Logistic Infrastructure Scenario in Brazil

Marcelo Perrupato
Secretary for Transportation National Policy

Minneapolis, September 20, 2011
Brazilian Economic Scenario
Positive GDP Growth for Brazil and China

Annualized Quarter data

* Forecasts: USA and China - JP Morgan and Brazil - Ministry of Finance

Sources: BEA (USA), JPMorgan (China) and IBGE (Brasil) 
Produced by: Ministry of Finance
GDP Growth – International Comparison

2nd Quarter/09* - %

South Africa: -3
United Kingdom: 0
Italy: 1
Chile: 2
United States: 3
Switzerland: 4
Euro Zone: 5
Sweden: 6
Germany: 7
France: 8
Norway: 9
Poland: 10
Japan: 11
Australia: 12
Indonesia: 13
Russia: 14
India: 15
Brazil: 7.8
South Korea: 6
China: 12

* Growth relating to the previous quarter (1st Q 2009), updated annually and seasonally
Source: GDW JP Morgan 09/11/2009 and IBGE for Brazil
GDP and Consumption
Change in the last 12 months - %

Source: IBGE
Produced by: Ministry of Finance
Reduction of External Vulnerability

Produced by: Ministry of Finance.
Total External Net Debt

* Forecast – July 2009

Source: Central Bank of Brazil

Produced by: Ministry of Finance
Foreign Exchange Reserves (International Liquidity)

*Position on September 8th, 2009.

Source: Central Bank of Brazil.

Prepared by: Ministry of Finance
Logistic Infrastructure
# Road Network

<table>
<thead>
<tr>
<th>JURISDICTION</th>
<th>PAVED</th>
<th>NON PAVED</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEDERAL</td>
<td>60,469</td>
<td>13,604</td>
<td>74,073</td>
</tr>
<tr>
<td>STATE</td>
<td>122,889</td>
<td>119,429</td>
<td>242,318</td>
</tr>
<tr>
<td>MUNICIPAL</td>
<td>24,104</td>
<td>1,256,188</td>
<td>1,280,292</td>
</tr>
<tr>
<td>TOTAL NATIONAL</td>
<td>207,462</td>
<td>1,389,221</td>
<td>1,596,683</td>
</tr>
</tbody>
</table>

In km
Rail Network

- National Rail Network: 29,817 km
- Federal Rail Network under Concession: 28,314 km
  - 12 concessions operated by 5 private groups and 2 state-owned companies
National Ports

- 50 public ports in Brazil – sea and river
- 26 Federal Port Companies and National Department for Transport Infrastructure (DNIT)
- 23 States and Municipalities
- 1 private sector
Inland Waterways

- 28,000 km of inland waterways
- Potential utilization of over 15,000 km of new waterways
- Transport of over 25 million tons/year
  - Agricultural and mineral products, alcohol, construction material (sand, gravel), fertilizers
- Main Inland Waterways under operation
  - Paraná – Tietê
  - Amazonas - Madeira
  - Tapajós
  - Capim
  - Tocantins – Araguaia
  - São Francisco
  - Paraguai
  - Jacuí - Taquari and Lagoa dos Patos
- TOTAL 13,646 km

