



# URBAN CABLE CARS AN ANSWER TO PUBLIC TRANSPORTATION CITIES: LA PAZ – EL ALTO (BOLIVIA)

César Dockweiler Suárez



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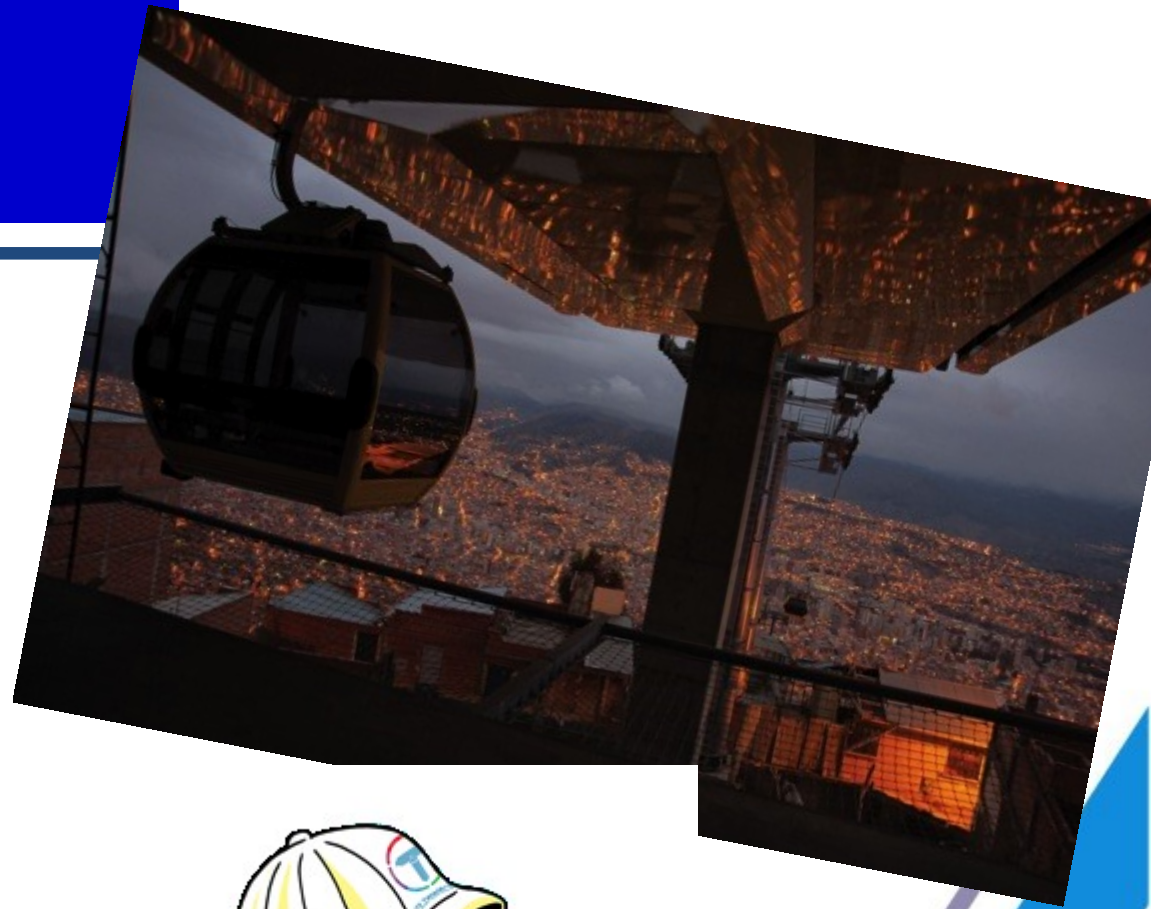
***URBAN CABLE CARS  
AN ANSWER TO PUBLIC TRANSPORTATION  
CITIES: LA PAZ – EL ALTO (BOLIVIA)***

**OITAF – Bolzano**

**JUNE 2017**

# THEMATIC

- A common problema in the world
- Public transportation principles
- Use of Cable Cars on public transportation

