Transporte

ENERGY TRANSITION IN TRANSPORT SECTOR

SUCCESSFUL CASE STUDY BOGOTA

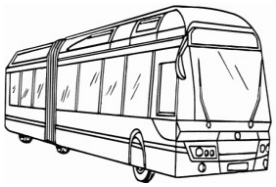
TRANSMILENIO S.A.

October 2023

ALCALDÍA MAYOR
DE BOGOTÁ D.C.

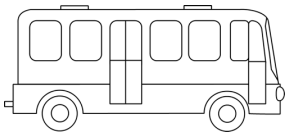
BOGOTÁ

Public Transport System



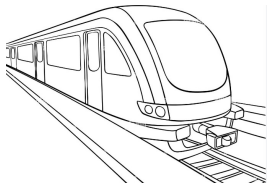
SITM

8 projects
in 13 municipalities



SETP

9 proyectos
in 9 municipalities

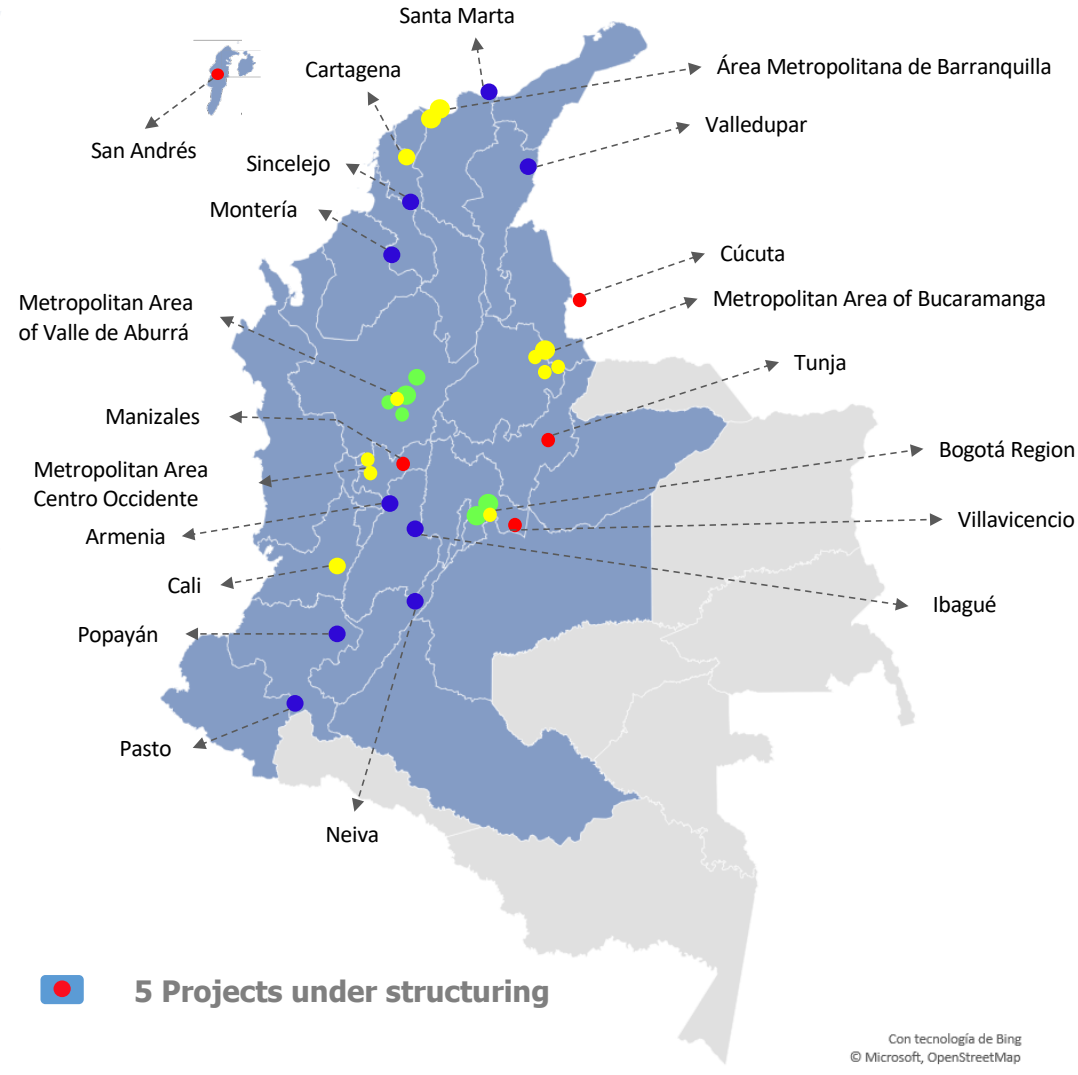


SITR

4 projects

Invesment betweeen 2002 to 2022:

National : 17.6 billion USD
MunicipaliGovermentties: 8 billion USD



OUR SERVICES 2023

BRT

2364
buses

2.056.200
Trips/day

114.4 km
Exclusive ways

26 km/h
average speed

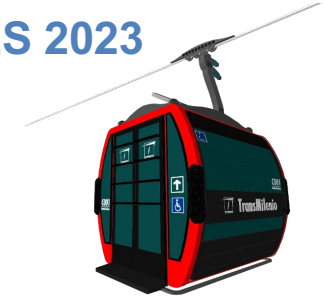
ZONAL

8625
buses

2.061.539
Trips/day

2.330 km
ways

16 km/h
average speed



CABLE

163
cabins

25.559
Trips/day

3.5 km
length

4 m/s
average speed

BIKE STATIONS

(Bike Stations modal integration)

26
Bike stations

7051
bike racks

Source: STS, Planning Advisory Office – TRANSMILENIO S.A.

TECHNOLOGICAL TRANSITION ACTION PLAN (DESCARBONIZATION)

TRADITIONAL PUBLIC TRANSPORT (BASE LINE)

TRANSMILENIO SYSTEM START PHASE I

TRANSMILENIO SYSTEM START PHASE II

Structuring and starting of:

- Passenger's mass public integrated transport system (PHASE III and SITP)
- Technological Ascent Plan

Bogota laboratory city - Zero and low emission technologies test program

Renewal concessions BRT system Phase I And (PHASE IV)

- Start operation of TransMiCable System
- Design and Structuring of Green corridor

Electromobility (Massive implementation of electric tech) Feeder and zonal fleet PHASE V.

Before 1999

- Old buses (pre-Euro)
- Congestion
- Contamination
- High accident levels
- Low service quality standards
- Lack of information
- Bad fuel´s quality
- Oversupply of transport and illegal transport

2000 2005

- Phases I and II BRT System
- New model of city (bike lanes, pedestrian spaces, bike stations, etc)
- New buses Euro (II – III – IV)
- Pilots with Biofuels (2004, 20089
- Pilot a CNG bus “Ikarus” in 2004
- Success CDM project
- Improved quality fuels
- Scraping buses oversupply
- New exclusive corridors
- Integrated Business model

2010 - 2021

- Integrated Business model
- 13 operational zones
- Physical and tariff integration
- New buses Euro (V) and 331 Hybrid buses
- Large business units (500 - 2000 buses)
- Democratization of transportation (included all little transporters and fleet of TPC).
- Structuring of Technological Ascent Plan
- 4 action lines

2011 - 2023

- Implementation of zero or low emission fleets in the SITP (Spanish acronym) .
- Development of more than 15 pilots with buses of zero and low-emission and different typologies:
  - Hybrid buses (12 m)
  - Electric buses (10 m, 12 m and 18 m)
  - CNG Buses (12 m, 15 m, 18 m y 27 m)
  - Hydrogen Bus (10 m)

2018 -2020

- Structuring and awarding of bidding process for the incorporation of zero and low-emission articulated and biarticulated fleet.
- 6 depots operation
- Bidding 1441 new buses (700 buses diesel Euro V + DPF and 741 CNG Euro VI buses).
- Separate business model
- Design and Structuring of Green corridor KR 7
- Modal integration (Cable – BRT).

