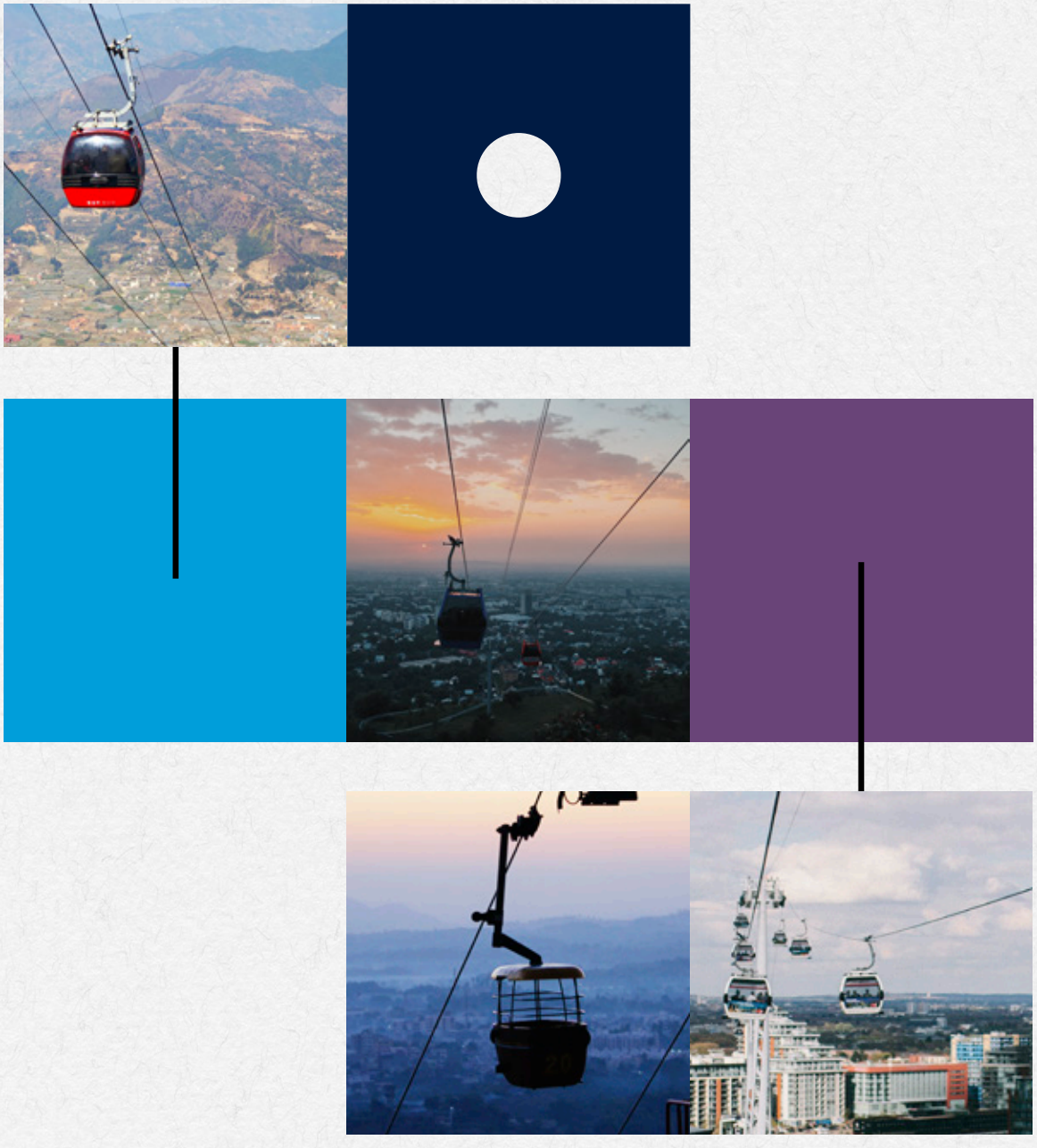
Urban Aerial Cable Cars as Mass Transit Systems

Case studies, technical specifications, and business models



WORLD BANK GROUP
Transport

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CONTENTS

Acronyms and Abbreviations

Bs	Venezuelan bolívar
	Bolivian boliviano
Ch$	Chilean peso
Col$	Colombian peso
DA	Algerian dinar
DANE	National Administrative Department of Statistics of Colombia
ETMVA	Valle de Aburrá Mass Transit Company
ETUP	Urban Passenger Transit Survey
ETUSA	Algiers Urban and Suburban Transport Company
IDB	Inter-American Development Bank
INE	National Statistics Institute
L1	Line 1 of the cable car system
L2	Line 2 of the cable car system
L3	Line 3 of the cable car system
O&M	Operation and maintenance
OMSA	Metropolitan Office of Bus Services
PPP	Public-private partnership
RATP	Dev Régie Autonome des Transports Parisiens Développement
R$	Brazilian real
RD$	Dominican peso
S/.	Peruvian sol
TRY	Turkish lira
UF	Unidad de Fomento [Development Unit] (a Chilean unit of account)
VAT	Value-added tax
€	Euro
£	Pound sterling

1. Introduction

Aerial cable cars (also known as aerial tramways) are coming into increasing use in urban transit systems in large cities as a way of connecting up nearby locations separated by steep gradients or mountainous terrain. While this type of system has primarily been used for mountain sports and other tourism-related activities, this report focuses on the use of such systems as urban transit solutions, along with a few specific applications in the tourism sector. Many Latin American cities have invested in aerial cable cars infrastructure to overcome accessibility and connectivity issues affecting residential areas located on steep slopes, most of which are informal, underserved settlements. Cities such as Medellín, Bogotá, La Paz, Mexico City, and Santiago, Chile, have established integrated mass transit networks that include aerial cable cars in order to reduce travel times and improve their populations' quality of life.

These systems can be implemented fairly rapidly and have traditionally been funded, built, and run by the public sector, but a growing number of these projects are now being undertaken in conjunction with private partners. In Latin America, aerial cable cars projects involving private partnerships include those of Rio de Janeiro and Guayaquil and, more recently, Santiago and Bogotá. In the latter case, the municipality has handed the system over to a private operator. Public-private partnerships (PPPs) in aerial cable cars systems have generally been limited in scope to operations and maintenance, with risk transfer mechanisms being introduced in some cases.

At the international level, a wide variety of different business models have been used, ranging from the award of concessions to private parties to build, operate, and maintain these systems, to public works operated by public agencies. This report provides information on international best practices and presents technical data sheets on each of 21 case studies.

Because the use of this type of technology is quite recent, the available data on the operating and maintenance costs of urban aerial cable cars facilities are fairly limited. The information provided in this report covers the type of use (urban transit, tourism, or both), technical and economic aspects, demand, and the operation of each system. Of the 21 case studies included here, 15 of the systems are already in operation, 4 are at the bidding or award stage, and 2 are out of service. Because these systems are so varied in terms of their technical aspects and purposes, they provide an overview of the different types of business models now in use, and thereby facilitate the identification of key factors to be taken into account in designing aerial cable cars systems and in defining appropriate management, business, construction, and operating models.

2. Objective and selection of case studies

The aim of this report is to provide a compilation of technical, economic, operational, and maintenance data on 21 aerial cable car systems in different countries. A quite varied sample of cases was selected in order to provide a full picture of the various types of private and/or public partnership models used for contracting and operating these systems.

This is the first publication to offer a compendium of objective data on urban aerial transit projects in Latin America and elsewhere. The criteria used for the selection of the case studies were based on such factors as setting (urban), geographic location, technology, and management model. The specific criteria that were used are detailed below:

- **All major monocable aerial cable car systems set entirely within urban areas of Central and South America, whether currently in operation or out of service.**
- **Urban or mixed urban/commuter transport facilities around the world that use differing technologies, whether in operation or under construction, that are representative of a given scale or management model.**

- Emirates Air Line (London, United Kingdom)
- Yenimahalle (Ankara, Turkey)
- Roosevelt Island (New York, United States)
- Brest cable car system (France)
- Algiers cable car system (Algeria)
- Toulouse cable car system (France)

- **Other systems used for tourism in South America**

- Metropolitan Park cable cars (Santiago, Chile)
- Kuélap cable cars (Amazonas, Peru)

The 21 case studies concern aerial cable car projects of international renown that were selected as examples of good practices based on their overall characteristics. These 21 projects are:

Aerial Cable Car	Location	Stage
1. Mexicable of Ecatepec de Morelos	Mexico State, Mexico	In operation
2. Metrocable Medellín	Medellín, Colombia	5 lines in operation, 1 line under construction
3. Mi Teleférico	La Paz, Bolivia	10 lines in operation
4. TransMiCable	Bogotá, Colombia	In operation
5. Manizales Aerial Cable Car System	Manizales, Colombia	In operation
6. Bicentenary Cable Car System	Santiago, Chile	Concession awarded; now at the project stage
7. Metropolitan Park Cable Car	Santiago, Chile	In operation
8. Guayaquil Cable Car System	Guayaquil, Ecuador	Under construction
9. Caracas Metrocable	Caracas, Venezuela	3 lines in operation
10. Line 1 of the Santo Domingo Cable Car System	Santo Domingo, Dominican Republic	In operation
11. Line 2 of the Santo Domingo Cable Car System	Santo Domingo, Dominican Republic	At the bidding stage
12. Kuélap Cable Car System	Amazonas, Peru	In operation
13. Emirates Air Line	London, United Kingdom	In operation
14. Yenimahalle Cable Car System	Ankara, Turkey	In operation
15. Roosevelt Island Tramway	New York, United States	In operation
16. Algiers Cable Car System	Algeria	6 lines in operation
17. Capucins Cable Car System	Brest, France	In operation
18. Téléo Urban Cable Car System in Southern Toulouse	Toulouse, France	Under construction
19. MioCable	Cali, Colombia	In operation
20. Alemão Cable Car System	Rio de Janeiro, Brazil	Out of service
21. Providência Cable Car System	Rio de Janeiro, Brazil	Out of service

3. Methodology

Project descriptions

The technical data sheet for each project includes a general description and information on key aspects of the technical arrangements and business model. The level of detail varies depending on the availability of information in each case.

The data sheets cover each project's purpose (urban transit, tourism, or a combination of the two), the construction model, entry into operation, and the main parties involved in each stage. In addition, capital and operating expenditures are itemized to the extent that the available information permits, and information is given on the technical features in terms of carrying and infrastructure capacity of the type of technology employed, the number of stations and cars, power, length of the route, and speed. Information on major operational aspects, such as operating schedule, effective demand, and fares (and whether those fares are integrated with those of other modes of transportation), is also provided.

Case studies

Of the 21 aerial cable car projects covered here, 6 are based on a business model whereby the construction of the works and their operation and maintenance are under private concession **(A)**, 9 are public works run by public entities **(B)**, and 6 were designed, built, and launched by public agencies but are run by private operators **(C)**. In all, 15 of these projects are in operation; 4 are at the bidding, award, or construction stage; and 2 are out of service. The projects' technical specifications vary widely, as do their purposes. They differ markedly in terms of other characteristics as well, with levels of demand ranging from 270 passengers per day in a system designed for tourism such as the Kuélap cable cars in Amazonas, Peru, to up to 163,000 passengers per day in the case of the Mi Teleférico mass transit system in La Paz, Bolivia.

