Planning for Sustainable Transportation Systems in Asian and Latin American Cities: Some Lessons Learned

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18th UCLA Lake Arrowhead Symposium
The Future of Cities and Travel
October 19-21, 2008

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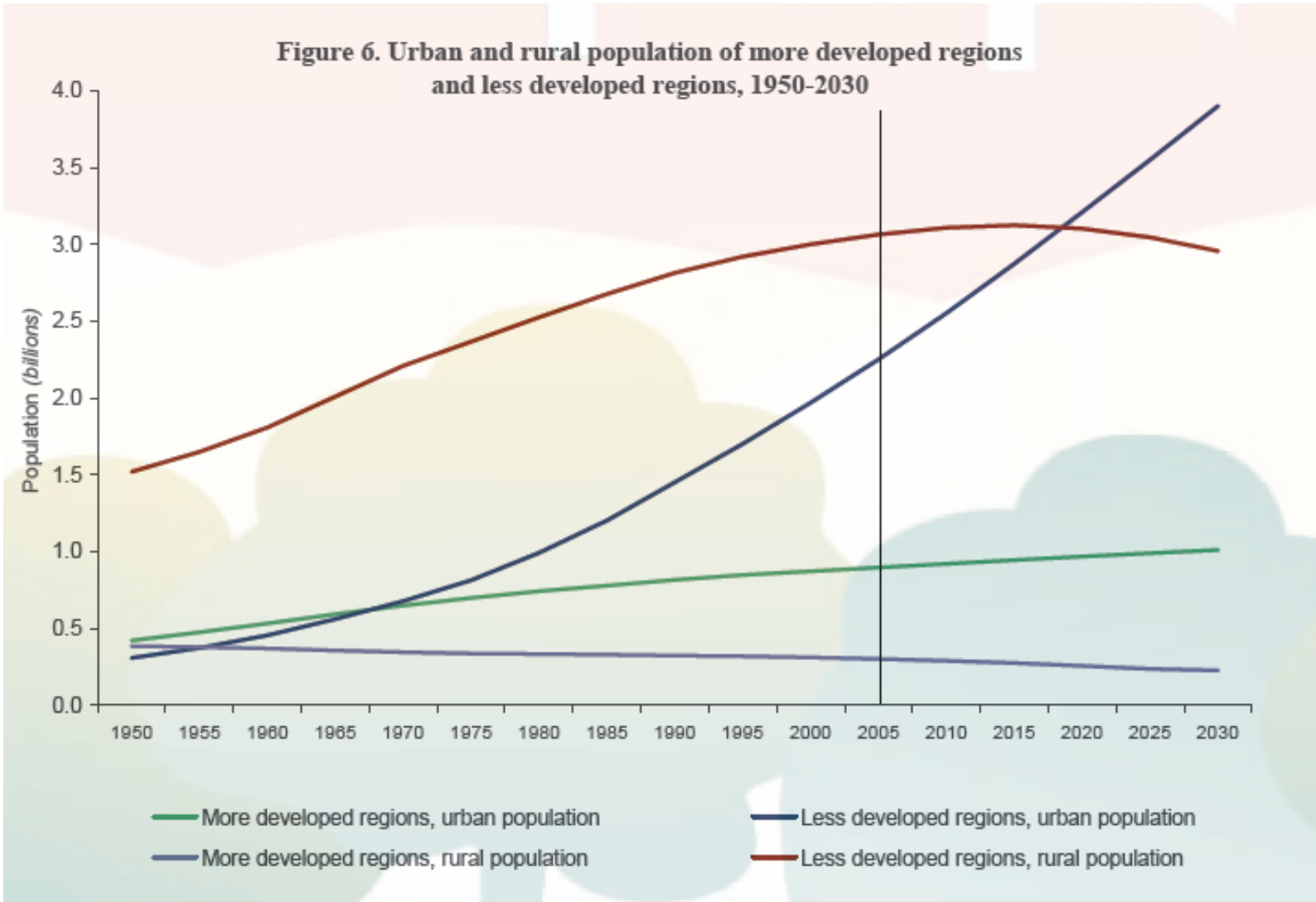
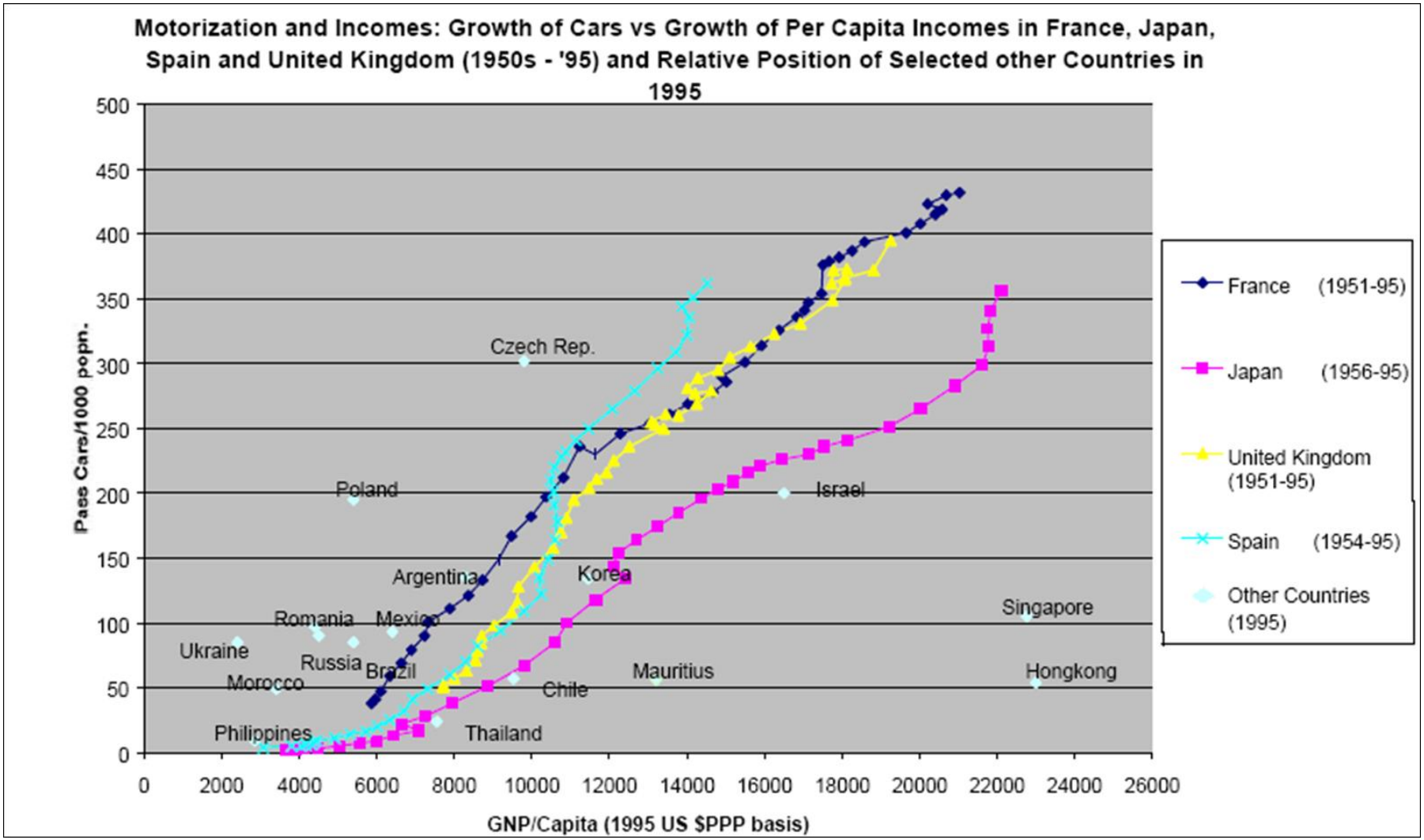
Challenge 1: in 2030 4 billion people will live in urban agglomerations in developing countries