2019 - 2023

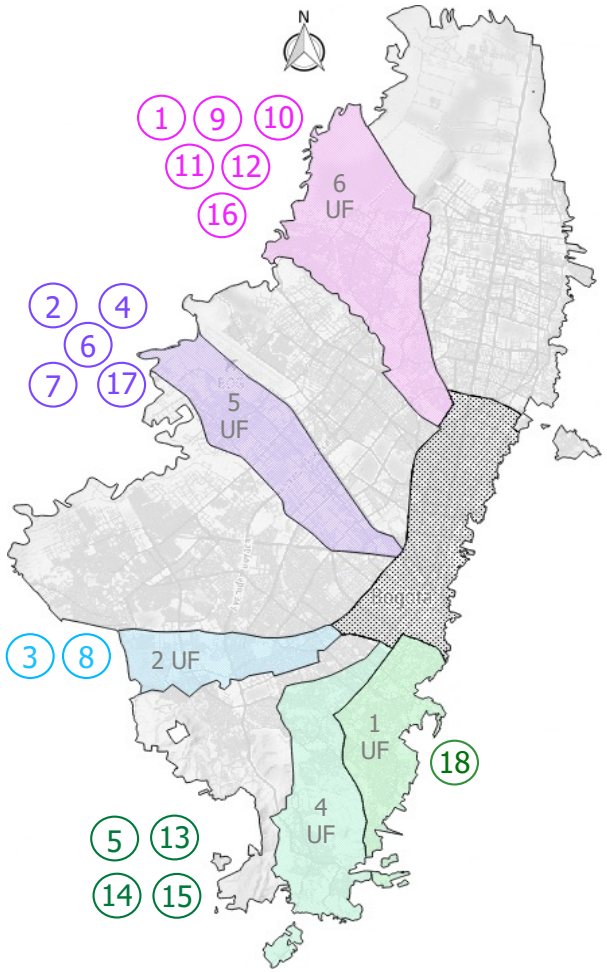
- In house structuring
- Structuring and awarding of 3 bidding processes for the incorporation of zero and low-emission fleet.
- 6 operation zones
- 18 functional units
- Bidding Approx 3,000 new buses (adjudicated 2257 new buses: 1485 electric buses and 772 low emissions)
- Separate business model



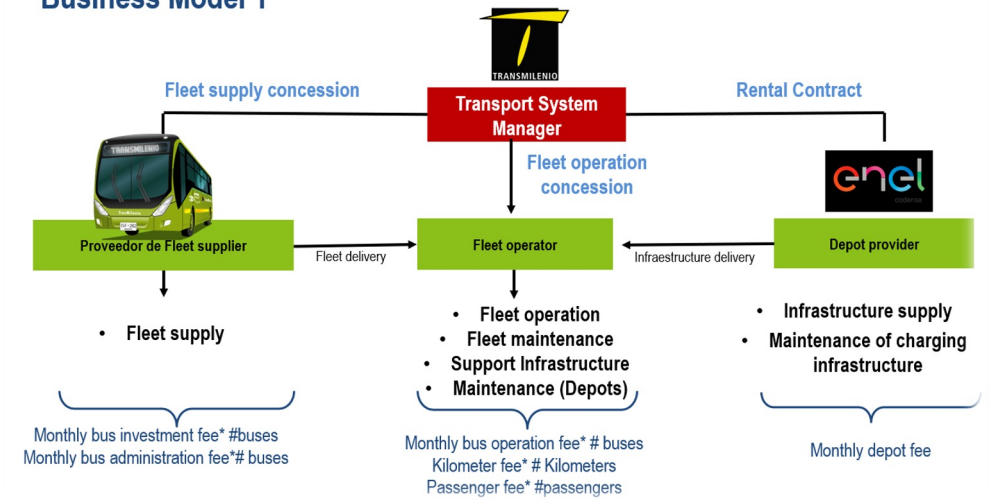


The structuring considered the following premises:

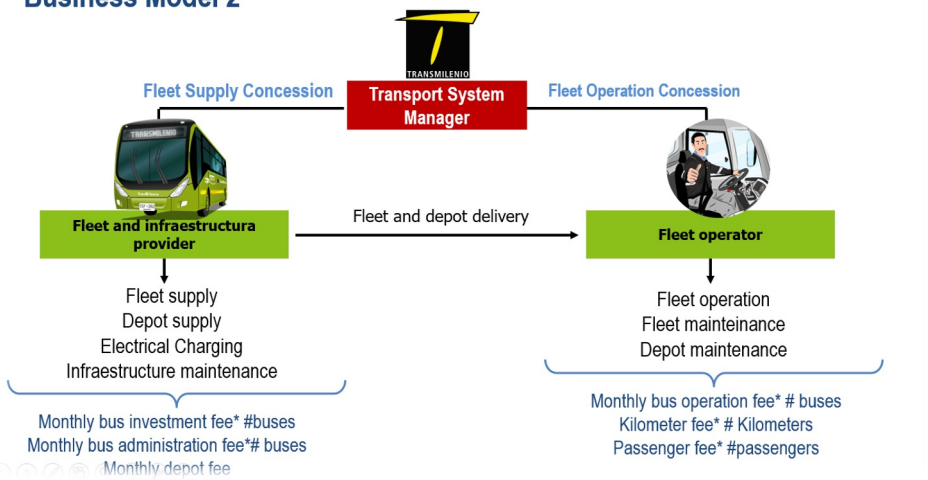
- In a first stage, to secure the participation of electric buses, competition was only of this technology. In the third stage, additional points were awarded to proposals that included electric technology.
- Deep market analysis. However, during the tender process participants were far less.
- Business model separated in two concessions contracts: fleet supplier and fleet operator. This model helps to bankability and participation of foreign companies. Concession term (15 years zero emissions and 10 years low emissions)
- Electric buses depots will be delivered by TRANSMILENIO, which include the electric recharging infrastructure. (contracts signed with Bogotá's electric network operator – ENEL Codensa)
- Working tables with the financial and insurance sector:
  - Bankability
  - Risk analysis
  - Guarantees
- business units with a maximum of 250 buses, buses (10m, 12m), Autonomy 260 km, recharging time (maximum 5 hours for total fleet), braking regenerative.
- User´s fares do not include the total cost of technology. Bogotá subsidy about 25% of public transport system cost.



