A B2B MAGAZINE FROM SI SEILBAHNEN INTERNATIONAL, NO. 2 | 2025
OFFICIAL MEDIA PARTNER OF THE CABLE CAR WORLD CONGRESS & TRADE FAIR

SEILBAHNEN INTERNATIONAL

THE URBAN CABLE TRANSPORT MAGAZINE

URBAN

CABIN & TECHNOLOGY

HOW MODERN IS THE ZURICH CABLE CAR?

INDIA & SOUTH AMERICA

WHERE ARE URBAN CABLE CARS PLANNED?

TRANSPORT CAPACITY & ADJUSTMENT SCREWS

HOW MUCH CAN THE CABLE CAR HANDLE?

PHOTO: STEFAN KUERZI

BEND IT LIKE CURVO

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Non-Linear Ropeway Technology

The Future of Urban Mobility

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CURVO by CRS

Elevating the Future of Urban Mobility

The Future Rises

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CURVO a breakthrough in Ropeway innovation

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CURVO™ represents more than technology - it is a revolution in urban mobility, built in India for cities worldwide.

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SCAN ME

EDITORIAL

Gerald Pichlmair, Publisher SI Urban

INTERALPIN
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MEDIA PARTNER
CABLE CAR WORLD

THE CABLE CAR DOESN'T FLOAT ALONE; IT IS PART OF URBAN LIFE.

Whether in Latin America, Europe, North Africa, or India, urban cable cars are currently being built on almost every (sub)continent – or at least planned. At the start of this issue, we provide an overview of the hottest projects. The development in India is particularly impressive – here, a four-billion-US-dollar master plan aims to establish cable cars as a key mode of transport.

It is important not to view the cable car in isolation. It is not always the right solution, but often it fills exactly the gaps that other modes of transport cannot. A multimodal transport mix with interconnected carriers is the gold standard in urban mobility, as transport researcher Claudio **Büchel** emphasizes in an article in this issue.

So the cable car does not float alone; it is part of urban life. This is particularly evident in South America, where cable cars enhance marginalized neighborhoods on multiple levels and improve the lives of many people. Our interviews with Claudia **Díaz,** Secretary of Mobility of Colombia's capital Bogotá, and Juan Carlos **Muñoz**, Chile's Minister of Transport, clearly demonstrate this. Urban cable cars thus contribute to greater equity – they are a democratic mode of transport.

What else they can achieve, how the supply industry can help, and what ideas and plans exist worldwide – you can read all of this in this issue!

DATES

March, 3rd – 5th, 2026
IT-Trans, Karlsruhe (GER)

March, 10th – 13th, 2026
Intertraffic, Amsterdam (NL)

April, 21st – 23th, 2026
UITP Summit 2026, Dubai (UAI)

April, 21st – 23th, 2026
Mountain Planet, Grenoble (FR)

June, 09th – 10th, 2026
Cable Car World, Essen (GER)

September, 22th – 25th, 2026
InnoTrans, Berlin (GER)

IMPRINT

Seilbahnen International Verlag GmbH, Straß 21, A-5301 Eugendorf; **Tel.:** +43(0)6225/7290 (Fax-14); **E-Mail**: office@simagazin.com; **Internet:** siurban.com; **Editor:** Gerald Pichlmair; **Administration:** Sandra Rottner; **Sales:** Laurin Strolz; **Editors:** Thomas Surrer (ts), Ekaterina Zakharova (ez); **Printing:** Druckerei Roser Ges.m.b.H., Mayrwiesstraße 23, A-5300 Hallwang / Salzburg Tel.: +43 (0) 662 / 66 17 37, **Publication in accordance with the media law:** simagazin.com/impressum; **Underlying concept of the medium:** "SI Urban" is an impartial, international specialist journal for urban cable cars and sustainable urban mobility. **Frontpage:** DOPPELMAYR/Federleicht

website **newsletter** **subscription**

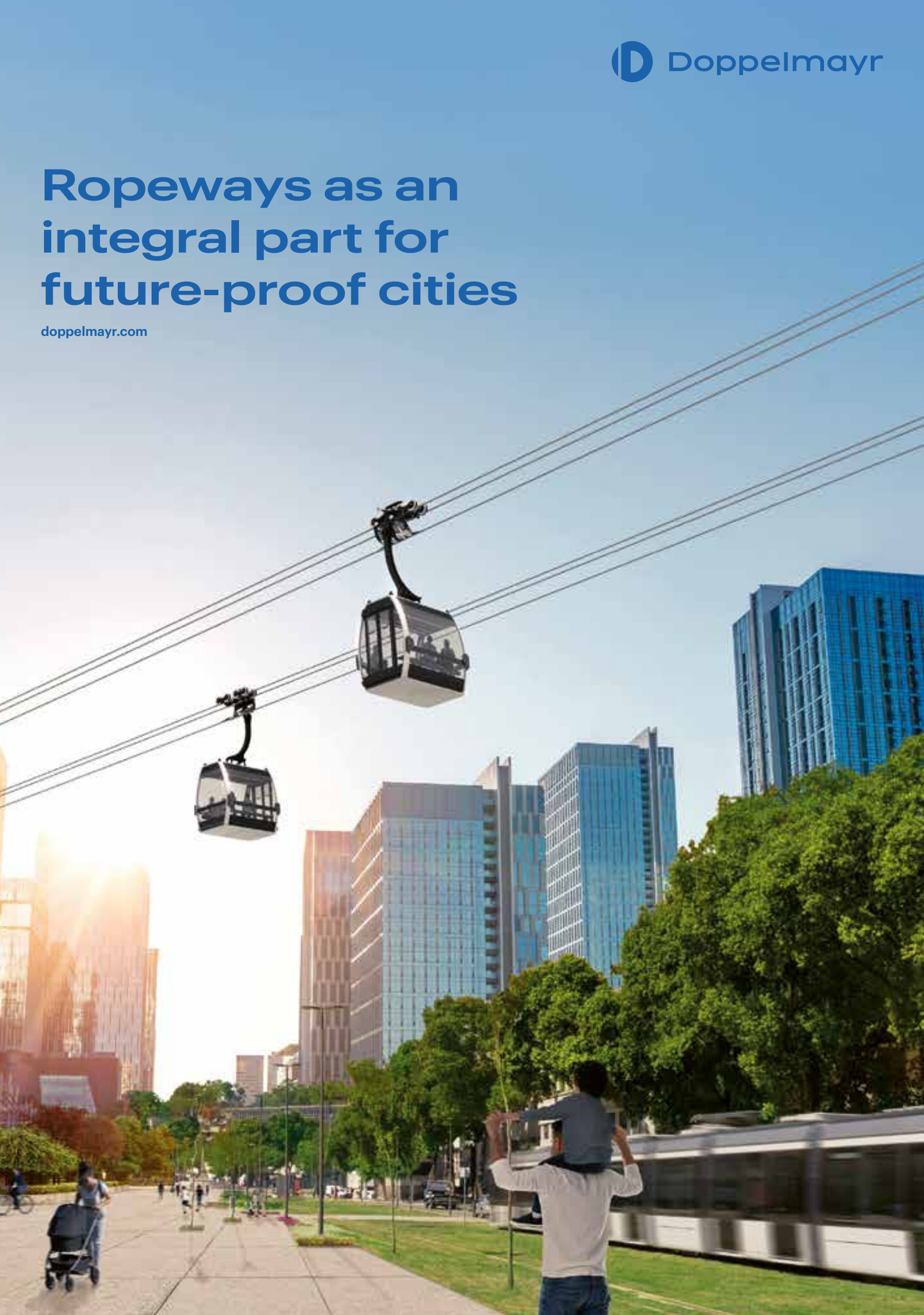
201920025
PRINTED IN AUSTRIA

Printed in accordance with the Austrian ecolabel "printed products" directive. Druckerei Roser Gesellschaft m.b.H., UW no. 1037

Doppelmayr

Ropeways as an integral part for future-proof cities

doppelmayr.com



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CABLE CAR PLANS

CABLE CAR & SOCIETY

CABLE CAR & ECONOMY

CABLE CAR & ENVIRONMENT

A TRINATIONAL CABLE CAR?

URBAN LINE UNDER DISCUSSION BETWEEN PARAGUAY, ARGENTINA, AND BRAZIL

Two international companies expressed interest in developing this project and offered their services for the construction of the 25-kilometer-long cable car.

The governments of Paraguay, Argentina, and Brazil are discussing an urban cable car between the three countries. © Pexels

Paraguay, Brazil, and Argentina launch a major integration project at the Triple Border. It includes measures to promote trade flows, new infrastructure initiatives, and logistical innovations. The countries' representatives reported this during a special session of the Trinational Development Commission (CODETRI). The meeting focused on the necessary measures to prepare for the opening of the integration bridge between cities Franco (Paraguay), and Foz (Brazil). Thousands of large trucks are expected to cross this bridge daily, making appropriate infrastructure and fast customs and immigration services on both sides essential. During the meeting, officials also discussed a trinational cable car over the Iguazú and Paraná rivers, which would connect Foz do Iguaçu (Brazil), Ciudad del Este and Presidente Franco (Paraguay), and Puerto Iguazú (Argentina).

Manufacturers express interest

Two companies expressed interest in developing this project and offered their services for the construction of the 25-kilometer-long cable car. One of the companies cited the cable car in La Paz, Bolivia, as an example, noting that it features state-of-the-art technology and performance in an urban environment.

Project long on the table

Efforts to realize the project have been ongoing since 2018 but have been delayed by bureaucracy and the coronavirus pandemic. The project aims to develop the region strategically, but making the cable car a reality will require the three governments to coordinate customs and immigration services.

If realized, the cable car would also be a tourist attraction, offering visitors a panoramic view of the Three Borders landmark, where Paraguay, Argentina, and Brazil meet.

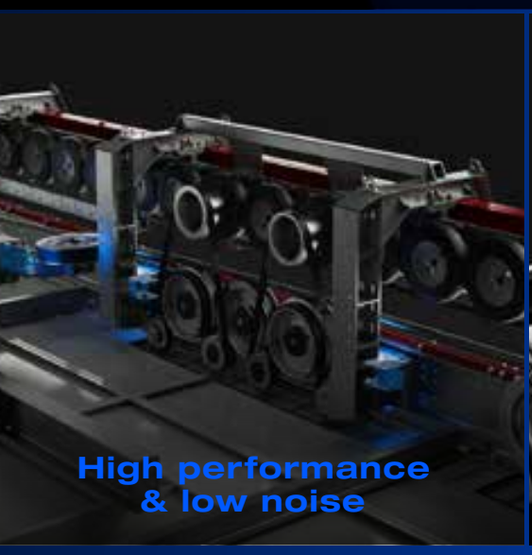
In addition, the cable car would increase tourism in Paraguay, as the Iguazú Falls – located just 20 kilometers from the border between the Brazilian and Argentine national parks – receive over one million visitors each year, only a very small percentage of whom cross into Paraguay.

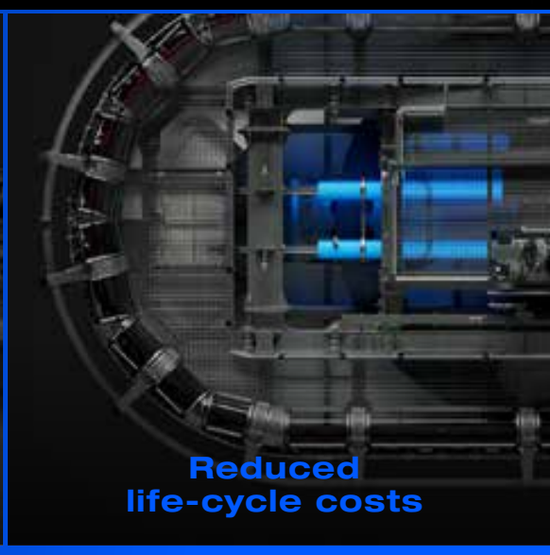
The construction of a cable car has been proposed between four cities.

The cable car is intended to strengthen strategic relations between the countries.

ROPERA®

Efficient & sustainable design





At LEITNER, we strive to be innovation leaders in our daily work and to create the most efficient, sustainable, and user-friendly ropeway solutions. Our many years of experience, continuous research and development work, and close collaboration with our customers were the prerequisites for developing the new ropeway standard **ROPERA®**.

leitner.com/ropera

LEITNER®

TIZI OUZOU

CABLE CAR BY POMA – THE SECOND ONE

The TIZI II cable car from POMA is scheduled to start operation in 2026. © POMA

The urban cable car of the Algerian city of Tizi Ouzou has proven exemplary reliability of 98 percent since 2020 and carries more than 3.7 million passengers per year without serious incidents. Now, the line is being expanded with two additional sections: the French manufacturer POMA is currently constructing the "Tizi II" 10-seater gondola lift.

Since 2020, the TIZI I gondola lift by POMA has been gliding over the dense infrastructure, narrow streets, and steep topography of the Algerian city of Tizi Ouzou. The 2.4-kilometer 10-seater cable car connects the intermodal station (bus and train) with the university, the stadium, and the regional government headquarters. It links the neighborhoods of New City and M'douha to key transport hubs, thus providing sustainable and socially equitable mobility.

Second development phase

From the start, plans called for extending the cable car with two additional lines: first to the city hospital and finally to a mountain viewpoint. The first phase of this expansion is already becoming a reality: the French manufacturer POMA is currently building the TIZI II 10-seater gondola. The new line runs from the M'douha district at 210 meters up to the Sidi-Belloua hospital plateau at 505 meters – a vertical difference of nearly 295 meters over a distance of 1.86 kilometers. "The terrain profile shows a mix of densely built-up urban areas, road crossings, and a final forested slope before reaching the hospital complex. What used to be a 20-minute uphill drive through steep, congested streets will soon become a silent six-minute ride through the air," reports Sebastien **Martin**, project manager at POMA.