Source: United Nations Population Division, World Urbanization Prospects, The 2005 Revision

Challenge 2: Vehicles property and use increases faster than the population

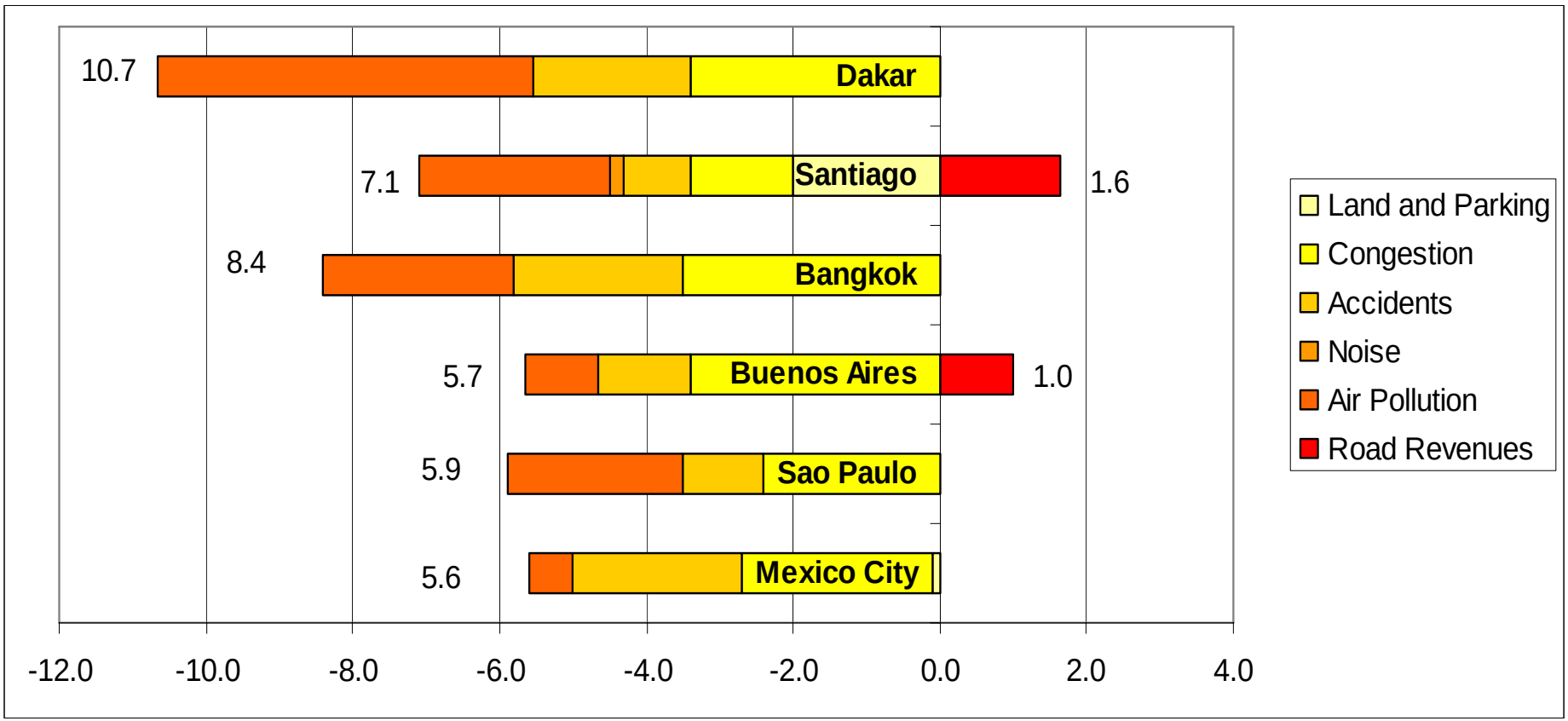


Source: Cities on the Move, The World Bank, 2004

Challenge 3: Financial, institutional, physical resources are constrained

A very large burden is imposed on the society, especially the low income population

Percent of the Gross Regional Product in Transport Externalities



Source: World Business Council on Sustainable Development, 2001.

¿What to do?