* Usable conditions
### Inland Waterways system

<table>
<thead>
<tr>
<th>BASIN</th>
<th>STATES</th>
<th>NAVIGABLE</th>
<th>POTENTIAL</th>
<th>TOTAL*</th>
<th>MAIN RIVERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMAZÔNICA</td>
<td>AM, PA, AC, RO, RR, e AP</td>
<td>18,300</td>
<td>723.5</td>
<td>19,023</td>
<td>Amazonas, Solimões, Negro, Branco, Madeira, Purus, Juruá, Tapajós, Teles Pires, Juruena, Mamoré, e Guaporé</td>
</tr>
<tr>
<td>NORDESTE</td>
<td>MA e PI</td>
<td>1,740</td>
<td>2,975</td>
<td>4,715</td>
<td>Mearim, Pindaré, Itapecuru, Parnaíba e Balsas</td>
</tr>
<tr>
<td>TOCANTINS/ARAGUAIA</td>
<td>TO, MA e GO</td>
<td>2,200</td>
<td>1,300</td>
<td>3,500</td>
<td>Tocantins, Araguaiae Mortes</td>
</tr>
<tr>
<td>SÃO FRANCISCO</td>
<td>MG, BA, PE e SE</td>
<td>1,400</td>
<td>2,700</td>
<td>4,100</td>
<td>São Francisco, Grande e Corrente</td>
</tr>
<tr>
<td>LESTE</td>
<td>MG, ES e RJ</td>
<td>-</td>
<td>1,094</td>
<td>1,094</td>
<td>Doce, Paraíba do Sul e Jequitinhonha</td>
</tr>
<tr>
<td>TIETÊ/PARANÁ</td>
<td>SP, PR e SC</td>
<td>1,900</td>
<td>2,900</td>
<td>4,800</td>
<td>Paraná, Tietê, Paranaíba, Grande, Ivaí e Ivinheima</td>
</tr>
<tr>
<td>PARaguai</td>
<td>MT, MS e PR</td>
<td>1,280</td>
<td>1,815</td>
<td>3,095</td>
<td>Paraguai, Cuiabá, Miranda, São Lourenço, Taquari e Iaurú</td>
</tr>
<tr>
<td>SUL</td>
<td>RS</td>
<td>600</td>
<td>700</td>
<td>1,300</td>
<td>Jacuí, Taquari,Lagoa dos Patos e Lagoa Mirim</td>
</tr>
<tr>
<td>URUGUAI</td>
<td>RS e SC</td>
<td>-</td>
<td>1,200</td>
<td>1,200</td>
<td>Uruguai e Ibicuí</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>27,420</td>
<td>15,407.5</td>
<td>42,827.5</td>
<td></td>
</tr>
</tbody>
</table>

* Not necessarily continuous stretches.
Ro-Ro Terminal in Manaus (State of Amazonas)

Convoy on the Madeira River (States of Amazonas & Rondônia)

Construction of Tucuruí Locks (State of Pará)

Convoy on a Tietê River Canal (State of São Paulo)
Transport Policy and Planning
The transport matrix is unbalanced considering the size of Brazil.
which is proved as compared with similar-size countries.

- **Russia**: Rail 81%, Road 8%, Water & others 11%
- **Canada**: Rail 46%, Road 43%, Water & others 11%
- **Australia**: Rail 43%, Road 53%, Water & others 4%
- **USA**: Rail 43%, Road 32%, Water & others 25%
- **China**: Rail 37%, Road 50%, Water & others 13%
- **Brazil**: Rail 25%, Road 58%, Water & others 17%
To organize such scenario and recover the transport sector, the Ministry of Transport has developed the National Plan for Logistics and Transportation (PNLT)

- An instrument for strategic organization with an integrated view on the territory and development.
- Transport as an agent to induce and facilitate development.
- A more balanced Brazilian transport matrix with a significant participation of rail and water modes, which are more efficient in terms of economy and energy consumption, with less emission of CO2 and NOx.
PNLT indicates ways to change the transport matrix

- Consolidation of a new Brazilian rail network (Law 11772/2008) with the implementation of 11,800 km of new rail lines, with 10,700 km of large-gauge tracks.

- New railways will serve areas of agricultural & mineral new frontiers.

- This new basic railway system prepares the Country for a new economic growth cycle to meet the domestic demand increase and integration with exporting ports.

- Gradual transfer of general cargo from roads to railways, inland waterways, and coastal shipping.
The Brazilian power generation matrix is clean, based on hydro-electric plants. It is needed to make this feature compatible with navigation needs.

Power Generation Matrix – Brazil and the World (%)

- **BRAZIL 2007**: 85% renewable, 10% petroleum, 3% nuclear, 23% coal, 12% hydraulic, 5% other.
- **OECD2006**: 41% renewable, 15% nuclear, 20% coal, 20% hydraulic, 4% other.
- **WORLD**: 40% renewable, 16% nuclear, 30% coal, 16% hydraulic, 2% other.