Political goals

When selecting the route, the Algerian Ministry of Transport prioritized accessibility over geographic factors. By directly linking the city's main hospital to the existing cable car, rail, and bus infrastructure, the new section transforms what was once a difficult, car-dependent ascent into a seamless and inclusive journey for everyone. For the first time, residents of nearby towns and mountain villages will be able to reach specialized medical care without private transport. This forward-looking decision goes beyond passenger numbers (two million annually): it brings essential public services closer to the people, strengthens social inclusion, and redefines urban justice through mobility.

State financing

The project is entirely financed through the Algerian State budget under a multi-year program authorization. The delegated project management is ensured by the Entreprise du Métro d'Alger (EMA),

■ **CABLE CAR TIZI I**

Status	*in operation (2020)*
Sections	*3*
Capacity	*2,000 p/h/d*
Length	*2.4 km*
Vertical rise	*140 m*
Speed	*5.5 m/s*
Travel time	*15 min*
Stations	*4*
Cabins	*65*
Cabin Capacity	*10 p*
Towers	*19*
Operating hours	*12 h/day*
Availability:	*98%*
Passengers per year	*3.6 million*

■ **CABLE CAR TIZI II**

Status	*under construction (2025)*
Sections	*1*
Capacity	*950 p/h/d*
Length	*1.8 km*
Vertical rise	*295 m*
Speed	*5.5 m/s*
Travel time	*7.1 min*
Stations	*2*
Cabins	*22*
Cabin Capacity	*10 p*
Towers	*9*
Operating hours (forecast)	*4,500 h/year*
Availability (target)	*98%*
Passengers per year (target)	*2.3 million*

a public operator in charge of implementing the Ministry of Public Works and Transport's urban mobility policy. EMA supervises the overall financing, procurement, and execution of the project on behalf of the State, ensuring transparency and long-term ownership. "This public-investment model allows the infrastructure to remain fully integrated into Algeria's national strategy for sustainable and accessible urban transport," explains Martin.

When fully completed, the cable car network in Tizi Ouzou will consist of six stations: the stops at the train station (Gare de Kef Naâdja), the university (Université de Tizi Ouzou), the stadium (Stade du 134 Novembre), and the regional government headquarters (Wilaya) have already been built. The station at the hospital (Sanatorium) is currently under construction. A final station is planned on the excursion mountain (Redjaouna).

Technical continuity

Like TIZI I, the new line is designed as a detachable 10-seater gondola, ensuring full interoperability and optimized maintenance within the existing network. The stations function as local hubs and are designed to adopt the architectural language and accessibility standards of TIZI I, ensuring smooth passenger transfers and simplified operations for staff.

Operation secured through UPilot

TIZI II, like TIZI I, will be operated by ETAC – a joint venture between POMA and the state-owned TRANSTEV group. ETAC has been responsible for the operation, management, and maintenance of Algeria's existing cable car network for ten years – including those in Tizi Ouzou. And its record speaks for itself: 3.7 million passengers and no accidents. This achievement stems not only from technology but also from the people – technicians and operators – trained through POMA's UPILOT system. The digital platform combines simulation, maintenance training, and certification for the safe operation and upkeep of urban cable car systems.

Algeria has also established a robust legal framework through Decree No. 11-359, closely aligned with European standards and the STPG regulation for passenger cable car operations. In accordance with this framework, the operator ETAC is developing a comprehensive Safety Management System (SGS) to structure procedures, risk control, and continuous improvement in daily operations.

Partnership overcomes challenges

Back in the construction phase, two major challenges stood out: the limited availability of land in densely populated urban areas and the complex economic context marked by successive financial and health crises between 2018 and 2021. "Despite this, the strong and lasting partnership between POMA and EMA was able to move forward – a model for future urban cable cars in Algeria," says Martin.

Third mountain cable car line

One such project is the third phase of Tizi Ouzou's cable car network. From the hospital, another cable car is planned to improve mobility in the city's hillside neighborhoods and give residents greater access to leisure activities. Implementation is expected in the coming years, once TIZI II goes into operation in spring 2026. *ts*

TIZI I reduces both the distance (–40%) and travel time (–30%) for residents, saves 7,758 megawatts of electricity annually, and prevents 2,853 tons of CO_2 equivalents each year.

Now, as the TIZI II extension nears completion – a 1.9-kilometer line linking M'douha to the Sidi Belloua Hospital at 600 meters altitude – Tizi Ouzou is preparing for another leap forward.

SAN SALVADOR

POMA BUILDS FIRST OF FOUR CABLE CARS

"Mejicanos" – this will be the name of El Salvador's first cable car. The installation by French manufacturer POMA will be one of four cable cars operating in the capital, San Salvador. Construction has already begun.

The stations are planned to be partially integrated into larger buildings. © POMA

San Salvador, the capital of El Salvador, has around 316,000 inhabitants in the city center and more than 1.74 million in the metropolitan area, making it one of the largest cities in Central America. To improve the population's quality of life and mobility, the Ministry of Public Works and Transport (MOPT) is pursuing a master plan that, in addition to metro and bus lines, also includes four cable cars: one will connect the Bicentenario Park with the proximity of El Boqueron Volcano, one will serve the dense district of Soyapango, one will heads south and one will run through the city center.

Intermodal cable car

The line through the city center is the first to be implemented – by the French manufacturer POMA. It will be the country's first cable car, extending over three kilometers and comprising four stations. Each stop connects key points of downtown San Salvador:

The first station serves the "Mejicanos" district, the second largest district with more than 150,000 inhabitants; it also handles all traffic coming from the north of the metropolitan area.

The second station provides access to the University of El Salvador ("UES").

The third station, "Centro de Gobierno," is located among various public administrative buildings and near a medical services area.

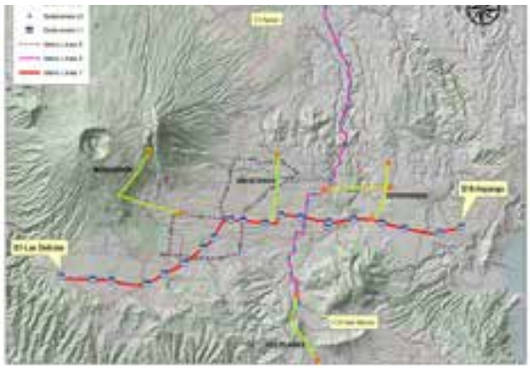
The final stop, in the city center, is planned as an intermodal hub connected to the future Metro Line 1. Each station will integrate feeder bus routes as part of a reorganization plan for conventional urban public transport.

The cable car will have a transport capacity of 3,500 people per hour per direction, ensuring fast, safe, clean, and comfortable travel.

Cable car to operate in 2027

Transport Minister Romeo **Rodríguez** confirmed that construction will begin in October 2025, last 18 months, and be completed by mid-2027 – despite dense urban development and heavy traffic.

Manufaturer POMA has taken appropriate measures, as project manager Guillaume **Ployon** finally emphasizes: "Among other things, we are implementing a space-optimized cable car line with few double-head towers capable of carrying higher loads at specific points."

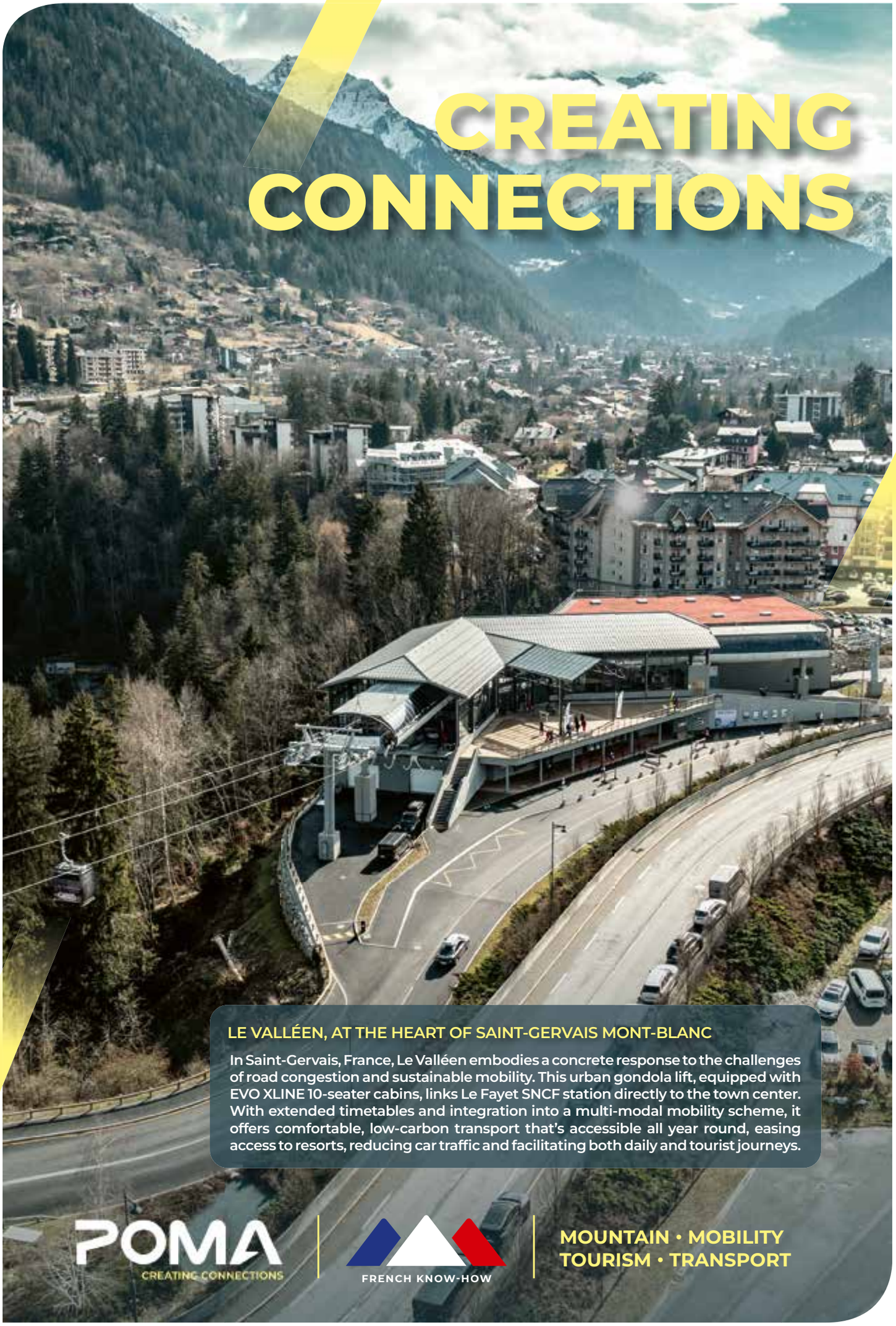


Master plan with four cable car lines (in green): one goes to the volcano (Boquerón), one runs through the city center (Mejicanos), one heads south (Los Planes) and one will serve the east district (Soyapango).

CABLE CAR MEJICANOS

Status	*in construction (2025)*
Capacity	*3,500 p/h/d*
Length	*3.5 km*
Vertical Rise	*5 m*
Speed	*6 m/s*
Travel time	*14 min*
Stations	*4*
Cabins	*153*
Cabin capacity	*10 p*
Towers	*22*

The stations will become mobility hubs.


CREATING
CONNECTIONS
LE VALLÉEN, AT THE HEART OF SAINT-GERVAIS MONT-BLANC
In Saint-Gervais, France, Le Valléen embodies a concrete response to the challenges of road congestion and sustainable mobility. This urban gondola lift, equipped with EVO XLINE 10-seater cabins, links Le Fayet SNCF station directly to the town center. With extended timetables and integration into a multi-modal mobility scheme, it offers comfortable, low-carbon transport that's accessible all year round, easing access to resorts, reducing car traffic and facilitating both daily and tourist journeys.
POMA
CREATING CONNECTIONS
FRENCH KNOW-HOW
MOUNTAIN • MOBILITY
TOURISM • TRANSPORT

The design of the vehicles was jointly developed by Verkehrsbetriebe Zürich (VBZ), GARAVENTA, CWA, and Milani Design.

ZURICH

GARAVENTA MODERNIZES RIGIBLICK FUNICULAR

The Rigiblick funicular is not only a landmark of the Swiss metropolis of Zurich but also fully integrated into the public transport network of Verkehrsbetriebe Zürich (VBZ). On their behalf, the cable car manufacturer GARAVENTA, part of the DOPPELMAYR Group, has comprehensively modernized the more than 120-year-old line. The focus was on new, barrier-free vehicles, modern technology, and greater comfort for passengers.

The new cabins from CWA accommodate 33 instead of the previous 30 people, are about 80 centimeters longer than their predecessors, and are deliberately designed to resemble the Zurich Flexity tram. Both vehicles are unique. Special lighting rings on the interior ceiling create a distinctive atmosphere inside. On the uphill side, each lighting ring frames a round skylight, allowing additional daylight into the cabin. Together with the raised wooden seating on the uphill side, this creates a stage-like impression – a tribute to the Rigiblick Theater. Panoramic windows extending to the floor create a bright, open atmosphere.

Less noise from wheels and cable

In addition to the vehicles, the entire electrical control system was replaced by FREY STANS. As part of the work, GARAVENTA modified the brake hydraulics and renewed all bearings of the drive and deflection wheels as well as the cable compensation system. The motor with gearbox was overhauled and reinstalled. Chassis with low-noise plastic wheels now minimize noise emissions in the city area. A new *PERFORMA* haul rope with a diameter of 32 millimeters from FATZER also ensures smooth and quiet operation.

The cable car's passengers include theater-goers, tourists, and local residents.

The cable car's technology was extensively upgraded.

The funicular operates automatically, with staff intervening only when necessary.

A round skylight with a lighting ring brings additional daylight into the cabin, especially over the raised seating area.