Alternative 1:
Capital and land intensive solutions

Give greater capacity to the road network to relieve congestion

USA Highway

Alternative 2:
Low cost, reduced land use

Give priority to non-motorized transport; improve transit; reduce motor vehicle use

Amsterdam, The Netherlands
Photo: FPPQQ

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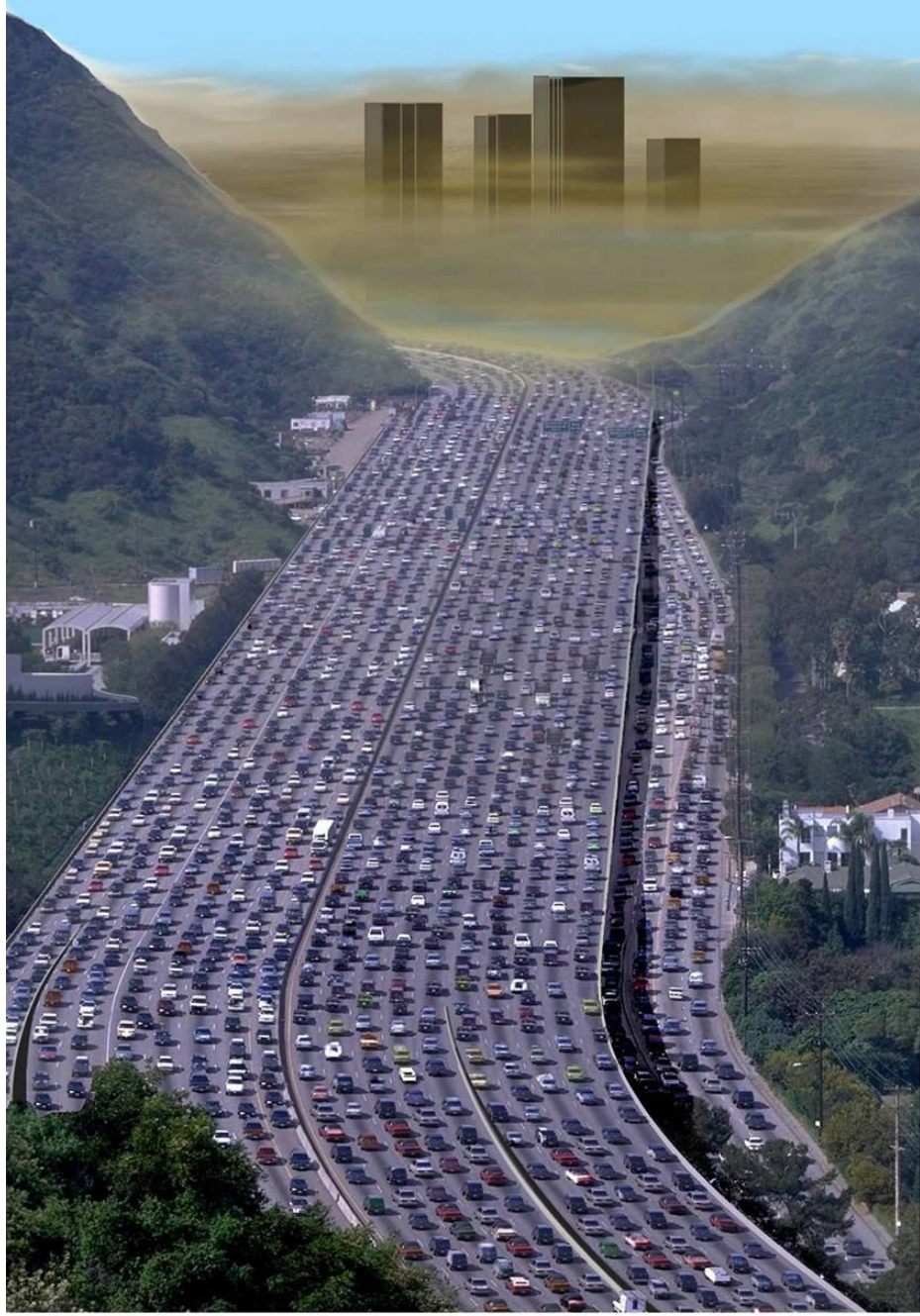
Capital & Land intensive solutions: highways



Courtesy Transfuture.net

Alternative Sustainable Solutions

Technical Sustainability

Economic Sustainability

Social Sustainability

Political Sustainability

Environmental Sustainability

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Non-Motorized Transport

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Traffic Demand
Management
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Transport Oriented Development

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Bus Rapid Transit

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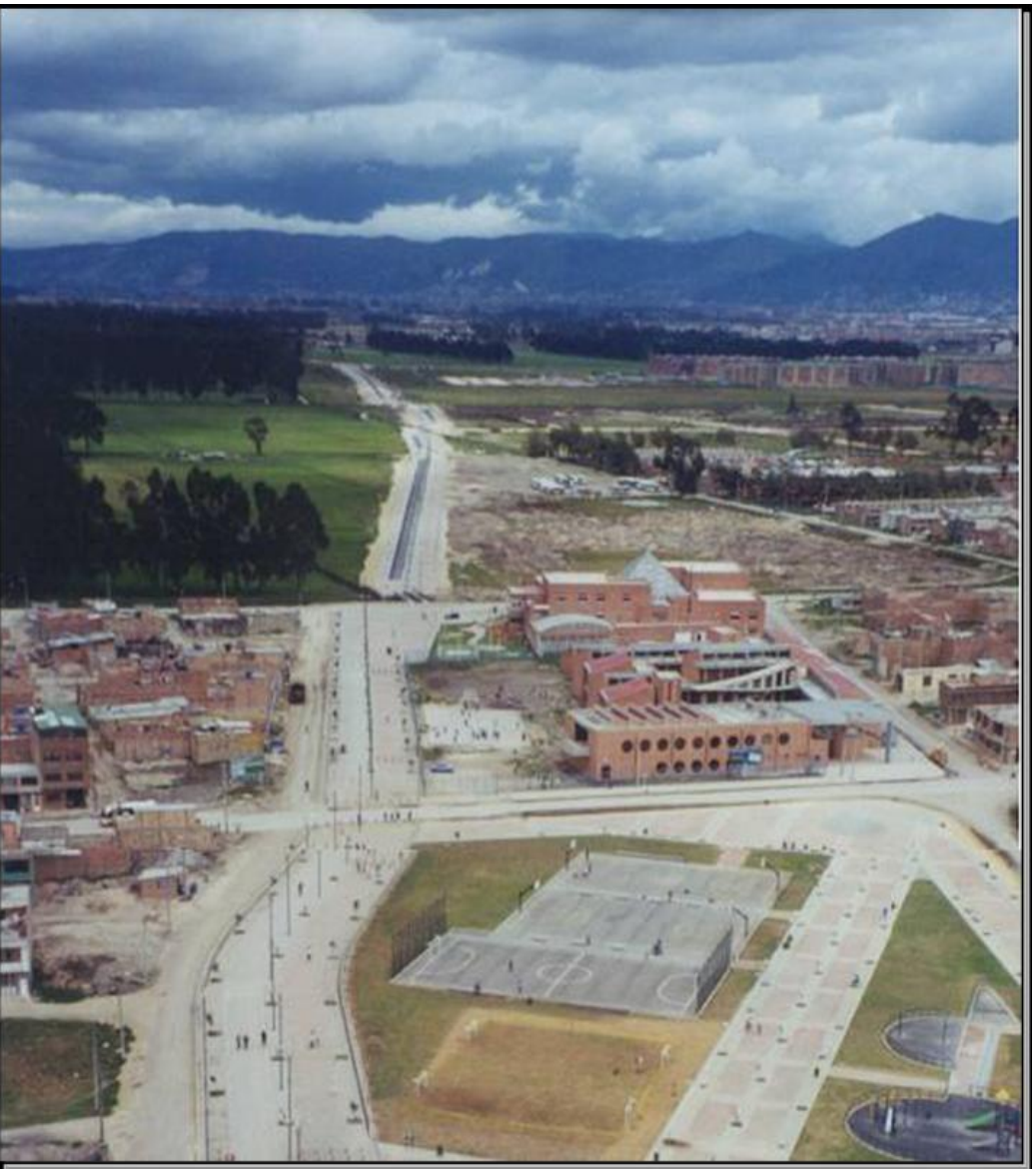
Non motorised transport