Source: MME
Power Generation Matrix in Brazil is markedly renewable

**ENERGY MATRIX**

**BRAZIL**

- Biomass: 29.7%
- Hydro-electric: 15.0%
- Natural gas: 9.3%
- Petroleum and by-products: 38.4%
- Coal: 6.4%

44.7% renewable

**WORLD**

- Coal: 24.1%
- Uranium: 6.4%
- Natural gas: 20.9%
- Hydro-electric: 2.1%
- Petroleum and by-products: 35.3%
- Biomass: 11.2%

13.3% renewable

Energy consumption all sources (%)

Evolução da Participação das Fontes no Total
Brasil 1970 a 2005

Source: MME / BEM 2006
Oil consumption by sectors (%)

Source: MME / BEN 2006
Source: PNLT Processing, considering energy consumption
Benefits from the Transport Matrix change 2005 to 2023/2025

(Transport production grows from 851 to 1,510 bi TKU)

- 38% of energy efficiency increase
- 41% of fuel consumption reduction
- 32% of CO₂ emission reduction
- 39% of NOₓ emission reduction
PAC
Growth Acceleration Program
Background

- Brazil has faced a long period of low investment in logistic infrastructure
- Better economic conditions have allowed:
  - Rehabilitation of public investment capability
  - Favorable scenario for partnerships with the private sector
    - Road Concessions
    - Railroad Concessions
PAC

- After two decades, it is the first initiative to accomplish a significant program of investments in transportation
- Public investments selected from the PNLT
  - Projects with strong potential for generating economic & social return
  - Synergy among projects
- Rehabilitation of the existing infrastructure
- New projects and conclusion of projects under way
Main PAC’s Projects

**Highways**
- Construction of new highways: 2,989 km
- Expansion of the existing road capacity: 1,926 km
- Rehabilitation of the existing road network: 53,585 km

**Railways**
- Rail network capacity increase
- Expansion of the rail network (12,000 km): 2,700 under construction; 1,500 to be built; 5,300 under studies & design; 2,500 under analysis

**Inland Waterways**
- Construction of inland waterway terminals in Amazonia
- Construction of locks

**Incentive to Shipbuilding (Financing)**
- Construction of ocean-going, coastal, maritime aid and river vessels (384 vessels, 103 of which finished)
- Construction and modernization of 8 shipyards
Partnerships with the Private Sector
Road Concessions

1\textsuperscript{st} phase of the Federal Highway Concession Program
1,482 km in 3 States: Rio de Janeiro, São Paulo and Rio Grande do Sul
(Concluded)

2\textsuperscript{nd} phase of the Federal Highway Concession Program
3,228 km in 6 States: Bahia, Minas Gerais, Rio de Janeiro, São Paulo, Paraná and Santa Catarina (Concluded)

3\textsuperscript{rd} phase of Federal Highway Concession Program
2,230 km in 5 States: Minas Gerais, Espírito Santo, Goiás, Federal District and Santa Catarina
Bidding in 2010
Railway Program

- Public investment together with private funds from the entrepreneur

- North-South Railway
  - 719 km – Açailândia/MA – Palmas/TO – sub-concession concluded in Dec. 2007
  - 1,535 km – Palmas/TO – Estrela d’Oeste/SP – under way: construction works, section Palmas/Anápolis (855 km); and studies relating the section Anápolis/Estrela d’Oeste (680 km)

- West-East Integration Railway
  - 1,490 km – Figueirópolis-TO / Ilhéus-BA
  - Studies and project under way
Projects for Railways Expansion in Brazil

11,800 km (10,700: 1.60m gauge; 1,100: 1.00 m gauge)
Estimated Cost Investment: US$ 30 billion

