



# Medellin *Metrble*:

## *A urban redevelopment success story*

New transport solutions for the future

p o m a . n e t

**Cable technology for urban transportation**

**Medelin transport master plan and development**

**Medelin Central Oriental Corridor implementation**

**Medelin as the most successful urban cable car**





# 70%

Of the world population will be urban in 2050



Number of personal vehicles x2 every 7 years in developing countries

**2017 to 2050 = 500,000,000.00 additional population in Indian urban area**



## Public transport issues

Social issues

Environmental issues

# 80 years of cable transportation innovation



Since 1936 POMA offers solutions of transportation that are fast, silent and sustainable !



**1ST SURFACE LIFT  
BY JEAN POMAGALSKI**  
ALPE D'HUEZ (FRANCE)

1936



**1ST AUTOMATIC  
PEOPLE-MOVER (APM)**  
POMA 2000 LAON (FRANCE)

1982



**1ST INTERMODAL  
URBAN CABLEWAY**  
MEDELLIN (COLOMBIA)

2004



**GEARLESS  
DRIVE SYSTEM**  
DIRECTDRIVE

2013



**SMARTCITIES  
« PHOSPHORE » PROJECT**  
GRENOBLE (FRANCE)

2030

1966

**1ST DETACHABLE  
GONDOLA LIFT**  
VAL D'ISERE (FRANCE)



2003

**WORLD'S BIGGEST  
CABLE CAR**  
VANOISE EXPRESS,  
PARADISKI (FRANCE)



2012

**1ST CLEAN ROOM  
CABIN FUNICULAR**  
GRENOBLE (FRANCE)



2016

**3D TRAINING  
SIMULATOR**  
OPERATION & MAINTENANCE



## TOP-SUPPORTED



**GD**  
Monocable  
Detachable Gondola

**2S**  
Bicable  
Detachable Gondola

**3S**  
Tricable  
Detachable Gondola



**PULSED GONDOLA**



**AERIAL TRAM**

## BOTTOM-SUPPORTED



**FUNICULARS**



**INCLINED ELEVATORS**

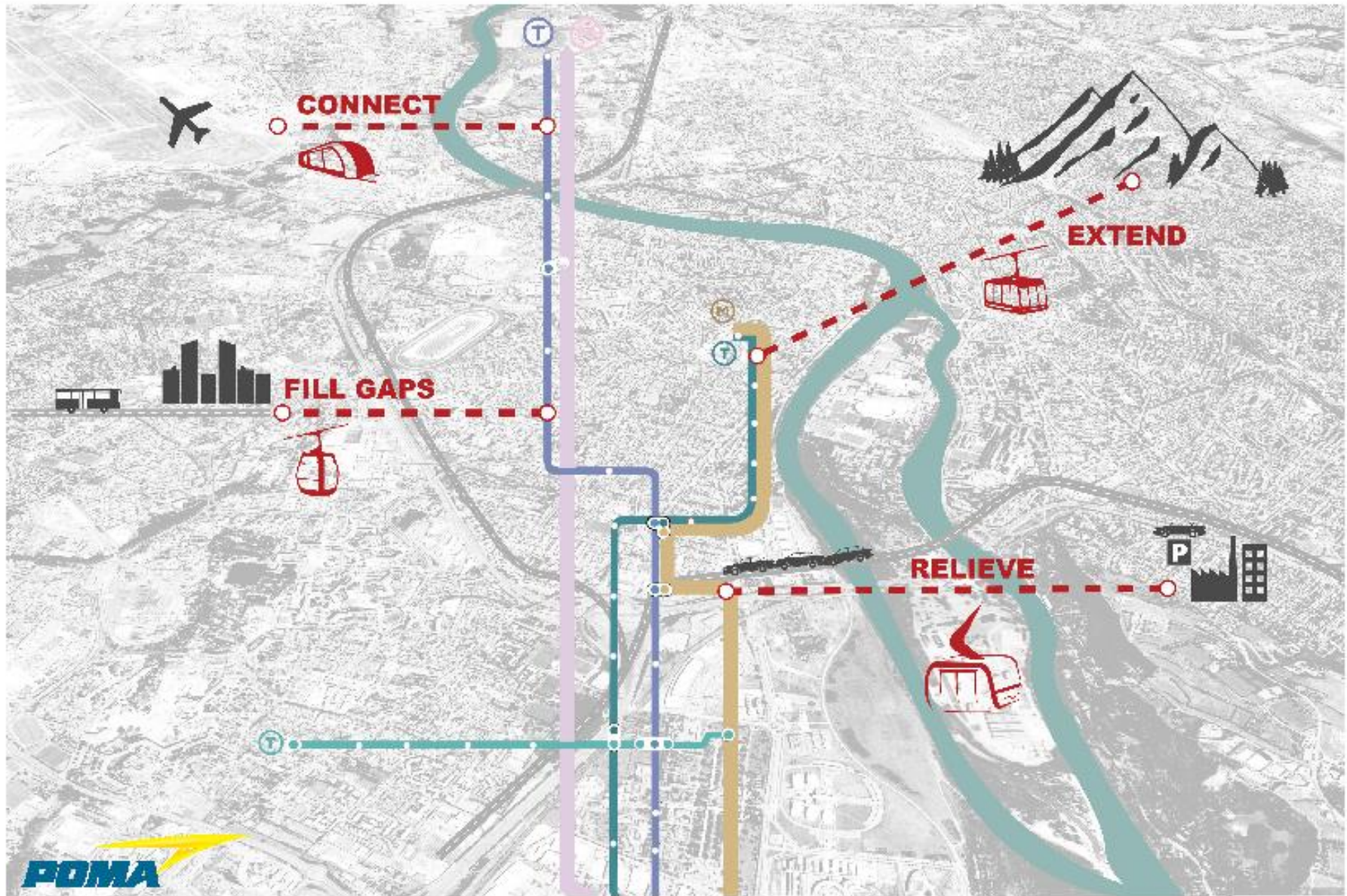


**MINI-METRO**

**Up to 5,000 pphpd capacity  
(top supported)**

**Up to 10,000 pphpd capacity  
(bottom supported)**

Integration of Cable car in public transport network



Adapted to hilly area but not only...