Summary Table

Aerial Cable Car	Location	Purpose	Model	Stage	Entry into Operation	Capital Costs (millions of U.S. dollars, 2020)	Number of Cars	Capacity (passengers/ unit)	Speed (m/s)	Travel Time (min)	Demand (passengers/day)	Capacity (passengers/ hour/ direction)	Number of Stations	Length (km)	Fare integration	Number of lines
1. Mexicable	Mexico State, Mexico	U	A	In operation	2016	97.4	185	10	6.0	19.00	17,000	3,000	7	4.80	Yes	1
2. Metrocable	Medellín, Colombia	U/T	B	In operation	2004	204	468	8 - 10	5.0	8.60	38,689	11,500	16	11.82	Yes	5
3. Mi Teleférico	La Paz, Bolivia	U	B	In operation	2014	831	1,400	10	5.0	12.37	163,161	29,000	36	30.50	No	10
4. TransMiCable	Bogotá, Colombia	U	C	In operation	2018	73.7	163	10	6.0	12.00	21,000	3,600	4	3.30	Yes	1
5. Cable Aéreo	Manizales, Colombia	U	B	In operation	2009	49.7	87	10	5.0	4.75	8,500	1,400	5	2.58	No	2
6. Teleférico Bicentenario	Santiago, Chile	U/T	A	Concession awarded	2022	80	126	10	6.0	12.00	—	3,000	4	3.33	No	1
7. Parque Metropolitano	Santiago, Chile	U	C	In operation	2016	10.3	47	6	5.0	7.00	—	1,000	3	2.05	Yes	1
8. Aerovía de Guayaquil	Guayaquil, Ecuador	U/T	A	Under construction	2020	134	154	10	5.0	20.00	40,000	2,600	4	4.10	No	1
9. Metro Cable	Caracas, Venezuela	U	B	In operation	2010	1.079	353	10	5.0	12.67	23,744	8,000	10	10.20	Yes	3
10. Line 1 Santo Domingo	Dominican Republic	U	B	In operation	2018	69.2	215	10	5.0	17.42	19,495	3,000	4	5.16	Yes	1
11. Line 2 Santo Domingo	Dominican Republic	U	A	At bidding stage	2021	207	—	—	7.0	39.00	—	4,500	8	12.8	Yes	1
12. Telecabinas de Kuélap	Amazonas, Peru	T	A	In operation	2017	18.9	26	8 - 10	6.0	20.00	274	1,000	2	4.03	No	1
13. Emirates Air Line	London, United Kingdom	U/T	B	In operation	2012	87.3	34	10	6.0	3.17	3,609	2,500	2	1.10	Yes	1
14. Yenimahalle	Ankara, Turkey	U	B	In operation	2014	30.4	106	10	6.0	9.20	8,219	2,400	4	3.26	Yes	1
15. Roosevelt Island	New York, United States	U	C	In operation	1976	—	2	110	8.0	2.83	4,110	1,200	2	0.96	Yes	1
16. Téléphériques d'Alger	Algeria	U/T	B	In operation	1956	—	131	10 - 35	5.7	4.33	—	9,455	14	6.10	Yes	6
17. Téléphérique des Capucins	Brest, France	U	C	In operation	2016	22.7	2	60	7.5	1.50	1,781	1,200	2	0.42	Yes	1
18. Téléo	Toulouse, France	U	A	Under construction	2021	90.6	15	34	5.5	10.00	—	1,500	3	3.00	Yes	1
19. MioCable	Cali, Colombia	U	B	In operation	2015	35	90	10	5.0	10.00	6,000	3,000	3	2.79	Yes	1
20. Teleférico do Complexo do Alemão	Brazil	U	C	Out of service	2011	161.9	152	10	5.0	17.00	10,000	2,800	6	3.46	No	1
21. Teleférico da Providência	Brazil	U	C	Out of service	2014	37.4	16	10	5.0	3.50	—	1,000	4	0.721	Yes	1

Purpose: Urban (U), tourism (T), or both (U/T)
Model: (A) Construction, operation and maintenance under private concession; (B) Public works run by public operators; and (C) Design, construction, and start-up by public agencies but run by private operators.

Source: IDOM-SEMSA

4. Data and technical specifications

The technical data sheets for the 21 aerial cable car projects are divided into three main sections: (i) a description of the project that includes an introduction and information on its location, purpose, specific dates, etc.; (ii) technical specifications, which detail the estimated construction and operating costs, the route, and other technical information based on the available data; and (iii) information on the business model, manufacturer of the electromechanical equipment, and the operator.

The following is an example of how the information is organized in each case:

PROJECT: MEXICABLE, ECATEPEC DE MORELOS MEXICO STATE, MEXICO

PROJECT DESCRIPTION

Introduction

Location

Purpose

Business model

Builder

Estimated cost

Routes

Technical specifications

Operations

Fare integration

This system was built in 2015 and 2016. It is Mexico's first urban aerial cable car line and was inaugurated in October 2016. The Mexicable is composed of two independent sections that carry residents of San Andrés de la Cañada, in the Sierra de Guadalupe highlands, to Vía Morelos.

Its seven stations have an avant-garde look to them and are designed in a way intended to integrate urban art and safe, modern, durable finishings such as exposed concrete and galvanized steel.

The San Andrés de la Cañada neighborhood is an unplanned settlement that is hard to reach by road (heavy traffic) and has a high crime rate. The cable car system cuts the travel time between San Andrés de la Cañada and Vía Morelos from 45 minutes (by automobile or bus) to 19 minutes. The Mexicable is also a safer form of transportation that has security cameras and other devices installed in each cable car.

The Mexicable was conceived of as a catalyst for the economic and social development of the area. It has directly created over 200 jobs, has improved the residents' quality of life, and has ushered in a new era of urban mobility.

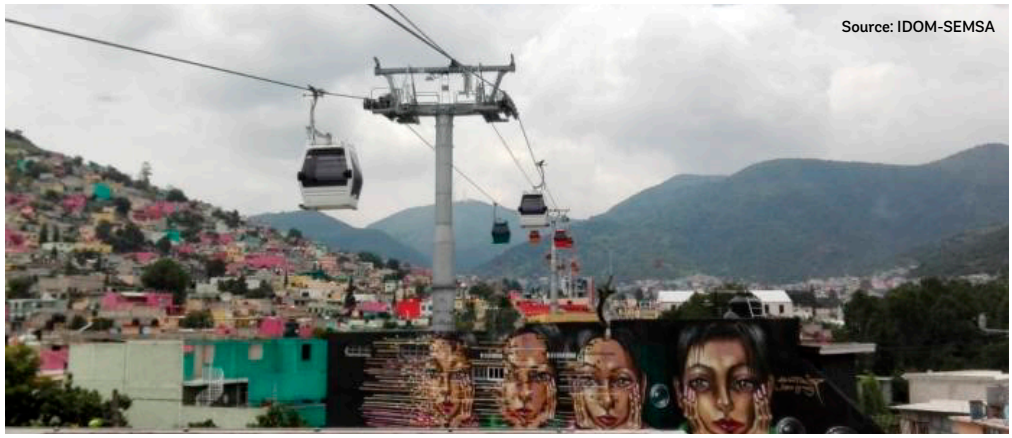
Information on each of the 21 projects covered in this study is presented below.[1]

[1] Note: The data included here have been taken from official material published by the government agency that commissioned the works in question, statements made by project representatives that have been published in nationally recognized media outlets, and IDOM-SEMSA sources.

1. Mexicable

PROJECT: MEXICABLE, ECATEPEC DE MORELOS, MEXICO STATE, MEXICO

PROJECT DESCRIPTION



Source: IDOM-SEMSA

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TECHNICAL SPECIFICATIONS

Estimated cost of construction	Mex$1.7 billion (US$90 million at the exchange rate for October 2016): 62.5 percent in public investment (Government of Mexico State) and 37.5 percent from the concession holder.

Estimated operating and maintenance (O&M) costs	Not available	
Route	Section 1: Santa Clara - Hank González – Fátima - Tablas del Pozo Section 2: Tablas del Pozo - Los Bordos – Deportivo - La Cañada	
Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	7
	Power:	2 x 794 kW
	Length:	4.8 km
	Cars or gondolas:	185 10-passenger units
	Speed and travel times:	Top speed: 6 m/s Travel time: 11 minutes + 7 minutes 45 seconds = 19 minutes (approx.)
	Carrying capacity:	3,000
	Other: Passengers have a bird's eye view of the urban landscape and of 52 murals painted by internationally renowned artists such as Farid Rueda, David Ortiz, Guido Van Helten, and John Pugh.	
Operations	**Operating hours:**	Mon–Fri: 5:00 a.m. to 11:00 p.m. Sat: 6:00 a.m. to 11:00 p.m. Sun: 7:00 a.m. to 10:00 p.m.
	Fare:	• Mex$9 (US$0.40) for a single trip using a prepaid smart card • Free for persons over the age of 60 and under the age of 5 and for persons with disabilities
	Passengers:	• Over 17 million users since October 2016 • Approximately 17,000 passengers/day
Fare integration	• The Mexicable provides a direct link to Line 4 of the Mexibus (a bus rapid transit system), which runs from Tecámac to Indios Verdes (a major destination point). • On December 9, 2017, passengers' prepaid cards began to be replaced by the MEXIPASE card, which provides full access to the three Mexibus lines and to the Mexicable line. As of January 14, 2018, this card provided access only to the aerial cable car and to Mexibus Line 3.	
Links	**http://sitramytem.edomex.gob.mx/mexicable**	

BUSINESS MODEL

Model for structuring the system's construction and operation	⊗ A) Construction, operation, and maintenance under private concession ○ B) Public works run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators **Additional information:** • Minimum guaranteed revenues equivalent to 29,000 users/day • The concession contract covers the construction, use, operation, conservation, and maintenance of the Mexicable cable car. • The concession covers a period of 30 years but could be extended to allow the concession holder to recoup its investment on the basis of the agreed returns on that investment.
Engineering and installation of electromechanical equipment	Leitner
Operator	Mexiteleféricos. S.A (private sector firm)

2. Metrocable de Medellín

PROJECT: METROCABLE, MEDELLÍN, COLOMBIA

PROJECT DESCRIPTION


Source: IDOM-SEMSA

In operation since 2004 (construction of Line K began in 2003), this is the world's first urban mass transit aerial cable car.

Metrocable now has 5 lines (J, K, H, L, and M) covering a total route of over 11 km in length. Its purpose is to provide transportation services to members of communities in the densely populated hills overlooking the Valle de Aburrá, where the city of Medellín is located.

It is part of the Valle de Aburrá Integrated Transportation System (SITVA). While the main objective of Metrocable is to provide urban transportation services, Line L was built to boost tourism in the Arví Regional Ecotourism Park.

TECHNICAL SPECIFICATIONS

Estimated cost of construction

- Line K: Col$68 billion (US$26 million) (2004)
- Line J: Col$96.9 trillion (US$53 million) (2008)
- Line L: Col$50.5 trillion (US$26 million) (2010)
- Line H: Col$85 billion (US$28.3 million) (2016)
- Line M: Col$118 billion (US$38 million) (2019)

Estimated O&M costs	Not available	
Routes	• Line K: Acevedo – Santo Domingo Savio • Line J: San Javier – La Aurora • Line L: Santo Domingo Savio – Arví • Line H: Oriente – Villa Sierra • Line M: Miraflores – Trece de noviembre	
Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	• Line H: 3 stations • Line J: 4 stations • Line K: 4 stations • Line L: 2 stations • Line M: 3 stations
	Power:	• Line H: Not available • Line J: Not available • Line K: 2 x 456 kW • Line L: Not available • Line M: Not available
	Length:	• Line H: 1.4 km • Line J: 2.7 km • Line K: 2.07 km • Line L: 4.6 km • Line M: 1.05 km
	Cars or gondolas:	• Line H: 44 8–10 passenger units • Line J: 115 8–10 passenger units • Line K: 90 8–10 passenger units • Line L: 170 8–10 passenger units • Line M: 49 8–10 passenger units
	Speed and travel times:	Top speed: 5 m/s, except Line L, which has a top speed of 5.8 m/s Travel time: • Line H: 5 minutes • Line J: 12 minutes • Line K: 9 minutes • Line L: 13 minutes 20 seconds • Line M: 4 minutes

Carrying capacity:

- Line H: 1,800
- Line J: 3,000
- Line K: 3,000
- Line L: 1,200
- Line M: 2,500

Operating hours:

- Line K: Mon–Fri: 4:30 a.m. to 11:00 p.m.
- Line K: Sat–Sun: 8:30 a.m. to 10:00 p.m.
- Lines H, J: Mon–Fri: 4:30 a.m. to 11:00 p.m.
- Lines H, J: Sat–Sun: 9:00 a.m. to 10:00 p.m.
- Line L: Mon–Fri: 9:00 a.m. to 6:00 p.m.
- Line L: Sat–Sun: 8:30 a.m. to 6:00 p.m.