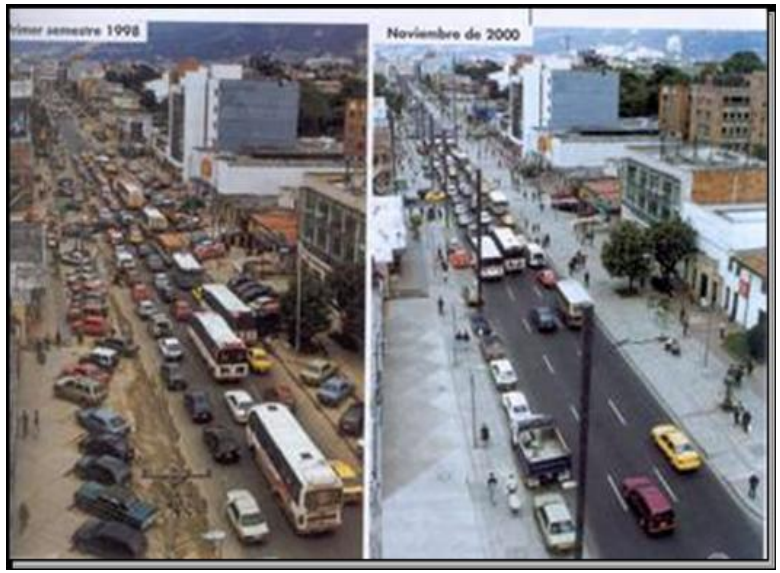
- Pedestrian and bicycle priorities over private vehicles
- Recovery of invaded public space
- Infrastructure construction
- Promotion and incentives
- Safe bicycle parking
- Road safety

UTRTECH, THE NETHERLANDS
Photo: FPPQQ

LONDON
Photos: DHG

Non motorised transport
Bogotá





Traffic Demand Management

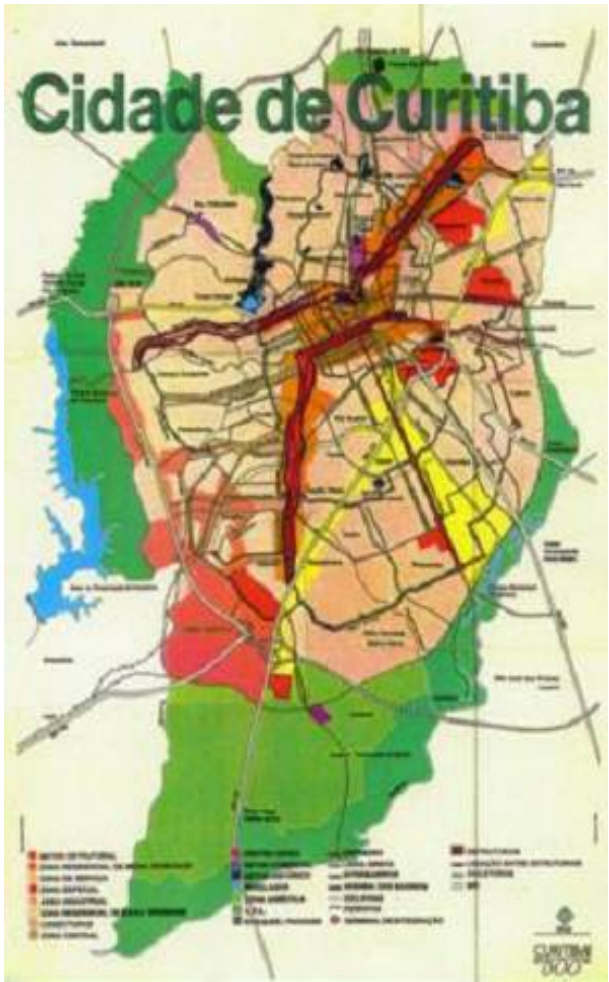
- Congestion charging: Singapore, London, Sweden
- Administrative measures (plate restrictions: Bogotá, São Paulo, Santiago)
- Parking controls
- Taxes (fuel, property)
- Changing Citizens' Behavior