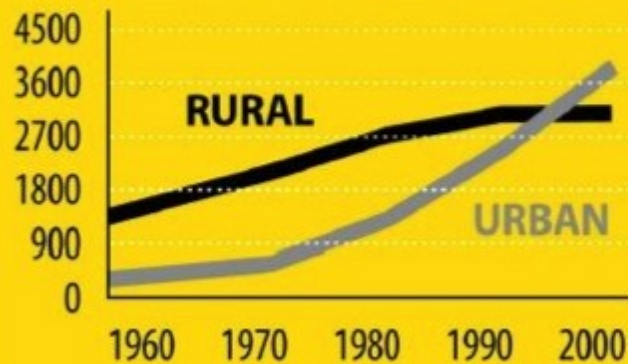


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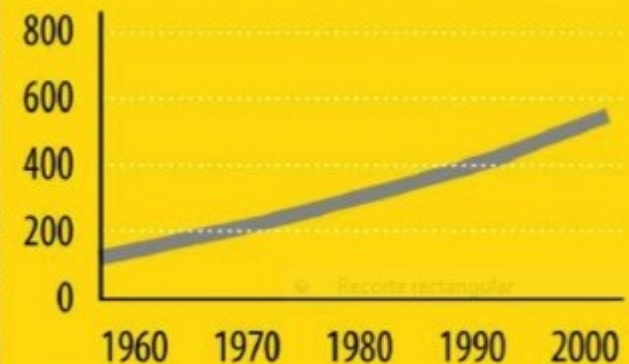
# WORLD PROBLEM

- 2014 – more than 54% lived in the cities.
- 2050 – more than 66% will live in the cities (6.000 Millions of people)
- The percentage raise each minute, we live in a world of Urbanization process.

**Population of Developing Countries**  
millions of people



**World Car Population**  
millions of cars

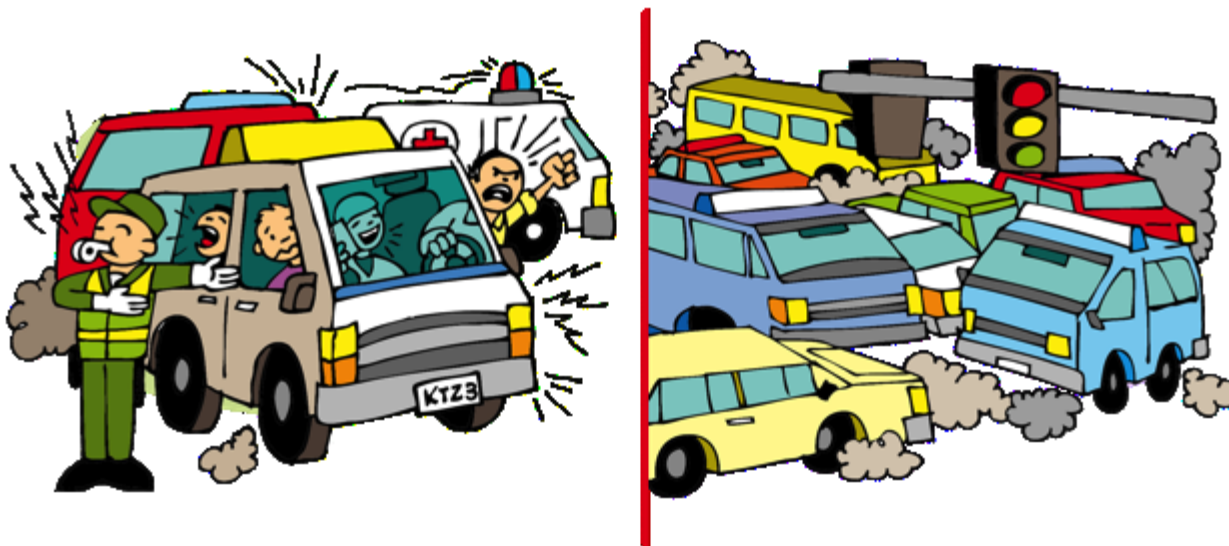


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# RESULTS OF THE URBANIZATION AND MOTORIZED GROWTH (2011 Data)

- Disconnection of urban areas
- Inequality in the access of public transportation
- Traffic jam and waste of time
- Environmental pollution: 3,7 million deaths per year

every year



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## HUMAN PERSPECTIVE

- Promote Access to assets, resources and services (connectivity, social inclusion and affordable price)
- Improve health and security
- Give a worthy service to human beings

## ENVIRONMENTAL PERSPECTIVE

- Promote the use of more efficient transport systems from the environmental, social and economic point of view
- Guarantee the use of renewable resources
- Accomplish energy efficiency



# URBAN MOBILITY PRINCIPLES

## CITY PERSPECTIVE

- Use of maintainable of transportation System
- Encourage modal connection and use of non-motorized transport
- Reduce urban vehicular traffic
- Improve the use of public space

## GOVERNMENT PERSPECTIVE

- Improve investments in economy
- Implement fast and effective solutions
- Reduce or eliminate grants