**Santo Domingo, Dominican Republic: 5km line, 4 stations and...4 meters rise only!**



# Successful Urban Integration



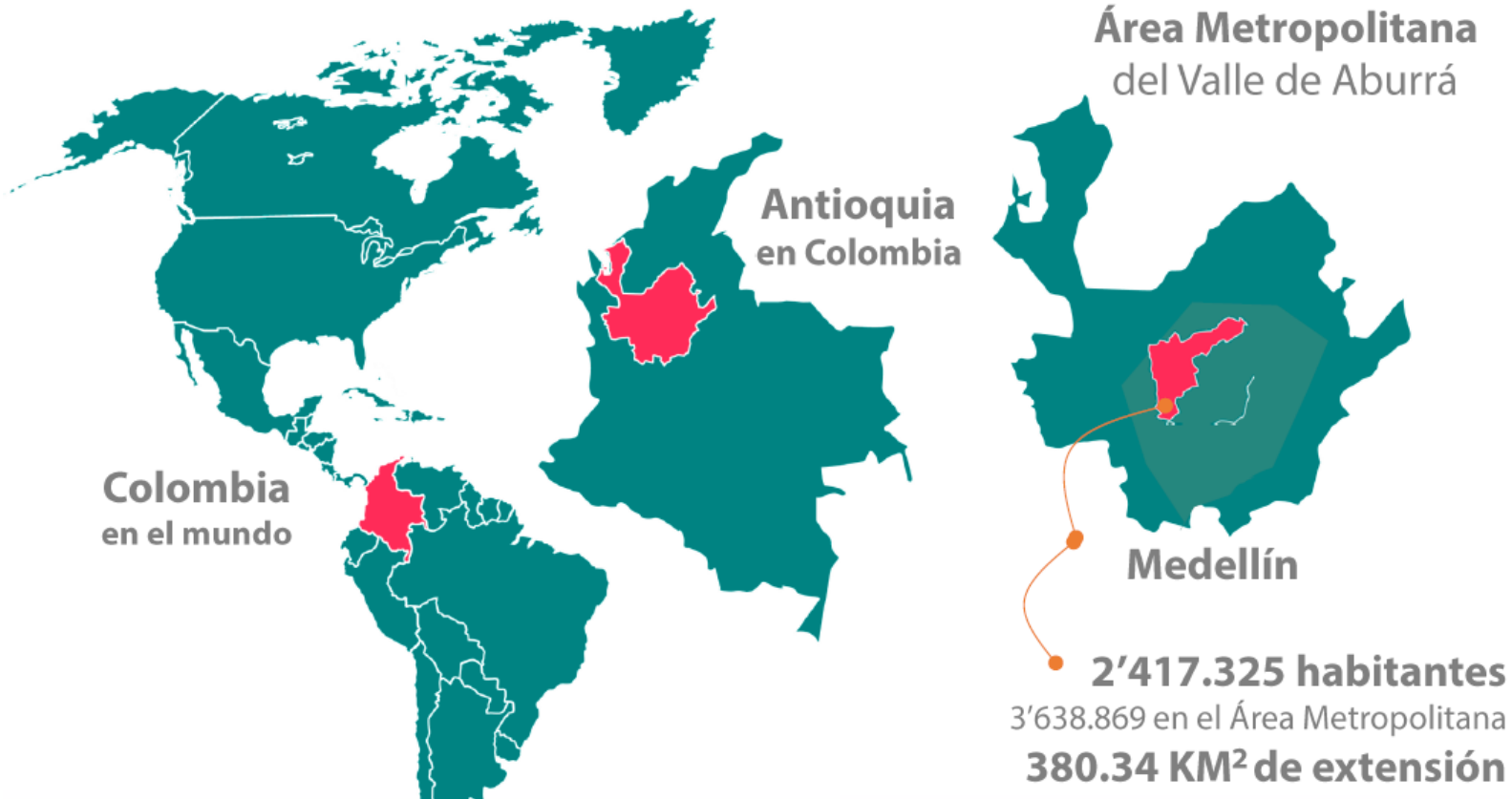


Cities in: Algeria, Brazil, Colombia, France, Georgia, Italy, Korea, Taiwan, Turkey...



Second largest Colombian city (2,4M hab.)

Drug violence and highest homicide rate (380/100 000 in 1991)



→ 2000's « targeted social urbanism » policy = massive investments to unprivileged area (transport, education, sports,...) to provide “the best to the poorest”