London


Bogota, Sunday Ciclovía

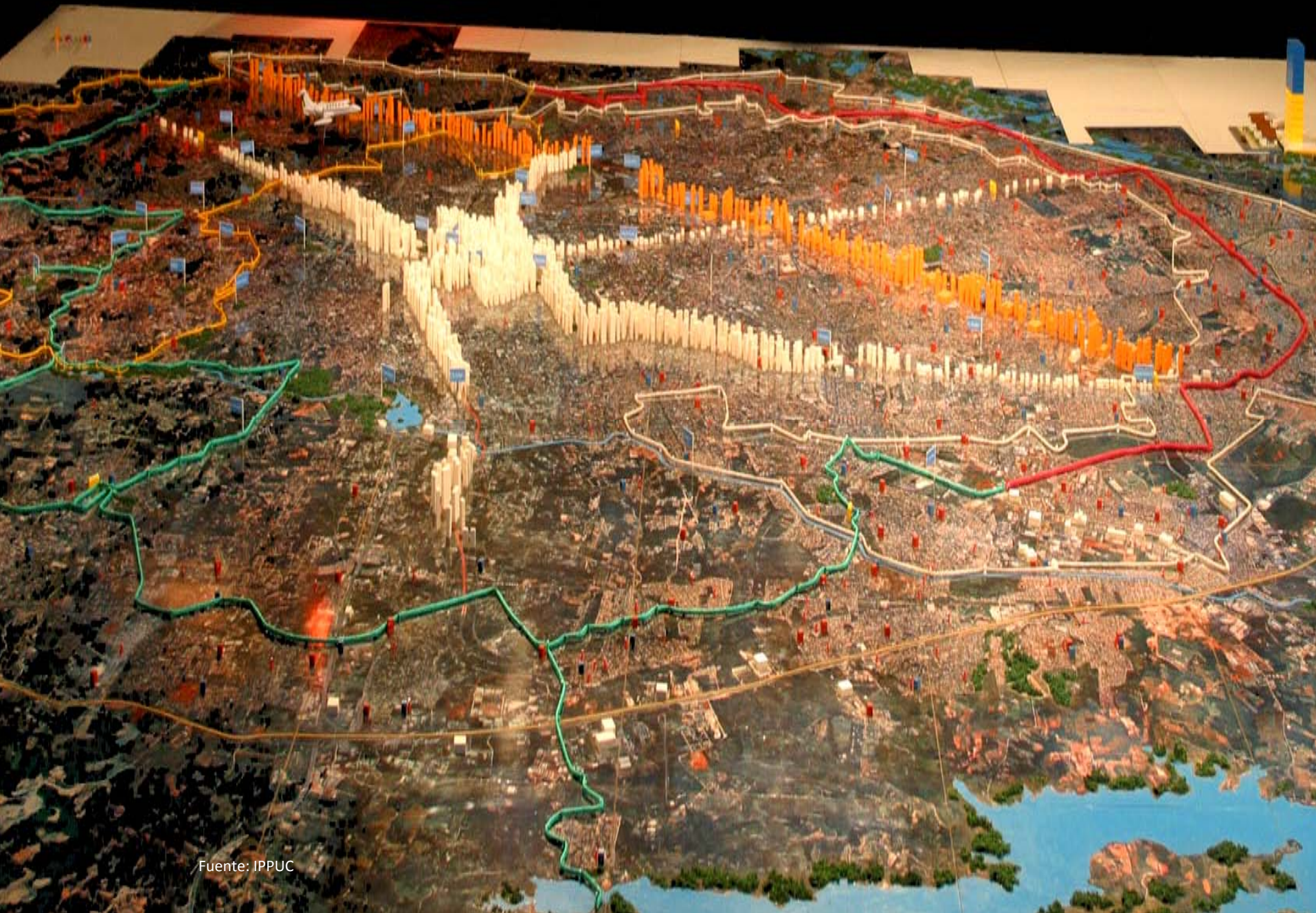

Bogota, no car day

Transit- oriented development (TOD)



Fuente: Arq. Antonio Juarez Nakamura, Presentación en IV Seminario Internacional de Arquitectura – Universidad Piloto de Colombia, Bogotá, Agosto de 2002

Curitiba

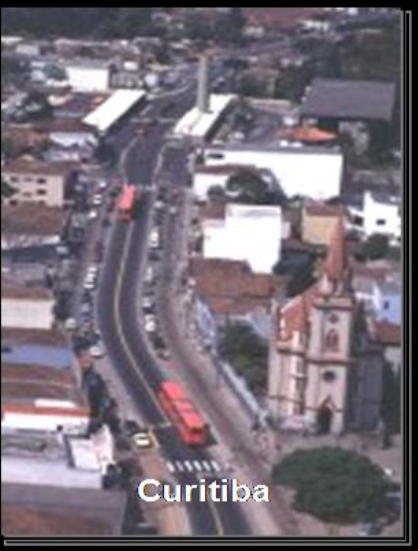


Fuente: IPPUC

Curitiba

Fuente: IPPUC

Bus Rapid Transit BRT



Bus Rapid Transit (BRT)

“BRT Systems” in Operation as July 2008

Source: Adapted from Wright and Hook, 2007 *New Projects in 2008

Some BRT Examples

Photo A.Juarez

Curitiba, RIT
(1974)

Curitiba, Integrated Transport Network RIT (1974)

- Wide range of services
- **65-km** median busways, 139 stations, 26 terminals (22-km busway is under construction)
- 340 Km of feeder routes, 185 Km of inter-district circular routes, 250 Km of ‘rapid buses” (express) routes; 340 bus lines, 1,100 kms of bus route
- **1,677 units**, 114 bi-articulated diesel, articulated, conventional, small buses, special buses
- Electronic Fare collection, USD 0.76 flat rate per trip (discount for special groups)
- **1.2 million pax/day**
- 7 private operators under agreements with a public authority

Population: 1’900,000 inhabitants

Source: City of Curitiba, 2002

Some Issues in Curitiba

- The system provides fast and reliable services with ample coverage,
- Services are not comfortable - very high occupation
- Fares are relatively high
- User information is not ample
- Expansion to the metropolitan - routes doubled in length, but ridership grew 10% only
- Net cost, per kilometer logged. Inefficient
- Lacks of central control
- Slow expansion in the last decade – decline in quality of service

