

Role of Ropeway in Providing Affordable Urban Mobility Solutions: Lessons from La Paz

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About IPRCL

IPRCL

Creating Seamless Connectivity

- A first of its kind Joint Venture Company (JVC) between the Major Ports under the Ministry of Shipping and RVNL with the objective to provide efficient rail evacuation systems to Major Ports for enhancing their capacity and throughput.
- Building Multimodal Transit Systems like Ropeways.
- Building ROBs under Setu-Bharatam.



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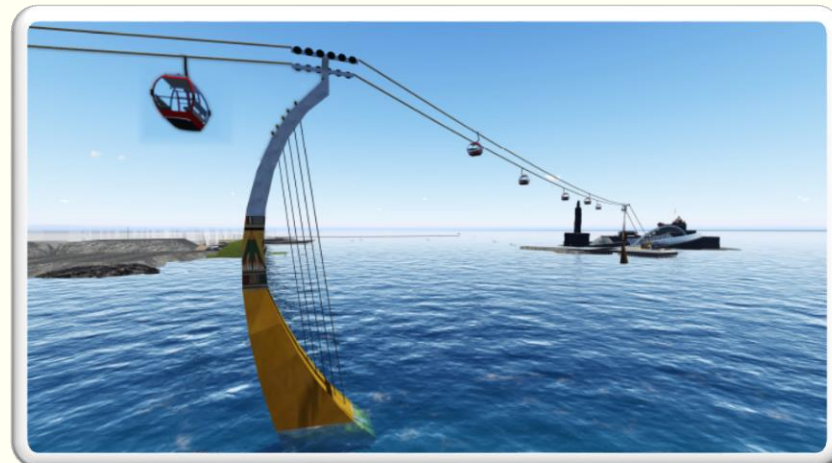
website: www.iprcl.org