The consistent lighting and design concept applies not only to the cabins but also to the five stations. © GARAVENTA

More comfort and accessibility

The cable car with it's roughly 160 daily trips meets the requirements of the Swiss Disability Equality Act (BehiG): wide doors and an optimized interior design provide more space and facilitate barrier-free access and passenger flow. Against this background, all five stations were also modernized with a consistent lighting and design concept. "The Rigiblick funicular is an important part of Zurich's local transport. With this modernization, we ensure that it can be used reliably and barrier-free in the future," emphasizes Ueli **Sutter**, Sales Project Manager at GARAVENTA.

About the funicular

The Rigiblick cable car opened in 1901 and was extensively rebuilt in 1978/79. It is considered Switzerland's first fully automatic, licensed funicular with intermediate stations. Fully automatic means that the line operates according to schedule without on-site personnel: control, monitoring, and safety systems run continuously and are centrally managed, while operating staff can intervene in the background if necessary. The cable car usually runs from early morning until midnight at short intervals, is optimally integrated into the public mobility network of VBZ, and reliably transports 700,000 passengers per year. The line resumed operations on September 26, 2025.

About GARAVENTA AG

GARAVENTA AG is the Swiss division of the DOPPELMAYR Group and has established itself as a manufacturer of gondola lifts, funiculars, material ropeways, and complex cable cars.

■ FUNICULAR RIGIBLICK

Capacity	*720 p/h*
Cabin Capacity	*33 p*
Length	*385 m*
Vertical rise	*95 m*
Maximum incline	*36%*
Speed	*5 m/s*
Travel time	*122 sec*
Stations	*5*
Opening	*09/2025*

MANIZALES

LEITNER EXPANDS THE CABLE CAR NETWORK IN THE COLOMBIAN CITY

Two existing systems successfully integrated into the transport network – third line put into operation at the end of September 2025: The ropeway network of the Colombian city of Manizales has now grown to almost five kilometers – thanks to the manufacturer LEITNER.

The Colombian city of Manizales is continuing to implement the latest generation of urban mobility and is systematically expanding its ropeway network in collaboration with LEITNER. After successfully completing two projects, the South Tyrolean ropeway manufacturer was also awarded the contract to build a third line in 2022. With the commissioning of the new system at the end of September, the urban ropeway network in the city of around 400.000 inhabitants has been extended to a total of 4.885 meters – another milestone in designing sustainable and efficient public transport.

Cable cars have long been a favorite among residents

Back in 2009, LEITNER built the first 10-seater gondola lift along one of Manizales' central transport axes. It is seamlessly integrated into the existing ticket system and the city's infrastructure, creating a direct connection between the bus terminal, residential areas, and the city center. Due to the high level of public approval, the "Cable Aéreo Manizales" was extended in 2013, and has since then served the suburb of Villamaría. The second line, "Cámbulos – Villamaría", was built as part of this expansion and demonstrated that ropeways are an ideal complement to conventional transport, especially in a city characterized by substantial differences in elevation. The systems will be used intensively as they significantly reduce travel times and offer residents convenient connections to the most important parts of the city.

Third system expands ropeway network to almost 5 kilometers

The contract for the third line, which is 2.328 meters long and serves four stations, was signed in 2022.

GIACOMO TRATTENERO
The responsible project manager at LEITNER.

"The long-standing collaboration with Manizales impressively demonstrates how urban ropeway systems can sustainably improve the quality of life in dynamically growing cities, characterized by significant differences in altitude."

In its initial phase, it is equipped with 53 cabins and it is able to transport up to 1.500 people per hour. The future capacity can also be extended to a maximum of 2.100 people per hour with the addition of 20 cabins. As of September 2025, the new line connects the north of Manizales with the financial and business district and the transport center, further increasing the efficiency of the city's transport network. The third line is also powered by the *LEITNER DirectDrive* – a unique gearless drive system that offers impressively quiet operation, low maintenance requirements, and maximum energy efficiency, thus ensuring reliable, comfortable, and sustainable operation.

Well integrated into the city

LEITNER's new project combines technological innovation, energy efficiency, and compatibility with the landscape. The ropeways blend harmoniously into the city's steep landscape, save valuable urban space, and contribute to the sustainable development of urban mobility in Manizales. A special feature of the ropeway network is that the first stations of all three lines are all located together within one building complex, which enables passengers to transfer between the individual lines quickly and easily. With the continuous expansion, Manizales is upholding its pioneering role in the field of urban ropeway systems.

The city's topographically challenging location, at an altitude of 2.160 meters in Colombia's coffee-growing region, has made ropeways a proven and indispensable means of transport for decades. Historic systems were used for both passenger transport and transporting coffee, and paved the way for today's modern solutions.

The third cable car system in Manizales is powered by the energy-efficient and quiet LEITNER DirectDrive. © LEITNER

In Muttrah, the historic port city near the capital Muscat, construction of the new BARTHOLET cable car is progressing rapidly. It is set to boost tourism in the region while offering spectacular views. © BARTHOLET

MUTTRAH (OMAN)

CABLE CAR PROJECT IN THE "SWITZERLAND OF THE MIDDLE EAST"

In Muttrah, a historic port city ear Oman's capital Muscat, two new cable car lines by BARTHOLET are currently under construction. The ambitious project aims to boost Oman's tourism sector and revitalize the region. For the Swiss manufacturer, this is the first installation carried out in collaboration with the operator Sabeen Investment.

Muttrah is known for its distinctive forts, bustling market, numerous museums, and the Al Alam Palace, the Sultan's residence. The new cable car will add a whole new dimension to the city's skyline – visitors will be able to experience Muttrah from new perspectives. Rising above the city, passengers will enjoy impressive panoramic views of the waterfront promenade and the breathtaking landscapes of the Gulf of Oman.

Technical details & timeline

The project includes two independent lines with a total length of nearly 2.7 kilometers and a height difference of 100 meters. Equipped with modern, deep-black 8-person cabins designed by Studio F. A. Porsche, the system combines elegance, comfort, and functionality.

In the final configuration, each line will include a VIP cabin equipped with special amenities for a premium experience. Construction on the project began at the end of 2024.

In its initial phase, up to 400 people per hour can be transported in a total of 18 cabins – 10 on Line 1 and eight on Line 2 – at a speed of five meters per second. The opening is scheduled for spring 2026.

CABLE CAR MUTTRAH

Length	*2.7 km*
Travel speed	*5 m/s*
Number of cabins	*18*
Cabin capacity	*8 p*
Capacity	*400 p/h*
Elevation change	*100 m*
Highest cable car tower	*87 m*
Longest span	*690 m*

Thanks to the cable car, visitors will experience Muttrah from new perspectives.

BARTHOLET's tallest towers, 71 and 87 meters high, are being built here.

The cable car will feature two lines, with a total length of almost 2.7 kilometers.

Highlight: BARTHOLET's tallest towers

Line 1 offers a standout feature: Towers 3 and 4 will rise as the tallest cable car towers built by BARTHOLET, reaching 71 and 87 meters and creating a landmark for the area.

The longest span between two towers measures 690 meters. From there, passengers are treated to spectacular views of Muscat's iconic waterfront promenade, the sea, the surrounding mountains, and the stunning coastal landscape.

One of the valley stations is located directly at the former industrial port, transformed into the Sultan Qaboos Cruise and Yacht Port. Passengers can start their journey here and enjoy the breathtaking views along the way.

Construction began at the end of 2024.

Work is now in full swing.

The opening is scheduled for 2026.

The intermediate stop of the Ujjain cable car at the Triveni Museum is designed as a corner station.

UJJAIN

URBAN CABLE CAR TO THE TEMPLE

Ujjain is one of the seven "holy cities" of India. The large city, with a population of 550,000, attracts a multitude of pilgrims thanks to the Mahakaleshwar Temple. Starting in the summer of 2026, a cable car will transport devotees from the railway station to the temple via an intermediate stop at the Triveni Museum. The engineering firms SALZMANN and BERNARD Group are supervising the project.

Ujjain, the capital of the district of the same name in the Indian state of Madhya Pradesh, not only has 550,000 residents but also welcomes many pilgrims. Especially on religious holidays, thousands of worshippers make their way from the railway station to the Mahakaleshwar Temple. Currently, the journey through the congested streets takes at least 25 to 30 minutes – a route that is both arduous and complicated.

64,000 passengers per day

To make the trip to the temple significantly more comfortable and convenient, the state-owned company NHLML (National Highway Logistics Management Limited) has commissioned a cable car: a 1.7- kilometer, eight-seater gondola lift with 55 cabins and a transport capacity of 2,000 people per hour in each direction. The system is expected to carry 64,000 passengers per day. With a travel time of just seven minutes, the journey will be dramatically shortened. Moreover, the cable car ride will be far more comfortable and offer an excellent view of the city. Elderly pilgrims and those with limited mobility will particularly benefit. Overall, the cable car aims to improve mobility for millions of people.

■ CABLE CAR UJJAIN

Capacity	*2,000 p/h/d*
Length	*1.78 km*
Speed	*6 m/s*
Travel time	*7 min*
Cabins	*55*
Cabin Capacity	*8 p*
Stations	*3*
Towers	*11*

Intermediate station with a turn

The three stations – at Ujjain railway station, the Triveni Museum, and Ganesh Colony (temple) – are strategically placed to provide easy access for both locals and visitors. The buildings not only house the cable car technology but also serve as local hubs featuring shops, waiting areas, restrooms, security checkpoints, and operational rooms. Architecturally, the stations are designed to blend seamlessly with

The terminal station at the temple is to be attractively designed.

The cable car starts at the railway station of Ujjain. © NLHLM

the cultural, religious, and urban environment. The intermediate station serves as a corner station, linking the cable car line toward the temple.

Build-and-operate model

The Indian construction company MSIL (Jai Makakaleshwar Ropeway Private Limited) will implement the cable car by the summer of 2026 and operate it until approximately 2031. The manufacturer DOPPELMAYR will supply the system. After five years, NHLML is expected to take over operations – as stipulated by the national cable car plan for most such projects.

Independent supervision

The planning, construction, and operation of the cable car are being monitored by independent experts from SALZMANN Ingenieure and BERNARD Consult. "Essentially, we represent NHLML in dealings with contractors: we manage the project, review plans and calculations, and ensure deadlines and quality standards are met," explains cable car planner Stephan **Salzmann**. While the BERNARD Group, with its Indian staff on site, focuses on transport planning, construction, and architecture, SALZMANN contributes its cable car expertise. In addition, an experienced urban cable car specialist from Colombia has been brought on board for the Ujjain project.

Well-acquainted engineers

Together with the BERNARD Group, the Austrian engineering firm SALZMANN has already supervised 14 projects for NHLML, seven of which are currently being implemented. The most well-known is the urban cable car from BARTHOLET in Varanasi, which will soon go into operation. Other noteworthy projects include the planned aerial tramway in the million-strong city of Prayagraj (another of India's seven holy cities) and the temple cable car in Kullu.

Additionally, on behalf of the state of Himachal Pradesh, the firms are developing an urban cable car network in Shimla with three lines.

The joint venture is also working on 12 cable car projects for private clients across the subcontinent. "Feasibility studies are also a major part of our work in India – we've already examined nearly 40 cases to assess whether urban cable cars are even viable," emphasizes Stephan Salzmann. With over 50 years of experience in alpine cable car construction (more than 400 projects to date), SALZMANN knows exactly what rope-based transport systems can achieve. *ts*

CURVO

NON LINEAR ROPEWAY BENDS AND CURVES ALONG CITY ROADS

Faster, affordable, and sustainable – ropeways are emerging as serious players in urban mobility. All existing systems share a key limitation: they can only operate in straight lines between the stations. The Indian company Conveyor & Ropeway Services Pvt. Ltd. (CRSPL) solved this problem, with its globally patented technology, CURVO allowing ropeways to bend and curve horizontally along city streets, integrating seamlessly into urban infrastructure as a second tier urban transportation.

CURVO is a Non-Linear Monocable Continuous Gondola system.

CURVO is not merely another ropeway; it is the world's first, non-linear aerial ropeway system, engineered to move horizontal with slight inclines through the complex geometry of modern cities with intelligence, agility negotiating bends along the existing roads. A prototype is already on the road in Kolkata, India.

SHEKHAR CHAKRAVARTY, Inventor of CURVO

"It is designed for modern cities for a clean, green, safe and fatality free transport for the mass commuters".

Ropeways that bend within city

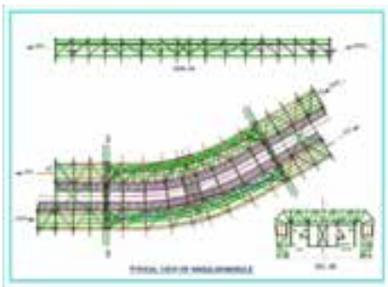
CRSPL, a pioneering Indian ropeway company, developed *CURVO* through years of careful research and precise engineering. The system can follow non-linear routes horizontal with slight inclines along urban roads. Drawing on over 55 years of industry expertise, Founder and Chairman of CRSPL, Mr. Shekhar **Chakravarty**, envisioned a ropeway system that bends with the city, effortlessly integrating into complex urban landscapes. *CURVO* represents the bold realization of that vision through innovation of a globally patented, next-generation solution.

Initial situation

Conventional ropeway systems either move strictly in straight lines between stations or require full intermediate stations to take turns, which is often difficult in urban areas. It also requires elevated adjustments to pass over buildings and other obstacles interfering the linear alignment. In the winding, irregular grids of most cities, this rigidity limits their usability. *CURVO*, addresses this challenge by enabling aerial transport to navigate curves just like ground vehicles, fully adapting to the cityscape. "CURVO's brilliance lies in the effortless way it achieves what was once impossible-turning corners at line speed, without detachment form the rope ", says Rachana **Mukherjee,** Owner and Director at CRSPL: The unique innovation has paved the path for a huge market for urban aerial transport industry in sync with the global requirement of sustainable urban transport.

