Urban mobility in Brazil: measures for adaptation to climate change

Clarisse Cunha Linke
September 13, 2018
• In Brazil since 2009 as a local non profit
• Headquarter in NY
• Promotion of high quality transport systems and policy solutions that make cities more livable, equitable, and sustainable.
• Bridging public sector, civil society and private sector agendas
Session’s objectives

Context: Urban mobility in Brazil

Current vulnerability of existing urban mobility systems to climate

Future projections

Assessment of cities’ vulnerability to climate change

Measures to increase systems’ resiliency
Context: Urban mobility in Brazil
Urban mobility in Brazil

- 84% urban
- 40% population living in metropolitan regions
- 1970-2010 population increased by 76%, while urban land area by 127%
- Average travel time 38 minutes
- R$ 150 bi pledged for infrastructure since 2007
- 45% GHG emissions related to transport

Sources: Ministry of Cities (2015), SEEG (2014)
Climate change and urban mobility policy frameworks

- 2001: Cities Statute
  - Ministry of Cities is established
- 2003: Insufficient resources to fund transport infrastructure
- 2004 - 2008: Growth Acceleration Program (PAC) World Cup
- 2009: National Policy on Climate Change (PNMC)
- 2010: Sectorial Plans begin to be developed
- 2011: PAC Mobility
  - PAC Large Cities
- 2012: Urban Mobility Law
  - PAC Middle-size Cities
- 2013: Street protests
  - PAC Urban Mobility
- 2014: Transport Sectorial Plan on Climate Change for Mitigation (and Adaptation)
- 2015: GHG reduction targets:
  - 37% by 2025
  - 43% by 2030
  - Metropole Statute
  - National Adaptation Plan
Current vulnerability of existing urban mobility systems to climate
From 2001-2010, frequency of natural disasters has multiplied by 270% in Brazil, compared to the previous decade.
Existing vulnerability of urban mobility systems

Maceió, 2010
Existing vulnerability of urban mobility systems

Recife, 2013
Existing vulnerability of urban mobility systems

São Paulo, 2015
Existing vulnerability of urban mobility systems

São Paulo, 2014

Rio de Janeiro, 2016
Existing vulnerability of urban mobility systems

Rio de Janeiro, 2016
Existing vulnerability of urban mobility systems

Rio de Janeiro, 2016
Existing vulnerability of urban mobility systems

Rio de Janeiro, 2016
Existing vulnerability of urban mobility systems
Vehicle fleet grew by 111% 2003-2015

Fonte: Elaborado pelo Observatório das Metrópoles a partir do Registro Nacional de Veículos Automotores (RENAVAN), do Departamento Nacional de Trânsito (DENATRAN)
Future projections
### Indicators

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Increase in the average: the number of days per year with temperatures above 30º Celsius</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Extreme events: the number of six or more consecutive days of very high temperature per year (heat waves)</td>
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<table>
<thead>
<tr>
<th>Precipitation</th>
<th>Increase in average: the number of wet days per year</th>
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<tr>
<td></td>
<td>Extreme events: the number of days with rains above 30 mm per year (storms)</td>
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- Two horizons: 2026-2055 and 2056-2085
- Two global regional climate models: HadGEM2-ES and MIROC5
- Two scenarios based on degrees of concentration of GHG: major and minor
- 283 municipalities with more than 100,000 inhabitants
Increase in the number of days with temperature above 30ºC

**2026-2055**
+50 days/year

**2056-2085**
+150-200 days/year
Increase in the number of heat waves per year

2026-2055

2056-2085

+150-200 days/year
Increase in the number of wet days

Southern region: 15-20% increase
Intensification of rainfall in the Southern region

2026-2055

2056-2085

9 extra days of storms per year
Assessment of cities’ vulnerability to climate change
Rio de Janeiro: high vulnerability and low capacity to adapt
Rio: high % of residents spend +1 hour day commuting
Rio: risk of flooding due to sea level rise
Measures to increase systems’ resiliency
A-S-I Strategy to ensure 2º Celsius scenario

**AVOID**
Reduce or avoid the need to travel – *System efficiency*

**SHIFT**
Shift to or maintain share of cleaner modes – *Trip efficiency*

**IMPROVE**
Improve the energy efficiency of transport modes and vehicle technology – *Vehicle efficiency*
Transit Oriented Development
Instruments to mobilize local actors to identify vulnerabilities, ie Mobility Plans and Urban Development Plans.