IPRCL's Operations



Road Over Bridges



Ropeways



Port Loading Platforms



Railway Lines

Ropeway vs Other Modes



There are
200 persons
in **117** vehicles

IN A TRAIN
COACH



IN THREE (3)
Buses



CYCLING

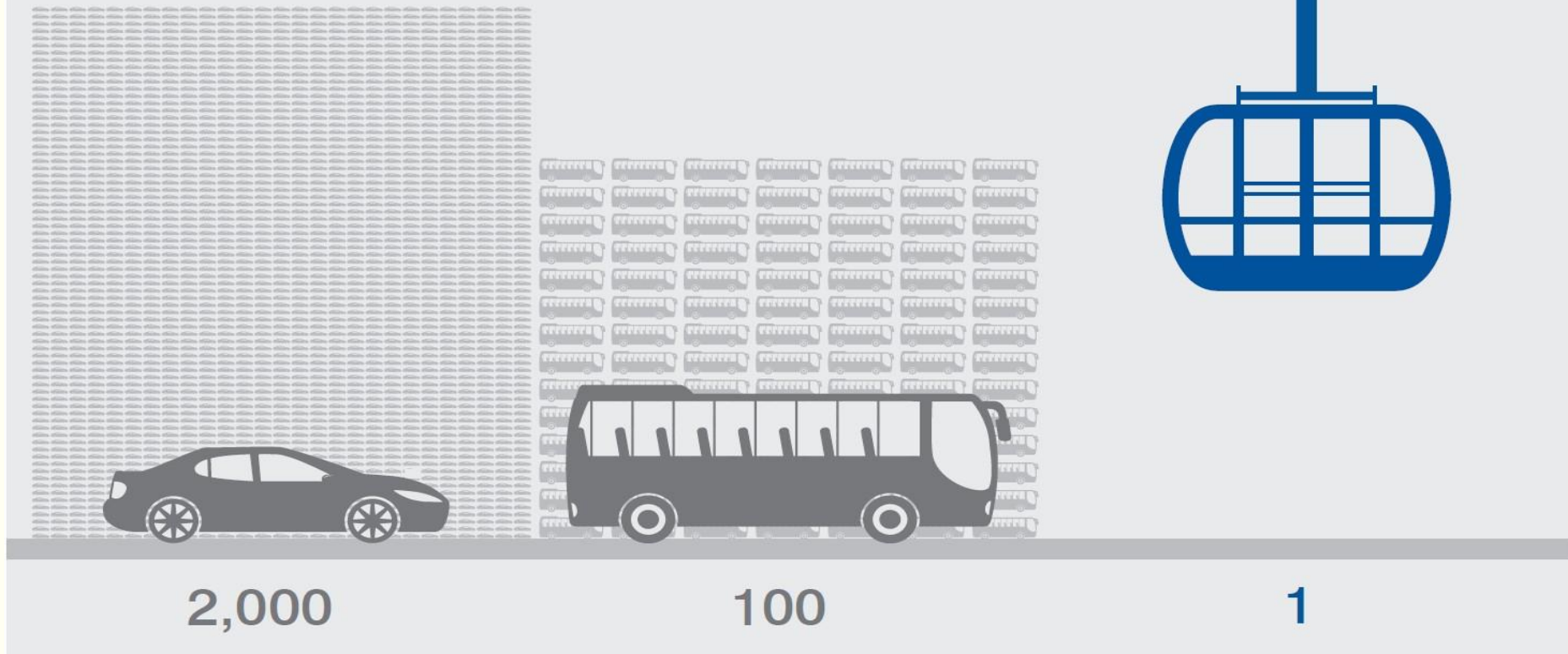


WITHOUT CARS

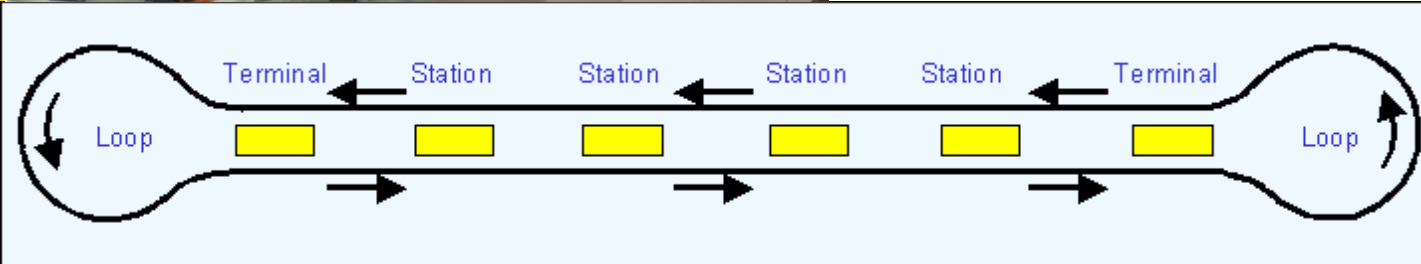
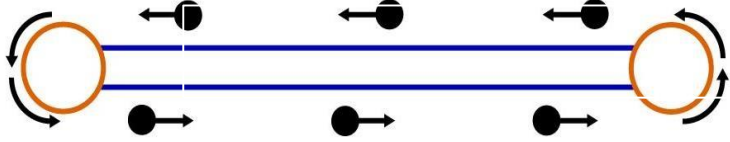


Ropeway Needs Minimum Road Space

To Transport 10,000 passengers / hour (5,000 in each direction), you need:

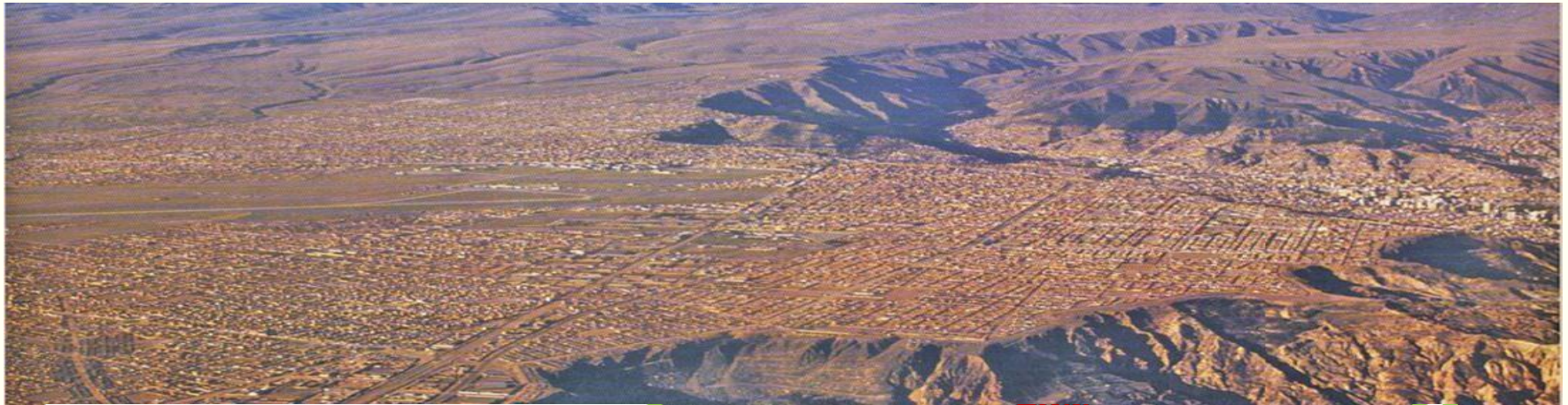


It is a Simple System

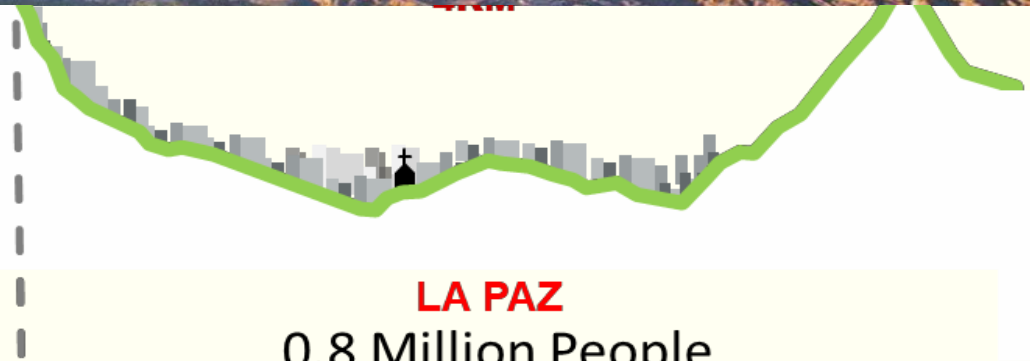


The Twin City of La Paz and El Alto

3000 M Above MSL



EL ALTO
1.1 Million People



LA PAZ
0.8 Million People

Densely Populated City



With congested roads filled up with public taxis, vans, mini buses in downtown areas

City's Average Trip Time was Increasing

- Average Trip Time:
 - 1980: 18'
 - 2015: 37'
 - 2030: 51'
- The speed of traffic:
 - 2015: 3 km/h.
 - 2030: 1.2 km/h.
- Average speed of a pedestrian is 5km/h.

Ropeway provided Shorter Travel Time

La Paz Ropeway System:

- Average Reduction in travel time of travel from 15 to 90 minutes
- Every Pass of the Red Line saved on average 16 days per year in just travel time
- Each Line runs at 6 km/hr with 4,000 pass/h



Since 2016 Ropeway System Brought Turnaround



The Complete Ropeway System



11 Line Network Capacity



Ropeway vs Metro on Center of City Roads



Metros Journey is of Hardship

General Views in Metros



Cable Car Journey is Joyful



Satisfying Users in Terms of Efficiency:

- All sitting, no standing
- More space for the user (35% more than a terrestrial vehicle)
- Enjoyable Trip
- Punctuality & Availability
- Easy Differently Abled Access

It Promotes Social Inclusion



Urban Ropeway vs Metro

Metro	Ropeway
Best for Long Distance Travel	Best for Short 4-5 Km Travel
The Cost per additional Km for incremental ridership is higher	Highest value for money for moving incremental passengers
Long Lead Construction	18 Month Construction
Large Land Requirement	Only a fraction of Metro
Un-removable	Removable System except Station
Under-ground very costly	10% of u/g Metro

Decongesting Capacity of Mumbai Suburban

6 Lines	2342 Train Services (12 & 15 Coaches)	465 Km
141 Stations (Western: 37, Central: 62, Harbour: 32 Trans – Harbour: 10)	75 Lakhs Passengers Per Day	23 Hours per day

701 Passengers per Hour per Km

Decongesting Capacity of Delhi Metro

6 Lines	2206 Coaches at end of Phase III Operationalization (333 trains)	231 Km
173 Stations	27.6 Lakhs Passengers Per Day (2016 – 17 Peak Day Capacity)	18. 5 Hours per day