RACHANA MUKHERJEE, Owner and Director at CRSPL

"Curvo is a revolution that can reinvent ropeways and carve out a new dimension in aerial urban mobility. Our vision is that in the future, skylines will be marked by fluid, seamless aerial corridors rising above road congestion to give back time, space and clean air to millions of commuters."



Angular modul of CURVO

■ **CURVO CONCEPT**

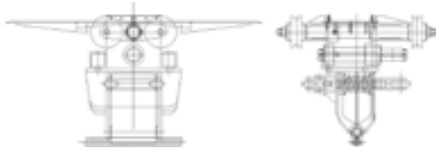
Cabin Capacity	*8-10 p*
Speed	*4.5 m/s*
Capacity	*5,000 p/h*

CURVO ropeway incorporates the patented vertical grip technology and the angular module to negotiate bends at line speed without detachment.

Technology overview

The *CURVO* system introduces a world first non-linear gripping technology. It is oriented vertically relative to the rope and can negotiate non-linear alignments, including horizontal curves, at line speed without detaching from the rope.

To negotiate horizontal bends, the cabin passes through an "angular module". The carriage or gripping device transfers onto a pair of shunt rails via articulated track wheel frames mounted on the grip. This design shifts the suspension centroid to negotiate the horizontal deviation, allowing the grip to travel smoothly along curved rails. The rope is guided by multiple horizontal rollers parallel to the curve.



The vertical grip of CURVO has a moving jaw and a fixed jaw.

Advantages of CURVO

CURVO is particularly suited for urban environments, providing seamless overhead connectivity without interfering with road traffic:

Height: *CURVO* requires a clearance of 6-7 meters from the road surface as it follows the road alignment. Linear Systems sometimes need 40-50-meter-high towers to pass over buildings.

Land requirement: *CURVO* needs minimal ground space for stations roughly 50m^2 and intermediate support frames roughly 10 m^2 which can be spaced 90-100 meters apart along road curbs. Linear Systems often require land for high-rise terminal and intermediate stations.

Accessibility: Boarding and deboarding stations can be placed overhead as per the urban planning requirements along the route.

First- & last-mile connectivity: The flexible *CURVO* system can serve as a feeder to existing transport networks such as railways, metros, airports, & bus stations, with unified ticketing and seamless intermodal integration.

Maintenance: "Routine maintenance and emergency interventions are easier to manage ", as Mr. Kamal Kumar **Bose**, Managing Director of CRSPL, points out.

Speed: *CURVO* travels faster than the average vehicular speed and also reaches directly to destination unlike some linear ropeways.

Privacy & Clearances: *CURVO* travels above existing roads rather than directly over habitat residential areas requiring clearances from local authorities or private landowners.

Conclusion

Together, these elements transform ropeways from a rigid, point-to-point infrastructure into a fluid, modular mobility platform – capable of adapting to complex terrains, urban environments and scalable network configuration in urban cities where land availability is limited and where we have to respect heritage structures and existing urban infrastructure. Rachana Mukherjee emphasizes: "The result is a new design class of aerial transport where traditional systems cannot operate and positions CURVO as technical leader in next-generation aerial mobility." In short, *CURVO* doesn't merely improve ropeway transport – it reinvents it, unlocking an entirely new frontier of continuous, flexible, and globally scalable sustainable movement.

CURVO is a globally patented technology.

Scan Me

Scan the QR-code to watch the video about CURVO

The 8.4-kilometer-long cable car in Uruapan will be the longest in Mexico upon completion. Two PERFORMA ropes with a diameter of 50 millimeters will allow the transport of 1,500 passengers per hour. © DOPPELMAYR MX

ROPE & SPLICE

THE DREAM DUO FOR URBAN CABLE CARS

Where urban cable cars are built with the rope manufacturer FATZER, the low-noise PERFORMA rope is indispensable. Combined with the TRUsplice ES splicing technology, it meets the highest demands of urban installations.

Urban cable cars are the high-performance vehicles of public city transport. Operating on average 18 to 20 hours a day for around 350 days a year – totaling 5.500 to 7.000 hours – they carry commuters and tourists almost around the clock, linking suburbs with city centers and providing an alternative to traditional urban transit. It is obvious that the haul and track ropes must withstand the highest levels of stress. Multiple intermediate stations, short spans, and high operating speeds often result in 60.000 to 250.000 sheave rotations per year, also known as bend cycles.

South America has been a pioneer in the use of cable cars for public transport. More than 20 years ago, the Colombian city of Medellín set the example, followed by Rio de Janeiro, Caracas, La Paz, Santo Domingo, Santiago de Chile, Mexico City, and many others. In La Paz alone, the network consists of eleven lines.

Half a dozen new systems are currently under construction, including the Teleférico San Cristobal in Bogotá, Colombia's capital, and the 10-seater monocable gondola Uruapan in the Mexican city of the same name.

As with almost all systems in South America for which FATZER supplied the haul rope, the aforementioned installations use *PERFORMA ropes* – specifically developed to meet the demands of urban cable cars. Around one-third of all *PERFORMA ropes* delivered for urban systems are used in South America.

Their durability under heavy usage, reduced maintenance requirements, and quiet operation make them an obvious choice for urban environments, where thousands of people depend on reliable service daily and any downtime can cause major disruption.

Three reasons for TRUsplice ES

FATZER's *PERFORMA rope* is thus state of the art in South America's major cities. FATZER applies the same standard to splicing – the process of joining the rope ends to form a loop. Ten years ago, the company developed the short long splice *TRUsplice ES* (Engineered Solutions). While already established on other rope types, the technology truly takes off with the certification for *PERFORMA*, providing the foundation for long-lasting performance in urban environments.

First: space and location
Splicing work in urban areas requires complex scaffolding, as stations are often located in densely built-up spaces or on steep terrain where the rope cannot simply be laid on the ground.

A single rope, such as the 50-millimeter-diameter rope used on the Uruapan monocable gondola, requires a working area of at least 60 meters in length. With *TRUsplice ES*, the total splice length can be reduced to a maximum of 730 × rope diameter – almost half the usual length.

This allows for significantly less complex and costly scaffolding, or even eliminates the need for it entirely, since the splicing can be carried out within the station. The spatial advantage is just as important for overlay splicing as it is for rope replacement.

Second: time and cost advantage
Thanks to the shorter splice length, the actual splicing work can be reduced by about one-third. Additional time savings come from less complex pr eparation, assembly, and dismantling of scaffolding and rope tensioning. The reduced material and labor requirements result in cost savings, which are especially important for urban systems, where budgets are tighter and fares must remain affordable for passengers.

Third: fewer support staff
A significantly shorter splice requires far fewer assistants. With *TRUsplice ES*, up to one-third fewer people are needed – for a 50-millimeter rope, experience shows that only eight workers are required instead of twelve.

With TRUsplice ES, the high quality of the splice on the PERFORMA rope is maintained. © FATZER

This is particularly important in South America, where experienced personnel are often hard to find.

Conclusion
Used together, *PERFORMA* and *TRUsplice ES* form the dream duo on the "dance floor" of urban cable car operations, tackling its challenges and meeting its high demands.

© DOPPELMAYR MX

TRUsplice ES reduces material, time, and labor requirements.

PERFORMA runs smoothly and quietly.

REMEC IN BERLIN

EXTERNAL OPERATIONS MANAGERS FOR CABLE CARS

Whether maintenance or mountain exercises: the external operations managers from REMEC are on site. © REMEC

In the summer of 2024, the urban cable car in Berlin suddenly found itself without a technical manager. To ensure operations could continue quickly, the operator relied on external operations managers from the Swiss company REMEC. Together with the operator, the experts reorganized maintenance and operations and introduced the maintenance software SAMBESI. Since then, REMEC has been responsible for technical operations – an example of a success story with potential to be replicated.

The cable car is 1.5 kilometers long, has three stations, and can transport up to 3,000 people per hour in each direction in 65 cabins: Since 2017, an urban cable car has been running in the German capital Berlin. It connects the Kienbergpark subway station via the mid-station "Wolkenhain" at the summit of Kienberg to the main entrance of the "Gardens of the World" at Blumberger Damm. Built for the International Garden Exhibition (IGA), the 10-person monocable gondola serves to access the park, transport residents of the Marzahn-Hellersdorf district, and is an attraction in itself. From March to the end of September 2025, the operator– LEITNER Seilbahn Berlin GmbH – counted over 612,000 passengers.

Urgent need for a quick solution

The cable car runs frequently: about 2,000 operating hours per year, and between March and October, it runs seven days a week from 10 a.m. to 7 p.m. High availability is therefore essential. The situation became critical in summer 2024, when the cable car suddenly had no operations manager and faced a backlog of maintenance tasks. "Berlin isn't a cable car country; finding a new operations manager here is almost impossible," says Norbert **Lippold,** site manager of LEITNER Seilbahn Berlin GmbH. His team of 17 employees – five of them technicians – was also new to the cable car industry. A rapid solution was needed.

The cable car manufacturer LEITNER then referred the operator to the independent company REMEC. The Swiss company is primarily known for *SAMBESI*, maintenance software for cable cars, but also offers "external operations manager" services, according to CEO Johannes

NORBERT LIPPOLD,
Site Manager LEITNER Seilbahn Berlin GmbH

"We are very satisfied with the external operations managers from REMEC – both professionally and personally. They guide and advise us clearly and on equal footing – with extensive experience and a vast network. We are also impressed with SAMBESI: the maintenance software makes our work much easier and gives us an excellent overview."

The Berlin cable car runs over the "Gardens of the World."

Stadler: “In Switzerland, we already manage 25 destinations and are responsible for the safe operation of their systems.”

Thomas Oppeneiger works for REMEC as an external operations manager for cable cars.

Johannes Stadler, CEO of REMEC, markets the maintenance software SAMBESI.

Assessment on site

As with every inquiry, REMEC first assessed the Berlin cable car installation before submitting a final offer. “We spend two to three days inspecting the technology and maintenance documentation on site and conducting tests. Minimum standards must be met; otherwise, we sometimes decline a mandate,” says Thomas **Oppeneiger**, REMEC’s external operations manager.

The Berlin cable car met the requirements, yet almost everything was reassessed: “Together with REMEC, we analyzed operations, maintenance, and documentation from the ground up and created an investment plan,” emphasizes Lippold. With aging infrastructure, more measures are always needed, and Berlin is also working on a new cable car law that takes the urban perspective more into account.

Responsibilities clearly defined

In August 2024, REMEC took over the technical management of the Berlin cable car. Three cable car experts are officially registered with authorities as responsible, with Thomas Oppeneiger in charge. On a rotational basis, a REMEC expert is on site almost every week for three days to guide and train the Berlin team, monitor operations, and organize maintenance tasks. “We are also reachable at any time by phone, video chat, and remote maintenance,” says Oppeneiger. Responsibilities also include organizing tools and materials and supervising external service providers, such as rope work. REMEC is not responsible for economic operations or personnel management but can provide advice if requested. The cable car experts have extensive independent knowledge, experience with numerous systems, and a broad professional network.

Introduction of SAMBESI

“One of the first measures was the implementation of our maintenance software SAMBESI,” emphasizes Oppeneiger. Previously, maintenance was organized on paper. Now, with *SAMBESI*, all tasks are planned and documented digitally – accurately, comprehensively, and on schedule. The operations log is now digitally certified, and disturbances are efficiently managed with the “Events” module. “With SAMBESI, we also generate an availability report for the operator,” adds Oppeneiger. Spare parts and contracts are also managed using *SAMBESI.*

REMEC remains onboard

In the long term, the Berlin cable car aims to employ its own operations managers, and the first employees are already enrolled in training. However, it will take about four more years before this is achieved, and even then, REMEC will continue to provide consulting. Thomas Oppeneiger is particularly pleased, for a very special reason: “Since we are on the operator’s side, we can optimally further develop SAMBESI. In daily operations, we notice best where the software still has potential!” *ts*

BECORIT/WABTEC supports operators in overcoming challenges with reliable, efficient, and high-performance mobility solutions. © WABTEC

FRICTION PRODUCTS

HIGH-PERFORMANCE DRIVE AND BRAKE SOLUTIONS BY BECORIT/WABTEC

Without friction, there is no drive. What may sound like a physical paradox is actually a technical necessity for cable cars and rail transport. For almost a century, BECORIT – part of the WABTEC Group since 2006 – has ensured reliable operation in these systems with its traction sheave linings.

BECORIT looks back on almost 100 years of history and sees itself well-equipped for the future. The increasing demand for sustainable mobility solutions is opening up new perspectives in the field of urban cable car systems. BECORIT positions itself as a trusted partner, offering tailored solutions to meet the specific needs of each operator and project.

Friction products used worldwide

Originally produced to meet the demands of the mining industry, BECORIT's traction sheave linings became a globally demanded product. In 1946, brake pads for rail vehicles were added. In 2006, BECORIT was acquired by WABTEC, one of the world's largest suppliers to the railway industry.

The integration of BECORIT into the WABTEC Group enables the use of an international network of local contacts and the offering of a wide range of industrial products. Cable car operators who rely on maximum safety also benefit from the international presence from Canada to Australia, as well as the stateof-the-art testing and validation capabilities. BECORIT's friction products can be found in various safety-relevant applications.

Whether in cable cars, trains, industrial conveyor towers, elevators, or even crane and wind energy systems, BECORIT guarantees a firm hold.

Strengthening local production

In recent years, BECORIT has invested heavily in the German site. Whether it's robots handling friction materials or the implementation of CNC manufacturing, economic production is at the forefront.

The recent switch from gas to electric furnaces and the 1.000 kW peak PV system show how serious WABTEC is about achieving climate neutrality.

■ **WABTEC'S KEY COMPONENTS FOR PASSENGER MOBILITY**

Rail original equipment

Full door systems
HVAC systems
Full braking systems
Couplers
Passenger information systems
Power collection
Event recorders
Platform Screen Doors

Power and mobility components

Bus doors
Bus & ferry charging
Relays, train protection & energy
Frictions

Rail services

Maintenance & Overhaul

LUCERNE

A MIX OF TUNNEL AND CABLE CAR?

