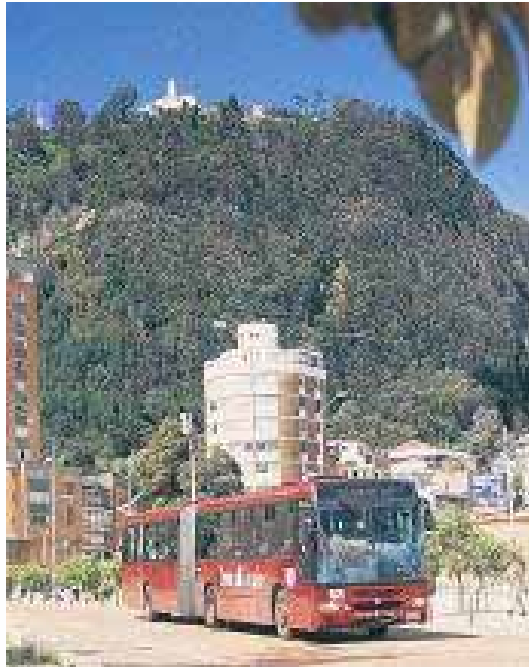


BRT BOGOTÁ (COLOMBIA): TransMilenio System



- **City:** Bogotá (Colombia)
- **Average Temperature:** 17°C / 63°F
- **High:** 2.600 meters over the sea level
- **Total Area :** 37.414 ha aprox.
- **Population:** 7'000.000 inhabitants (15% of the country's population)
- **Population density:** 286 inhabitants/ha in the urban area
- **Rate of growth of the population:** 2.5% per year.
- **Trips in public transport:** 6.081.000 trips per day
- **TransMilenio passengers per day:** 1.700.000 pass
- **Travel Demand:** Aprox. (28% of total daily trips in public transport)



TransMilenio within a Mobility Policy

Promoting non-motorized modes



Non-Car Day

Restriction on private cars. Pick and Plate (1998)

Development of the Integrated Mass System Transport TransMilenio. 1999.