630 Passengers per Hour per Km

Decongesting Capacity of Ropeway is Higher

The Ropeway urban transit system is a 10 Seater Monocable Gondola Detachable (MGD) system

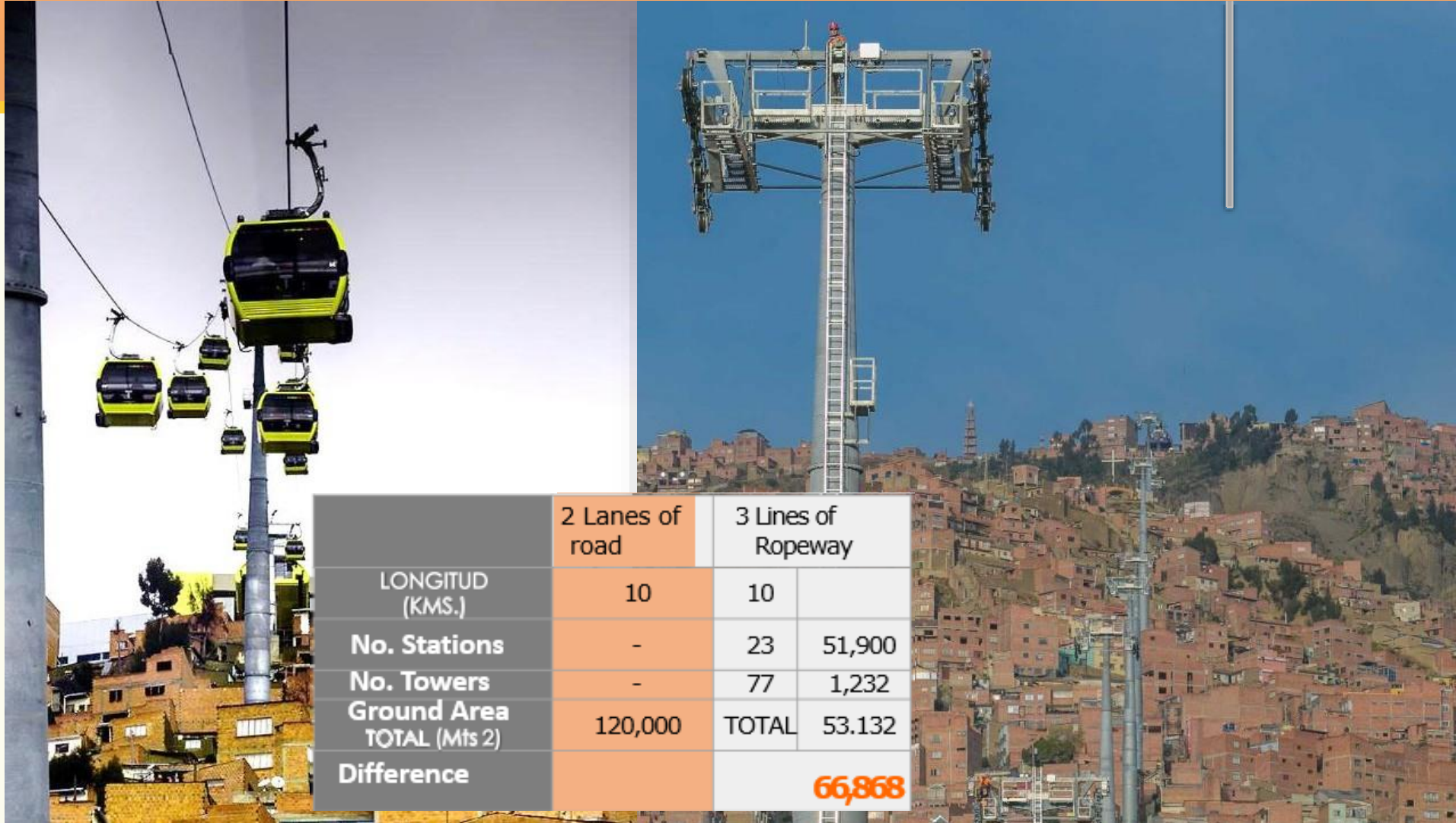
No of Lines	Status	People Per Day (Lakhs)	Network (km)	No of Stations	Operations (hours)	PPH/km
1	Design Capacity	0.9	4	5	17	2250
La Paz, Urban Ropeway System						
5	Current Ridership	2.79	17.3	20	17	950
5	Design Ridership	5.10	17.3	20	17	1734
4	Addl. Under Implementation	4.42	10.6	13	17	2452+
9	Total System Capacity	9.5	27.9	33	17	2225 ++