City is built in a large valley between hills with a North/South development

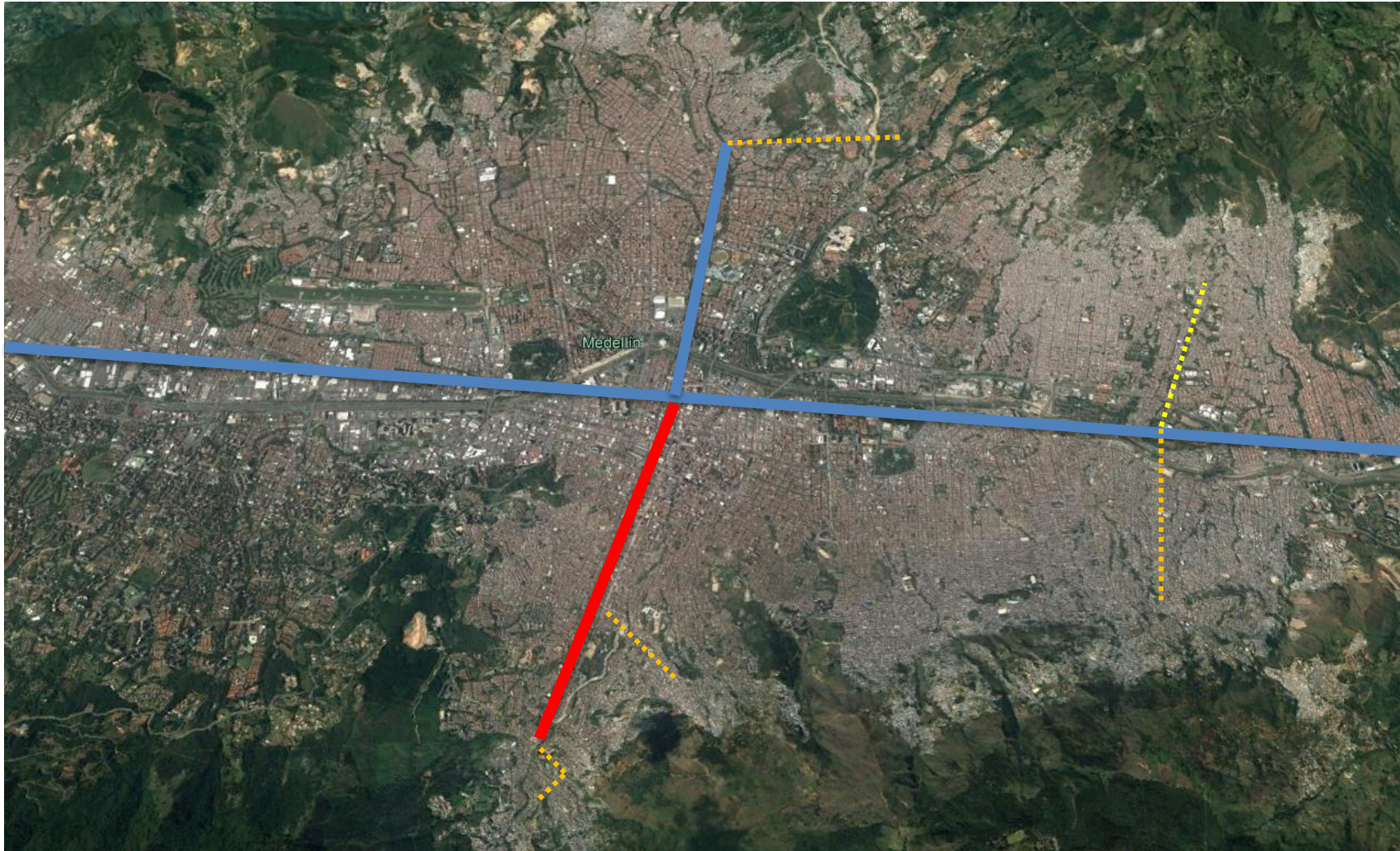
➔ Transportation infrastructure as a way to boost urban redevelopment & social transformation

Master plan & corridor priority determined with: Current and future demand? Greater incentive for social inclusion? Where to reduce social exclusion risks due to mobility issue? Where to propose alternative to private car?...