Ministry of Transportation

- Ferrovia Transcontinental Açu - Boq. da Esperança (BR/PR)
- Ferrovia de Integração Centro-Oeste Uruaçu/GO - Vilhena/RO
- Ferronorte Alto Araguaia/MT - Rondonópolis/MT
- Ferrovia Norte-Sul Palmas/TO - Estrela D'Oeste/SP
- EF-267 Panorama/SP - Porto murtinho/MS
- Ferrovia do Frango Itajai/SC - Chapecó/SC

- Ferrovia Nova Transnordestina
- Ferrovia de Integração Oeste Leste Alvorada/TO - Ilhéus/BA
- Trem de Alta Velocidade Belo Horizonte-Curitiba
- Trem de Alta Velocidade Rio de Janeiro-São Paulo-Campinas
- Ferrovia Litorânea Imbituba/SC - Araquari/SC
High Speed Train
Rio de Janeiro – São Paulo – Campinas

- Extension: 511 km
- Serves the most populous and economically developed region in Brazil
- Studies on demand, alignment, geology, operation and economic-financial modeling are concluded

- Call for bidding and auction for technology: 1st semester of 2012
  - Transfer of technology is mandatory
    - The winner will be responsible for:
      - final engineering design
      - maintenance
      - operation

- Call for bidding and auction for the High Speed Train:
  - Construction
High Speed Train
Rio de Janeiro - São Paulo - Campinas

PROPOSED STATIONS

<table>
<thead>
<tr>
<th>Station</th>
<th>Location</th>
<th>Km</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Campinas</td>
<td>0.53</td>
</tr>
<tr>
<td>2</td>
<td>Viracopos</td>
<td>22.9</td>
</tr>
<tr>
<td>3</td>
<td>São Paulo</td>
<td>98.9</td>
</tr>
<tr>
<td>4</td>
<td>Aeroporto de Guarulhos</td>
<td>120.5</td>
</tr>
<tr>
<td>5</td>
<td>São José dos Campos</td>
<td>182.0</td>
</tr>
<tr>
<td>6</td>
<td>Barra Mansa / Volta Redonda</td>
<td>391.6</td>
</tr>
<tr>
<td>7</td>
<td>Aeroporto Galeão</td>
<td>494.5</td>
</tr>
<tr>
<td>8</td>
<td>Rio de Janeiro / Barão de Mauá</td>
<td>509.5</td>
</tr>
</tbody>
</table>

STATION LOCATIONS

Ministry of Transportation
Major Directives from the Ministry of Cities for Urban Mobility

Implement corridors and transport equipments for all major cities with more than 300 thousand inhabitants, state capitals and metropolitan regions, focusing bus and rail systems, including 60% expansion in the existing metro network.

PAC mobility goals:
- Existing network: 215.7 km
- Expansion of 133.5 km up to 2022
- Metro network (São Paulo, Rio, Recife, B. Horizonte, Salvador, Fortaleza, Brasília)
- Rail & VLT (São Paulo, Rio, P. Alegre, Natal, Salvador, J. Pessoa, Recife, Fortaleza, Maceió, N. Hamburgo, Curitiba)
São Paulo Metro

- 4 existing lines totalling 62.3 km
- 3,500,000 pax/day
- 12 km expansion (private operation)
- 11 km of new line (5) in 2015
- 24 km of 2 monorail lines in 2014
- Expansion Expresso Tiradentes - 23 km monorail
- Expansion of 6 km Orange line subway.
- Basic Design 12 km Monorail or VLT: S. Bernardo-São Paulo

CPTM VLT

- 6 existing lines totalling 260.8 km
- 2,150,000 pax/day
- New line (13) with 20 km in 2025
- 84 new trains (8 cars each) in 2014
- Design Capacity: 4,100,000 pax/day (3 min headway)
- PPP operation under analysis
Maceió Diesel VLT

- 1 existing line totalling 32.1 km
- 6,000 pax/day
- System is under improvement with VLT rolling stock
Salvador Surface Rail

- 1 existing line totalling 17 km
- 12,000 pax/day
- Under improvement
- Public operation

Salvador Metro

- 1 existing line totalling 6 km
- Expansion to 12 km in 2011
- 200,000 pax/day forecast
- Public operation
Fortaleza Metro
South Line (under construction)