In Lucerne, Switzerland, an initiative is pushing for the construction of an urban cable car. The concept relies on an innovative combination of above-ground and underground sections and is primarily aimed at addressing the city's tour bus traffic problem.

The cable car in Lucerne could help ease the city's tour bus traffic. © CityLink Lucerne

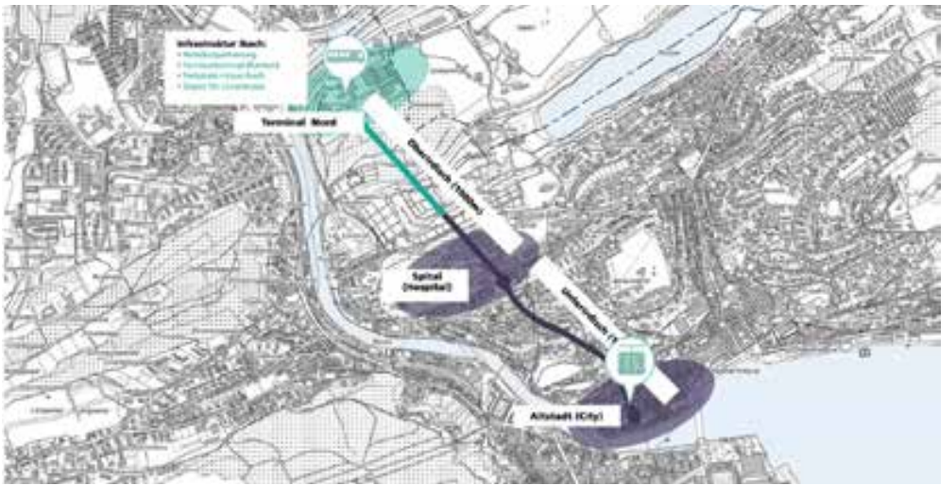
Parking for tour buses has long been a challenge in the Swiss city of Lucerne. The CityLink project offers an unusual solution – a combination of cable car and tunnel. The plan envisions a direct connection between an above-ground parking garage and the city center. The concept aims to relocate tour bus parking and transform urban spaces into areas for social interaction.

This summer, the project took an important step forward: the initiative committee submitted 1.151 valid signatures to the city for the construction of the cable car – well above the 800 required.

Traveling above and below ground

According to the concept, the cable car will connect downtown Lucerne with the cantonal hospital and the Ibach business area in the north of the city. The CityLink consists of two sections, each about one kilometer long. The route to the hospital runs underground, then continues above ground to Ibach. In the tunnel, the cabins travel on a ceiling-mounted rail and transition seamlessly onto a rope guidance system.

A mid-station beneath the hospital provides direct access to the new hospital square. The end stations are located in Ibach and the Old Town, with the mid-station under the cantonal hospital offering direct access to the hospital square.



Proposed route: Bus terminal to hospital above ground, then underground to city center.

The cabins are planned to accommodate eight or ten passengers each, with a maximum capacity of around 2,200 people per hour in each direction.

The cost factor

According to proponents, the CityLink project is estimated to cost 150–190 million Swiss francs. The initiators aim to minimize the financial burden on the city and canton but rely on support from authorities, particularly for regulatory approvals, land use rights, and overpass permissions.

Next steps

According to the initiative group, the city council will review the project, followed by a recommendation to the Grand City Council. Consideration by the Grand City Council could take place in the summer of 2026, with a public vote planned for the fourth quarter of 2026. Project planning could continue until 2030, with the cable car expected to be operational by 2033, which the project team considers realistic.

Who's behind the project?

According to the project website, the CityLink Lucerne interest group is made up of around 20 committed private companies and organizations from the city and surrounding region.

INTERVIEW

“SEVEN CABLE CARS IN BOGOTÁ WOULD BE NEEDED.“

Claudia Díaz, Mobility Secretary of Bogotá, shares in an interview with SI Urban at the UITP Summit how the Colombian capital is integrating its first cable car into the public transport system. She also discusses ongoing projects and reflects on the challenges of planning and implementation. Bonus: a first look at the design of the new cable car and photos from the construction site.

SI Urban: How has the cable car improved citizens' lives, aside from optimized access to public transportation?

Claudia Díaz: The cable car has had a primarily social impact. The neighborhood of Ciudad Bolívar used to be on the outskirts of the city and felt like a hidden community – nobody really knew much about it or how to get there.

The cable car brought the district into the spotlight and fostered a sense of community. Residents began beautifying their neighborhoods around the stations, sending a message: “We're here, we care about our community, and we want you to visit us.“

Public transportation projects are not just about moving people – they're about connecting them. The cable car has clearly strengthened the sense of community along its route.

TransMiCable connects Bogotá's steep district Ciudad Bolívar to the city's Bus Rapid Transit system since 2018. © TRANSMILENIO S.A.

Claudia Díaz, Bogotá's Secretary of Mobility, with SI Urban.

How is this cable car integrated into the city's transport system? Is there one ticket that covers, for example, buses, trains, and the cable car?

Yes, it is 100 percent integrated. There is just one ticket valid for a 125-minute period. You only pay once, whether you're using the BRT system, the cable car, or both. You don't have to pay twice.

Within those 125 minutes, you can make up to two transfers for free. For example, you can take the cable car, then switch to the BRT system, and finally transfer to a regular bus that runs in mixed traffic – all with the same ticket. So, our public transport system is fully connected and completely integrated.

Are there plans for new cable cars in Bogotá?

We have two new cable cars coming. One is scheduled to start operating, if everything goes according to plan, in February 2026. It will be located in another area of the city with characteristics similar to Ciudad Bolívar – San Cristóbal, which is also on a hill and faces social and mobility challenges. We're really happy to be able to provide a new cable car in an area that needs it the most. The second one will be in Potosí, also in Ciudad Bolívar. It is planned to begin operations, again if everything goes according to plan, in January 2027.

Could you please share some details about the San Cristóbal cable car?

San Cristóbal is currently under construction. The cable car will be 2.8 km long and will have three stations. We expect it to benefit more than 400.000 people from the southeast of the city, with a daily capacity of around 34,000 passengers – about 4.000 people per hour.

The San Cristóbal cable car is set to open in February 2026. The image shows the "20 de Julio" station. © Instituto de Desarrollo Urbano

Construction is currently 63 percent complete, and we expect the cable car to be operational by February 2026. The cost is estimated at around $80 million. Approximately 420 people from the local area are working on the project

At what stage is the Potosí cable car?

The second cable car, Potosí, will be located in Ciudad Bolívar. Currently, we are in the bidding process. It will cover a distance of 3.3 km, and we expect it to be ready by January 2027.

Is there a need for more cable cars in Bogotá besides the three that currently exist or are planned?

According to our policies and the city's long-term plans, we have identified seven cable car projects in total, including the three we've already mentioned. Based on the city's geography and accessibility, especially in the outskirts, cable cars are considered a more efficient and effective solution compared to regular buses traveling uphill and downhill. This administration has a four-year term, which started last year in 2024 and will end in December 2027. During this period, we are committed to bringing two more cable cars to the city. However, there are already plans to develop even more in the coming years.

What were the main challenges you've faced in implementing and planning cable car projects?

One of the main challenges we've faced – not only with cable cars but in other projects as well – is acquiring the land needed for construction and negotiating with the current owners. Having those agreements finalized before construction begins is crucial. Another challenge – but also an opportunity – was how to make the cable car more than just a public transport project. We wanted to create a community around it, which meant engaging in social processes and understanding what the community needed. This involved asking what services the city should provide around the cable car stations, not just focusing on transportation.

For example, in Ciudad Bolívar, each cable car station includes community services like kindergartens, so mothers can leave their children there and go to work. This aspect required intense collaboration with the community to understand their needs and improve their access to essential services.

How do you see the future of urban transportation, and what role do you think cable cars will play in it?

I believe the future of urban transportation is about inclusion and equity – not just moving people from A to B, but improving their overall experience. It's about connecting vulnerable and isolated communities who often lack access to public transport. The focus should be on the human aspect: making the invisible visible by identifying who is currently underserved and integrating them into the system. Our goal is to provide solutions that truly meet the needs of those most in need, ensuring better connectivity and infrastructure for all.

Interview: Ekaterina Zakharova

Full interview and more photos can be found on the SI Urban website. To access it, scan the QR code.

LIVE FROM UITP SUMMIT
UITP CONTENT
OFFICIAL MEDIA PARTNER

Construction work on the cable car in the San Cristóbal area. © Instituto de Desarrollo Urbano

■ CABLE CAR SAN CRISTÓBAL

Investment	*$80M*
Length	*2.87 km*
Travel time	*10 min*
Number of stations	*3*
Number of towers	*21*
Number of cabins	*144*
Cabin capacity	*10 p*
Capacity	*4,000 p/h/d*
Opening	*February 2026*

INTERVIEW

THREE URBAN CABLE CARS FOR CHILE

Chile is actively expanding its cable car network across the country to improve urban mobility. Some projects are already being implemented, while others are in the planning stage. By integrating cable cars into public transport systems, Chile aims to connect hillside neighborhoods with city centers more efficiently. Chile's Minister of Transport, Juan Carlos Muñoz, presented the projects in an interview with SI Urban at the UITP Summit.

Juan Carlos Muñoz, Minister of Transport of Chile.

SI Urban: ***Chile is strongly focusing on cable cars. Why this mode of transport?***

Juan Carlos Muñoz: We in Chile have a very long tradition of being very serious about how we decide when and how we are going to invest in new public transport modes. Traditionally, we've been quite reluctant about cable cars because, compared to buses or metro, they don't seem to be very cost-effective. However, I think that's correct only in cases where buses can provide good service – which is not always the case – and where metro has the demand to justify it. So, in between, there is an area where I think the characteristics of the service make a cable car a very good alternative. That happens when two conditions are met. First, you have to go over a clear geographical obstacle, where buses cannot provide an efficient service. And second, the demand for the service should not be extremely high – and ideally, it should be balanced in both directions so that the cable cars can be used effectively.

Our country is full of geographical obstacles. It's very mountainous, it's close to the sea, and it has steep terrain. So I think the country has many areas where cable cars can be a very attractive public transport alternative.

One cable car is planned to connect the cities of Iquique and Alto Hospicio. What does the area look like?

Iquique is a port city with very strong cliffs. We have a new settlement there that is constantly growing, and many people living there commute to the port. For them, the road alternative is not very attractive. So, I think having a cable car would be very effective. This cable car will be around six kilometers long. I believe the capacity a cable car can provide – usually no more than 2.000 passengers per hour – will be perfect for the city.

We also expect to provide some kind of fair integration with buses in Alto Hospicio and down in Iquique so that users can have a seamless experience between the two cities. The travel time for passengers will be reduced from 45 to 16 minutes between the two communes. The cable car will also attract people who simply want to enjoy the stunning views of the city.

The route of the cable car between Iquique and Alto Hospicio. © Government of Chile

CABLE CAR ALTO HOSPICIO – IQUIQUE

Investment	*approx. $133M*
Length	*5.7 km*
Travel speed	*6 m/s*
Capacity	*2,000 p/h*
Number of stations	*3*
Construction start	*2028*
Final operation launch	*2030*

How will the project be financed?

This will be a concession project with some subsidies from the government. The company managing the project will also receive funds from the fares. So, it will be a mixed financing process.

As far as I know, another urban cable car is also planned to be built in Chile – in Talcahuano.

We are currently in the feasibility study phase for a cable car in the Talcahuano area. It's a low-income neighborhood located in the hills of Talcahuano. We haven't defined the specific route yet because there are two or three alternatives under study. What's very interesting in this case is that we will also have some fare integration, but this time it will be with the train. There is a train running from Talcahuano to downtown, which should be a great opportunity for low-income people living in the hills to access job and study opportunities elsewhere in the city.

What factors do you consider during the bidding process besides the project costs?

Usually, in these cases, there are certain features, characteristics, and quality requirements that any operator must meet. For example, the operator needs to show that they know how to do the job and that their company can guarantee the construction quality. They must also have the necessary financial background and experience building this kind of infrastructure.

The quality of the cabins and the travel experience should meet certain standards. For instance, this is an area in northern Chile where it is very sunny, so the provider will have to guarantee that people will have a comfortable trip despite the weather.

As long as all the required features are met according to the tender documents, then price is probably the main factor that will decide who gets the responsibility.

The cable car in Talcahuano is expected to carry 28,000 passengers on a weekday. © Government of Chile

Another cable car is already under construction in Santiago, the capital of Chile – specifically, is the existing tourist cable car being expanded?

Yes, at this moment, the city of Santiago is building the first public transport cable car we will have – because we already have a touristic one – but this one is more for commuting.

There's a hill in the middle of Santiago with a cable car, but it mostly uses small cabins for tourism – going up and down the hill.

Now, there is another cable car being built on the same hill, but this one will connect two different neighborhoods and will be very useful for commuting trips. We expect that it will provide a very good alternative in both directions, which makes it very attractive, I think.

When will it be opened?

It will probably open in 2027.

Interview: Ekaterina Zakharova

After the interview, another tender for a new cable car in Valparaíso, Chile, was announced. Details are available on the SI Urban website. Scan the QR code to access them.

The cable car in Talcahuano is intended to improve urban connectivity and facilitate access to essential services. © Government of Chile

■ CABLE CAR IN SANTIAGO

Length	*364 km*
Travel speed	*6 m/s*
Travel time	*13 min*
Capacity	*3,000 p/h*
Number of cabins	*121*
Cabin capacity	*10 P*
Number of stations	*3*
Number of towers	*19*
Opening	*January 2027*

MUNICH

NEW OPPORTUNITY FOR A FUNICULAR IN THE BAVARIAN STATE CAPITAL?

The German federal government's €500 billion infrastructure package could give new momentum to a funicular in the major city of Munich. Transport planner Thomas Kantke has resumed his work. The political window for continuing the project is opening once again.