# Feeding lines of main « backbone »

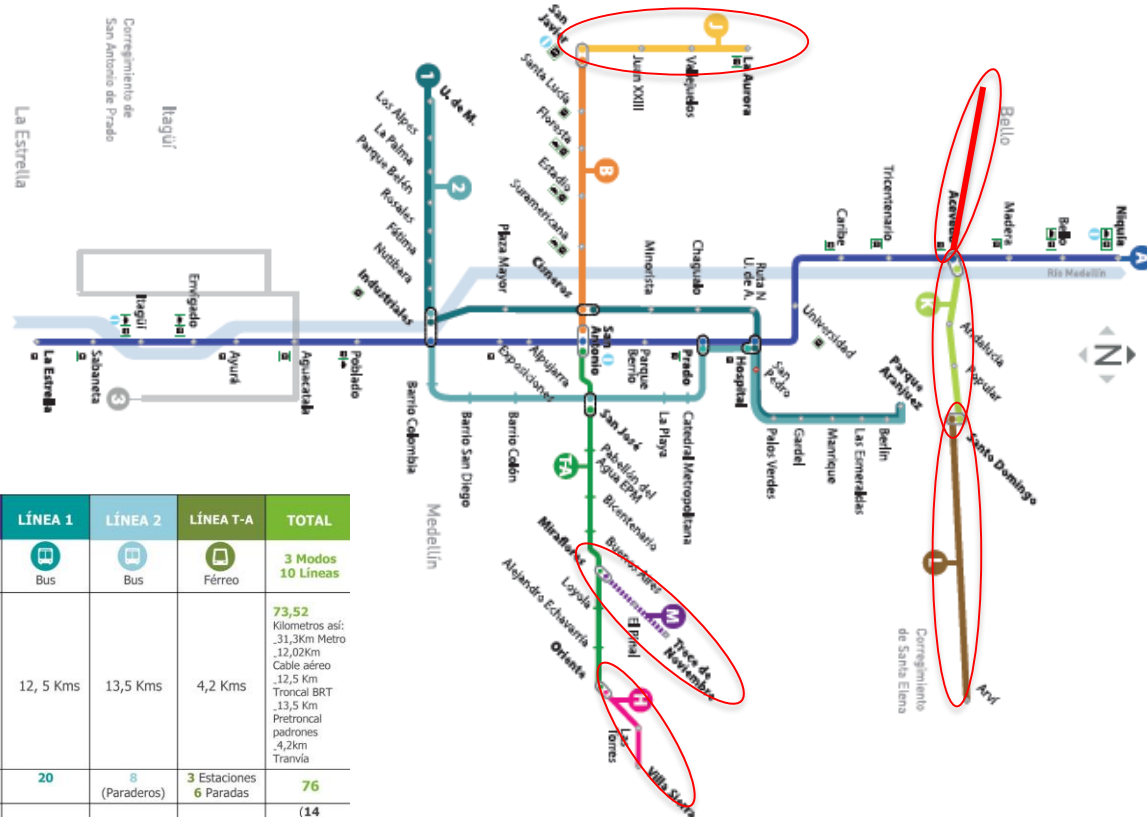
-  Metro
-  Tramway
-  *Metro Cable*
-  *Future Metro Cable*



# Metro Cable implementation phases



- Línea K (2004)  
2km - 3000pphd – 4 stations
- Línea J (2008)  
2,7km – 3000pphd – 4 stations
- Línea L (2010)  
4,6km – 1200pphd – 2 stations
- Línea H (2016)  
1,4km – 1800pphd – 3 stations