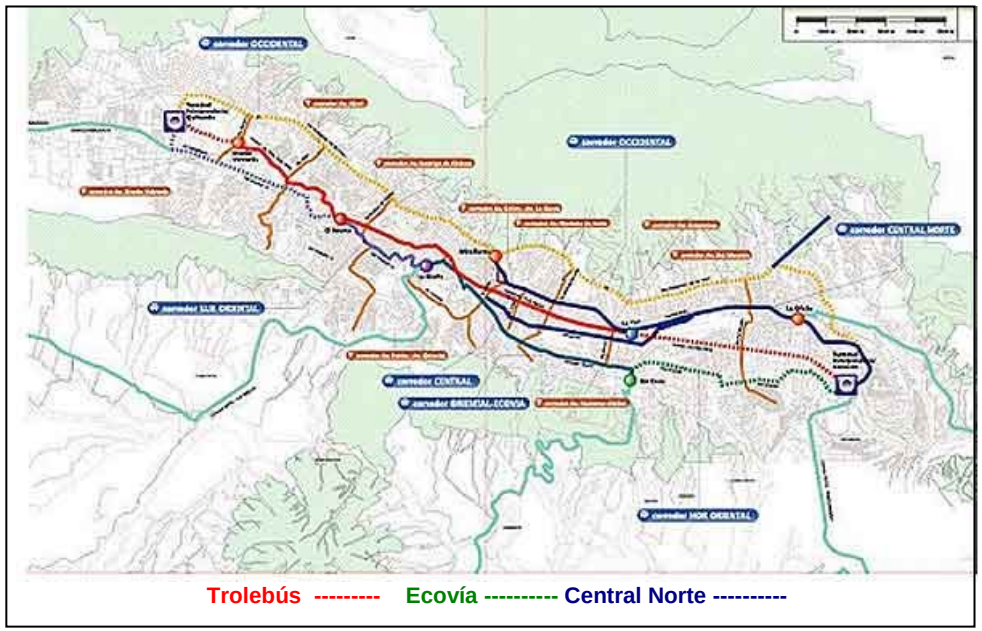
Source: http://www.curitiba-parana.com/arquitetura-urbanismo.htm

Quito, Metrobús-Q
(1995, 2001, 2005)

Photos by D. Hidalgo

Quito, Metrobús-Q
(Trolebús 1995, Ecovía 2001, Central Norte 2005)

Population: 1’600,000 inhabitants



Source: Transport Directorate, Quito, 2006

- Three BRT corridors
- **37 Km** median busways
- 68 stations, 9 terminals
- Integrated feeder services (each corridor)
- **189 articulated buses** (113 trolley buses); 185 feeder buses
- Coin-based fare collection
- **440,000 pax/day**
- USD 0.25 per trip (discount for special groups)
- Public operator/ owner (Trole, Ecovía); Private Operator (Central Norte)

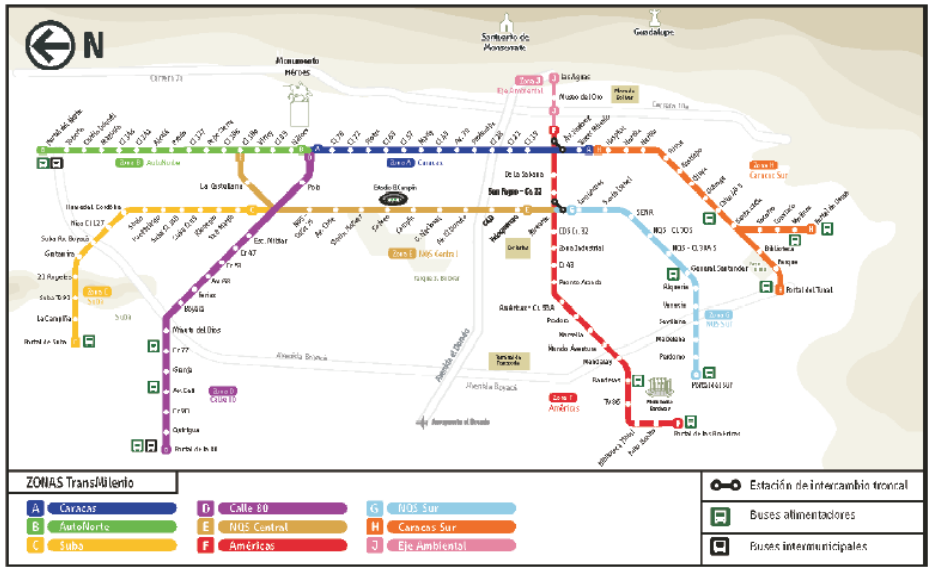
Some Issues in Quito

- Corridors are not integrated
- Fares are politically defined; they do not cover operation and vehicle capital costs
- A transition to private operation could be beneficial, but no adequate mechanisms have been used.
- Infrastructure requires maintenance.
- Operations started with temporary facilities yet to be completed
- Implementation of advanced fare collection technologies has been delayed.
- Bus priority is not fully enforced

Bogotá, TransMilenio (2000, 2003)

Bogotá, TransMilenio (Phase I 2000, Phase II 2003)

Population: 6’400,000 inhabitants



Source: TRANSMILENIO S.A., 2006

- High capacity BRT system **45,000 pphpd**
- **84 Km** median busways;
- 104 stations; 10 integration points,
- Integrated feeder services
- Advanced centralized control
- **1070 articulated buses**; 400 feeder buses
- Electronic fare collection system
- **1,400,000 pax/day**
- USD 0.73 per trip (flat rate includes integration)
- Five private groups partially formed by some traditional operators - 7 trunk, 6 feeder zone concession contracts

- **Bogotá TransMilenio**
- **Eje Ambiental Avenida Jiménez**

Photo: ITDP

Some issues in Bogotá

- Pavement structures and station floors had early deterioration
- Implementation was rushed, especially for the fare collection system
- Cost increases in Phase II and III reduced the opportunities for further system expansion.
- New scheme of operations in May 2006 (completion of Phase II), required a large scale user education campaign.
- Very high bus occupation
- Reorganization of routes of the traditional system has been delayed

México City, Metrobús
(2005)

Photos by D. Hidalgo,

México City, Metrobús Insurgentes (2005)

Population: 7’000,000 inhabitants
39% of the Metropolitan Area

Source: Metrobus, México, 2006

- One BRT Line
- **27.5 Km** median busway
- 42 stations
- 3 terminals
- Centralized control using IT
- **113 articulated buses**
- Electronic fare collection system
- **315,000 pax/day**
- USD 0.45 per trip
- Three operators, two private, one public
- Physical integration with regional buses, Metro, regional train.

Av. Insurgentes Expansion

Feb 2008

8.5 Km +35,000 pax/day

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Some Issues in Mexico City

- Rushed implementation
- Operational deficit in the first 2 years.
- Early destruction of the segregation devices, bad alignment of some stations, and interferences in critical points
- Reconstruction of pavements required
- Initial problems with fare collection
- Direct assignment of contracts resulted in higher costs
- Fare definition remains a political decision
- No fare integration with other services: regional buses regional rail and Metro.