Fare:

- Depending on the degree of integration of different modes and user profiles (frequent user, commuter, student, etc.): Col$1,090–Col$4,150 (US$0.29—US$1.11)
- For Line L: Col$10,000 (US$2.67) extra per trip

Operations

Passengers:

15.9 million passengers traveled by Metrocable of Medellín in 2019 (DANE, ETUP).

Passengers per line (2017)

- Line H: 674,747
- Line J: 5,006,021
- Line K: 7,438,189
- Line L: 1,002,630
- Line M: Not available

Fare integration	• Starting in 2020, Valle de Aburrá Integrated Transportation System (SITVA) fares have been merged in the "Tarjeta Cívica" pass.
Supplementary information	**New lines under construction:** • Line P, which will run between the Acevedo and El Progreso stations and serve a total of four stops, is under construction. The route is 2.657 km in length, and the line will have a carrying capacity of 4,000 passengers/hour. The construction is scheduled for completion in 2020.
Links	**https://www.medellincolombia.co/getting-around/medellin-metro/**

BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ⊗ B) Public works (traditional financing) run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators **Additional information:** Empresa de Transporte Masivo del Valle de Aburrá (Valle de Aburrá Mass Transit Company, ETMVA) is in charge of operating the entire public transportation system of the Medellín metropolitan area, which includes the Metrocable lines. It reported an operating surplus between 2016 and 2018.
Engineering and installation of electromechanical equipment	Pomagalski Colombia S.A.S.
Operator	ETMVA (public)

3. Mi Teleférico

PROJECT: MI TELEFÉRICO, LA PAZ, BOLIVIA

PROJECT DESCRIPTION


Source: IDOM-SEMSA

With 10 lines covering a network of more than 30 km in length, this is the world's most extensive (and highest-elevation) aerial urban cable car system.

The first contract was signed with the firm Doppelmayr in 2012, and the lines built during this first stage of the project (the Red, Yellow, and Green Lines) opened in 2014.

Mi Teleférico continues to expand. The Silver Line opened in 2019, and the Golden Line (the system's eleventh) is to be inaugurated in 2020.

The studies being conducted for the further expansion of the Mi Teleférico network are exploring the possibility of building a line to link up the El Alto airport with the Mi Teleférico network.

There were a number of reasons for deciding to invest in this unconventional mode of transport, with the region's terrain being perhaps the most important of all. La Paz is situated in a narrow canyon at an elevation of 3,650 meters, which is 420 meters below the city of El Alto (4,070 meters). The topography of the area makes it difficult not only to travel between the two cities but also to circulate within them. La Paz and El Alto have both seen a population boom, with the two cities' populations nearly doubling in the last two decades. The case of El Alto is particularly noteworthy. Having been formally designated as a city only in 1987, El Alto's population has swelled from 11,000 inhabitants in 1950 to over 1 million today and is now the highest big city in the world and Bolivia's second-largest city, after Santa Cruz de la Sierra (INE, 2015).

These factors pose a challenge for urban and inter-urban mobility. It is estimated that over 440,000 passengers travel from El Alto to La Paz every day (IDB, 2015). There is also a social factor to be included in this equation, since 29 percent of Bolivia's urban population is living in poverty (World Bank, 2015), and having suitable transportation links between the two cities can therefore make a significant contribution to poverty reduction.

TECHNICAL SPECIFICATIONS

Model for structuring the system's construction and operation	• US$234.6 million for the first 10-km phase (Red, Yellow, and Green Lines), including US$25 million for supervision, inspection, and expropriations) • US$450 million for the second 21-km stage (Blue, Orange, White, Azure, Purple, and Brown Lines) (2018) • US$54 million for the Red Line (2014) • US$74 million for the Yellow Line (2014) • US$80 million for the Green Line (2014) • US$75 million for the Blue Line (2017) • US$66 million for the Orange Line (2017) • US$60 million for the White Line (2018) • US$81 million for the Azure Line (2018) • US$91 million for the Purple Line (2018) • Brown Line Not available • US$56.5 million for the Silver Line (2019) Total: US$737,987,118, including supervision, inspection, and establishment of the transport company, and expropriations.
Estimated O&M costs	US$13.7 million for the Red, Yellow, and Green Lines (2014)
Routes	• Red Line (3 stations), 2014, Central – Cementerio – 16 de julio • Blue Line (5 stations), 2017, 16 de Julio – Plaza Libertad – La Paz – UPEA – Río Seco • Azure Line (4 stations), 2018, El Prado – Teatro al Aire Libre – Del Poeta – Libertador • Silver Line (3 stations), 2019, 16 de julio – Faro Murilo • Yellow Line (4 stations), 2014, Libertador – Sopocachi – Buenos Aires – Mirador • Orange Line (4 stations), 2017, Central – Armentia – Periférica – Héroes de la Revolución • Purple Line (3 stations), 2018, 6 de marzo – Faro Murillo – Obelisco • Green Line (4 stations), 2014, Irpavi – 17 de Obrajes – Alto Obrajes – Libertador • White Line (4 stations), 2018, Héroes de la Revolución – Defensores del Chaco – Próceres de la Independencia – Del Poeta • Brown Line (2 stations), 2018, Defensores del Chaco – Las Villas
Technology	Monocable detachable gondola lift

Technical features	**Number of stations and length of lines**	**Total: 36 stations** • Red Line: 3 stations, 2.4 km • Yellow Line: 4 stations, 3.9 km • Green Line: 4 stations, 3.7 km • Blue Line: 5 stations, 4.7 km • Orange Line: 4 stations, 2.6 km • White Line: 4 stations, 2.9 km • Azure Line: 4 stations, 2.7 km • Purple Line: 3 stations, 4.3 km • Brown Line: 2 stations, 0.7 km • Silver Line: 3 stations, 2.6 km
	Power:	Not available
	Length:	30.5 km in total
	Cars or gondolas:	**Total: 1,400 10-seat vehicles** • Red Line: 109 • Yellow Line: 169 • Green Line: 165 • Blue Line: 208 • Orange Line: 127 • White Line: 131 • Azure Line: 159 • Purple Line: 190 • Brown Line: 26 • Silver Line: 116
	Speed and travel times:	**Top speed:** 5 m/s except the Azure and Purple I Lines, which have a top speed of 6 m/s **Travel times:** • Red Line: 10 minutes • Yellow Line: 13 minutes 30 seconds • Green Line: 16 minutes 35 seconds • Blue Line: 17 minutes • Orange Line: 10 minutes • White Line:13 minutes 5 seconds • Azure Line: 11 minutes 50 seconds • Purple Line: 16 minutes 10 seconds • Brown Line: 3 minutes 50 seconds • Silver Line: 11 minutes 40 seconds

Technical features	**Carrying capacity:**	• Red, Yellow, Green, Blue, Orange, White, and Silver Lines: 3,000 passengers/hour/direction • Azure and Purple Lines: 4,000 passengers/hour/direction • Brown Line: 2,000 passengers/hour/direction
	Other:	• A new line (the Golden Line) is under construction. It will be 2.2 km in length and will have three stations, a carrying capacity of 3,000 passengers/hour/direction, and a travel time of 7 minutes and 35 seconds. • Mi Teleférico also runs the tourist gondola system of the City of Oruro.
Operations	**Operating hours:**	Mon-Sat: 6:00 a.m. to 11 p.m. Sun: 7:00 a.m. to 9:00 p.m.
	Fare:	• Bs 3 per person (US$0.43) • Special rate: Bs 1.50 (US$0.20) for older adults, students, and persons with disabilities • Transfers using the BI ticket or smart card cost Bs 2 (US$0.28) • Passengers may purchase single tickets, BI passes, or rechargeable smart cards
	Passengers:	• Over 250 million since 2014 (as of October 2019) and an average of 163,161 passengers/day • Red Line: 7.78 million persons/year • Yellow Line: 14.59 million persons/year • Green Line: 4.4 million persons/year
Fare integration	• A plan has been developed for integrating the Mi Teleférico, La Paz Bus, and Wayna Bus networks by introducing a consolidated fare system that would allow riders to use all three networks with a single pass or ticket. Although tests and interagency agreements were concluded in 2017, no date has yet been set for its implementation.	
Links	**http://www.miteleferico.bo/**	

BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ⊗ B) Public works (turnkey facility) run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators **Additional information:** • According to Mi Teleférico, the company is self-reliant and does not require subsidies to cover its costs.
Engineering and installation of electromechanical equipment	Doppelmayr
Operator	The government-run cable car transportation company Mi Teleférico

4. TransMicable

PROJECT: TRANSMICABLE, BOGOTÁ, COLOMBIA

PROJECT DESCRIPTION


Source: https://rodoaf.remontees-mecaniques.net/colombie/bogota/tcd10tra/ok%20(90).JPG

In service since late 2018, this system is located in the southern part of the urban area and connects the Ciudad Bolívar district with the City of Bogotá's TransMilenio bus rapid transit system.

TransMiCable was built by the Doppelmayr company and uses Uni-G standard terminals. The line is over 3 km in length and includes four stations and two cable loops.

This cable car system is completely integrated with the TransMilenio network. Riders use the same pass for all modes of transport in the TransMilenio network.

Given the topography of Bogotá, it is likely that other densely populated areas of the city will also be serviced by an aerial cable car system in the future.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	• Col$240 billion (US$73.7 million in 2020) • This sum includes 12 months' worth of maintenance at Col$1,623,205,783, and the cost of the system's construction was therefore Col$220 billion (US$70.8 million as of January 2019).
Estimated O&M costs	Col$96.338 billion over 5.5 years (US$29.5 million in 2019)
Route	Four stations: Mirador del Paraíso – Manitas – Juan Pablo II – Tunal

Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	4
	Power:	2 x 852 kW
	Length:	3.3 km
	Cars or gondolas:	163 10-passenger units
	Speed and travel times:	Top speed: 6 m/s Travel time: 12 minutes (approx.)
	Carrying capacity:	3,600 passengers/hour/direction
Operations	**Operating hours:**	Mon-Sat: 4:00 a.m. to 10:00 p.m. Sundays and holidays: 5:30 a.m. to 9:00 p.m.
	Fare:	• Col$2,500 (US$0.67). There are reduced fares for older adults and persons with disabilities.
	Passengers:	• 19,000 passengers/day
Fare integration		• TransMiCable is part of the Integrated Public Transportation System (SITP), which also includes the TransMilenio bus rapid transit system. In the future, it will also incorporate the Bogotá Metro. • If a rider transfers from the TransMiCable line to either the Blue or Red Lines of the bus system within 110 minutes or from a Blue Line bus to TransMiCable within that time span, then the transfer is free. Otherwise, the normal fare is payable. • The SITP offers a travel pass known as "TuLlave" (your key) that works on both systems at a cost of Col$5,000.
Links		**https://www.transmilenio.gov.co/TransMiCable/**

BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ○ B) Public works run by public operators ⊗ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators **Additional information:** • Revenues from public sources are linked to indicators, not demand.
Engineering and installation of electromechanical equipment	**Consortium formed by:** • Doppelmayr Colombia S.A.S (50 percent) • Constructora Colpatria S.A. (25 percent) • ICEIN Ingenieros Constructores S.A.S. (25 percent)
Operator	TransMilenio S.A The Cable Móvil Consortium was in charge of the system's operation and maintenance for a six-month period prior to start-up and will continue in that role for the first 60 months (5.5 years) of the system's operation. The contract provides for the possibility of an extension for a further 30 months.

5. Cable Aéreo de Manizales

PROJECT: MANIZALES AERIAL CABLE CAR SYSTEM, VILLAMARIA AND CALDAS, COLOMBIA

PROJECT DESCRIPTION


Source: ente: https://rodoaf.remontees-mecaniques.net/colombie/manizales/tcd10vil/ck%20(43).JPG

This aerial cable car project was launched by the Manizales Institute for Finance, Promotion, and Development (Infi-Manizales).