# LA PAZ - EL ALTO

**SUPERFICIE TOTAL: 636 km²**

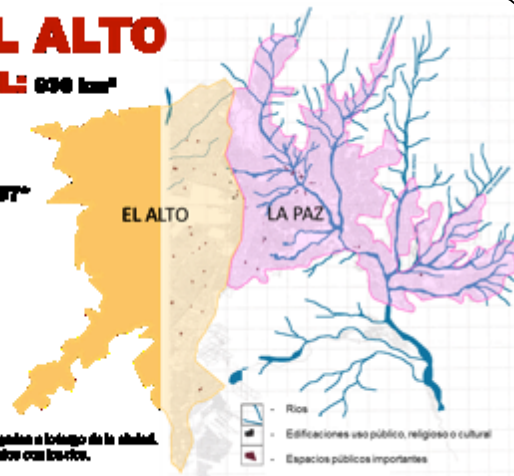
La Paz: 472 km² - 3.600 personas

El Alto: 163 km² - 4.870 personas

**POBLACIÓN: 1.013.487\***

La Paz: 764.617 hab.\*

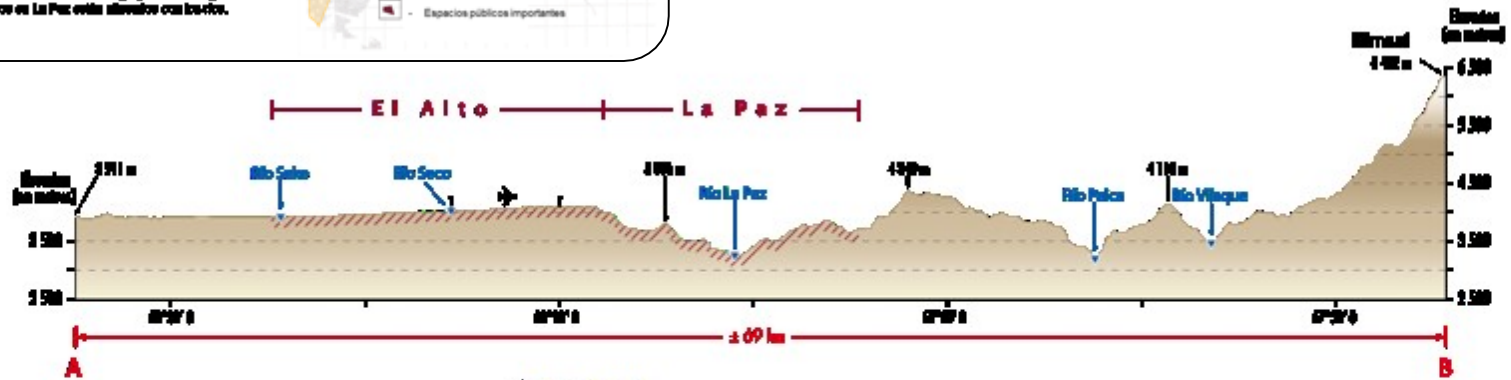
El Alto: 248.869 hab.\*



- Las Edificios/Públicos en El Alto están agrupados a lo largo de la ciudad.
- Las Edificios/Públicos en La Paz están dispersos con barrios.

\*Censos 2012.