Business Model 1



Business Model 2

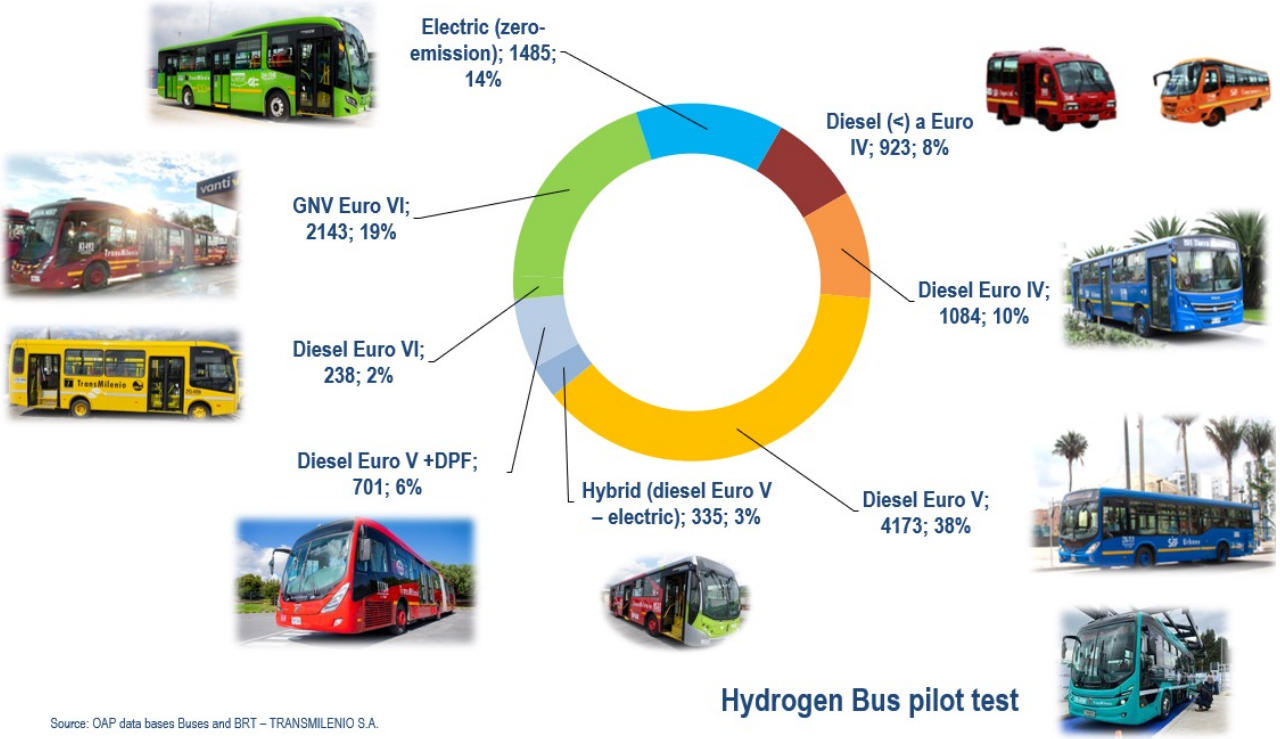


- Facilitated the procurement of land for the construction of infrastructure for fleet management (garages or depots: parking, maintenance, energy supply, etc.).
- Allowed to implement in less time the depots and recharge infrastructure.
- Learn about the process and business of energy supply for recharging.
- Learning about the risks involved in the implementation of the recharge infrastructure..

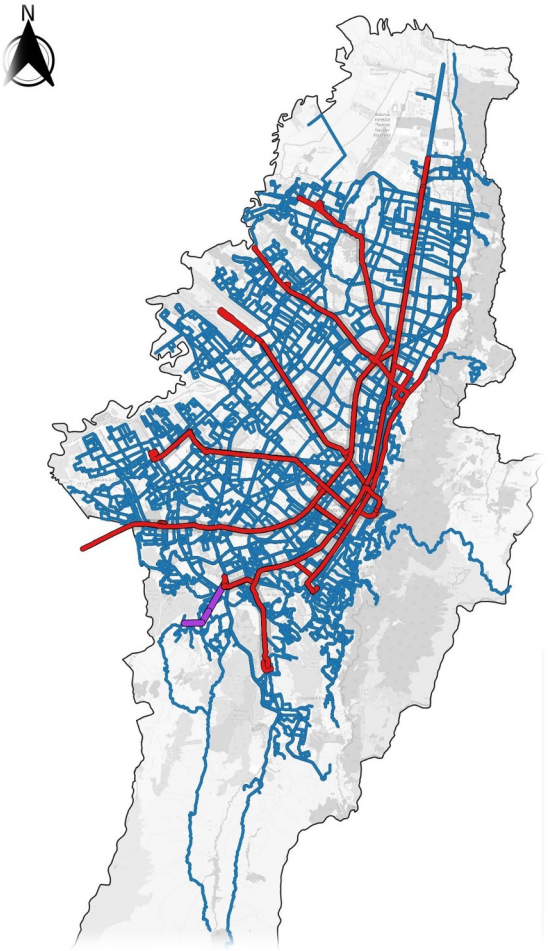
Among other aspects:

- Implementation of improvements and lessons learned to massify electromobility.
- Diversify energy supply marketers.
- Implementation of the Public Operator.

Fleet Technology Composition / Emission Standard (September 2023)



Source: OAP data bases Buses and BRT – TRANSMILENIO S.A.



Source: STS, Planning Advisory Office – TRANSMILENIO S.A.

COST AND BENEFITS OF ELECTRIC FLEET

USD 2483 Millions Total = **USD 828** Millions for fleet acquisition + **USD 283** Millions for infrastructure + **USD 1372** Millions for fleet operation

1485 e-buses

10 e-Depots

- Business model made feasible the financing e-buses project
- The provider does not take operational risk
- More managing flexibility

- Beetwen 74.000 - 94.000 CO_2 tons less per year
- *40 MP tons less per year*
- *Noise reduction*

- Real time information
- *Planning trip*
- Improves services levels

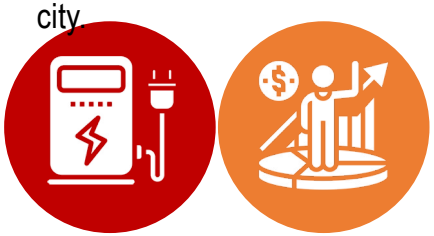
- Increased Jobs
- *3000 drivers*

- **Build trust:** Technical knowledge to demonstrate technology contributes to the sustainable solution of city problems.