It is integrated with the Strategic Transportation System (SET by its Spanish acronym), which is based on a large-scale plan for the development of urban mobility in a number of different municipalities in the vicinity. The aim is to find an effective and affordable global solution for linking up various densely populated areas and optimizing the accessibility of the city center for settlements on the city's outskirts. This urban cable car passenger system serves the cities of Manizales and Villamaria and currently has two lines, both of which are integrated into the public transportation system.

The first (L1) has been in service since 2009 and links the downtown area to the Los Cámbulos terminal.

Construction of the second line (L2) began in May 2011 but, owing to administrative problems, that line did not enter into operation until January 3, 2014. It is a short route (705 meters, with the cable being suspended from four pylons with lights strung between them) that spans a deep ravine that is the main obstacle to travel by road in that area. This line links the municipality of Villamaría with the Los Cámbulos de Manizales terminal.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	L1: Col$55 billion (US$27.6 million, 2009) L2: Col$27.643 billion (US$13.7 million, 2014)

Estimated O&M costs	US$2.82 million (January–September)	
Routes	Line 1: Los Cámbulos – La Fuente — Fundadores Line 2: Los Cámbulos – Villamaría	
Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	L1: 3 L2: 2
	Power:	L1: 2x250 kW L2: 250 kW
	Length:	L1: 1870 m L2: 705 m
	Cars or gondolas:	64 units with room for 10 passengers (seating for 8 and standing room for 2) L1: 42 units (designed for up to 58) L2: 22 (designed for up to 29)
	Speed and travel times:	Top speed (L1 y L2): 5 m/s Travel time: L1: 7 minutes 10 seconds L2: 2 minutes 20 seconds
	Carrying capacity:	L1 and L2 (current): 1,400 passengers/hour/direction L1 and L2 (final): 2,100 passengers/hour/direction
	Other	Not available
Operations	**Operating hours:**	L1: 7 days/week from 6:00 a.m. to 10:00 p.m.
	Fare:	• Col$2,000 (US$0.53) • From 2018 on, rechargeable smart card
	Passengers:	• 8,500 users/day • 30 million passengers in 10 years • 3,150,232 passengers in 2018.
Fare integration		• Not integrated
Links	**https://www.cableaereomanizales.gov.co**	

BUSINESS MODEL	
Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ⊗ B) Public works run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators
Engineering and installation of electromechanical equipment	Leitner
Operator	Asociación Cable Aéreo de Manizales [Manizales Aerial Cable Association] (This association also operates the MioCable system of MetroCali.)

6. Teleférico Bicentenario

PROJECT: BICENTENARY CABLE CAR SYSTEM, SANTIAGO, CHILE

PROJECT DESCRIPTION

Source: Ministry of Public Works, General Directorate for Concessions (DGC). https://youtu.be/7h8s1ZlPKmY

This project involves the construction of an aerial urban transit system in Santiago, Chile, which will link the districts of Providencia, Las Condes, Vitacura, and Huechuraba. The line begins at Plaza Nueva Zelandia, approximately 170 meters from the Tobalaba subway station, and runs in a northwesterly direction, crossing the Santiago Metropolitan Park and providing a new gateway to this urban green space. It ends at the Ciudad Empresarial (a large business park) in the district of Huechuraba.

The project enhances connectivity and helps improve vehicular and pedestrian transit in one of the most congested areas of the capital city by providing an efficient, sustainable mode of transportation. It will help reduce travel times to and from the eastern part of Santiago and relieve congestion in the sector. Since, as noted, one of the stations will be located in the Metropolitan Park, in addition to serving as an urban transit system, it will also serve recreational and tourism-related purposes.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	UF (Development Units) 1,948,603 (without VAT, equivalent to approximately US$80 million in 2020)

Estimated O&M costs	Not available	
Routes	Section 1: Luis Thayer Ojeda – technical station (change in direction) – Parque Metropolitano. Section 2: Parque Metropolitano – Ciudad Empresarial (Santa Clara)	
Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	3 stations + 1 technical station
	Power:	Not available
	Length:	Total: 3,329 m - S1: 2,031 m - S2: 1,298 m
	Cars or gondolas:	126 10-passenger units (75 + 51 = 126)
	Speed and travel times:	Top speed: 6 m/s Travel time: 7.45 minutes + 4.12 minutes = 12 minutes (approx.)
	Carrying capacity:	3,000 passengers/hour/direction
Operations	**Operating hours:**	Not available
	Fare:	• Estimated at Ch$650 (US$0.78)
	Passengers:	• Not available
Fare integration	• The Ministry of Public Works can require the concession holder to integrate the system's fares with other modes of public transportation between the third and twentieth year of operation.	
Links	**http://www.concesiones.cl/proyectos/Paginas/detalle_adjudicacion.aspx?item=152**	

BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ⊗ B) Public works run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators **Additional information:** • Includes the implementation, repair, conservation, and operation of the Teleférico Bicentenario. • Teleférico Bicentenario is also the name of the concession holder. This consortium is composed of the following companies: - 42.5 percent: Ciudad Empresarial S.A. 4 - 2.5 percent: Icafal Inversiones S.A. - 10 percent: Doppelmayr Chile Holding SpA - 5 percent: Teleférico Bicentenario SpA • The concession has a maximum duration of 420 months (35 years). • The revenue sources for the concession holder are: - Fares - A guaranteed minimum income if actual ridership falls short of projections (approximately UF 259,000 the first year of operation, rising to UF 315,000 by Year 23) - Payments for environmental measures - Payments for cost overruns for Pylon 3 Penalties for unsatisfactory service delivery are to be deducted from the above.
Engineering and installation of electromechanical equipment	Doppelmayr (a member of the Teleférico Bicentenario consortium)
Operator	Teleférico Bicentenario consortium

7. Teleférico del Parque Metropolitano

PROJECT: METROPOLITAN PARK CABLE CAR, SANTIAGO, CHILE

PROJECT DESCRIPTION

This cable car line for tourists is located on San Cristóbal Hill in the Metropolitan Park of Santiago, Chile.

San Cristóbal Hill is part of a cluster of mountains that include its "sister hill," Chacarillas, along with Los Gemelos and La Pirámide, in the roughly 722-hectare Santiago Metropolitan Park, the largest urban park in Chile and one of the biggest in the world.

The cable car line was inaugurated in 1980 but was closed in 2009 because of mechanical problems. The system was overhauled and re-opened to the public in 2016.

The route starts at the foot of San Cristóbal Hill, in the Pedro de Valdivia Norte neighborhood (Oasis Station), and rises to its summit (Cumbre Station) after stopping at the Tupahue Station halfway up, where the Tupahue swimming pool, the Mapulemu Botanical Garden, and the Camino Real restaurant are located. At the summit, visitors can admire the statue of the Virgin Mary and take a ride on the funicular that runs between the Bellavista neighborhood and the summit of San Cristóbal Hill.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	The 2016 renovation cost US$9.5 million.

Estimated O&M costs	Not available	
Routes	3 stations: Oasis – Tupahue – Cumbre	
Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	3
	Power:	340 kW
	Length:	2,050 m
	Cars or gondolas:	47 6-passenger units
	Speed and travel times:	Top speed: 6 m/s Travel time: 7.45 minutes + 4.12 minutes = 12 minutes (approx.)
	Carrying capacity:	1,000 passengers/hour/direction
Operations	**Operating hours:**	Tues-Sun: 10:00 a.m. to 8:00 p.m.
	Fare:	**Round trip:** • Mon-Thurs: Ch$2,700 (adult fare) (US$3.29) and Ch$1,760 (child fare) (US$2.15) • Sat-Sun and holidays: Ch$3,250 (adult) (US$3.97) and Ch$2,120 (child) (US$2.59) • One-way tickets and short-trip tickets (between two stations) can also be bought.
	Passengers:	Not available
Fare integration	• There are fares that integrate the cable car line with other transportation systems within the park (the funicular and electric buses) and with attractions in the outdoor adventure park.	

BUSINESS MODEL	
Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ⊗ B) Public works run by public operators ○ C) Contract for renovation and start-up + private party operator contract
Engineering and installation of electromechanical equipment	Poma (2016)
Operator	Transportes Turísticos Santiago - Turistik

8. Aerovía de Guayaquil

PROJECT: GUAYAQUIL CABLE CAR PROJECT, GUAYAQUIL, ECUADOR

PROJECT DESCRIPTION


https://www.eluniverso.com/sites/default/files/styles/powgallery_1280/public/fotos/2020/03/20188525.jpg?itok=CxOkJqh9

In recent years the Municipality of Guayaquil has undertaken a number of successful mobility initiatives, especially in the area of mass transit. The MetroVía network carries nearly half a million passengers each day and has garnered international recognition. Projects now under way will expand the transportation network, extending it from the downtown area to the western part of the city, but additional transportation systems are needed in this growing urban center. The Municipality of Guayaquil has placed priority on the Aerovía, or Guayaquil Airway project, which calls for the construction of an aerial cableway between the cities of Guayaquil (the center of the metropolitan area) and Durán.
t
This will be the first urban aerial cable car in Ecuador and, because the line will cross over the Guayas River, it is also seen as a new tourist attraction for Guayaquil.

Construction of the cable car system began in 2019 and is scheduled for completion and the start-up of operations in 2020.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	• US$134 million: 85 percent is being covered by the Municipality of Guayaquil with a loan from the French Development Agency (2020).
Estimated O&M costs	• US$2 million per year in Years 1, 2, 3, 4, 6, 7, 8, 9, 11… • US$5 million per year in Years 5, 10, 15, 20…
Route	• 4 passenger stations: Malecón Ablel Gilbert Durán – Malecón 2000 – Julián Coronel – Parque Centenario • 1 technical station

Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	4
	Power:	Not available
	Length:	4.1 km
	Cars or gondolas:	154 10-passenger units
	Speed and travel times:	Top speed: 5 m/s Travel time: 20 minutes (approx.)
	Carrying capacity	2,600 passengers/hour/direction
Operations	**Operating hours:**	365 days/year, 18 hours per day
	Fare:	• US$0.70 (magnetic card)
	Passengers:	• Estimated at 40,000 passengers/day
Fare integration	• Not integrated	
Links	**https://guayaquil.gob.ec/Aerosuspendido/EspecificacionesT%C3%A9cnicas.pdf**	

BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ○ B) Public works run by public operators ⊗ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators **Additional information:** • The Aero Suspendido Guayaquil consortium is under contract to deliver the final designs, supplies, construction, assembly, start-up, and operation of the system. • The consortium's earnings will come from the fares, rental of commercial spaces, and a subsidy for the improvement of environmental quality. • The concession covers a period of 30 years. The operation will be conducted at the consortium's own expense and risk. It will receive all revenues and will cover all personnel expenses and the entire cost of spare parts and preventive and corrective maintenance.
Builder	Poma, as part of the Aero Suspendido Guayaquil consortium formed by Poma ASA and Sofratesa Inc.
Operator	The Aero Suspendido Guayaquil consortium will be responsible for the system's operation and maintenance, including the operation of the Durán bus system, ticketing, station management, security, cleaning, etc.

9. MetroCable de Caracas

PROJECT: METROCABLE, CARACAS, VENEZUELA

PROJECT DESCRIPTION

Source: https://www.doppelmayr.com/typo3temp/assets/_processd_/4/1/csm_Produkte-8MGD_MaricheTramoExpreso3-Doppelmayr_02_804005a00e.jpg

This aerial cable car integrated with the Caracas Metro system. It was built to provide the inhabitants of the city's steep hillsides with a quicker and safer mode of transportation.

There are currently three lines. The first was opened in 2010 and has 5 stations along its 1.8 km route. The intermediate stations have been looted, however, and are now out of service.