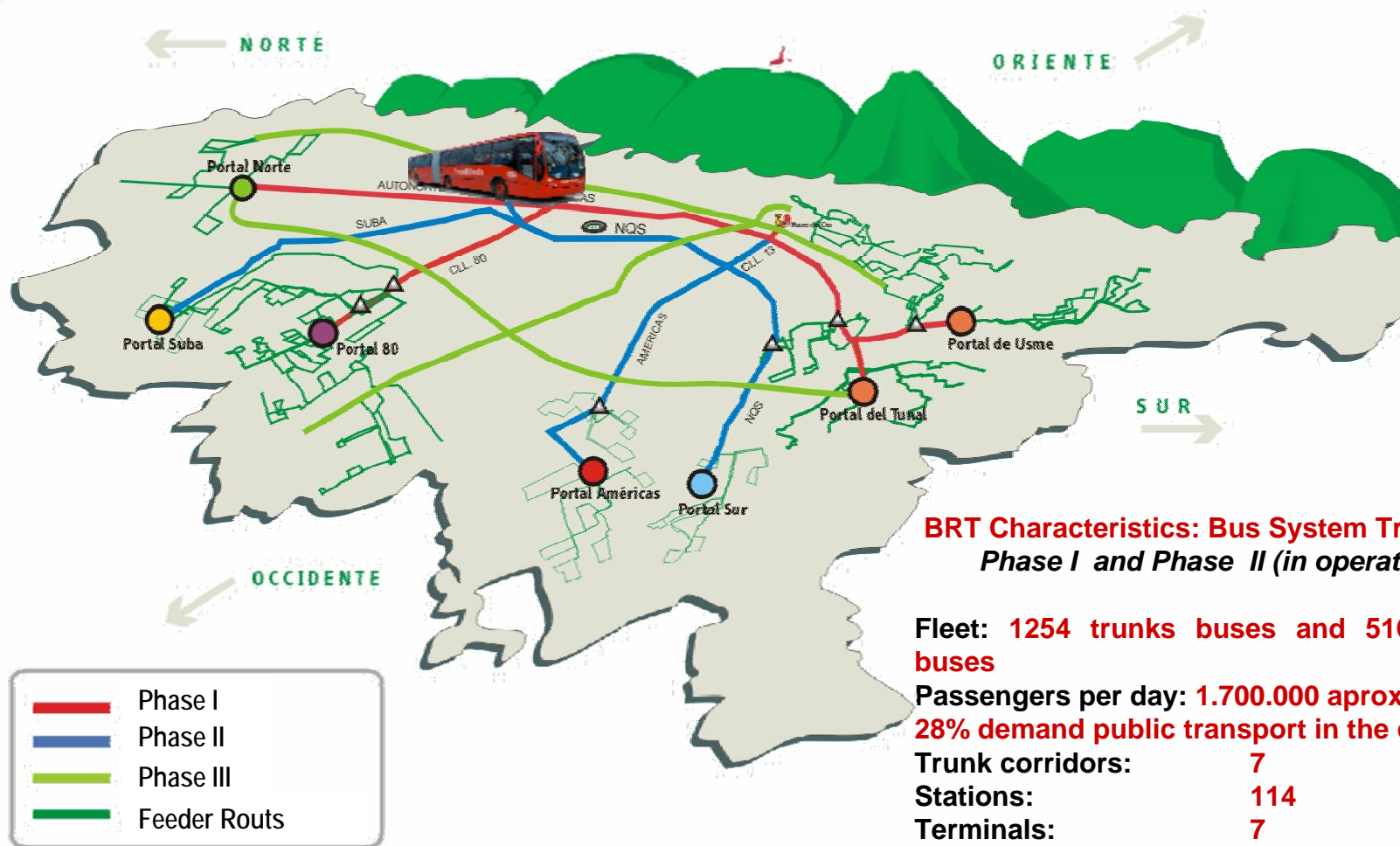
1999 TransMilenio System – BUS RAPID TRANSIT - BRT

■ Characteristics:

- Massive system
- Trunk corridors and feeder roads
- Based on buses
- Control System
- Exclusive lanes: Comfortable highways
- Operated by articulated and bi-articulated buses
- Feeder buses which bring the passengers from their neighborhoods to the head stations



System TransMilenio - Infrastructure



BRT Characteristics: Bus System Transport Phase I and Phase II (in operation)

Fleet: 1254 trunks buses and 516 feeder buses

Passengers per day: 1.700.000 aprox.
28% demand public transport in the city

Trunk corridors: 7
Stations: 114
Terminals: 7
Intermediate Stations: 6

Exclusive bus lanes: 81 km
Feeder corridors: 515 km
Feeder Routes: 71
Trunk Routes: 96
Bicycles Parking: 1.653 spots



Sustainable Development Contribution Environmental Management Institutional Plan

**PIGA
TRANSMILENIO S.A.**

External Component

Communication Strategy



**Qualification and
Generation of
Environmental Culture**

**Monitoring, Control and
following to environmental
Parameters**

(Noise, emissions, water, solids,
energy, urban and landscape
management, CDM project)

**Environmental
Observatory**

(Research, Information
system, Indicators system,
documental center)

**Join with others
Institutional Projects**

Quality (ISO 9001, ISO 14001,
OHSAS 18001, GP1000)



TRANSMILENIO S.A.

CDM : BRT BOGOTÁ (COLOMBIA): TransMilenio PHASE II - IV

Methodology approved AM0031 - Methodology for Bus Rapid Transit Projects

Potential GHG Impact of a BRT

New buses: Units with less emissions per km

Large buses: Units with less emissions per transported passenger

Higher occupation rate: more efficient transport

Modal switch: from taxis, motorbikes or cars to buses

Technology and/or fuel change: usage of bio-fuels, gas or Hybrids buses

AM0031 includes all impacts except bio-fuels

The methodology is based on comparing emissions per passenger trip of the baseline and the project (not per kilometer)

The methodology includes emissions per passenger trip of various transport modes: Public transport (buses), Cars, Taxis, Motorcycles, NMT(bikes, foot), Induced traffic and compares these with the emissions per passenger trip of the new system



TRANSMILENIO S.A.