# PROJECT LOCALIZATION



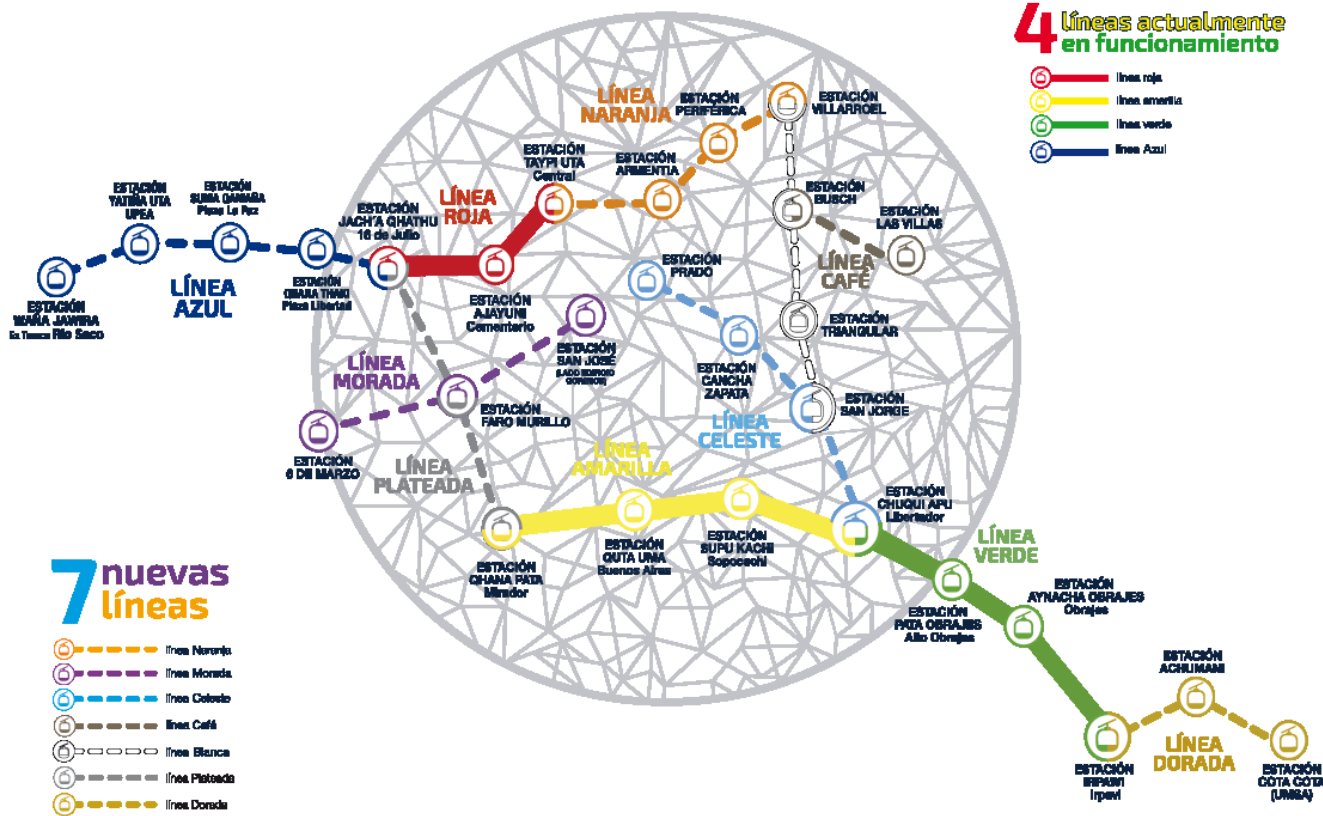
- Estación de la zona urbana (Urban area station)
- Zona Urbana (Urban area)
- Principales localidades (Main localities)
- Aeropuerto (Airport)
- Cota de altura (Elevation point)



# CABLE CAR NETWORK

PHASE I: 9,98 Kms. = 234,6 MM/\$US.

PHASE II: 21,7 kms. = 560 MM/\$US.



Network carrying capacity: 100.000 passenger/hour



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# TECHNICAL SPECIFICATIONS



LINE	EXTENSION [m.]	CABINS	STATIONS
Red	2.348	109	3
Yellow	3.736	168	4
Green	3.705	165	4
Blue	4.989	208	5
Orange	2.599	127	4
White	2.920	120	4
Purple	4.299	190	3
Light Blue	2.629	159	4
Brown	714	26	2
Silver	2.610	120	3
Gold	2.250	106	3
<b>TOTAL</b>	<b>32.799</b>	<b>1.498</b>	<b>39</b>

 Survey conducted in 60 countries



# CABLE CARS A TRANSPORT SYSTEM TO LIVE WELL

- Improve life quality
- It solves traffic problems
- Adapted to the city
- Require reachable investments
- Accomplish it is own sustainability
- The best choice for a Government administration



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TOTAL PASSENGERS

**79.176.335**

Since May 29 2014 to May 29 2017



# IMPROVING CONECTIVITY TRANSPORTED PASSENGERS

**MAXIMUM** (RECORDS)

**68.789**

DATE: 17/05/2017

**80.805**

DATE: 13/06/2016

**34.372**

DATE: 17/05/2017

**64.275**

DATE: 17/05/2017

All lines total Record

**194.971**

Date: 17/05/2017



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# LESS TRAVELLING TIME



## Travel average:

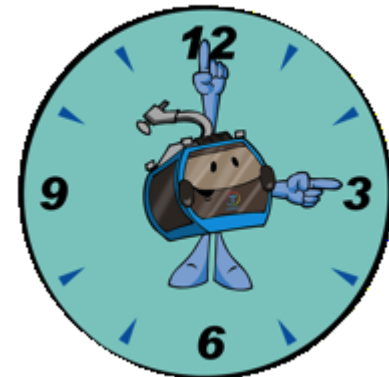
- 1980: 18'
- 2015: 37'
- 2030: 51'

## Traffic speed:

- 2015: 3 km/h.
- 2030: 1,2 km/h.
- The speed average of a walker is 5 km/h.