The second and longest (4.8 km) line was inaugurated in 2012 and has two stations. The third, of 3.6 km in length, has three stations and was opened to the public in 2015.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	L1: US$318 million (US$18 million for the overhead portion) (2010) L2 + L3 (2012): Electromechanical equipment (whole system): Bs 10,159,505 + US$67,893,184 = US$72.6 million Study, project, and civil works: Bs 647,005,982.58 + US$229,406,310.49 = US$530.3 million Total for L2 + L3 = US$603 million (US$1= Bs 2.15 as per the contract)

Estimated O&M costs	The contract for L2 + L3 includes technical training for operators and maintenance of the site during the construction and implementation of the works and for two years after their completion.	
Routes	• L1 (San Agustín Metrocable): Inaugurated in 2010, it has 5 stations (San Agustín – El Manguito – La Ceiba – Hornos de Cal – Parque Central) • L2 (Mariche Metrocable): Known as the express line and inaugurated in 2012, it has 2 stations (Palo Verde II – Mariche) • L3 (La Dolorita Metrocable): Inaugurated in 2015, it has 3 stations (Palo Verde III – Guaicoco – La Dolorita)	
Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	L1: 5 stations L2: 2 stations L3: 3 stations
	Power:	L1:178 kw
	Length:	L1: 1.8 Km L2: 4.8 km L3: 3.6 km
	Cars or gondolas:	353 units with room for 10 passengers (seating for 8 and standing room for 2) L1: 51 units L2: 144 units
	Speed and travel times:	Top speed: 5 m/s Travel times: L1: 9 minutes, L2: 17 minutes, and L3: 12 minutes
	Carrying capacity:	L1: 3,000 passengers/hour/direction L2: 3,000 passengers/hour/direction L3: 2,000 passengers/hour/direction
Operations	**Operating hours:**	5:00 a.m. to 10:00 p.m. Sun: 1:00 p.m. to 10:00 p.m.
	Fare:	• Bs 1,000 (US$0.005) May 2020
	Passengers:	• L1: 2,000,000 passengers/year • L2: 20 million/passengers in 3 years
Fare integration	• The cable car system is fully integrated with the Caracas Metro system.	
Links	**https://www.archdaily.com/429744/metro-cable-caracas-urban-think-tank**	

BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ⊗ B) Public works run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators
Builder	Doppelmayr/Garaventa
Operator	C.A. Metro de Caracas (a government-run company responsible for operations and maintenance)

10. Line 1 of the Teleférico de Santo Domingo

PROJECT:LINE 1 OF THE SANTO DOMINGO CABLE CAR SYSTEM, SANTO DOMINGO, DOMINICAN REPUBLIC

PROJECT DESCRIPTION

Source: https://rodoaf.remontees-mecaniques.net/repdom/tcd10ligne1/ok%20(36).JPG

Line 1 of the Teleférico de Santo Domingo is the first aerial cable car urban transit system in the Dominican Republic and in all of the Caribbean.

The construction of this aerial cable car is part of a larger land use and planning initiative undertaken in eastern Santo Domingo. This larger program includes the resettlement of residents of the Barquita district and the extension of Line 2 of the Metro.

The cable car was built in response to the need for a way to address the city's traffic snarls during rush hour, the shortcomings and high cost of Santo Domingo's mass transit and road system, and the need for a means of transportation for the inhabitants along the banks of the Isabela and Ozama rivers and in the northwestern part of Santo Domingo.

The aerial cable car was inaugurated on May 23, 2018 and started operating on a regular schedule on July 1, 2018.
Line 1 crosses over the Ozama River and connects with the station for Metro Line 2 and with the buses operated by the Metropolitan Office of Bus Services (OMSA).

TECHNICAL SPECIFICATIONS

Estimated cost of construction	US$66.5 million managed by La Barquita and Environs Development Project Unit (URBE) and financed in part by the French Development Agency.

Estimated O&M costs	Poma is under a three-year O&M contract at an annual cost of US$4,647,307.93	
Route	4 stations: T1 (Gualey), T2 (Los Tres Brazos), T3 (Sabana Perdida), and T4 (Charles de Gaulle)	
Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	4
	Power:	441 kW
	Length:	3,568 + 1,593 meters
	Cars or gondolas:	10-passenger units 133 (designed for 145) + 47 (designed for 70)
	Speed and travel times:	441 kW
Operations	**Operating hours:**	Mon–Fri: 6:00 a.m. to 10:30 p.m. Sat: 6:00 a.m. to 9:00 p.m. Sun: 8:00 a.m. to 9:00 p.m.
	Fare:	• One way: RD$20 (US$0.36) • Multiple trips (10): RD$185 (-7.5 percent) (US$3.33) • Multiple trips (20): RD$360 (-10 percent) (US$6.48)
	Passengers:	• 19,489 passengers/day • 5 million passengers since the system's inauguration (approx.)
Fare integration	• When the cable car entered into operation, a project for the integration of feeder routes using a system-wide transit pass ("SD Go") was launched by the National Transit and Land Transport Institute (INTRANT) in coordination with OMSA.	
Links	**http://www.telefericosantodomingo.com/**	

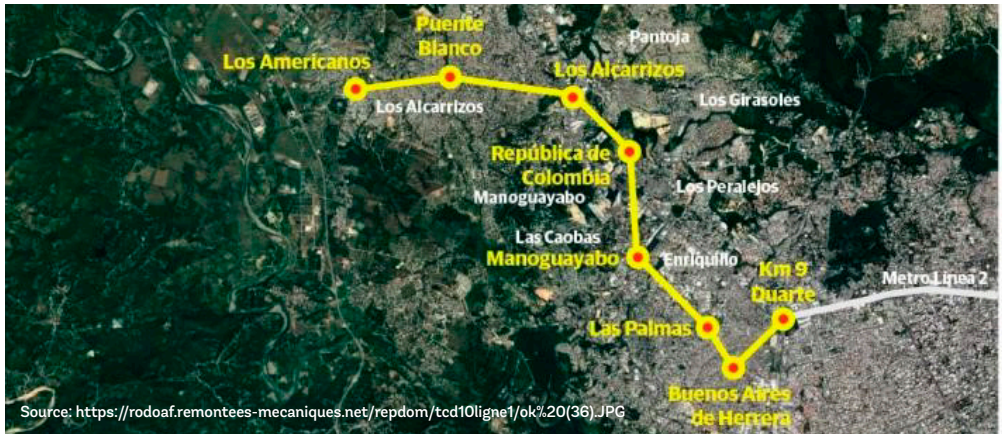
BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ⊗ B) Public works run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators **Additional information:** The builder and the government will run the facility jointly for the first three years of operation in order to ensure the successful transfer of knowledge and expertise.
Engineering and installation of electromechanical equipment	Poma
Operator	Office for the Reorganization of Transportation (OPRET), Poma, and Metro de Santo Domingo

11. Line 2 of the Teleférico de Santo Domingo

PROJECT: LINE 2 OF THE SANTO DOMINGO CABLE CAR SYSTEM, SANTO DOMINGO, DOMINICAN REPUBLIC

PROJECT DESCRIPTION



The government is working to resolve the City of Santo Domingo's mobility problems by expanding the public transportation network while de-emphasizing the use of private vehicles. This system will benefit approximately 394,000 residents in Los Alcarrizos, Pantoja, Los Peralejos, Los Girasoles, Manoguayabo, Las Caobas, Alameda, Las Palmas, Buenos Aires de Herrera, and Libertadores.

This aerial cable car line will connect up with Metro Santo Domingo at the María Montez Station, which services Metro Line 2. It will also connect with the Cibao Interurban Bus Terminal that is to be built in the Municipality of Los Alcarrizos at Kilometer 15 of the Duarte Highway. These transfer points will integrate these three different modes of transportation.

Line 2 of the Santo Domingo cable car system is now in the bidding stage.

TECHNICAL SPECIFICATIONS

Routes	• Section 1: Duarte – Manoguayabo • Section 2: Manoguayabo – Los Alcarrizos • Section 3: Los Alcarrizos – Los Americanos

Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	Km 9 Duarte Buenos Aires de Herrera Las Palmas Manoguayabo República de Colombia Los Alcarrizos Puente Blanco Los Americanos
	Power:	950 + 750 + 850 kW (approx.)
	Length:	12.8 km
	Cars or gondolas:	The number of cars or gondolas was not defined in the bidding documents but will be determined by the builder on the condition that the number is sufficient to achieve the required transit capacity.
	Speed and travel times:	Top speed: 7 m/s Travel time: 39 minutes (approx.)
	Carrying capacity:	4,500 passengers/hour/direction
Operations	**Operating hours:**	18 hours per day; closures of no more than 7 days per year for maintenance
	Fare:	• Not available
	Passengers:	• Not available
Links	**http://www.telefericosantodomingo.com/**	

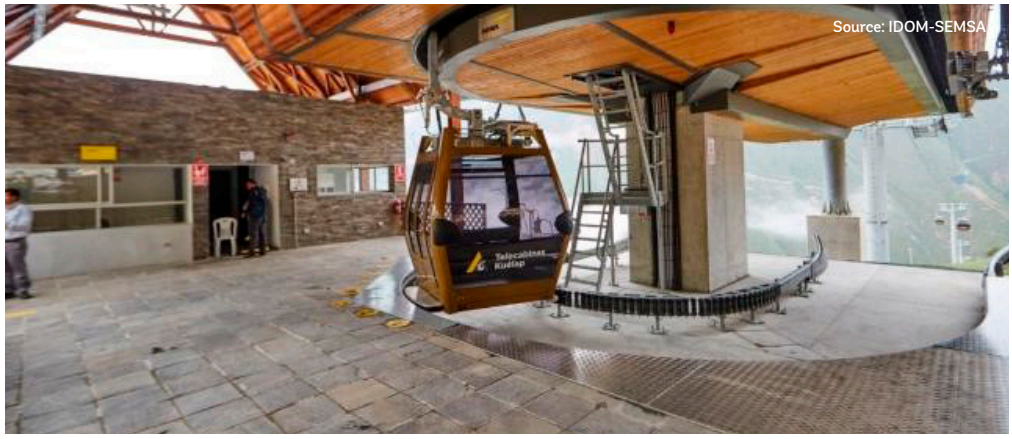
BUSINESS MODEL

Model for structuring the system's construction and operation	⊗ A) Construction, operation, and maintenance under private concession ○ B) Public works run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators
Engineering and installation of electromechanical equipment	At the bidding stage
Operator	For the first year, the system will be operated by the firm that builds the electromechanical equipment. The extension of that firm's operating contract for a further 10 years will be an option.

12. Telecabinas de Kuélap

PROJECT: KUÉLAP CABLE CAR SYSTEM, DISTRICT OF TINGO DE LUYA, AMAZONAS DEPARTMENT, PERU

PROJECT DESCRIPTION


Source: IDOM-SEMSA

The Kuélap cable car system is located near the town of Nuevo Tingo, about 38 km from the city of Chachapoyas in the Department of Amazonas in northern Peru. It opened on March 2, 2017.

This cable car provides access to the Kuélap Fortress, an important pre-Incan archaeological site that was built by the Chachapoyas people.

The construction of this system has greatly reduced the time it takes to reach this archaeological site, allowing visitors to take a 20-minute gondola ride rather than a three-hour hike or a 90-minute drive.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	US$17,893,192 (without the 18 percent VAT) (2017). This sum is being covered entirely by the Ministry of Foreign Trade and Tourism with monthly payments during the project's execution.
Estimated O&M costs	These costs will change over time and will increase by 9.31 percent from Year 10 on, since maintenance costs will rise as the system ages and parts need to be replaced. The cost is estimated at US$1.3 million during the early years of the project, with that sum climbing to US$1.8 million during the later years of the concession.