LÍNEAS/ DATOS	LÍNEA A	LÍNEA B	LÍNEA K	LÍNEA J	LÍNEA L	LÍNEA H	LÍNEA M	LÍNEA 1	LÍNEA 2	LÍNEA T-A	TOTAL
TIPO SISTEMA	Férreo	Férreo	Cable aéreo	Cable aéreo	Cable aéreo	Cable aéreo	Cable aéreo	Bus	Bus	Férreo	3 Modos 10 Líneas
LONGITUD DE LAS LÍNEAS	25,8 Kms	5,5 Kms	2,07 Kms	2,7 Kms	4,6 Kms	1,4 Kms	1,05 Kms	12, 5 Kms	13,5 Kms	4,2 Kms	73,52 Kilómetros así: -31,3Km Metro -12,02Km Cable aéreo -12,5 Km Troncal BRT -13,5 Km Pretroncal padrones -4,2km Tranvía
ESTACIONES	21 (8 elevadas)	6 (5 elevadas)	3 (2 elevadas)	3 (2 elevadas)	2 (1 elevada)	2 (1 elevada)	2 (1 elevada)	20	8 (Paraderos)	3 Estaciones 6 Paradas	76  (14 Paraderos) 174 Coches de Tren 362 Telecabinas 47 Buses articulados 12 Vehículos Tranvía
VEHÍCULOS	58 unidades de tren (174 coches, 126 de primera generación y 48 de segunda)		93 Telecabinas	119 Telecabinas	55 Telecabinas	44 Telecabinas	51 Telecabinas	25 Buses articulados	47 Buses Padrones	12 Vehículos Tranvarios	
NÚMERO DE PILONAS (Más alta)	N/A	N/A	20 (#11- 33m)	31 (#5- 34m)	23 (#7 - 24,5)	10	11	N/A	N/A	N/A	95
TIEMPO DE RECORRIDO (Un trayecto)	40 min	10.5 min	9 min	12 min	15 min	5 min	4 min	45 min	60 min	17,5 min	
VELOCIDAD COMERCIAL (Vel. max.)	40 Kms /h (80 Kms/h)		18 Km/h					16 Km/h (60Km/h)	13 Km/h (60 Km/h)	16 Km/h (45 Km/h)	
FRECUENCIA MÁXIMA	3'30"	4' 45"	12"	12"	14"	13"	9"	2'55"	6'	3'30"	
CAPACIDAD (Pasajeros/Hora/Sentido)	35.555	13.100	3.000	3.000	1.200	1.800	2.500	3.018	1.350	5.400	
ESTACIÓN DE TRANSFERENCIA	-Acedo -San Antonio -Hospital -Prado -Industriales	-San Antonio -Cisneros -San Javier	-Acedo -Santo Domingo	-San Javier	-Santo Domingo	-Oriente	-Miraflores	-Hospital -Cisneros -Industriales	-Hospital -Prado -Industriales	-San Antonio -Miraflores -Oriente	X 100 Personas
INICIO OPERACIÓN COMERCIAL	30/11/1995	29/02/1996	07/08/2004	03/03/2008	09/02/2010	17/12/2016	Construcción	22/12/2011	22/04/2013	31/03/2016	

- Línea M (2018)  
1km – 2500pphd – 3 stations
- Línea P in (2020)  
2,6km – 4000pphd – 4 stations
  - MRT new rolling stocks
  - MRT station design modification

# Center Oriental Corridor project

Transport infrastructure investment to connect Central East part of the city (350 000hab)  
Global project implies:

- Tram line (TA) of 4,2km with 12 tram-trains
- Two Metro Cable lines (M & H) as feeder of TA
- 113,000m<sup>2</sup> of new public spaces, green area, bike paths...etc





2011: French Agency for Development (AFD) is granting a US\$ 250M loan to Medellín city  
Implementation and infrastructure operation & maintenance to Metro de Medellín

2016: Tram line and « H » Metro Cable line completed and open to public



# Transport network evolution (2006-2016)

From 123,000,000 passengers/year in 2006...  
 ... to 269,000,000 passengers/year in 2016!





2006 © UrbanRail.Net (R. Schwandl)






## Use of various adapted technologies

 **Línea A** Niquía – La Estrella  
**Línea B** San Antonio – San Javier

 **Línea J** San Javier – La Aurora  
**Línea K** Acevedo – Santo Domingo  
**Línea L** Santo Domingo – Arví  
**Línea M** Miraflores – Trece de Nov  
**Línea H** Oriente – Villa Sierra

 U. de M. - Parque de Aranjuez  
**Línea 1** Av. Ferrocarril  
**Línea 2** Av. Oriental

 **Línea TA** San Antonio - Oriente



Integrated fare system

## One single operator for One integrated network



Physical integration

## Technical Success

→ With extensive operating hours (20h/day, 355/year), MetroMedellin reaches great availability rates: 99,82% (2014), 99,81% (2015), 99,83% (2016) for K line.

## Social Inclusion

→ From 2003 to 2012, the homicide rate dropped by 84% in the direct area of K Metro Cable

## Economical Impact

→ Last 10 years, average time saving of 80min/day for public transport user = 20 days/year

## Environmental Impact

→ 2010-2016, *Metro Cable* of Medellin allowed a 121,000 tons of CO<sup>2</sup> emissions reduction  
Under the United Nation CDM program, the city received a grant of US\$ 1,9M for this period







**THANK YOU FOR  
YOUR ATTENTION**