MAIN OUTCOMES

Climate Change

CDM Project - Methodology approved AM0031 - Methodology for Bus Rapid Transit Projects

Amount of Reductions:	246,563 tons CO ₂ eq per year
Verification Audits (2006- 2009):	4
CER's (2006-2009):	277,044 tons CO ₂ eq.
VER's (Voluntary Market) Phase I:	1.394.001 tons CO ₂ eq.
Total emissions Reductions:	1.671.045 tons CO ₂ eq.
Local emissions Reductions (NO _x , SO _x , PM):	61.288 tons
Safe for health sector (2006-2009):	US\$ 428.662.000
Safe fuel consumption in front CPT (59%):	583.380 barrels of fuel per year
Economic safe for fuel:	USD\$57,096,166



TRANSMILENIO S.A.

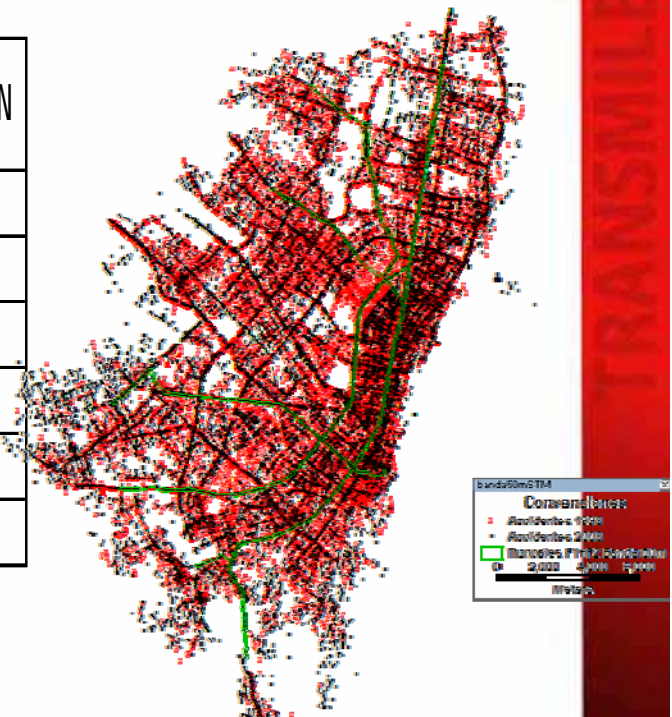
OTHERS OUTCOMES

ENVIRONMENTAL AND HEALTH

Noise Reductions levels in corridors:	3 – 10 db
Safe Water (98% water is recirculated)	30 – 40% (46.249 m ³ per year)
Safe Electric Energy (3.2%):	469.926 kwh per year
Reduction in solid waste generation:	31%

Road Traffic Crashes Reductions levels in corridors:

ROAD TRAFFIC CRASHES TYPE	1998	2008	% REDUCTION
WITH DEATHS	123	52	57,7%
WITH INJURIES	2.953	1.396	52,7%
WITHOUT VICTIMS	7.764	3.966	48,9%
TOTAL ROAD TRAFFIC CRASHES (50 m around TransMilenio Network)	10.840	5.414	50,1%
TOTAL ROAD TRAFFIC CRASHES (citywide)	46.760	35.984	23,0%
% ROAD TRAFFIC CRASHES TM NET/TOTAL CRASHES CITYWIDE	23,20%	15,00%	35,3%



