Perspectives from the South Globe: Roadmap to decarbonizing freight transport in Brazil

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The ICCT & Brazil Office
ICCT Mission

To improve the environmental performance and energy efficiency of all modes of motorized transportation—passenger vehicles, heavy-duty trucks and buses, ocean-going ships, and commercial aviation—and fuels they burn—to address air pollution and climate change.

Runaway climate change is the greatest existential threat facing our planet. To limit emissions to 1.5º C, the ICCT is committed to meeting the challenge of decarbonizing the global transportation sector by mid-century in partnership with governments in major markets around the world.

### Programs
- LDVs
- HDVs
- Aviation
- Marine
- Fuels
- Freight

### Regions
- US & Canada
- UE
- China
- India
- Brazil
- Latin America

### Centers & Clusters
- Cities
- Remote Sense
- Batteries
- EV Infrastructure
- H2
- Equidade
- Fleets
- Modeling
Technical Support to Governments and Decision Makers

Focus on bus decarbonization, green freight and energy transition in the automotive industry

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Brazil Overview
CO2 Emissions
Co2 Total Emission in Brazil

Agriculture and Livestock 24,8%

Land Use 49%

Energy 17,9%

Industrial Process 4,5%

Waste 3,8%

Source: SEEG https://seeg.eco.br/
Co2 Emissions Energy Sector

Transport represents almost **50%** of energy total emissions

Source: SEEG https://seeg.eco.br/
Brazil is highly dependent on road transportation, which increases GHG emissions and air pollution.

The trucks shown in the graphic represent interregional and last mile travel.

Source: SEEG https://seeg.eco.br/
Transport emission is predominant in the 27 capitals and cities with more than one million people, which represents 40% of the population.

Source: SEEG https://seeg.eco.br/
Brazil
Transport Infrastructure in Pathway of Decarbonization
Top 10 Ports by transacted values
1. Santos Port (SP)
2. Paranaguá Port (PR)
3. Navegantes/Portonave Port (SC)
4. Rio de Janeiro Port (RJ)
5. Manaus Port (AM)

Source: FazComex
Scenarios to improve the efficiency of cargo transport

The Planning and Logistics Company linked to the Ministry of Infrastructure has been evaluating scenarios to improve the efficiency of cargo and people transport.

For this, 8 evaluation scenarios were built. Below we will detail Scenario 1 – which has all the projects already in progress. Scenario 8 combines all scenarios and collects input from the public-private sector and experts.

Scenario 1 – Main Interventions
RoadWay – Improvements to existing roads and connections
RailWay – Connection – North/South;
  - FIOI – Connection North/South to the Coast (Ilhéus Port)
  - FICO – Center/West Line connected to North/South
  - Ferrogrão – Connect West to waterway in north (parallel to North/South Railway)
Referencial X Scenarios with Allocated Flows

Source: EPL 2021 / Base Year 2017
## Comparison in volume in the modal share of scenarios

### Mode

<table>
<thead>
<tr>
<th>Mode</th>
<th>Base Year 2017</th>
<th>Scenario 1 – Projects in Progress</th>
<th>Scenario 8 – All projections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TKU(billions)</td>
<td>Modal Share</td>
<td>TKU(billions)</td>
</tr>
<tr>
<td>Roadway</td>
<td>1.549,84</td>
<td>66,21%</td>
<td>1.869,70</td>
</tr>
<tr>
<td>RailWay</td>
<td>414,13</td>
<td>17,69%</td>
<td>1.052,66</td>
</tr>
<tr>
<td>Coastal Cabotage</td>
<td>215,49</td>
<td>9,21%</td>
<td>303,12</td>
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<tr>
<td>Inland Navigation</td>
<td>130,61</td>
<td>5,58%</td>
<td>154,25</td>
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<tr>
<td>Pipelines</td>
<td>29,56</td>
<td>1,26%</td>
<td>46,75</td>
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<tr>
<td>Airway</td>
<td>1,33</td>
<td>0,06%</td>
<td>1,74</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2.340,96</td>
<td>100%</td>
<td>3.428,22</td>
</tr>
</tbody>
</table>

### Variation between scenarios and perspective of GHG emissions

| Total Variation in relation to the baseline scenario | 1087,26 | 46%  | 1838,72 | 79% |
| GHG (Ton/Co2 eq.)                                         | 154.574.520 | 191.504.623 (24%) | 186.288.545 (21%) |

Source: EPL 2021
Other factors that influence efficiency and reduction of emissions

- Brazil is a producer of Biofuels - Ethanol, primarily based on sugar cane for light vehicles and biodiesel, primarily based on soy for heavy vehicles
  - The gasoline sold has 30% ethanol
  - The diesel sold has 10% biodiesel

- The Brazilian Electric Matrix is made up primarily of renewable sources: 61.9% hydroelectric plants; 8.0% biomass; 11.8% wind; 4.4% solar; 10% Fossil (coal, natural gas and others); 2.1% Nuclear; 1.0% import.
  - Factor that greatly favors electromobility in the country
    - More and more cities are investing in bus electrification as an environmental solution
    - Companies have also invested resources and efforts to electrify urban delivery fleets.
    - Chinese auto companies are setting up electric vehicle factories

- Regarding navigation, Brazil launched the BR do Mar program, which favors the increase in cabotage navigation and modernization of ports

(https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-748/topico-681/BEN_S%C3%ADntese_2023_PT.pdf)
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