There is currently no funicular anywhere in Bavaria. Will that change in Munich? © Pixabay

The idea of a funicular in the German city of Munich is getting a second chance. Due to the pandemic between 2020 and 2022, Thomas **Kantke** and his team of engineers had to pause their planning. Now, with the German federal government launching a €500 billion infrastructure package, a new political window has opened to push the project forward. The concept is set to be presented to the newly elected city council in spring 2026.

Zoo, stadium, and more

But what is the project actually about? Specifically, the funicular is intended to connect the Siemenswerke train station with Hellabrunn Zoo and Wettersteinplatz. So far, this route has not been served by public transport, partly because a bridge in the area cannot support the necessary load. Yet demand would be high: the zoo records between 1.8 and 2.6 million visitors annually, and up to 15,000 guests occasionally attend events at the Grünwalder football stadium. In addition, residential developments with several high-rise buildings have been built east of the Siemenswerke station in recent years. The Siriuspark business district has also been established, and together with a second business area, around 3,000 new jobs have been created.

High passenger potential

Counts have shown that about 20 to 25 percent of zoo visitors come from the southern surrounding area, meaning that a public transport connection to both the tram and the Bavarian Regio Railway (BRB) would be necessary to address the zoo's public accessibility deficits.

"To leverage synergy effects and optimally connect the zoo to the subway network, Hellabrunn Zoo should be linked to both the Siemenswerke subway station and the Wettersteinplatz subway station," Kantke reports. Surveys of football spectators also revealed that around ten percent of fans would use the planned funicular for their arrival and departure. Last but not least, there are plans to extend an important tram line to the Siemenswerke station, which would further boost demand. Since weekend traffic peaks from zoo visitors and football match attendees overlap additively depending on the kickoff time, transport capacities of up to 3,200 people per hour per direction are required during peak loads.

What is a funicular?

To serve the route Siemenswerke – Hellabrunn – Wettersteinplatz, there are theoretically several options, but according to studies, only the funicular would truly make sense. In

■ MUNICH FUNICULAR

Length	*3,512 m*
Cabin capacity	*2 x 400 p*
Speed	*16 m/s*
Maximum incline	*15 %*
Capacity max.	*3,200 p/h/d*
Drive power max.	*2 x 4,6 MW*
Football match interval	*7,5 min*
Regular shedule interval	*10 min*
Travel time	*6 min*
Investment funicular	*€ 80 Mio.*
Investment tunnel	*€ 200 Mio.*

□ *THOMAS KANTKE, Munich transport planner*

"Currently, around 60 percent of employees in the Sirius business park use their own car for their commute. We expect that with the launch of the funicular, the share of car users can be halved from the current 60 percent to 30 percent. Surveys have also shown that ten percent of stadium visitors would use the funicular, which would likewise bring noticeable relief to traffic congestion."

this transport solution, two vehicles run on a single track and pass each other in the middle. The vehicles have no propulsion of their own but are pulled by a haul rope located in the center of the track. The travel speed is 16 m/s, so the journey time for the entire route would be about six minutes – significantly faster than by car or conventional public transport.

Why not bus or tram?

"For bus operation, a new bridge would be necessary, as well as a 2.5-minute interval schedule requiring disproportionately high personnel costs. Moreover, with a travel time of 15 minutes, it would not be attractive enough to convince enough people to switch from car to bus," reports Kantke. A tram, on the other hand, would not be technically feasible due to the 13 percent gradient, and would require substantial construction work, including a new bridge. Equally unrealistic is a metro, according to Kantke: "A subway would be extremely expensive, with investment costs of at least €800 million." Building a three-cable aerial cableway would be technically possible, but the interventions caused by stations and supports would be significant, and it would be difficult to implement legally and politically.

Funicular favored

"In short: the funicular is the best solution. It also found the most approval in discussions with citizens and politicians," emphasizes Kantke. To provide a professional basis for the funicular planning, technical discussions and site visits with cable car and construction engineers have already taken place. These revealed an investment cost of around €165 million for a funicular that runs underground except for the 400-meter-long above-ground section at the Hellabrunn parking lot. Of this, €35 million is allocated to the cable car technology and €130 million to the structural shell (prices as of 2017).

Autonomous operation

"The route is, except for the passing loop at Hellabrunn in the middle of the track, completely single tracked," Kantke gives insight into the current planning status. Basically, the funicular can operate fully automatically. The vehicles do not have driver cabins. "It is entirely sufficient for the funicular to be monitored and controlled via monitors by the subway dispatchers of the Munich Transport Company," the transport planner assures. Accordingly, the funicular requires about 0.1 jobs per shift. Considering different shifts, vacation, and sick days, Kantke estimates 0.5 full-time jobs needed for the funicular's operation.

Passenger forecast

According to the transport planner, a transport capacity of 3,200 persons per hour per direction with two trains of 400 seats each, operating at a 7.5-minute interval, is sufficient to handle the traffic. The funicular is expected to carry approximately three to four million passengers annually. *ts*

Istanbul as a role model: Similar to the Turkish metropolis, the funicular in Munich is also intended to provide public transport access to a football stadium. © BARTHOLET

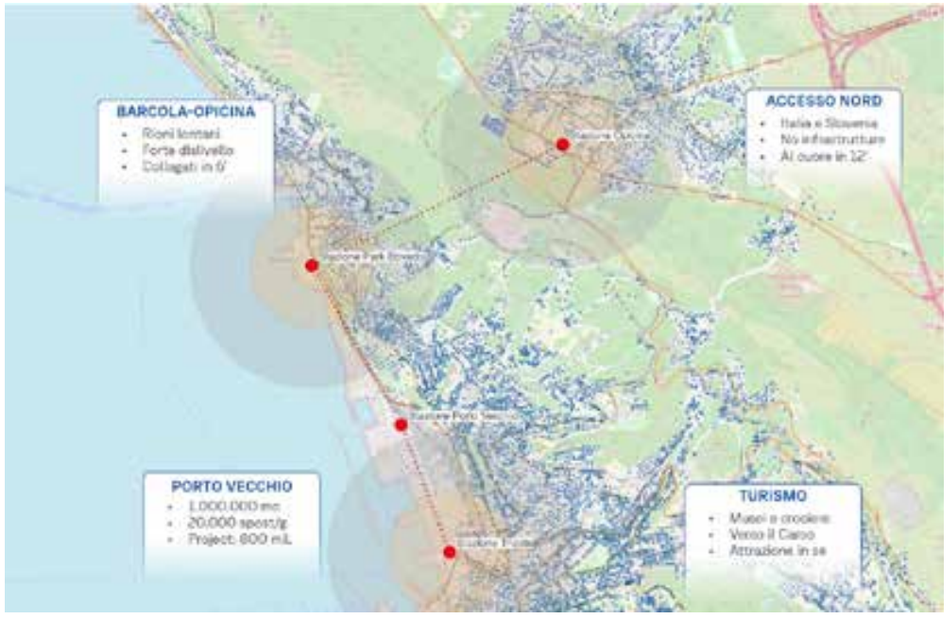
TRIESTE

CONSTRUCTION OF THE CABLE CAR TO BEGIN THIS YEAR?

Nature Line: The cable car is planned to pass over parking areas on the port grounds.

With financial support of €48.7 million from the National Recovery Plan, the urban cable car in Trieste (Italy) is becoming a tangible reality. Construction could begin by the end of 2025, reported Giulio Bernetti. The Director of the Department of Urban Planning, Environment, Public Works, and Cultural Heritage of the City of Trieste presented new details about the planned facility at the INTERALPIN trade fair.

The Italian port city of Trieste suffers from congested roads due to its hilly hinterland, while its old port awaits revitalization. An urban cable car could address both issues. According to current plans, a 10-passenger monocable gondola lift is to connect the hillside suburb of Opicina with the coastal district of Barcola-Bovedo. There, the line makes a 90-degree turn and runs along the coast to the Porto Vecchio station. Nearby are a conference center, museums, and a cruise terminal. From there, the cable car will travel along the wide road between the old port warehouses, ending at Pier IV in the center of Trieste. The selected 4.15-kilometer route thus offers a continuous connection between Opicina and the city center, with two intermediate stations along the coast. Additionally, it serves as a revitalizing axis for the emerging port district.



The route leads from the mountain to the sea with four stations, one is a corner station.

Cable car to relieve northern traffic

Giulio **Bernetti**, Director of the Department of Urban Planning, Environment, Public Works, and Cultural Heritage of the City of Trieste, outlined four main goals for the cable car in his presentation at INTERALPIN. The first is to connect the city center to the hilly northern areas by public transport:

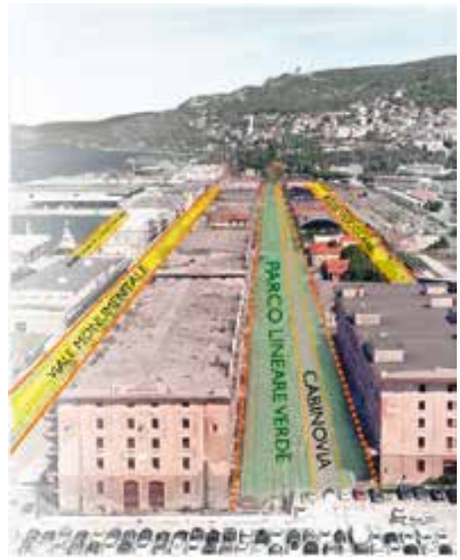
"Currently, many people commute to Trieste via inadequate roads and overcrowded rail lines. Coming from Slovenia or via the Italian highways, they will be able to park in Opicina and reach the city center in twelve minutes by cable car," said Bernetti. A two-story parking garage with 400 spaces and bus stops will be built at the Opicina station. This infrastructure is included in the already fully funded €62 million investment.

Cable car for the old "new" port

In the city center – between the sea and railway infrastructure – the old port covers 66 hectares. Long neglected, the area is now being redeveloped into a new urban district with apartments, museums, conference centers, hotels, offices, and shops.

"This new quarter will generate more than 20,000 trips per day. The cable car will absorb part of that," explained Bernetti, noting the second major goal.

INTERALPIN URBAN DAYS CONTENT OFFICIAL MEDIA PARTNER



The cable car runs through the third corridor of the port area. © City Triest

■ CABLE CAR TRIESTE

Section 1: Opicina – Bovedo	
- Length:	*2,260 m*
- Towers:	*19*
Section 2: Bovedo – Pier IV	
- Length:	*2,548 m*
- Towers:	*18*
Total capacity:	*1,800 – 2,400 p/h*
Headway:	*20 seconds*
Total length:	*4,808 m*
Total towers:	*37*
Cabin capacity:	*10 passengers*
Cabins:	*80 – 100*
Total investment:	*€62 million*

Cable car for peripheral neighborhoods

The third goal is better connection between the neighborhoods of Barcola and Opicina. Until now, they've been poorly connected to each other and to the city center. "The cable car will link both locations in just six minutes," Bernetti said.

Cable car as a tourist attraction

The fourth goal is to market the cable car as a tourist attraction. "The cabins will offer scenic views, allow bikes onboard, and connect the city center to nearby mountains and park & ride facilities," Bernetti added.

Cable car and its environment

An in-depth analysis of the origin-destination matrix, route planning, and modal shift projected a capacity of 5,000 passengers and 10,000 trips per day – taking into account the future development of Trieste and its old port area. "The environmental impact of the cable car will be minimal. The northern nature reserve will only be touched at its edge, and the CO_2 footprint will be relatively low," emphasized Bernetti. Furthermore, the interventions will be offset by new green areas, conservation zones, and tree planting.

Heritage conservation in the old port will also be respected, with the cable car closely integrated into district planning. "The port consists of four corridors – the waterfront by the sea, the Culture Line in the second row, the Nature Line with the cable car and green spaces in corridor three, and the already implemented Open City Line completing the area," explained Bernetti.

Cable car and politics

The cable car is included in all major planning documents for Trieste, including the Sustainable Urban Mobility Plan (SUMP), the Sustainable Energy and Climate Action Plan, the Master Plan for the Old Port, the Old Port Guidelines, and the city's overall Master Plan. All of these went through public consultation phases, as required by law. These included public information events, topic-specific workshops, and hearings involving numerous stakeholder groups.

"Involving the public takes a lot of time, carries the risk of lacking political responsibility, and often meets with low public interest, as people generally don't find planning processes exciting," said Bernetti. Additionally, it raises the question of who actually participates – often it's so-called NIMBYs ("Not in my backyard"), people who oppose changes in their immediate surroundings. Expert opinions are frequently disregarded or given little attention.

Cable car and current status

The planning phase for Trieste's cable car is complete. A local urban planning variation still needs city council approval. The final project design is ready and can now be reviewed by a conference of all involved authorities, Giulio Bernetti concluded: "Construction could begin by the end of the year." *ts*

□ *Giulio Bernetti, Director of the Department of Urban Planning, Environment, Public Works, and Cultural Heritage of the City of Trieste*

"We have solid data and studies. Nevertheless, there are objections to the cable car, particularly regarding traffic demand, environmental impact, and the protection of cultural heritage. These objections come from opposition parties, environmental organizations, and a citizens' association. One communication challenge is that public administration cannot keep up with social media, where misinformation is circulating. Despite this, I am confident that we can begin construction by the end of 2025."

GRANADA

SULAYR PROJECT: AN URBAN CABLE CAR FROM THE SPANISH CITY TO THE MOUNTAINS

Around 230,000 people live in the Spanish city of Granada. The Andalusian university city, home to the famous UNESCO World Heritage site "La Alhambra," is the gateway to the Sierra Nevada – a popular mountain region. However, this also brings traffic problems between Granada and the tourist resort of Pradollano. The mobility project "Sulayr" aims to address this with a cable car as part of the solution.

© Carlos Rodríguez

Granada is the gateway to the Sierra Nevada: Will a cable car soon take passengers there?