OTHERS OUTCOMES

ENVIRONMENTAL AND HEALTH

- Traffic accidents have been reduced by approximately 50% in the corridors where TransMilenio operates, with a reduction in injuries of more than 56% in average to 2008 in all network, and more than 80% in specific corridors in 2010.
- Encouraging public transport, TransMilenio promotes walking and recover 1,694,090 m² of public space represented in pedestrian corridors, sidewalks, parks, plazas and malls.
- Campaigns of citizen culture, environmental, promoting and prevention of health (road safety, H1N1, etc)



OTHERS OUTCOMES

HEALTH

- Working standards are high for TransMilenio bus drivers, in contrast to conditions under traditional public transport providers, where drivers often worked 15 hour shifts and lacked access to health and social security benefits and long-term contracts.
- All of TransMilenio's bus drivers are now covered by health and social security benefits, and the system regulates work hours and wage levels.
- Good occupational health services are provided, as are physical activity and nutrition facilities and services. TransMilenio also sponsors wider road safety and health promotion campaigns.



OTHERS OUTCOMES

Employment Generation and Gender Equity

- In 2009, the system generated 39,869 direct jobs and 55,817 indirect jobs, prioritizing employment of vulnerable social groups such as single mothers and Bogota's mission program workers.
- While traditionally the transport sector has employed men, in the TransMilenio system women have been able to significantly increase their workforce participation.
- Female participation is currently 24% of the total system workforce, among whom 62% are single mothers, while in activities such as fare collection and bus washing the participation of women reaches 70% and 43%, respectively.
- **"Democratization transport process"**- The operators companies must have a percentage of participation from small owners (32% for feeders, 26% for trunks), to be allowed to participate into the operation system **process**.



RESEARCH

Assessing the impact on health and welfare of the public transport drivers in Bogota for the entry into operation of the TransMilenio system

- Cross-sectional study
- Ergonomic conditions for drivers
- Microenvironments Assessment: environmental and occupational level (quality air, noise, vibrations, T, etc.)
- Review of Medical Records, laboral absenteeism and Statistics causes. Morbidity and mortality statistics (Road Traffic Accidents)
- Occupational medical examinations and clinical tests for biological tracers (carboxyhemoglobin, benzo-pyrenes).
- Condition assessment surveys for quality of life, welfare and psychosocial conditions to assess mental health. - Program evaluation. Levels of exposure - working hours



VS



TRANSMILENIO S.A.

FINANCIAL PROJECT SCHEME

- Infrastructure is financial to government:
 - Máx. 70% National Government
 - Aprox. 30% Local Government
- Investment in Infrastructure Phases I,II and III: USD\$2.040.433.882
- The, operation system is an scheme with public and private participation. the operation is supporting through fare (**Cop\$1.600 = US\$0.80**)
 - Private operators put the logistic for the operation (buses, drivers, human resource, etc)
 - Technology for fare collection, Employees for selling and control.
- The resources come from CDM project are investment in the support to control and physical infrastructure for the operation system and environmental projects.
 - USD\$ 894.737 per year



Why TransMilenio System is a good practice in sustainable Transport to reproduce in Colombia and the world?

- The system offering coverage and accessibility to 536 neighborhoods, and offering particular benefits to low-income populations living in the periphery of the city.
- Saving up to 40 minutes per trip compared with a 1998 base year. Right now transport 85.000 pass/hr, travel demand similar a subway.
- In 10 years of operation the system has mobilized more than 3.000 million passengers
- TransMilenio is considered to be the best practice in sustainable transport for its operational model and its social and environmental responsibility.
- The system transport TransMilenio has brought city-planning, environmental, social, cultural, operational and economic benefits to the city and has improved the environmental quality, the quality of life and the well-being for the citizens of Bogota.
- The transport sector accounts for around 40% of CO₂ global emissions for burning fossil fuels but less than 1% of CERs issued.
- There are about 177 BRT's projects around the world (48 operation, 15 construction, 100 planning, and 14 in expansion), potential to applied CDM projects. 7 are currently under development in Colombia.