- **Provide feasibility** analysis and technical, economic, financial and environmental sustainability of the technology. (Contract terms, Operation size, Remuneration drivers = remunerated costs, Risk Analysis (allocation and exposure))

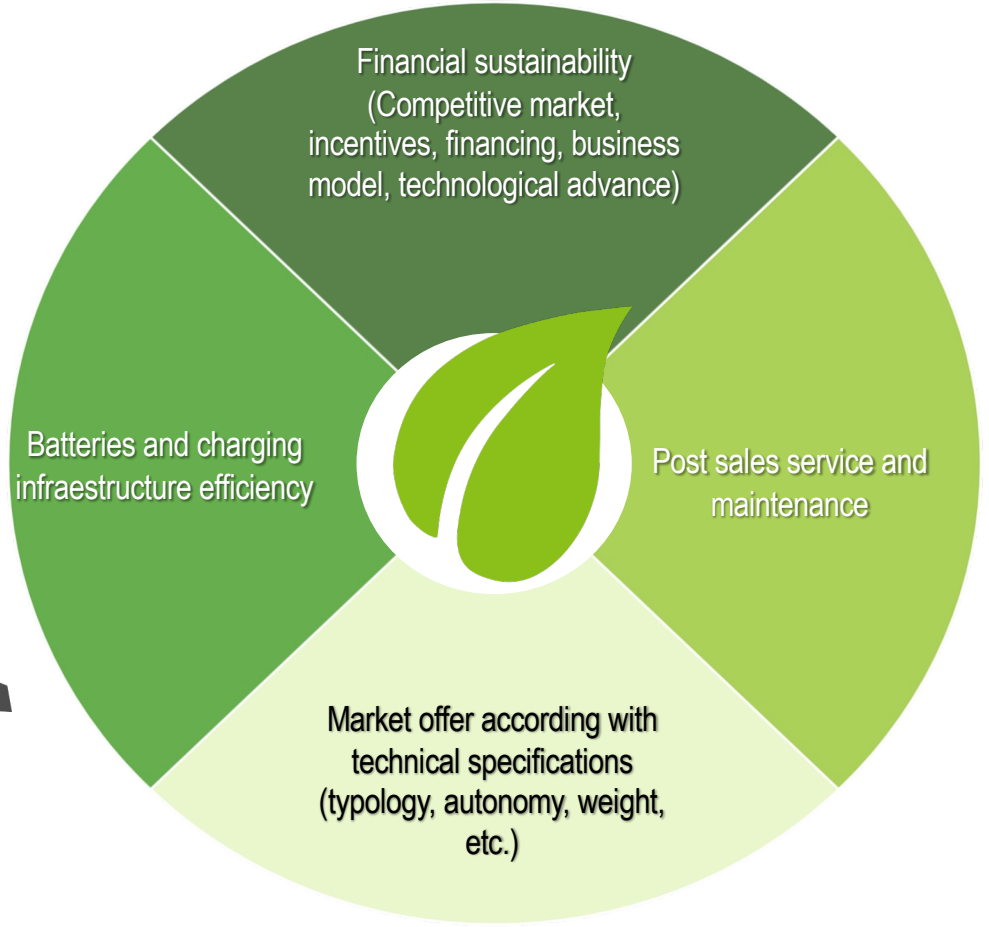
Leader, manager and articulator
TRANSMILENIO has been a pioneer in the implementation of new technologies both in Colombia and in the region and a catalyst for the technological ascent of transport in the country

- **Align market conditions with goals**, objectives, logistics and requirements of the system and the city.



- **Align key actors** - Union of wills (public, private, society, other actors)
- Generate concertation spaces
- Political will
- Manage public policies and generate regulatory framework and standards.

Source: Planning Advisory Office – TRANSMILENIO S.A.


Financial sustainability (Competitive market, incentives, financing, business model, technological advance)
Batteries and charging infraestructure efficiency
Post sales service and maintenance
Market offer according with technical specifications (typology, autonomy, weight, etc.)

NEW INFRASTRUCTURE

Required:

- New technologies and typologies (zero emissions).
- Standards for energy supply infrastructure
- Increased efficiency
- New financing models