- 1 line totalling 17 km
- 190,000 pax/day
- Operation in 2011
- 2 lots of 10 trains each (with 4 cars)

Fortaleza Diesel VLT
West line

- 1 existing line totalling 21 km
- 8,000 pax/day
- May be expanded for integration with the metro system
- State public operation
Brasília Metro

- 1 existing line totalling 40.3 km
- 120,000 pax/day
- Expansion of Rolim stock for 190,000 pax/day
- Public Operation
Belo Horizonte Metro - CBTU

- 1 existing line totalling 2.2 km
- 170,000 pax/day
- Capacity forecast: 240,000 pax/day
- Need for 10 new trains (4 cars each)
- Final engineering design for Lines 2 and 3 totalling 33.8 km
João Pessoa VLT - CBTU

- 1 existing line totalling 30 KM
- 11,000 pax/day
- Design for improvement under analysis
Recife Metro - CBTU

- 2 existing lines totalling 39.7 km
- 220,000 pax/day
- 15 TUE (electric train unit)
- Public operation

Recife VLT
South Line

- 2 existing lines totalling 26.1 km
- 6,000 pax/day
- Under improvement (connecting to SUAPE Industrial Port)
- PAC I
Rio de Janeiro Metro

- 2 existing lines totalling 35.6 km
- 550,000 pax/day
- Line 4 under construction with 14 km (Ipanema - Barra da Tijuca)
- Demand forecast 250,000 pax/day
- Prospective construction of Line 3 (Niterói - São Gonçalo) for Olympic Games 2016

Rio de Janeiro Metro
SUPERVIA

- 5 existing lines totalling 225 km
- 500,000 pax/day
- 1,100,000 pax/day demand forecast
- Lines and Stations Improvement with 90 additional TUE (electric train units) to attend Olympic Games 2016
Natal Diesel VLT

- 2 existing lines totalling 56.2 km
- 7,000 pax/day
- Future improvement under analysis
Porto Alegre VLT
TRENSURB

- 1 existing line totalling 33.8 km
- 160,000 pax/day
- Expansion of 9 km in 2011 with 8 new TUE (6 cars each)
- Demand forecast: 200,000 pax/day
Passengers traffic on railway cargo network

- **Low demand cargo lines:**
  Feasibility studies are financed by the Ministry of Transport and implementation and operation by private enterprises, basically for tourism sector
  
  (14 prospective services throughout the Country)

- **Regular demand cargo lines:**
  Passengers traffic operated in non priority basis

- **New railway expansion lines:**
  Passengers traffic may be effectively operated in regular basis
  
  (under analysis by the Government)
Highlights of the Inland Waterway Sector
Inland Waterway Map

Convenção para Portos e Hidrovias
- Trechos Navegáveis
- Trechos Navegáveis nas cheias
- Trechos de Navegação Inexpressíveis

Navigable stretches
Inland Waterway Development

- Brazil is already developing the rehabilitation and structuring of the railway system
- Now the challenge is to structure an inland waterway system that contributes to a better equilibrium of the Brazilian transport matrix in terms of energy, economy and sustainability
- Such an arrangement implies a governmental articulation concerning the multiple use of water resources and the appropriate environmental handling
Strategic Inland Waterway Plan

Structures an organized and comprehensive instrument that, on the basis of the main potential-navigation hydrographic regions, aims to:

- Identify dredging and rock blasting works
- Identify and ranking works of dam crossing
- Structure inland waterway terminals
- Define institutional parameters for the inland waterway sector, considering the multiple use of water (water supply, irrigation, energy generation (*Brazilian matrix is clean, basically hydro-electric generation*), recreation, sanitation and transportation

Strong articulation and integration with other public and private agencies (especially the National Water Agency)
Opportunities for Cooperation

- All those points, specially concerning the increasing of the railway network, represent challenges to be faced by Brazil, as well as opportunities for transferring technology and international experience and for partnership on investments.

- Worldwide countries will certainly be important partners in such a process.
www.transportes.gov.br

F@le com o Ministério