The Sierra Nevada mountains in Spain are a sought-after destination year-round for both tourists and local residents of Granada. Visitor numbers continue to rise: in 2024, there were 800,000 skiers and 330,000 other visitors. The access roads are heavily used, with up to 221,400 vehicles per month, or 7,100 per day, on the A-395 road during peak periods.

Traffic congestion, noise, and exhaust emissions are the result. In the Sierra Nevada, littering along the road, parking shortages, and other negative experiences for visitors are common. At the same time, political and societal pressure is increasing for more sustainable mobility, driven in part by EU initiatives to reduce greenhouse gas emissions by at least 55 percent by 2030 and 100 percent by 2050. The regional strategy plan of the CETURSA ski area also aims to make tourism in the Sierra Nevada more environmentally sustainable.

Integrated mobility plan

For these reasons, work is underway on the integrated, sustainable mobility plan Sulayr, which aims to intelligently connect Granada and Pradollano through trains, metro, bicycles, e-scooters, a cable car, and electric buses.

Sulayr seeks to improve mobility through new transport corridors while enhancing environmental and living quality by reducing noise and air pollution. The project also pursues cultural and tourism goals, such as reducing seasonal dependency, promoting year-round tourism, expanding visitor services in less-developed parts of the Sierra Nevada, and better connecting the region to Spain's high-speed rail network.

A chain of transportation options

Including a cable car in the mobility plan reflects a multimodal concept for sustainable transport. Together with trains, metro, and e-buses, it creates an integrated public transport connection that makes access to the Sierra Nevada much more environmentally friendly. The cable car in particular enables low-emission transport – quiet, efficient, and safe.

TRI-LINE FACTS

- *Capacity of up to 8,000 p/h/d*
- *Speed up to 7 m/s*
- *Long rope spans, high vertical rise*
- *Stations with low concrete volumes*
- *Wind stability up to 100 km/h*
- *Cabin up to 20 passengers*
- *On-board power*
- *Barrier-free*
- *Autonomous ropeway operation*

The plan envisions a TRI-Line – a combination of a three-cable system and the advantages of a monocable gondola. © DOPPELMAYR

Cable car extends metro service

Visitors arrive via the existing high-speed train to Granada and transfer to a 6.8-kilometer metro line. Its terminal station, "Cenes," is designed as a multimodal hub, including a parking garage for 1,800 cars, bicycle and scooter parking, logistics for goods, and a shopping area. Cenes is already where visitors form carpool groups to the Sierra Nevada, making it an ideal transfer station. From there, passengers switch to the cable car, which passes over three intermediate stations en route to Pradollano.

Three intermediate stops

The first stop, "Neveros," will open a planned bike park and a paragliding launch area, attracting two key visitor groups. The station "Trevenque" facilitates access to the mid-mountain ranges of the Sierra Nevada, which, although scenic, are currently little visited. The "Botanical Garden" station connects to the Hoya de Pedraza park, known for its diverse flora and fauna, offering spectacular panoramic views of the Sierra Nevada mountains.

Car-free Pradollano

Upon arrival in Pradollano, electric buses will cover the last mile, largely replacing private vehicles. The goal is a nearly car-free village with a large pedestrian zone. Road access will be limited to residents, hotel guests, and tourism staff.

The cable car is planned to extend the metro line by five stations. © Project Sulayr

Strong promotion of micro-mobility (e-bikes and e-scooters) will be a key element both in Pradollano and Granada. Similar projects already exist in Swiss towns such as Zermatt, Bettmeralp, and Stoos. Vehicle access would be controlled via automatic license plate scanning.

Accessible and safe

The cable car itself combines innovative technology with maximum operational safety – even in adverse weather. No traffic jams, waiting times, or exhaust emissions. Cable cars' accessibility features make them ideal for families with young children, older people, and individuals with disabilities. A capacity of 1,800 to 2,600 passengers per hour is realistic, depending on the number of cabins.

A system for transporting goods is also planned. In other regions, such as Grindelwald in Switzerland, these have been successfully implemented. A special feature allows efficient, automated transport of goods and equipment without affecting regular passenger service.

Funding

With an appropriate assessment and socio-economic benefit, the cable car could receive support from European funds. Additionally, the cable car would serve as a tourist attraction and could sustainably develop and energize the entire region. *ts*

MOBILITY 2050

THE URBAN MOBILITY OF THE FUTURE AND THE ROLE CABLE CARS WILL PLAY

The megatrends of urbanization, climate change, and individualization are already shaping mobility in cities today. What will urban transportation look like in 2050, and what role will cable cars play? Traffic expert Claudio Büchel discusses mobility in the past, present, and future.

Mobility hubs for cable cars, trains, buses, etc., can shape cities. © Claudio Büchel/Aletsch Arena

Between ten and fifteen minutes – that's how long people in the city typically spend traveling from point A to point B. This time span has remained almost unchanged since 1800, according to Claudio **Büchel**, lecturer in urban, traffic, and spatial planning at the Eastern Switzerland University of Applied Sciences (OST).

Whether it was a pedestrian in the 19th century, a tram passenger in the 20th century, or a car driver around the turn of the millennium – they all spent roughly the same amount of time on their daily journeys, the traffic researcher explained in his keynote at the INTERALPIN Inspiration Days 2025 in Innsbruck. And this, he says, is likely to remain the case in the future.

Büchel points to the urban planning concept of the 15-minute city, where all essential daily facilities can be reached within 15 minutes on foot or by bicycle. The goal is a livable, sustainable, and environmentally friendly city, where residents rely less on cars and enjoy a higher quality of life.

The concept originated in Paris and has already been implemented in several major cities. Nevertheless, a two-tiered system still tends to dominate.

Mono- versus multimodal

"In cities today, the monomodal, car-based mobility system dominates. The car serves as the mode of transport for all purposes, whether commuting, shopping, leisure, or goods delivery," says Büchel.

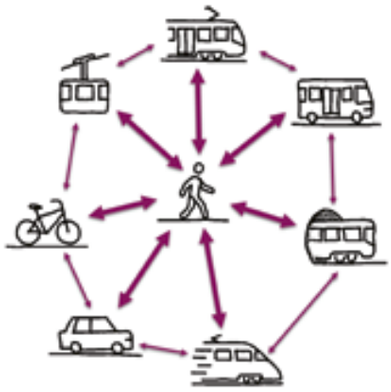
While the direct route from door to door – or more accurately, from parking spot to parking spot – is convenient, it requires a lot of space and energy. "Alongside this system, many places still have a multimodal public transport network. Depending on the purpose, people use different modes of transport," Büchel explains. Trains are used for long distances, and buses for shorter trips. The "last mile" is covered on foot or by bicycle.

"The multimodal system requires inconvenient transfers, but it is very space- and energy-efficient," says the traffic researcher. The goal must be to better connect both systems. Only in this way can the megatrends be addressed: Urbanization, with more and more people living in confined spaces. Global warming, creating new microclimates in cities and increasing the pressure to develop emission-free areas. Individualization, with a decline in uniform mobility patterns.

Demand for seamless transfers

But aren't the car and transit worlds already connected today, for example through park-and-ride or kiss-and-ride options? Not really, according to Büchel: "Commuter parking lots are not real urban spaces. Drop-off and pick-up zones, in turn, cannot handle the high transport demand."

The future lies in a comprehensive transport system that is energy- and space-efficient and connects all modes of transport. "For each individual journey, we will use the most convenient, fastest, and cheapest mode of transport. The demand for seamless transfers will



Connectivity as the key: By 2050, we will be combining different modes of transport.

Every mode of transport has its strengths, which can be combined. © Claudio Büchel

therefore be high," says the traffic researcher. Every mode of transport has different strengths that must be recombined for each route. This also includes urban cable cars. They can help make cities greener by 2050 – in terms of energy management, vegetation, and climate-damaging emissions.

Form follows function

It is important to carefully define which mode of transport is best, when, where, and how. "Form must follow function," emphasizes Büchel. First, the requirements need to be clarified before choosing an appropriate system. In the Swiss mountain village of Bettmeralp, for example, the cable car was the mode of choice, as it provides the fastest connection between the train station and the village center. The capacity of 1,000 people per hour is sufficient in this case. Since the village is designed to be car-free, the cable car must do more. The gondola, for instance, can also transport waste – as underload in the cabins.

Connectivity as the key

"Connectivity is the key. It links urban space with the transport system and enables transfers between different modes of transport. It also generates economic benefits, provides more public space, and shapes a city's identity," explains Büchel. According to the traffic researcher, there are already examples of successful connectivity. "In Zurich, two suburban trains used to terminate one kilometer before the main station. Through the construction of two new tunnels, the rail lines were connected to the rest of the regional and national transport network, resulting in a 100 percent increase in passenger numbers over ten years," emphasizes Büchel. Another example is the funicular in Luxembourg. It connects key railway lines across challenging topography with the tram network and already recorded 7,500 passengers per day just one year after opening.

The funicular eases congestion at the main station and reduces travel time on certain routes by more than 20 minutes. *ts*

In Bettmeralp, the cable car even transports the waste collection. © Schweiz Tourismus

The funicular in Luxembourg connects the intercity and regional trains to public transport in the Grand Duchy. © Fluxx (Schweizer Mobilitätspreis)

At the INTERALPIN trade fair in Innsbruck, Austria, the Indian cable car development program was presented. © INTERALPIN

INDIA

CABLE CAR DEVELOPMENT PROGRAM WITH FOUR BILLION DOLLARS IN INVESTMENTS

"The market for urban cable cars in India is set to explode," promised Prashant Jain, Vice President of the Cable Car Division at the state-owned National Highway Logistics Management Limited (NHLML), at the leading global trade fair INTERALPIN in Innsbruck, Austria. Together with the overarching Ministry of Transport, NHLML presented India's ambitious development program for urban cable cars.

71 urban cable car projects covering a route length of 250 kilometers and representing an investment volume of 4.4 billion US dollars by March 2030 – the figures behind the "Parvatmala Pariyojana" are impressive. India's cable car development program, valued at 4.4 billion USD, is a response to the vast, still untapped potential of this mode of transport, as **Shri Syed Qamar Ahmad**, CFO of NHLML, emphasizes. On the one hand, India is densely populated; on the other, around 30 percent of the country is made up of hilly and forested terrain – urban cable cars are often the ideal solution to overcome such obstacles and enable mobility. Currently, India lags far behind other countries with its 71 cable car projects – compared to more than 170 in Japan and over 1,700 in Switzerland, not to mention major cable car nations like the USA and Austria (each with over 2,000), or France (with more than 4,000). But the subcontinent is determined to close the gap.

Centrally coordinated plan

The implementation of urban cable cars in India has a clear political dimension: at the top is the Ministry of Transport, which coordinates all state investments in the country's mobility and manages a project pipeline worth 1.4 trillion US dollars. Reporting directly to it is the National Highways Authority of India (NHAI). This agency is one of the world's largest infrastructure developers and is primarily responsible for India's highway network. Under its umbrella, the previously mentioned NHLML focusing on the country's logistics infrastructure to enhance economic efficiency. For example, NHLML is expanding India's fiber-optic network, building multimodal logistics parks, installing roadside infrastructure, and integrating ports into the national transport network. "And last but not least, NHLML is the central agency for implementing cable car projects under the Parvatmala Pariyojana," emphasizes CFO Ahmad.

Cable cars in India: in progress (NHLML)		
Place	**Length**	**Type of cable car**
Kedarnath	12.9 km	3S gondola lift
Varanasi	3.9 km	Monocable gondola
Biljli Mahadev	2.32 km	Monocable gondola
Shankaracharya	1.05 km	Monocable gondola
Prayagraj	2.20 km	Bicable aerial tramway
Ujjain	1.76 km	Monocable gondola
Dhosi Hill	0.99 km	Bicable aerial tramway
7 projects	**25 kilometers**	**648 million US-$**

Cable cars in India: in tendering (NHLML)		
Place	**Length**	**Type of cable car**
Hemkund	12.4 km	Mono/3S gondola
Nainital	14.9 km	Monocable gondola
Tawang	5.15 km	Monocable gondola
Kamakhya	1.44 km	Monocable gondola
Ramtek	2.20 km	Aerial tramway
Nashik	5.72 km	Monocable gondola
Tikitoriya	0.99 km	Bicable aerial tramway
7 projects	**40 kilometers**	**652 million US-$**

Cable cars at all project stages

Besides many ideas, seven NHLML projects with a total route length of 25 kilometers and an investment volume of 648 million US dollars are already underway *(see table above)*. Additionally, 13 projects are currently being implemented by other operators, covering a total of 38 kilometers. Another seven projects, totaling 40 kilometers of cable car routes and a budget of 652 million US dollars, are currently out for tender.

Many sectors benefit

According to Ahmad, India's national cable car plan offers numerous opportunities along the value chain: NHLML estimates 12.5 million dollars for project design and consulting, 132 million for site supervision, and 42 million for permits and safety inspections. "We estimate annual operating hours to exceed 240,000, private investment volume to range between 2.5 and 3 billion US dollars, and the expenditure for cable car components to reach 3 billion US dollars," says the CFO of NHLML.

India relies on PPP models

To build and operate the cable cars, NHLML depends on Public-Private Partnerships (PPPs). According to Ahmad, these are characterized by a standardized concession frame-work, a scalable PPP structure, investor-oriented risk-sharing, and a supportive environment from tendering to commissioning.

This environment is made possible by strong institutional backing, which quickly resolves disputes and expedites approvals, according to NHLML.

"Global standards implemented locally with national support," summarizes Ahmad.

"Make in India" as a goal

The long-term aim of the cable car development program is to shift part of the manufacturing to India. Alongside the project pipeline of 71 installations and an investment volume of 4.4 billion US dollars, lower material and production costs as well as economies of scale are intended to encourage foreign companies to invest in India. Project planners and site supervisors, manufacturers producing domestically, cable car operators and controllers, as well as investors who see urban cable cars in India as a major opportunity, are being sought. "Our country also boasts technical excellence through state-of-the-art manufacturing capacities," emphasizes Ahmad. Last but not least, the government provides companies with political and financial support under the "Make in India" program. *ts*

The urban cable car in Varanasi will begin operations shortly, with more systems set to follow nationwide. © BARTHOLET

HOW MUCH CAN THE CABLE CAR CARRY?