## CABLE CAR:

- Less travelling time from 15 to 90 minutes
- 1 Red Line passenger saves 16 days/year



# SOCIAL INCLUSION



- **EQUITY:** We promote equity and social justice (Gender, disabled people).
- **INTEGRATION:** access to opportunities of education, job and comercial.
- **CONNECTIVITY:** connexions, itinerary and frequency of t



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# LOWER RATE OF ACCIDENTS



- SECURITY - PRIORITIZING THE RESPONSIBILITY
  - The accident rate is inexistent: “0%” in urban cable cars
  - Reduce the probability of an traffic accidents.
  - It is estimated that the Cable Car System could reduce the rate of traffic accidents in 3.4% .

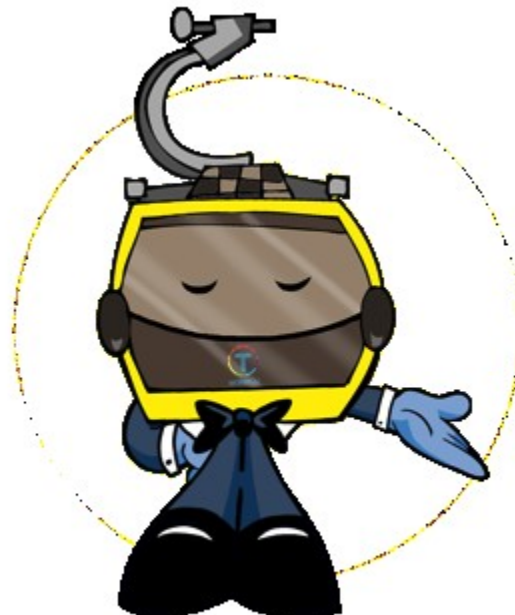


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# THE BEST QUALITY SERVICES

- We provide wellness, efficiency, and satisfaction:
  - Seated passengers
  - Comfortable space for the user (35% more than a conventional car)
  - Pleasant trip
  - Punctuality and availability



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# REDUCING POLLUTION



Inside a car there is 9.6 parts per million of carbon monoxide (CO)

Inside a cable car cabin there is 0 parts per million of carbon monoxide (CO).





# ENERGY EFFICIENCY



One Cable Car of “Mi Teleférico” Transport system has the capacity to carry 10 passengers equal to 3.3 KWH of electrical energy



A standard car has the capacity to carry 10 passengers equal to 157 KWH.



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# URBAN ACUPUNCTURE

	2 LANES avenue	THREE LINES OF URBAN CABLE CARS	
LENGHT (KMS.)	10	10	
TOTAL STATIONS	-	23	51.900
CABLE CAR TOWERS	-	77	1.232
TOTAL SPACE REQUIRED (Mts 2)	120.000	TOTAL	53.132
		-	66.868

Less tan 66.868 mts.2 of an area is required for the cable car system



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# INFRASTRUCTURE ADAPTED TO THE CITY



## STATIONS:

-  Bridges
-  Underground constructions
-  Micro stations
-  Building
-  Others





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# INTERMODAL INTEGRATION



-  A view of Integrated Transport System
-  Priority for Non-motorized transport



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# INVESTMENTS POSSIBLE TO ASUME




	NUMBER OF STATIONS	LENGTH (KMS.)	TOTAL INVESTMENT (MM. US\$)	INVESTMENT BY KM. (MM. US\$)
<b>METRO OF BOGOTÁ</b>	<b>23</b>	<b>23</b>	<b>4.781</b>	<b>208</b>
<b>TELEFERICO OF LA PAZ (PHASE 2)</b>	<b>23</b>	<b>21</b>	<b>450</b>	<b>23</b>



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# FAST AND EFFECTIVE IMPLEMENTATION

## RED LINE:

-  2,3 Kms.
-  3 Stations
-  109 cabins

## PROCESS:

-  Contract Sign:  
August /2012
-  Starting construction:  
May/2013
-  Inauguration:  
May/2014



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# FINANCIAL SUSTAINABILITY



- Operating costs, maintenance and administrative costs are covered by income
- If the grand were of US\$ 8 MM per year the amount would exceed the US\$ 320 MM. in its useful life (it could be more than the investment)



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# CONCLUSIONS



- The quality of urban life is related to the quality of public transport system.
- The Cable Cars System satisfactorily meets the requirements of Urban Transportation.



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*...Thanks!!*

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