- For La Paz, with a population of 25 lakhs, the system has been designed at an average ridership capacity of 6,000 people per hour per line; the planned capacity for 9 lines is 62,000 people per hour;
- The system can be planned for 12,000 people per hour per line for cities with higher population
- Peak Hour flow is 1.5 times of peak hour peak direction flow and average day ridership is 10 times peak hour flow

Typical Parameters for an Urban Ropeway

Parameter	Typical Value
Length	3-6 Km
Capacity	3,000 – 6,000 Pass/Hour/Direction
Cabin Capacity	10-30 Pass
Speed	5-6 m/s
Cabin Spacing	50-60 m, 10-12 second
Tower Spacing	90-140 m
Station Spacing	1.0-1.3 km
No. of Cabins Required	40-60 Cabins per Km
Land Area Required	1500-3000 Sq.m. per station

Ropeway is Urban Accupuncture



	2 Lanes of road	3 Lines of Ropeway	
LONGITUD (KMS.)	10	10	
No. Stations	-	23	51,900
No. Towers	-	77	1,232
Ground Area TOTAL (Mts 2)	120,000	TOTAL	53.132
Difference			66,868

Underground Station Also Possible



Heroes of the Revolution Station, La Paz

Station on Bridge across Road



Busch Station, La Paz

Station on a Road Island



Irpavi, La Paz

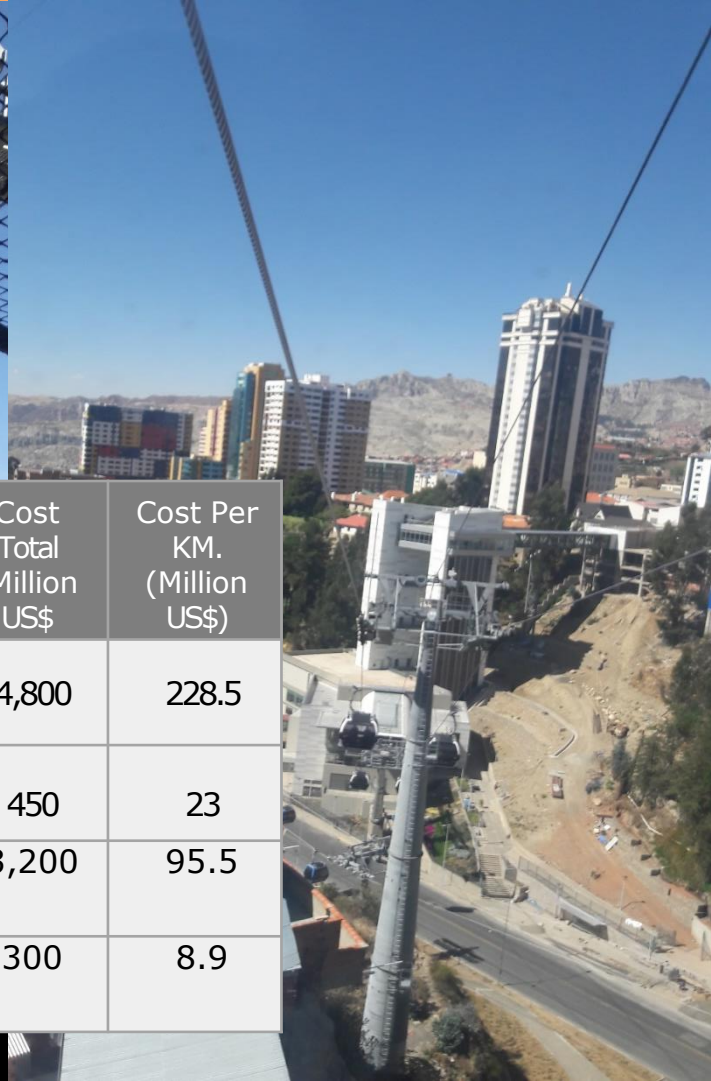
Station on a Road Triangle



Easy Tower Installation even from Air



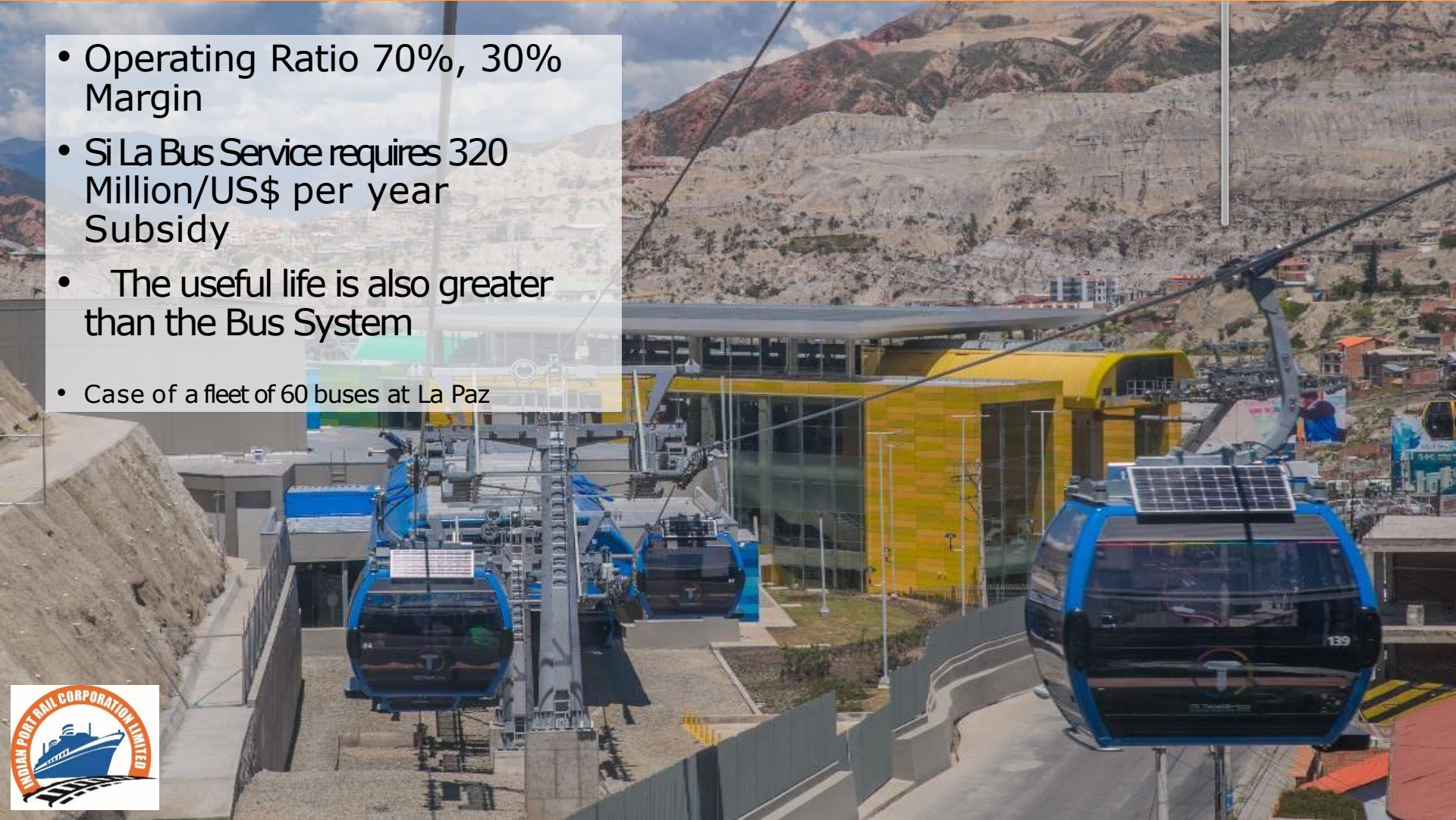
Much Cheaper than u/g Metro



	No. of Stations	Length (KMS.)	Cost Total (Million US\$)	Cost Per KM. (Million US\$)
METRO IN La Paz	23	21	4,800	228.5
Ropeway in La Paz (Ph 2)	23	21	450	23
Metro in India Mumbai	27	33.5	3,200	95.5
Ropeway in India	33	33.5	300	8.9