ABOUT THE CAPACITY OF URBAN CABLE CARS – AND THE ADJUSTING SCREWS

There are just over 60 purely urban aerial cable cars worldwide. How many passengers do they transport on average? And how can transport capacity be increased without consuming too much energy? The cable car manufacturer LEITNER and the operator Mexiteleféricos have found answers to these questions.

Linea Verde in Ecatepec (Mexico City) demonstrates what cable cars are capable of. © LEITNER

Between 2004 and 2023, the three largest cable car manufacturers – POMA, LEITNER, and DOPPELMAYR – implemented more than 60 cable car lines worldwide that are designed purely for urban use without a primary focus on tourism. How many passengers these systems transport on average – and what more might be possible – are questions that Klaus **Erharter,** Technical Director at cable car manufacturer LEITNER, and Paul **Abed**, Director of the urban cable car operator Mexiteleféricos S.A. de C.V., have explored.

The acceptable waiting time for cable cars is around seven minutes, says Paul Abed from Mexitelifericos SA.

Cable cars usually operate at 5 m/s

To begin with, both experts compiled statistics on operating speed, number of cabins, transport capacity, and inclined length of urban cable cars: 50 percent of the 60 systems built operate at less than five meters per second (m/s), while 41 percent run at speeds between five and six meters per second. Only five percent of cable cars operate faster than six meters per second, and just three percent exceed seven.

A large number of cabins is the exception

When it comes to the number of cabins, many urban cable car systems are relatively small: on 46 percent of the lines, there are no more than 50 cabins. The remaining systems are divided into those with 50 to 100 cabins (16 percent), 100 to 150 gondolas (11 percent), 150 to 200 vehicles (16 percent), and a few extreme cases with more than 200 cabins (8 percent).

3,000 passengers is the standard

Perhaps the most interesting figure is transport capacity: 45 percent of urban cable cars carry between 2,000 and 3,000 passengers per hour per direction (p/h/d). Another 21 percent fall into the smaller (up to 1,000 p/h/d) and medium-sized (1,000 to 2,000 p/h/d) categories. Only ten percent of urban cable cars transport between 3,000 and 4,000 people, and capacities beyond that are rare – accounting for just under two percent.

More than five kilometers is rare

A large share of urban cable cars – 46 percent – have a length between one and three kilometers. 20 percent are shorter (under one kilometer),

while 26 percent are longer, ranging from three to five kilometers. Only six percent of systems exceed five kilometers in length.

Case study: Linea Verde Ecatepec

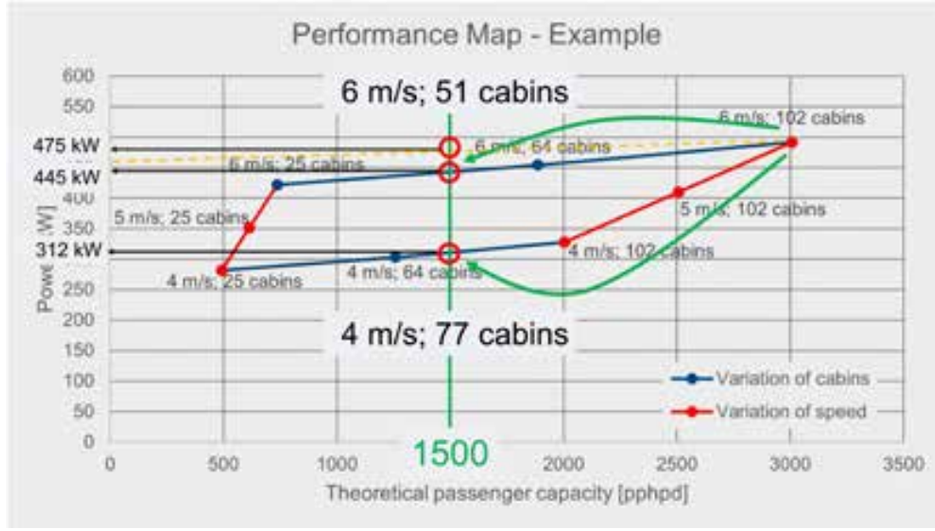
Given these technical facts, how can the transport capacity of urban cable cars be increased without compromising efficiency and causing excessive energy consumption? To answer this, Erharter and Abed moved away from the global perspective and focused on Section A of the Linea Verde cable car in Ecatepec near Mexico City.

This section is about three kilometers long, operates at six meters per second, and transports 3,000 passengers per hour per direction. Utilization varies depending on the time of day, the day of the week, and typical weekdays. On an ordinary workday, around 36,000 passengers are transported during operating hours from 5 a.m. to 11 p.m.

Control parameters

To change the transport capacity, both the number of cabins and the operating speed can be adjusted. The number of passengers per cabin, however, has only a minor impact on efficiency, reports Abed: "Less than ten percent of energy consumption actually depends on occupancy. Reducing the number of cabins hardly affects energy consumption." It is more efficient to reduce the number of cabins than the number of passengers per cabin. An oversized system with too many circulating cabins is definitely not energy efficient. "On the other hand, the operating speed has a massive impact on energy consumption. The relationship is almost linear," explains Erharter.

Klaus Erharter from LEITNER recommends designing cable cars so that additional cabins can be added.



A higher operating speed consumes significantly more energy: The number of cabins and the operating speed are the main control parameters for transport capacity.

Configuration comparison

The two experts then explored alternative configurations for Section A of the Linea Verde cable car in Ecatepec – with varying operating speeds and transport capacities. To do this, they changed, on the one hand, the number of supports, sheaves, and cabins.

On the other hand, they modified the length of the stations and the drive power. This allowed them to calculate the investment costs, energy consumption, and CO_2 emissions for each scenario.

Collected experience

The result: A cable car with a transport capacity of 3,000 passengers per hour per direction can easily handle a daily ridership of 36,000 to 40,000 passengers. This translates to an annual passenger volume of up to 12 to 15 million.

"There are two peak periods during which full capacity is needed. During these peak times, a limited waiting time can be accepted – in Ecatepec, for example, seven minutes were observed," says Abed. During periods of lower demand, it is advisable to reduce the speed, which can decrease both energy consumption and CO_2 emissions. When the speed is reduced from 6 m/s to 5 m/s, both decrease by 15 to 20 percent. "The CO_2 footprint per passenger-kilometer traveled is only 24.5 grams, making it virtually unrivaled," Erharter remarks proudly.

Recommendations

"Cable cars are infrastructure-driven modes of transport, where actual occupancy has only a minor impact on investment and lifecycle costs. We strongly recommend a precise analysis of the expected traffic flows," Erharter continues. Under-dimensioning leads to long waiting times and is difficult to correct afterward. Over-dimensioning, on the other hand, results in high investment and operating costs as well as an increased CO_2 footprint, concludes the Technical Director of LEITNER: "A slight over-dimensioning provides room for future higher passenger numbers. It is advisable to create this room by designing for a higher number of vehicles rather than by increasing the nominal speed!" *ts*

SI URBAN NEWS

KOBLENZ: DELIVERY BY CABLE CAR

Darmstadt University of Applied Sciences, DHL, and the Koblenz cable car operator (Germany) are conducting a field trial to explore whether parcels can be delivered by cable car to a new residential area being developed on the site of the former Fritsch military barracks above the city. The project is called "Skyfreight." This is how uphill delivery should look like: Couriers load packages into cable car cabins at the valley station, at the hilltop station, parcels are unloaded and delivered to the residential area by drivers using e-bikes. Return shipments are collected via e-bike and brought to the hilltop station. They are then loaded into the cable car and transported back to the valley station for processing.

Among other things, it is being investigated how long it takes to store the packages, how passengers react, and whether the order of packages and passengers plays a role. Scientists see this transport solution as a relief for delivery traffic, since delivery vehicles no longer need to drive into the higher-elevated residential area. In addition, it makes deliveries by DHL and other companies more environmentally friendly by reducing emissions.

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MEXICO: LONGEST URBAN LINE?

The government of Mexico City and the federal government of Mexico have announced the upcoming Cablebús Line 4, which, according to politicians, will become the longest urban cable car line in the world at 11.4 kilometers. The new route, which will serve over 65.000 people daily, will shorten travel times and reduce the commute for residents of high-altitude and hard-to-reach areas in the southern part of the city from one hour to just 40 minutes. The line is planned to include eight stations and connect 30 neighborhoods in Tlalpan as well as nine in Coyoacán. Additionally, it will provide access to marginalized areas such as Pedregal de San Nicolás and create strong connections to key points in the city's transit network, including Metro Line 3, Metrobús Line 1, Trolleybus Line 12, and the tram. To further improve accessibility and safety in the areas, the Cablebús project is complemented by "Safe Walkways." These will provide well-lit, walkable paths that allow passengers to reach the stations easily and safely on foot. Mexico City currently operates three Cablebús lines. Since their opening, the three lines have handled over 160 million trips combined, significantly improving daily life and accessibility for people. © The government of Mexico

VIENNA: RED TAPE CHALLENGES

The cable car project on Vienna's mountain, Kahlenberg, (Austria) has entered a new bureaucratic phase: The Administrative Court has sided with the project's opponents regarding an assessment under the Environmental Impact Assessment Act. Originally, it was assumed that no environmental impact assessment (EIA) was required for this cable car, as it occupies little space. Nevertheless, the former Ministry of Climate Protection requested an EIA determination procedure in 2023. The Vienna state government decided in 2024 that no EIA was necessary, but the Federal Administrative Court overturned this decision in October 2024 and sent the assessment back. Based on the most recent findings of the Administrative Court, an individual case review for the EIA must now be carried out. The initiative group plans for the Kahlenberg cable car to improve connections to the subway and suburban trains, reduce car traffic, and enhance the quality of life in the affected neighborhoods. The project is to be powered entirely by clean electricity from its own photovoltaic systems. The investment costs amount to approximately 70 million euros. Construction should be privately financed.

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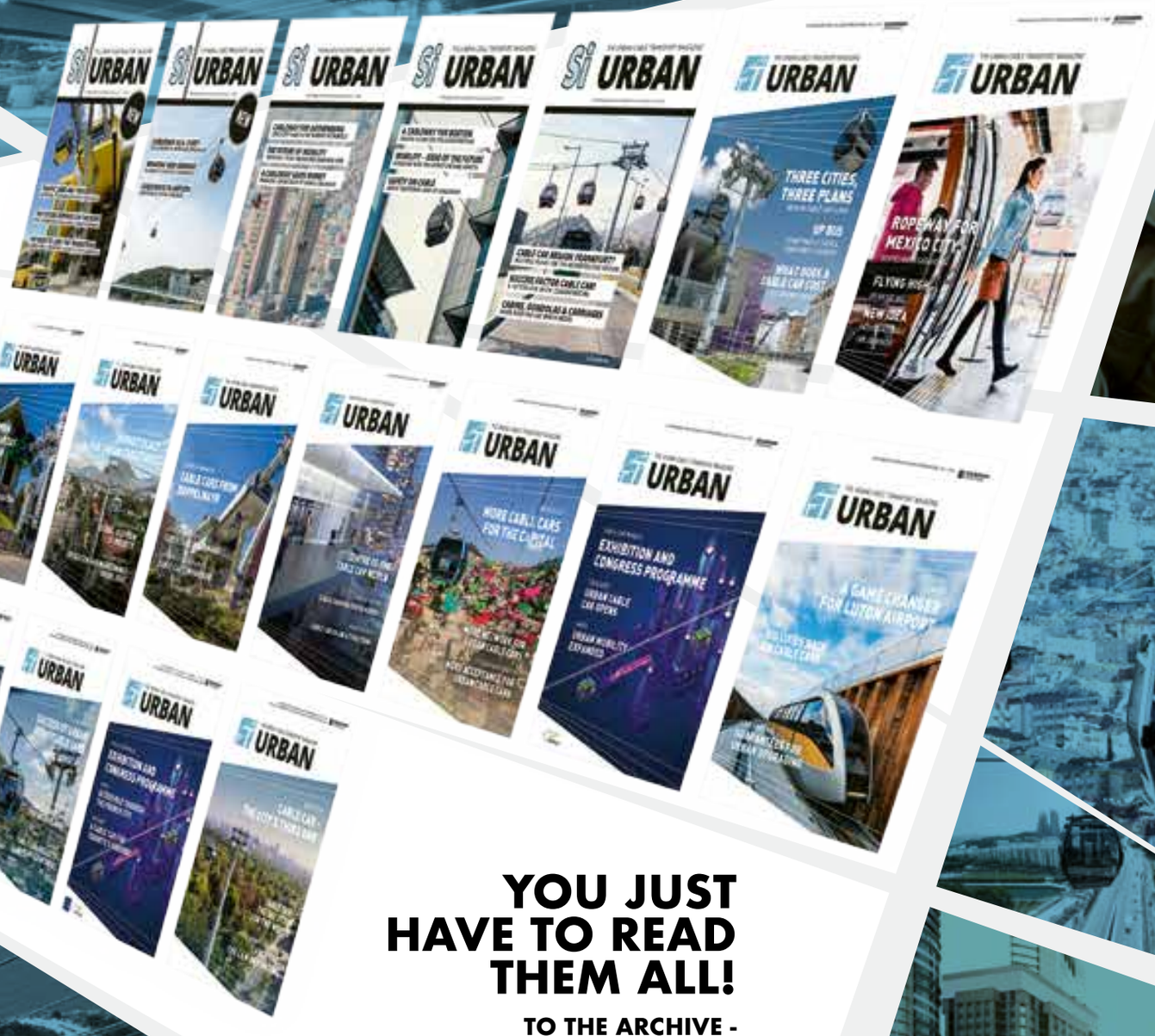

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