León de Guanajuato, México, Optibús (2003)

Photo by D. Hidalgo,

Jakarta, Transjakarta
(2004)

Photos ITDP,

Beijing, BRT Line 1
(2005)

Photos by O.E. Diaz

Pereira, Colombia, Megabús
(2006)

Photos by D. Hidalgo

Guayaquil, Ecuador,
Metrovía
(2006)

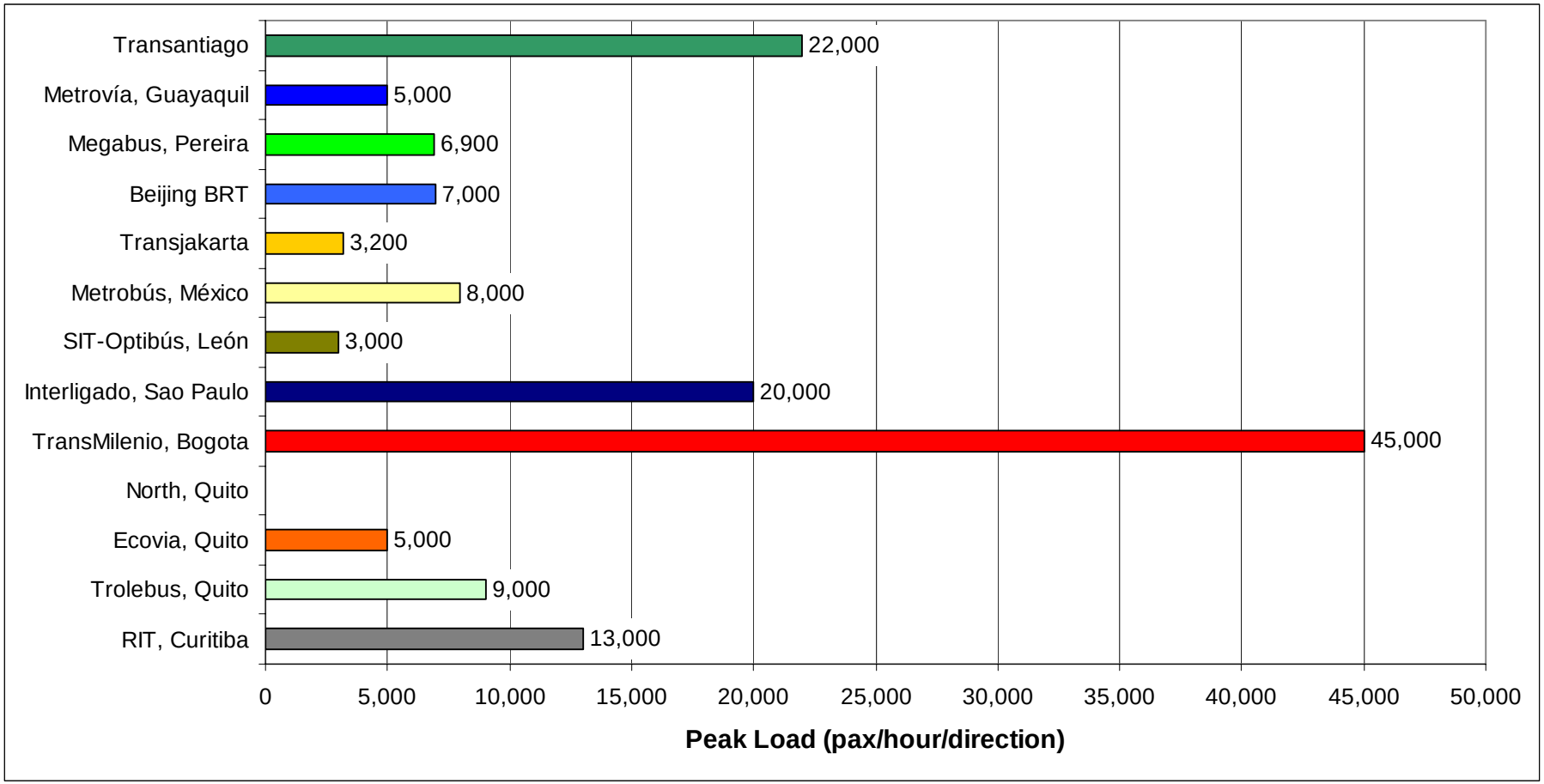
Photos by D. Hidalgo

Santiago, Chile
(2007)