Route	2 stations: Tingo Nuevo – Parador de La Malca	
Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	2
	Power:	Not available
	Length:	4,031 m
	Cars or gondolas:	26 8-10 passenger units
	Speed and travel times:	Top speed: 6 m/s Travel time: 7.45 minutes + 4.12 minutes = 12 minutes (approx.) 26 8-10 passenger units
	Carrying capacity:	1,000 passengers/hour/direction
Operations	**Operating hours:**	Tues-Sun: 8:00 a.m. to 5:00 p.m. Closure for one week each year for annual maintenance.
	Fare:	• Under Fare: S/.21 (US$6.28) Mon-Thurs; Ch$ 2,700 (adult) (US$3.29); Ch$ 1,760 (child) (US$2.15).
	Passengers:	Over 100,000 passengers in 2017
Fare integration	• The fare covers the round-trip ride in the gondola lift and in the bus that runs from Nuevo Tingo to the lower gondola lift terminal. It does not cover entry to the archaeological site.	

Supplementary information

The Kuélap project is being cofinanced by a public-private partnership between the government agency ProInversión/Ministry of Foreign Trade and Tourism and the concessionaire, Telecabinas Kuélap S.A.

Under this cofinancing agreement, the Ministry of Foreign Trade and Tourism covers the full cost of the construction works (US$17,893,192 – without the 18 percent VAT) and the maintenance and operating costs, which will vary from year to year. (These costs are projected to rise by 9.31 percent from Year 10 on, since maintenance costs will increase as the system ages and parts need to be replaced.)

Meanwhile, the concessionaire Telecabinas Kuélap S.A. will be in charge of the design, construction, operation, and maintenance of the cable car and of the areas and services required in order for the system to function properly.

Telecabinas Kuélap S.A will charge the fares for the Kuélap cable cars and will also be paid for any shortfall between the projected operating expenses and proceeds from ticket sales by the Ministry of Foreign Trade and Tourism.

The cofinancing formula is as follows:

- Annual cofinancing = payment for works + payment for operation and maintenance – (proceeds from ticket sales + other complementary services).
- As may be seen from the above formula, the government will provide the cofinancing only if the sum in question is greater than zero.
- This is because the amount of cofinancing is determined by the proceeds from ticket sales, since those proceeds are deducted from the payments made by the Ministry to cover operating and maintenance expenses.
- A trust fund will administer the payments to be made to the concessionaire under the public-private partnership arrangement. All payments for construction costs and for maintenance and operating expenses will be deposited with the trust fund, as will the proceeds from the sale of tickets and other complementary services.
- The trust fund will make monthly payments to the concessionaire to cover construction costs and semi-annual payments to cover operating and maintenance expenses, less the proceeds from ticket sales.

Links **http://www.telecabinaskuelap.com/en/**

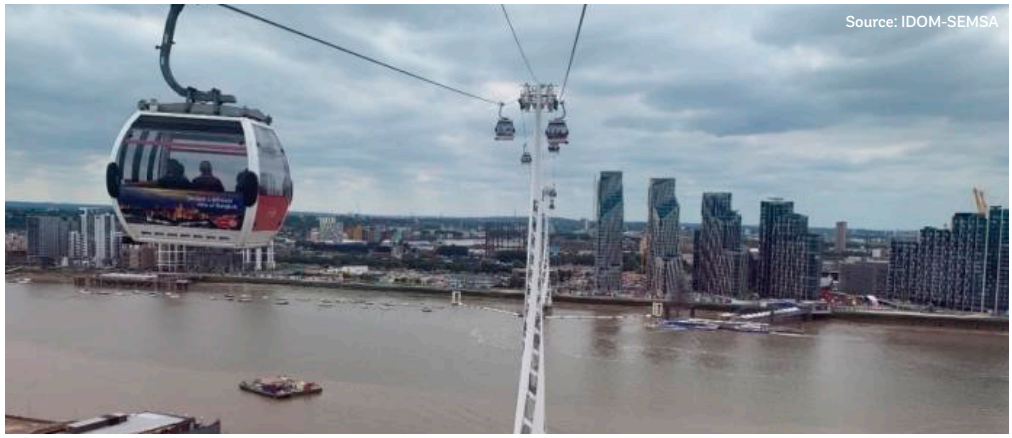
BUSINESS MODEL

Model for structuring the system's construction and operation	⊗ A) Construction, operation, and maintenance under private concession ○ B) Public works run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators **Additional information:** • A public-private partnership covers design services, financing, construction, operation, and maintenance of the cable car system for a period of 20 years, along with the maintenance of the road between Nuevo Tingo and the station where passengers will board. • Concessionaire: Telecabinas Kuélap S. A.
Engineering and installation of electromechanical equipment	Poma. Telecabinas Kuélap S.A. consortium: Ingenieros Civiles y Contratistas Generales S.A. (ICCGSA) (75 percent) and Poma S. A. (25 percent)
Operator	Telecabinas Kuélap, S.A.

13. Emirates Air Line, London

PROJECT: EMIRATES AIR LINE, LONDON, UNITED KINGDOM

PROJECT DESCRIPTION


Source: IDOM-SEMSA

The Emirates Air Line (also known as the "Thames cable car") is an aerial cable car that crosses over the Thames River in London, England. It was built by Doppelmayr with the sponsorship of Emirates Airlines.

The system was inaugurated on June 28, 2012 and is operated by Transport for London, a government body.

This cable car system serves both as a mode of urban transport and as a tourist attraction, thanks to the spectacular view of the cityscape that it affords from a height of over 80 meters as it crosses over the Thames River. During the 2012 Olympic Games in London, it also carried the athletes to the O_2 arena and ExCel centre.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	£60 million (US$74.5 million, 2012). Emirates Air Line provided US$36 million. L2: US$380 million
Estimated O&M costs	US$2.75 million/year
Route	2 stations: Royal Docks – North Greenwich

Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	2
	Power:	Not available
	Length:	1,103 m
	Cars or gondolas:	CWA gondolas: 34 10-passenger units
	Speed and travel times:	Top speed: 6 m/s Travel time: 3 minutes 10 seconds
	Carrying capacity:	2,500 passengers/hour/direction
	Other: The system has five pylons along the line. Those close to a station are a conventional type of double pylon. The three intermediate pylons have a remarkable design. They are metal towers that house a spiral staircase for use in evacuations and maintenance. The upper portions support 3 (T1) and 2 (T2) units.	
Operations	**Operating hours:**	Mon–Fri: 7:00 a.m. to 9:00 p.m. Sat: 8:00 a.m. to 9:00 p.m. Sundays and holidays: 9:00 a.m. to 9:00 p.m.
	Fare:	• Adult – one-way: £4.50 (US$5.50) • Adult – Oyster/Travelcard: £3.50 (US$4.20) • Adult – frequent traveler: £17.00/10 trips (US$20.80) • Child: £2.30 (US$2.80) • Child – Oyster/Travelcard: £1.70 (US$2.08)
	Passengers:	• 2019 (December 29, 2018 to January 3, 2020): 1,317,154 passengers
Fare integration	• The Emirates Air Line is integrated with the Transport for London system, and Travelcards and Oyster cards are accepted.	
Links	**https://tfl.gov.uk/modes/emirates-air-line/**	

BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ⊗ B) Public works run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators
Engineering and installation of electromechanical equipment	Doppelmayr
Operator	Transport for London

14. Yenimahalle

PROJECT: YENIMAHALLE CABLE CAR SYSTEM, ANKARA, TURKEY

PROJECT DESCRIPTION


Source: IDOM-SEMSA

This system, which opened in the spring of 2014, links up a hillside urban district with the city's public transportation network. Yenimahalle Station connects with Line 1 of the Turkish capital's metro system.

This gondola ropeway system is a highly satisfactory solution for this densely populated urban area, as it passes over the narrow, steep streets of the intervening residential areas.
The system is composed of three sections and two intermediate stations that allow the cable car to follow an angular path so that various points along the route can be served.

The system is made up of two different loops that meet at the TRT Station, where passengers can transfer from one to the other. This is the station that houses the drives for both loops and the maintenance garage.

Thanks to this cable car connection between the Şentepe district and the Yenimahalle metro station, traffic in this urban area and emissions have both been reduced considerably.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	US$30.4 million (2014)
Estimated O&M costs	Not available
Route	4 stations: Yenimahalle – Yunus Emre – TRT – Şentepe Merkezi

Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	4
	Power:	440 + 700 kW
	Length:	3,257 m
	Cars or gondolas:	106 10-passenger units
	Speed and travel times:	Top speed: 6 m/s Travel time: 9 minutes 12 seconds
	Carrying capacity:	2,400 passengers/hour/direction
Operations	**Operating hours:**	6:00 a.m. to 11 p.m. every day of the year
	Fare:	• TRY 1 (US$0.15)
	Passengers:	• 250,000 passengers/month
Fare integration	• Passengers who transfer to the metro must pay an additional TRY 1.50 (US$0.22) or, if they have a discount card, TRY 0.75 (US$0.11).	
Links	**https://www.leitner-ropeways.com/es/empresa/referencias/detail/gd10-yenimahalle-i-ii/**	

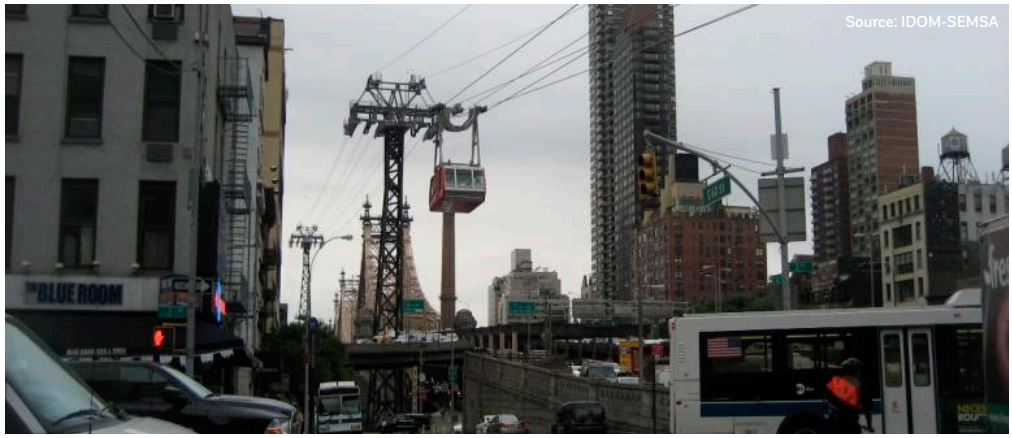
BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ⊗ B) Public works run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators
Engineering and installation of electromechanical equipment	Leitner
Operator	Ankara Electricity, Gas, and Bus Operations Organization (EGO General Directorate)

15. Roosevelt Island Tramway

PROJECT: ROOSEVELT ISLAND TRAMWAY, NEW YORK, UNITED STATES

PROJECT DESCRIPTION



This cable car spans the East River to connect Roosevelt Island with Manhattan. It was built in 1976 and completely overhauled in 2010.

As part of the 2010 renovation, the system was converted into a dual-haul system with two support cables and one haul cable that allow the new tram cables and cars to operate independently of one another, thereby ensuring that part of the system will still be operable if one of the two ropeways is out of service.

