Stimulate the diversity and competitiveness of biofuels in the national market

Brazil has pledged to reduce 37% of its domestic CO2 emissions by 2025 and 43% by 2030 compared to 2005 levels

- Decarbonization targets
- Decarbonization credits
- Efficient certification of biofuel production
Energy sector in Brazil
Electricity generation capacity (2021-2030)

85% RENEWABLE

2021
186 GW

2030
236 GW

+27%

Source: MME (2021)
Energy sector in Brazil

Expansion of the national transmission grid: important for the insertion of new renewable sources (wind and solar)

2020

- 162,700 km
- 395,400 MVA

+23%
+37,400 km
+33%
+129,800 MVA

Source: PDE 2030

2030

- 200,100 km
- 525,100 MVA
The SIN facilitated the insertion of different renewables

**Evolution of Electricity Generation**

- **Biomass (GWh)**
- **Nuclear (GWh)**
- **Wind (GWh)**

**Sources:** EPE, MME

**Evolution of Electricity Generation**

- **Solar**
- **Outras**

**Other Renewable Sources**

- **1.3%**
- **9.5%**

**Sources:** EPE, MME
Offshore Wind Power

- Although the challenges involved in economic viability of such projects, Brazil is focused on setting the stage for this new market!
  - Renewable source addressed by 2050 PNE (National Energy Plan) and 2030 PDE (10-year expansion plan)
  - 20 projects at early stage of environmental licensing

Source: EPE
Hydrogen

NATIONAL HYDROGEN PROGRAM (PNH\(^2\))

- Strategy to develop a strong hydrogen market in Brazil.
- August 2021: release of a report proposing six guidelines for the National Hydrogen Program.
  - Disruptive technology
  - Due to its features, Brazil enjoys several possible technological routes and inputs to produce hydrogen → several “colors” of hydrogen.
Auctions for new power generation projects

LAST 5 YEARS

346 PROJECTS
12,006 MW

WIND
194 PROJECTS
4,900 MW

SOLAR
62 PROJECTS
1,853 MW

BIOMASS
23 PROJECTS
727 MW

HIDRO
61 PROJECTS
1,288 MW

THERMO
6 PROJECTS
3,236 MW

Non-renewable: 27%
Renewable: 73%
Privatization - Eletrobras
BRAZILIAN POWER SOE

Features: holding comprising Eletrobras CGTEE; Eletrobras Chesf; Eletrobras Eletronorte; Eletrobras Eletronuclear; Eletrobras Furnas; and direct and indirect shareholding in Other companies.

Transmission Lines:
76,128.54 Km (being 70,091.89 km with tension > 230 KV)

Power generation capacity: 50,648.2 MW

- 125 POWER PLANTS
  - Hydropower: 46,259 MW
  - Nuclear Power: 1,990 MW
  - Thermal power: 1,695 MW
  - Wind: 703.5 MW
  - Solar: 0.9 MW

43.54% of total transmission capacity in Brazil
29% of total generation capacity in Brazil
Regional Benefits from Eletrobras’ Privatization

**USD 1.34 billion** for watershed revitalization and navigability

**USD 0.42 billion** for investments in energy efficiency in the North Region

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1 According to Articles 6th, 7th and 8th of Law 14.182/2021
2 Decree 10.838/21 was published on 10/18/2021, regulating investments in river basins and navigability
3 According to Articles 7 of Law 14.182/2021

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**RETURNING INVESTMENT TO THE HISTORICAL AVERAGE WILL REPRESENT THE CREATION OF MORE THAN 27 THOUSAND JOBS**

**BENEFITS FOR ALL**

**Additional Investments in Generation:**
20+ thousand potential new jobs

**Additional Investments in Transmission:**
7+ thousand potential new jobs