Metropolitan scale.

Local climate change assessments involving government, private sector (operators), civil society.

Identification of most vulnerable groups.

Integration to other systems – sanitation and housing.
### Rio: People Near Transit (per income levels)

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<thead>
<tr>
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<th>2010</th>
<th>2018</th>
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<tbody>
<tr>
<td>City</td>
<td>36%</td>
<td>52%</td>
</tr>
<tr>
<td>Metro</td>
<td>23%</td>
<td>31%</td>
</tr>
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<tr>
<th></th>
<th>Lower income level</th>
<th>Higher income level</th>
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<tbody>
<tr>
<td>City</td>
<td>46%</td>
<td>66%</td>
</tr>
<tr>
<td>Metro</td>
<td>23%</td>
<td>55%</td>
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</table>
Infrastructure planning

Assessment of existing infrastructure and service.

Include adaptation measures in the design stage of investments in mobility.

Consider windows of opportunity – less costly and more beneficial:

- renovation of infrastructure systems,
- maintenance cycles,
- review of sectoral plans.

Take advantage of infrastructure maintenance, replacement and improvement processes to incorporate incremental adjustments that adapt infrastructure to new standards.
Adaptation as part of design stage of new infrastructure

Rio de Janeiro, 2014
Adaptation as part of design stage of new infrastructure

Rio de Janeiro, 2016
The New York City Panel on Climate Change (NPCC2) Future 100-Year Flood Zones for New York City

using high-estimate 90th percentile projections of sea level rise

- 2020s: 10” Sea Level Rise
- 2050s: 30” Sea Level Rise
- 2080s: 58” Sea Level Rise
- 2100s: 75” Sea Level Rise
- FEMA Preliminary FIRM (December 2013)
- Borough Boundaries

Map Authors: L. Patrick, W. Solecki, August 2014, Contact: info@cunysustainablecities.org
Mayor celebrates delivery of 100 pocket parks across London

12 August 2015

A green scheme launched by the Mayor of London Boris Johnson to create 100 new pocket parks in the capital has been so successful there are plans to roll it out across the country.

The Mayor has today confirmed he has delivered his manifesto pledge to create 100 rejuvenated spaces as part of his pocket parks programme in 26 London boroughs.

From a rain garden in Vauxhall to a dinosaur playground in Hornsey and edible gardens along a south London bus route, more than 25 hectares of community land across the capital have been converted into new enhanced green areas, thanks to £2million of funding from the Mayor. This was match-funded from the Boroughs, as well as grants from businesses and trusts.

The programme to transform underused urban spaces across the city into mini oases for Londoners to enjoy has been a roaring success and proposals to develop it nationwide are being considered by the government.

The Mayor of London, Boris Johnson, said: “From what started as a green shoot in 2012, dozens of glorious spaces have sprouted up across almost every corner of the capital, offering an oasis of calm from the hustle and bustle of city life.

“They may have been pocket-sized pieces of previously forgotten land, but they pack a real punch in what they now offer local people, thousands of whom have given up their time to make the capital greener and more resilient. It really underlines London’s status as one of the greenest world cities.”
Non-structural measures

Develop strong connections between adaptation planning, disaster risk reduction and sustainable development.

Raise awareness among different constituencies.

Integrate systems and social impact analysis.

Collect, maintain, integrate high-quality data.
Thank You

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