Because of the technology used in this system, there are only two large-capacity (110 passengers) cars. These cars carry 1,200 passengers/hour/direction.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	The construction of the system in 1976 cost US$5 million. The 2010 renovation cost US$25 million. The entire system, with the exception of the pylons, was overhauled and outfitted so that each line can function independently of the other.
Estimated O&M costs	The operator is paid a fixed sum of US$4,100,000 with an annual 3 percent adjustment. An additional contract covers advisory services for repairs and maintenance at US$180–US$260 per hour and an annual minimum of US$50,000. For FY 2019 (to March), the sum paid under that contract was US$66,000.
Route	2 stations: Manhattan; Roosevelt Island

Technical features	**Technology:**	Aerial cable cars with two independent ropeways (two support cables and one haul cable in each direction)
	Number of stations:	2
	Power:	2 x 500 kW
	Length:	960 m
	Cars or gondolas:	2 110-passenger cars
	Speed and travel times:	Top speed: 8 m/s Travel time: 2 minutes 50 seconds
	Carrying capacity:	1,200 passengers/hour/direction
Operations	**Operating hours:**	20 hours/day (21 hours 30 minutes on weekends), 365 days/year
	Fare:	• One-way fare: US$2.75 (same fare as for the subway) • Reduced fares for weekly and monthly passes, for persons with reduced mobility, etc.
	Passengers:	• Over 26 million passengers since 1976 (1.5 million persons/year)
Fare integration	• The cable car is integrated with the mass transit system of New York City. Only MetroCards are accepted.	
Links	**https://rioc.ny.gov/302/Tram**	

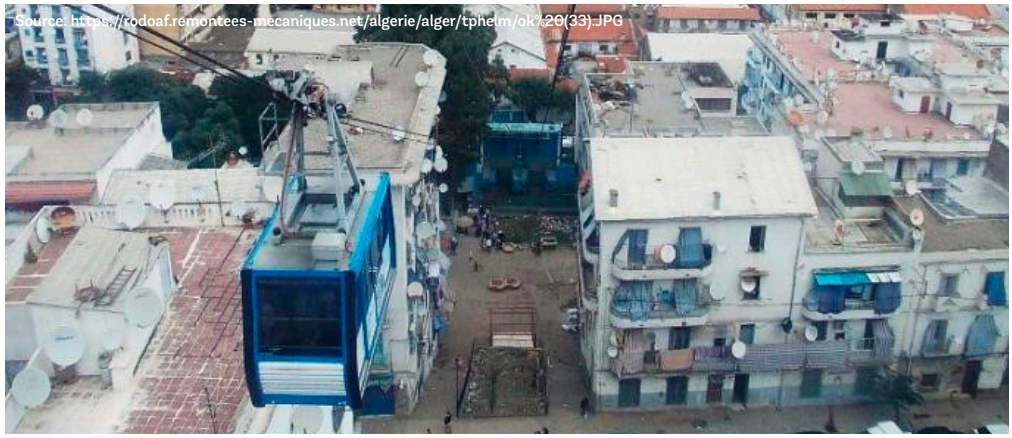
BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ○ B) Public works run by public operators ⊗ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators
Engineering and installation of electromechanical equipment	Von Roll / Poma
Operator	Leitner-Poma of America is under contract to the Roosevelt Island Operation Corporation of New York. The contract has a term of 5 years. The initial contract was signed in 2010 and renewed in 2017.

16. Téléphériques d'Alger

PROJECT: ALGIERS CABLE CAR SYSTEM, ALGIERS, ALGERIA

PROJECT DESCRIPTION



This aerial cable car is a highly suitable mode of transportation for Algiers, which straddles lowland and highland areas.

The first tram line was opened in 1956 but was overhauled in 2000 by the Algiers Urban and Suburban Transport Company (ETUSA) and Poma. The city currently has six cable car lines in operation.

The first four lines have one haul cable, one support cable, and two cabins with standing room for 35 passengers plus a cabin for the operator.

The last two lines use a monocable detachable lift technology and have a larger number of smaller cabins. This configuration provides a greater carrying capacity and permits the construction of intermediate stations.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	L1: €2.5 million (US$3.5 million) (fully renovated: 2007/2008) L2: €2.5 million (US$3.5 million) (fully renovated: 2007/2008) L3: €2.9 million (US$4.06 million) (fully renovated: 2007) L4: €2.5 million (US$3.5 million) (fully renovated: 2007/2008) L5: DA 2.5 billion (US$31 million in 2014) L6: DA 2 billion (2014 contract equivalent to US$24.9 million)

Estimated O&M costs	Not available	
Routes	L1: El Madania aerial cable car (1956, overhauled in 1982 and in 2007/2008). Stations: Hamma – El-Madania L2: Memorial aerial cable car (1987, overhauled in 2007/2008) Stations: Jardin d'essai – Mémorial du Martyr. L3: Palais de la Culture aerial cable car (1987, overhauled in 2007) Stations: El-Anasser – Palais de la Culture L4: Notre Dame d'Afrique aerial cable car (1984, overhauled in 2007/2008). Stations: Bologhine – Basilique de Notre Dame d'Afrique L5: Oued Koriche-Bouzareah gondola lift (2014). Stations: Oued Koriche – Frais Vallon – Bouzareah L6: Bab El Oued gondola lift (2019). Stations: Bab El Oued – Celeste – Z'Ghara	
Technical features	**Technology:**	Lines 1, 2, 3, 4: Aerial tram with 1 haul cable and 1 support cable Lines 5, 6: Monocable detachable gondola lift
	Number of stations:	Lines 1,2,3,4: 2 Lines 5,6: 3
	Power:	L1: 160 kW L2: 160 kW L3: 160 kW L4: 160 kW
	Length:	L1: 236 m L2: 260 m L3: 404 m L4: 268 m L5: 2,908 m L6: 2,025 m
	Cars or gondolas:	L1,2,3,4: Two cars with standing room for 35 passengers plus a cabin for the operator L5: 57 gondolas with room for 10–15 persons L6: 66 gondolas with room for 10 persons
	Speed and travel times:	Top speed: L1: 6 m/s Travel time: L1: 1 minute 30 seconds Top speed: L2: 5 m/s Travel time: L2: 1 minute 30 seconds Top speed: L3: 6 m/s Travel time: L3: 2 minutes Top speed: L4: 6 m/s Travel time: L4: 2 minutes Top speed: L5: 6 m/s Travel time: L5: 12 minutes Top speed: L6: 5.5 m/s Travel time: L6: 7 minutes

Carrying capacity	L1: 1,400 L2: 1,050 L3: 1,155 L4: 1,050 L5: 2,400 L6: 2,400	
Operations	**Operating hours:**	Lines 1,2,5: 6:00 a.m. to 7:00 p.m. every day Lines 3,4: 6:00 a.m. to 7:00 p.m. except Fridays (closed) Line 6: 6:00 a.m. to 7:00 p.m. except Friday: 7:30 a.m. to 7:00 p.m.
	Fare:	• Lines 1,2,4: DA 20 (US$0.16) • Lines 3,5,6: DA 30 (US$0.23)
	Passengers:	• L1: 1 million passengers/year • L5: 180,000–200,000 passengers/month
Fare integration	• Since 2017 a single type of pass is used for all modes of transportation in the city (metro, tram, train, bus) operated by ETUSA.	

BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ⊗ B) Public works run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators
Engineering and installation of electromechanical equipment	Lines 1, 2, 3, 4, and 6: Poma Line 5: Doppelmayr
Operator	Operated and maintained by the Algerian Transport Company (ETAC), owned by: Poma: 49 percent ETUSA: 41 percent Algerian Metro Company (EMA): 10 percent

17. Téléphérique des Capucins

PROJECT: CAPUCINS CABLE CAR SYSTEM, BREST, FRANCE

PROJECT DESCRIPTION

Source: https://upload.wikimedia.org/wikipedia/commons/a/a3/Telepherique-Brest-fin-Sept-16-2.jpgz

The urban aerial cable-propelled system in Brest has been in operation since 2016. It connects the two shores of the Penfeld River in order to provide a transport link between the Siam and Capucins districts.

The Capucins (Capuchin monks) district is located on the right bank of the Penfeld River and was once the site of the French Navy's shipyards. After a naval base was established in Toulon, the Brest shipyards were used to build submarines. The yards in Capucins were then closed in 1990, and in 2010 they were bought by the City of Brest, which is now carrying out urban renewal projects there. Since 2010, those projects have included numerous residential dwellings, car parks, movie theaters, shopping centers, restaurants, etc. The redevelopment of the area has brought to light the insufficiency of the transportation routes between this neighborhood and the rest of Brest, however. The associated problems include traffic congestion, deficient public transportation services (the existing tram line does not pass near the area in Capucins that is now being developed, bus routes pass through but have no stops in the area) and so forth.

The authorities therefore considered a range of possible solutions, including the options of building a floating bridge or a third "regular" bridge over the Penfeld River. In the end, however, they decided to build a gondola system, which would cost less, provide a rapid and direct link, would not interfere with road traffic, and would be comfortable and quiet. It is France's first entirely urban cable-propelled transit (CPT) system (the Grenoble cable cars are primarily used for tourism). The system has a carrying capacity of 1,220 passengers per hour at a maximum speed of 7.5 meters per second and allows passengers to cross the Penfield River in approximately 1 minute 30 seconds.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	€19.1 million (US$21.2 million, 2016)	
Estimated O&M costs	Not available	
Route	Two stations: Jean Moulin – Ateliers des Capucins	
Technical features	**Technology:**	"Leapfrog" technology that is a cross between Funitel and 3S technologies (each car rests on two 50-mm support cables and is pulled by one 25-mm haul cable)
	Number of stations:	2
	Power:	2 redundant engines of 220 kW each
	Length:	420 m
	Cars or gondolas:	2 60-person cars with seating for 11, half-seating or foldable seats for 7, and standing room for the rest
	Speed and travel times:	Top speed: 7.5 m/s Travel time: 1 minute 30 seconds at top speed Top speed: 6 m/s
	Carrying capacity:	1,200 passengers/hour/direction
	Other: There is an 80-meter pylon.	
Operations	**Operating hours:**	Open all year (except for 7 days/year when it will be closed for maintenance)
	Fare:	€1.60 one way (US$1.76) and €2.00 (US$22) round trip. There are also other fares for the Bibus network (day passes, group fares, 10-trip, weekly, and monthly passes, etc.).
	Passengers:	As of November 2018, the system had carried 1.35 million passengers since its inauguration two years earlier, for an average of 650,000 passengers/year.
Fare integration	• The system is integrated with Brest's mass transit network (Bibus) and is identified as Line C of the Bibus network.	

BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ○ B) Public works run by public operators ⊗ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators
Engineering and installation of electromechanical equipment	BMF-Bartholet
Operator	Line C has been operated by RD Brest (RATP Dev) as part of the Bibus network since July 1, 2019.

18. Téléphérique de Toulouse (Téléo)

PROJECT: TÉLEO URBAN CABLE CAR SYSTEM IN SOUTHERN TOULOUSE, FRANCE

PROJECT DESCRIPTION

3D mock-up of the Oncopole Station (Tisséo Ingenierie) Source: https://france3-regions.francetvinfo.fr/occitanie/sites/regions_france3/files/styles/asset_list_medium/public/assets/images/2019/09/30/telepherique_oncopole_ok-4447265.jpg?itok=NNFiL-Gc

This cable car system, which is currently under construction, will link the Oncopole (a cancer research center with some 10,000 employees) with Paul Sabatier University (30,000 students), with an intermediate stop at the Rangueil Hospital (200,000 visits per year). The cable car line will cross the Garonne River and Pech-David Hill, cutting travel time from 30 to 10 minutes.

The route of this cable car line is 3 km in length, and the line will have a carrying capacity of 1,500 passengers/hour/direction. It will use a tri-cable detachable gondola (3S) technology that is common at ski resorts but whose use in an urban environment represents an innovation.

The choice of this technology came about because the bidding documents (which included both construction and operation) did not specify which technology was to be used but instead simply stipulated the requisite carrying capacity (along with other requirements regarding the route, the location of stations, etc.). The firm that was ultimately awarded the contract proposed this 3S technology because it meets the requirements of the bid and will, in the firm's view, entail lower maintenance costs over the years.

The system was supposed to enter into operation in late 2020 but will now not open until 2021 as a consequence of the COVID-19 pandemic.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	€54.60 million (US$60 million) (net of taxes – price of the project) The quoted price has been updated to €82.41 million (US$90.6 million as of 2020), which includes the project, supporting works and operations, and management. Of that sum, €11.8 million (US$12.9 million) is to be financed by subsidies and €70.61 million (US$77.6 million) is to be covered by Tisséo Collectivités (the public transit network of Toulouse).