Current

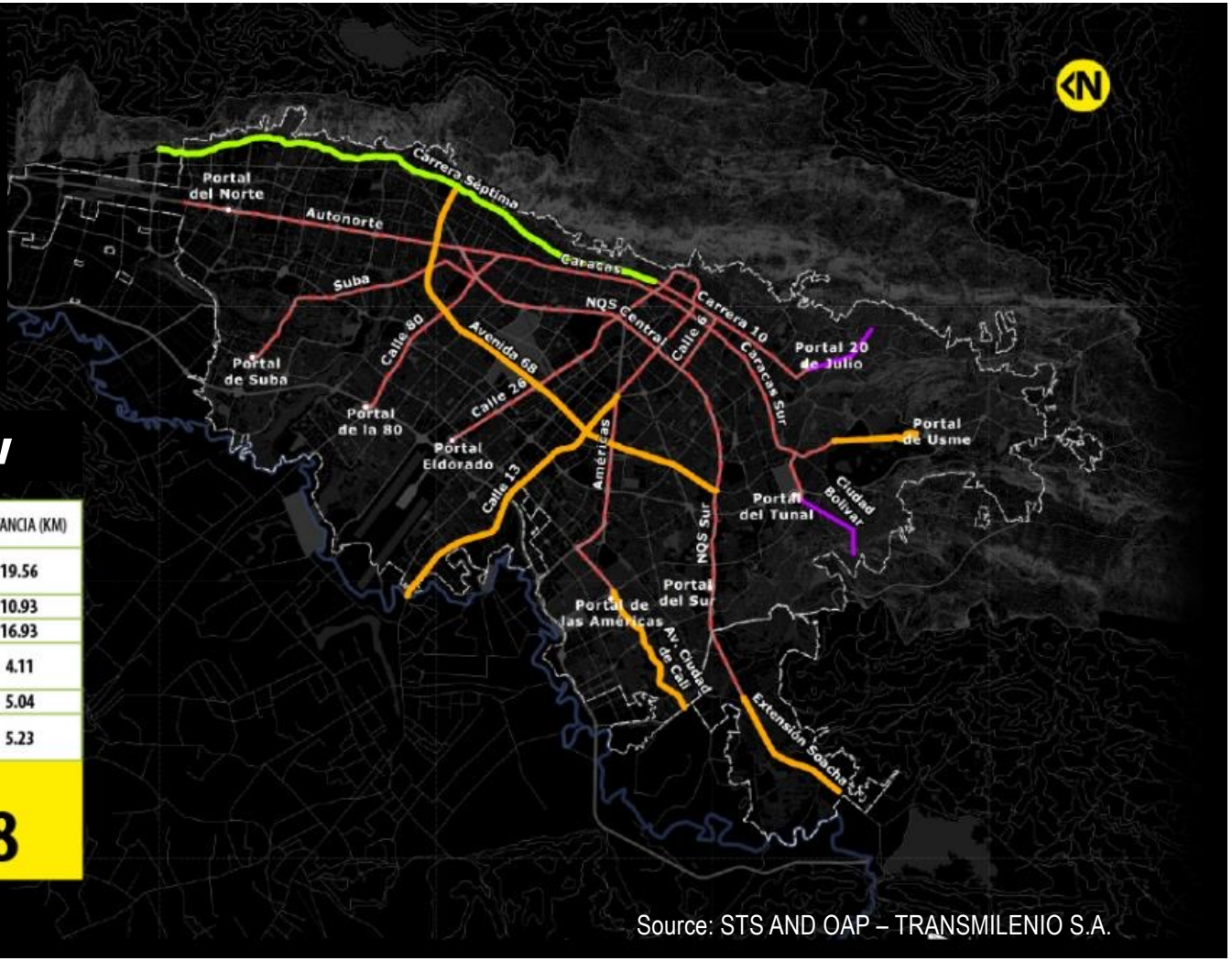
AMERICAS	13.1
AUTOPISTA NORTE	11.8
CALLE 26	12.3
CALLE 6	2.2
CALLE 80	10.1
CARACAS	20
CARRERA 10	7.1
EJE AMBIENTAL	1.9
NQS	23
SUBA	12.9

TOTAL 114.4

New

TRAZADO	DISTANCIA (KM)
CARRERA SÉPTIMA	19.56
CALLE 13	10.93
AVENIDA 68	16.93
EXT. AV. CARACAS	4.11
EXT. SOACHA	5.04
AV. CIUDAD DE CALI	5.23

TOTAL 61.8



Source: STS AND OAP – TRANSMILENIO S.A.

Energy Transition Fund for Transport Sector in Colombia

Opportunity to invest

- Low and preferably zero emissions for Public Passenger Transport Systems Co-financed by the Nation
- Light cargo (<10.5 ton) and dump trucks
- Individual transport service (taxi)
- Heavy cargo

More thae 4 billons USD for e-vehicles in Colombia to contribute our target.

COLOMBIA POTENCIA DE LA VIDA

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