Contact: **TRANSMILENIO S.A.**

Deysi Yasmin Rodríguez Aponte Eng. MSc. PhD (C)

Planning and Environmental Management

General Deputy Manager Office

Tel. + (571) 2203000 Ext. 1119

Fax: + (571) 3249870/80

Mail: deysi.rodriquez@transmilenio.gov.co



TRANSMILENIO S.A.

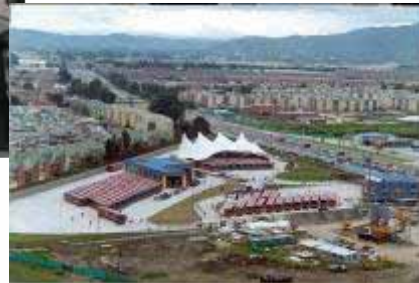


TRANSMILENIO S.A.

Financing – Infrastructure

Infrastructure

- Exclusive Trunk corridors
- Stations
- Pedestrian bridges
- Side walks
- Public Space
- Main stations and technical garages
- Control Center



Máx 70% National Government

Aprox. 30% Local Government



50% Oil taxes



TRANSMILENIO S.A.

Financing – Infrastructure

PHASE I – RECRUITMENT SCHEME

- Public works without funding
- Fixed unit price contracts without the adjustment formula.
- The contracts did not include maintenance, only designs and construction implementation.
- It was hired by specialty, depending on the type of work

Purpose	Contracts
Design and construction	61
Auditing	53
Total	114



Financing – Infrastructure

PHASE II - RECRUITMENT SCHEME

- Global fixed-price contracts without adjustments.
- For the NQS and the Suba Avenue (30 km.) corridors financial concessions were structured with future fiscal periods of the District and the Nation.
- The contracts include maintenance for 5 years
- The concessions include different specialties by the contractor (floors, metal structures, signals, etc.).

Purpose	Contracts
Design and construction	20
Construction	26
Auditing	26
Total	72



Investment in Infrastructure Phases I,II and III (USD\$)

Phases	Nation	District	Administrators	Total
Phase I	30.789.104	80.375.014	0	111.164.118
Phase II	882.398.243	406.241.524	3.564.091	1.292.203.858
Phase III	20.258.101	53.194.973	563.612.832	637.065.906
Total	933.445.448	539.811.511	567.176.923	2.040.433.882

USD\$ VALUES



Infrastructure Costs - TransMilenio System

Troncal	Km	Costo / Km	
		Pesos ⁽¹⁾	USD ⁽²⁾
Calle 80	10,10	35.750	15,9
Caracas	19,86	20.403	9,1
Autonorte	10,30	31.329	14,0
Jiménez	1,94	16.365	7,3
Fase I	42,20	26.557	11,8
Américas	12,98	39.470	17,6
NQS	19,30	64.132	28,6
Suba	9,95	60.002	26,7
Fase II	42,23	55.579	24,8
Calle 26	12,20	69.757	31,1
Carrera 10	7,65	76.597	34,1
Carrera 7 ⁽³⁾	17,50	50.761	22,6
Fase III	37,35	62.258	27,7
TOTAL	121,78	47.571	21,2

1. Pesos constantes de 2008
2. TRM a diciembre de 2008 \$2,243.59 (Banco de la República)
3. Estimaciones de costo de construcción obtenido de los Estudios y Diseños

Notas:

Los valores incluyen todos los costos de mantenimiento

Los valores no incluyen costos de financiación

Los valores de costos para las Fases II y III son asociados a proyectos urbanos integrales

No se incluyen costos de obras en rutas alimentadoras

Source: TRANSMILENIO S.A. - IDU



Financing

Cop\$1.600 = US\$0.80

Fleet operation

- High capacity Trunk busses (160 pax)
- Medium capacity feeder busses (80-90 Pax)
- Private operators selected with a tendering process
- Paid by kilometer (Trunk operators)
- Paid by passenger (Feeder operators)



Fare Collection Process

- Private companies
- Technology (Hardware and Software)
- Entrance Cards
- Employees for selling and control
- Paid by sold ticket.



Trust System

TRANSMILENIO S.A.