Estimated O&M costs	€38.2 million (US$42 million, 2020) net of taxes (over 20 years)	
Route	Three stations: Oncopole – Rangueil Hospital – Paul Sabatier University	
Technical features	**Technology:**	Tri-cable detachable gondola (3S) technology
	Number of stations:	3
	Power:	Not available
	Length:	3 km
	Cars or gondolas:	15 cars with room for 34 passengers (seating for half that number)
	Speed and travel times:	Top speed: 20 km/h (5.5 m/s) Travel time: 10 minutes
	Carrying capacity:	1,500 passengers/hour/direction
	Other:	5 pylons with a maximum height of 70 m
Operations	**Operating hours:**	5:00 a.m. to 12:30 a.m.
	Fare:	€1.70 (US$1.87)
	Passengers:	Not available
Fare integration	• This route will connect with the Line 5 bus (at the Oncopole Station) and with Toulouse metro Line B Université Paul Sabatier Station. The three stations will also have connections to public bus lines. The same ticket or pass will be used for the cable car system, the metro, and buses.	
Link	**https://tisseo-collectivites.fr/projets/teleo**	

BUSINESS MODEL

Model for structuring the system's construction and operation	⊗ A) Construction, operation, and maintenance under private concession ○ B) Public works run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators **Additional information:** • The contract is for 20 years.
Engineering and installation of electromechanical equipment	Poma
Operator	Poma

19. MioCable

PROJECT: MIOCABLE, CALI, COLOMBIA

PROJECT DESCRIPTION

Source: https://rodoaf.remontees-mecaniques.net/colombie/cali/tcd8mio/ok%20(171).JPG

Cali is the third city in Colombia (after Medellín and Manizales) to introduce an aerial cable car system as part of its urban mass transit network.

MioCable, which opened in 2015, is an urban cable car route that connects Siloé, one of the poorest districts in Cali, to the Cañaveralejo urban bus station.

It currently has a carrying capacity of 2,000 passengers/hour/direction (60 cars), but the fleet could be expanded to 90 cars, which would boost its carrying capacity to 3,000 passengers/hour/direction. Starting from the Cañaveralejo Terminal, passengers on the nearly 2.8-km line can stop at two stations along the way—Tierra Blanca and Lleras Camargo—before reaching the end of the line at Brisas de Mayo.

In view of the experience gained by Manizales with cable-propelled transport since 2009, Metro Cali S.A. has contracted Cable Aéreo Manizales to operate and maintain the system.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	US$42.3 million (2015): - Col$98 billion (US$31.7 million) - Col$33 billion for ancillary facilities (paths and lighting) (US$10.6 million)
Estimated O&M costs	Col$13.5 billion per year (US$3.37 million, 2015)

Routes	Four stations: Terminal Cañaveralejo – Tierra Blanca – Lleras Camargo – Brisas de Mayo	
Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	4
	Power:	453 kW
	Length:	2,790 km
	Cars or gondolas:	60 units initially, to be expanded to 90 units, with room for 10 persons (seating for 8 persons and standing room for 2)
	Speed and travel times:	Top speed: 5 m/s Travel time: 10 minutes
	Carrying capacity:	Initial: 2,000 passengers/hour/direction Final: 3,000 passengers/hour/direction
	Other:	Not available
Operations	**Operating hours:**	Mon-Sat: 5:00 a.m. to 11 p.m. Sundays and holidays: 6:00 a.m. to 10:00 p.m.
	Fare:	• Col$2,200 (US$0.55).
	Passengers:	• 5,000–7,000 passengers/day • 6 million passengers in the first three years
Fare integration	• MioCable is an integral part of the MIO system, which it links up with at the Cañaveralejo Terminal. The fare is the same as the bus fare. • The MIO smart card is used to travel anywhere within the MIO transit system.	
Links	**http://www.mio.com.co/index.php/miocable.html**	

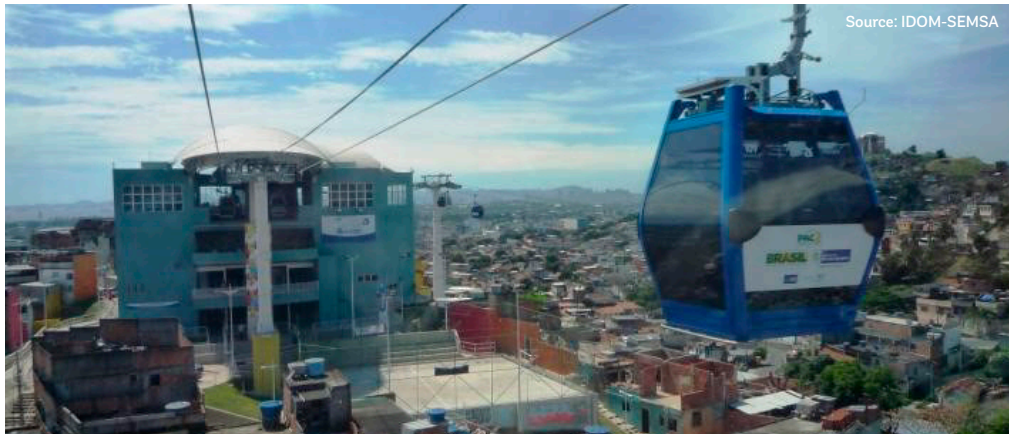
BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ⊗ B) Public works run by public operators ○ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators **Additional information:** • Although it is run by a government-owned company, recent problems that led to the temporary suspension of the system's operations have prompted the Mayor of Cali to announce that a tender will be prepared for a new private operator.
Engineering and installation of electromechanical equipment	Leitner
Operator	Metro Cali S.A. Operation and maintenance are contracted out to Cable Aéreo Manizales

20. Teleférico do Complexo do Alemão

PROJECT: ALEMÃO CABLE CAR SYSTEM, RIO DE JANEIRO, BRAZIL

PROJECT DESCRIPTION


Source: IDOM-SEMSA

In operation between July 2011 and October 2016, this cable car system served the communities of the Complexo do Alemão in northern Rio de Janeiro.

The system had six stations along a route of approximately 3.5 km in length and a carrying capacity of 2,800 passengers/hour/direction.

The Alemão cable car has been out of service since September 2016. At first the plan was to close the system down temporarily for maintenance, but eventually it was closed permanently because the government was unable to keep up payments to the operator, Consórcio Rio Teleféricos.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	R$210 million (US$135.5 million at the 2011 exchange rate) and £60 million (US$74.5 million, 2012); Emirates Air Line provided US$36 million in financing.
Estimated O&M costs	SuperVia: R$3.3 million/month (US$2.1 million) Consórcio Rio Teleféricos: R$2.7 million/month (US$1.7 million)
Routes	Section 1: Bonsucesso – Adeus – Baiana Section 2: Baiana – Alemão – Itararé – Palmeiras

Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	6
	Power:	Section 1: 2 x 630 kW Section 2: 2 x 630 kW
	Length:	3,460 passengers/hour/direction
	Cars or gondolas:	152 units with seating for 8 persons and standing room for 2
	Speed and travel times:	Top speed: 5 m/s Travel time: 17 minutes
	Carrying capacity:	2,800 passengers/hour/direction
	Other:	Not available
Operations	**Operating hours:**	Mon-Sat: 6:00 a.m. to 9:00 p.m. Sundays and holidays: 8:00 a.m. to 8:00 p.m.
	Fare:	• Residents: Two trips free of charge per day and additional trips at R$1 (US$0.19) Non-residents: R$5 (US$0.95) / €1.70 (US$1.87)
	Passengers:	• 10,000 passengers/day
Fare integration	• The gondolas were integrated with the train system. Users paid only the train fare of R$3.3 (US$0.63).	
Additional information	On September 15, 2016, the State Secretariat for Transport (SETRANS) announced that the gondolas would be out of service for six months for maintenance (particularly for the maintenance of one of the system's two haul cables). On October 14, 2016, however, the system was closed down because the government had failed to keep up its payments to the Consórcio Rio Teleféricos. Facing a financial crisis, the government confirmed that it did not have the resources to pay the consortium and that it would instead place priority on paying the country's civil servants. The system cost R$2 million in subsidies each month. Given that the system carried 300,000 passengers per month, that works out to a subsidy of R$6.70 per ticket. This is 2.4 times as much as the municipal bus fare in Rio de Janeiro (R$2.75) and 2.2 times as much as the metro (R$3.10), all of which have longer routes and carry more passengers.	
Links	**http://www.jauregui.arq.br/teleferico.html**	

BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ○ B) Public works run by public operators ⊗ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators
Engineering and installation of electromechanical equipment	BMF-Bartholet
Operator	The operation and maintenance works began in July 2011 under an experimental contract with SuperVía, the concession holder for the operation of urban trains in Rio de Janeiro. According to SETRANS, the concession was awarded on an experimental basis without a bidding process having been conducted because there was no model that could be used as a basis for a concession of public aerial cable car passenger services. The contract had an initial term of 12 months but was then extended on four different occasions for periods of differing lengths until March 2016 for a total operating period of 3.5 years. During that time, the State conducted studies to lay the groundwork for the development of a regulatory framework and viable model for the concession process. As a result, in October 2016 an operating concession for the system was awarded on the basis of a tender to the Rio Teleféricos consortium, composed of Hanover and Providencia Teleféricos. A service agreement model was used for the concession at that time. The Alemão aerial cable car system has been out of service since September of that year. It was initially shut down temporarily for maintenance but, eight months later, operations were permanently shut down owing to the State's failure to make the required payments to the concession holder.

21. Teleférico da Providência

PROJECT: PROVIDÊNCIA CABLE CAR SYSTEM, RIO DE JANEIRO, BRAZIL

PROJECT DESCRIPTION


Source: https://rodoaf.remontees-mecaniques.net/bresil/tcd8pro/ok%20(35).JPG

This cable car system was built in 2012 and 2013 and was officially inaugurated on July 2, 2014. The start-up of the system was delayed because the government had difficulty finding a company that was willing to run it. Eventually, the Urban Development Company of the Rio de Janeiro Port Region, a public sector company attached to the municipality, took over responsibility for its operation.

This system connects one of Rio de Janeiro's largest slum areas (Providência) to Central Station in the City of Rio de Janeiro (the biggest train station, which also has connections to the metro system and bus station).

At Gamboa Station, passengers can transfer to the Providência stop of the Carioca light rail system.

This cable car line has been out of service since December 17, 2016. As in the case of the Alemão cable car, its closure was due to the lack of necessary funds for the system's maintenance. There are plans to issue a call for bids in order to find a new operator for the system.

TECHNICAL SPECIFICATIONS

Estimated cost of construction	R$75 million (US$33.2 million, 2014)
Estimated O&M costs	Maintenance costs are currently R$1.4 million/month (US$0.62 million, 2014)
Route	Three stations: Central Station – Américo Brum – Gamboa Station

Technical features	**Technology:**	Monocable detachable gondola lift
	Number of stations:	3
	Power:	Not available
	Length:	721 m
	Cars or gondolas:	16 units with seating for 8 and standing room for 2
	Speed and travel times:	Top speed: 5 m/s Travel time: 3 minutes 30 seconds
	Carrying capacity:	1,000 passengers/hour/direction
Operations	**Operating hours:**	Mon–Fri: 7:00 a.m. to 7:00 p.m. Sat: 8:00 a.m. to 2:00 p.m.
	Fare:	No charge
	Passengers:	Not available
Fare integration	• Use of the system is free of charge. The line connects with Central Station in the City of Rio de Janeiro at one end and, at the other (Gamboa Station), passengers can change to the Providência stop on the Carioca light rail system.	

BUSINESS MODEL

Model for structuring the system's construction and operation	○ A) Construction, operation, and maintenance under private concession ○ B) Public works run by public operators ⊗ C) Design, construction, and start-up by government agencies (public turnkey project) but run by private operators **Additional information:** • The operation of the system is subsidized by the government under the Accelerating Growth Program (PAC).
Engineering and installation of electromechanical equipment	Doppelmayr
Operator	Porto Novo was the first concessionaire and operator of the cable car line. The Urban Development Company of the Rio de Janeiro Port Region (CDURP), a public sector company attached to the municipality, is planning to issue a call for bids in order to find a new operator.

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