No need for Operational Subsidy

- Operating Ratio 70%, 30% Margin
- Si La Bus Service requires 320 Million/US\$ per year Subsidy
- The useful life is also greater than the Bus System
- Case of a fleet of 60 buses at La Paz



100% Standbye Motor & Power Backup



For Un-interrupted
Operation



Faster 18 Month Construction



Quick Application of Mobility Solution

CELESTIAL LINE, La Paz Data

2.6 Km

4 Stations

155 cabins

• Process:

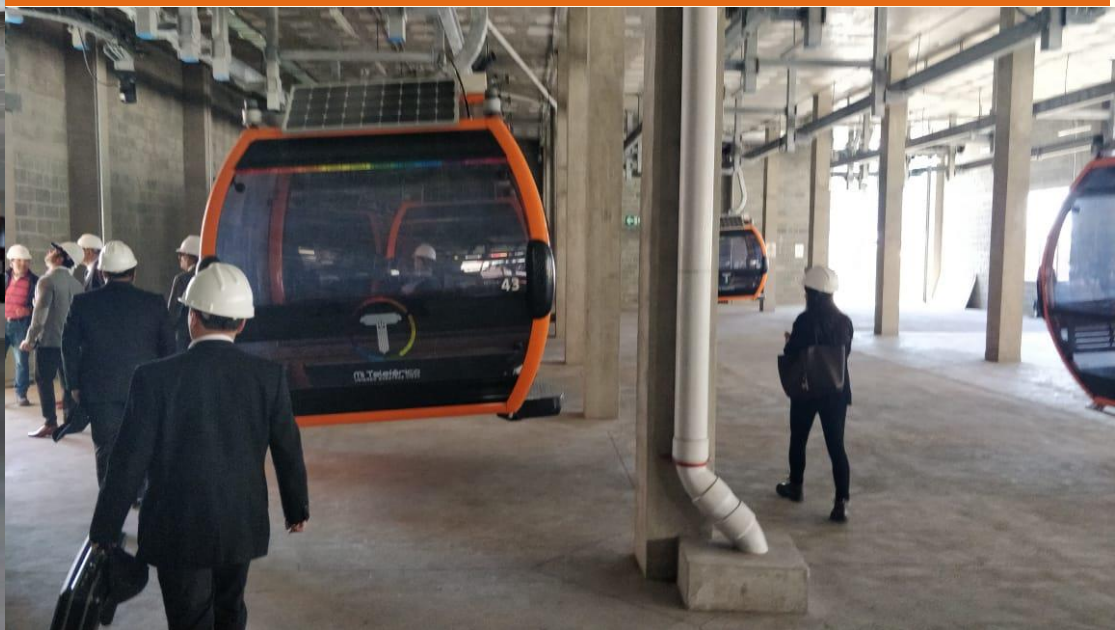
Start of Construction: 13 July/2017

Inauguration: 14 July/2018

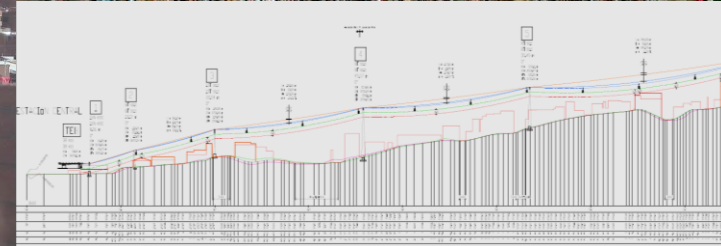
366days

IN CONSTRUCTION

Smaller Space Requirement for Car Maintenance

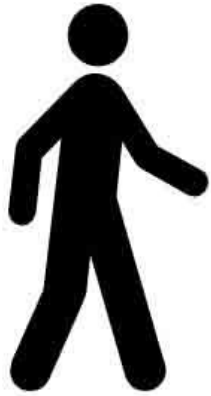


Requires Legal Aerial Rights to Operate above Houses



Ropeway can operate above built up areas in cities with a 1.5-4 m vert clearance and 2x15 m right of way against any infringement to Cabins

Best Urban Mobility Solution



[Run Video](#)

Thanks