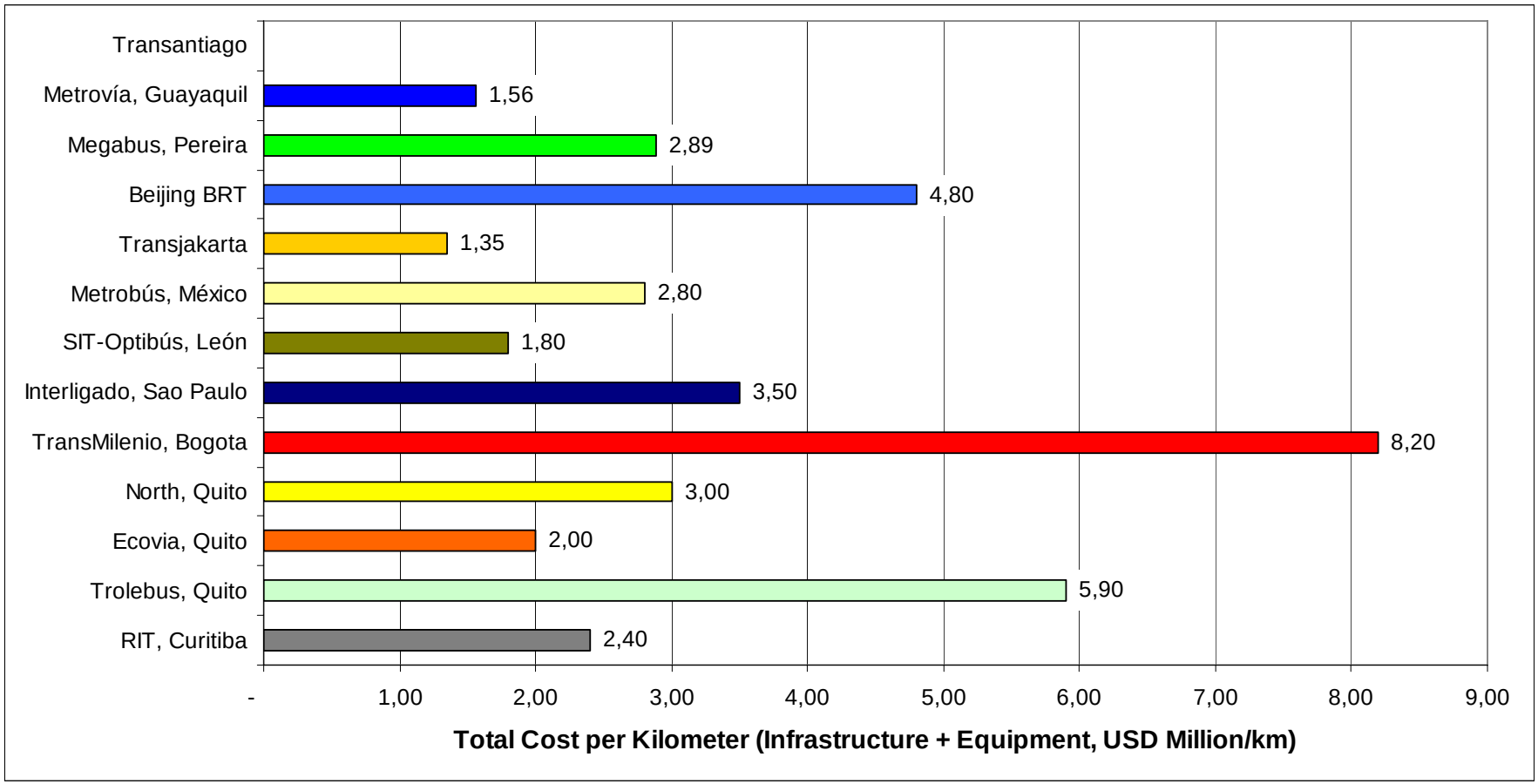
Photos by D. Hidalgo

Istanbul Metrobus (2007)

Performance (passengers/hr/direction)



Capital costs
(USD million / km)

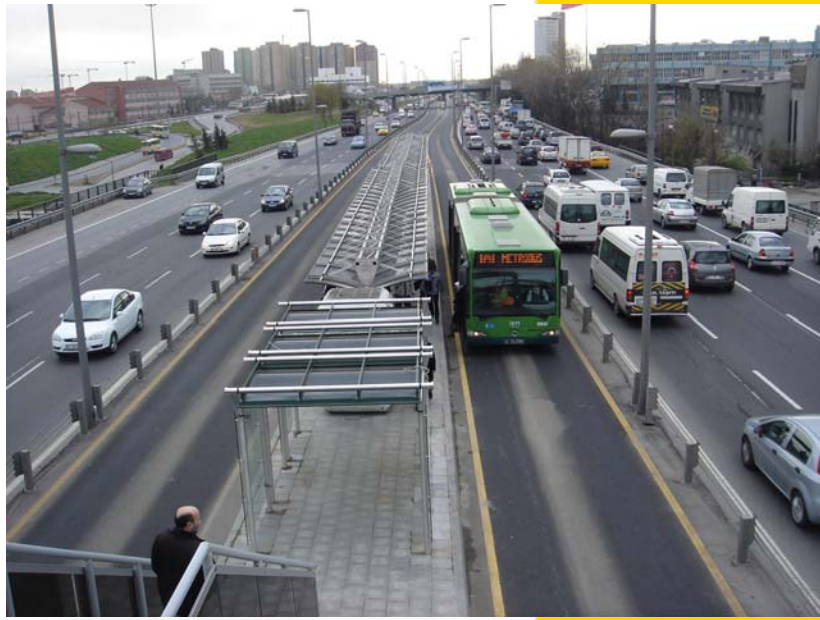


Note: Transit Only Infrastructure

Conclusions

- **Most systems have improved travel conditions and the quality and performance of public transport**

- **Main achievements: travel time savings and enhanced reliability and safety**
  - *Reduction in energy consumption and emissions.*
  - *Urban enhancements*



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Hitches, Hic-Ups

- **Planning problems were recurrent**
  - Limited institutional capacity (human capital and funding)
  - Lack of familiarity with BRT concepts (infrastructure + buses + operations + technology)
  - Opposition from very strong private operators
- **Initial operations had difficulties in all cases**
  - Commissioning was usually rushed
  - Most of the early problems were solved during the initial weeks
- **Outstanding needs**
  - High occupation, pavement maintenance, traffic engineering, and personal security concerns – financial/social limitations preclude progress
  - Financial sustainability: Low user fares – political definition - no subsidies policies
  - Lack of integration/competition between traditional services and the newly organized systems

Questions?

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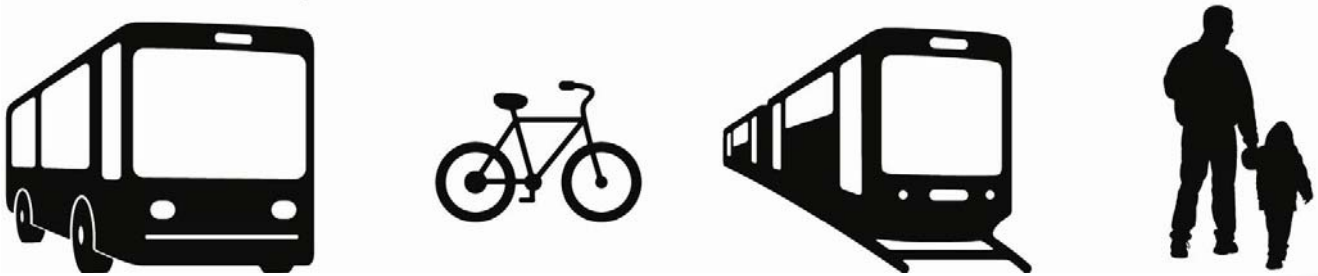
The mission of the EMBARQ network is to catalyze environmentally and financially sustainable transport solutions to improve the quality of life in cities.



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Policies for Sustainable Transport in Developing Cities

- Put equity as the driver force of the change process
- Have a continuous and comprehensive process with clear objectives and strategies
- Generate coordination mechanisms and adequate institutional arrangements
- Dedicate sufficient technical and financial resources for preparation and execution
- Include stakeholders in the process
- Think long term, with specific short term actions that have immediate demonstrative effect
- Assure financial sustainability, using measures that reinforce the principles even if they are unpopular (e.g. taxes, congestion charging)
- Leave the operation of the transit services to the private sector under performance based contracts with periodic competition

¡Muchas Gracias!

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