

Ropeways in the urban environment



 ... to new mobility.

 From proven technology ...



The only way is up

Cities around the globe face complex challenges. One of the ways in which Portland's former mayor addressed architectural, social and economic issues was to build an urban ropeway. Because a transport network that meets the needs of the local population and the economy is a key factor deciding the competitiveness and the attractiveness of a city. Despite all their historical and geographical differences, many urban areas today face similar traffic problems.

When it comes to encouraging people to switch from private transport to public transit systems, urban ropeways have a major role to play. They can be combined with existing modes of transport to fill a gap in the transport network. They

cross natural obstacles such as rivers and differences in elevation, link densely populated areas, help to relieve routes with high volumes of traffic or extend existing lines.

As cities grow, so the competition for the remaining space intensifies. In many cases, it is no longer possible to expand the existing road network. Problems are compounded by a lack of existing transport infrastructure as well as by built-up inner or outer city areas with inadequate links to central transport systems. Underground rail schemes often founder due to the level of investment required. The solution: open up a whole new plane for passenger transport.

➤ I viewed my mission as mayor to build the city physically as well as socially and economically. This is one physical build that I am proud of.

Former Portland mayor Vera Katz



A breath of fresh air

With more and more cars clogging up the roads, journey times continue to increase. Traffic jams and smog are part of daily life. A shift from private to public transport is often hindered by congested traffic routes which slow down conventional means of transport, making them significantly less attractive.

Urban ropeways are far more than a practical add-on to supplement car, bus and rail. As a cost-effective mode of transport that can readily be integrated into existing urban spatial structures, the ropeway harbors enormous potential for the social development of extra-urban communities. Experience shows that new urban centers establish themselves around ropeway stations.



➤ When we bring a transport system into an outlying area, we breathe new life into communities.

Alfredo Brillembourg, Professor of Architecture and Urban Design at the Swiss Institute of Technology (Eidgenössische Technische Hochschule, ETH) in Zurich and Co-Director of the Urban Think Tank





Essential for urban mobility

The urban ropeway is a highly versatile mode of transport – whether used as a feeder for industrial and commercial zones, for the targeted development of an area or for tourism. There are a range of systems available to suit the respective applications.

Solid economic arguments give urban planners, architects and decision-makers entirely new scope for implementing ropeway projects. Barrier-free access, speed and safety are just three factors which make the ropeway essential for a modern, urban transport concept.



One means of transport – many benefits

- **Uses a new level**
Urban ropeways follow a dedicated route that is independent of other modes of transport.
- **High capacity with optimal energy efficiency**
Modern high-capacity installations carry up to 5,000 passengers per hour and direction.
- **Short building phase without traffic hindrance**
Ropeway projects can be implemented rapidly thanks to a high level of modularization and optimized work processes.
- **Spacious cabins**
Up to 35 passengers can be carried in one cabin – as well as bicycles, baby strollers and baggage items.
- **The world's safest means of transport**
Ropeways have a proven track record and are statistically the safest means of transport.
- **Direct connection**
This means the fastest route from A to B in built-up areas or in the case of physical obstacles.
- **Simple integration into existing public transit systems**
Continuous movement ropeways don't stop. Consequently, they have no problem interfacing with other modes of transport as there is no need to coordinate service frequency.
- **Low space requirements for stations and towers**
A minimal structural footprint enables ropeways to be built in densely populated cities.
- **No waiting times in stations**
Ropeways are continuous movement transport systems. That means: constant availability of cabins and no need for timetables.
- **Barrier-free mobility for all**
Level access for wheelchair users and passengers with impaired mobility while cabins run at minimum speed or stop.
- **Environmentally friendly and cost-effective**
Ropeways have a minimum impact on the environment and offer an excellent cost-benefit ratio.





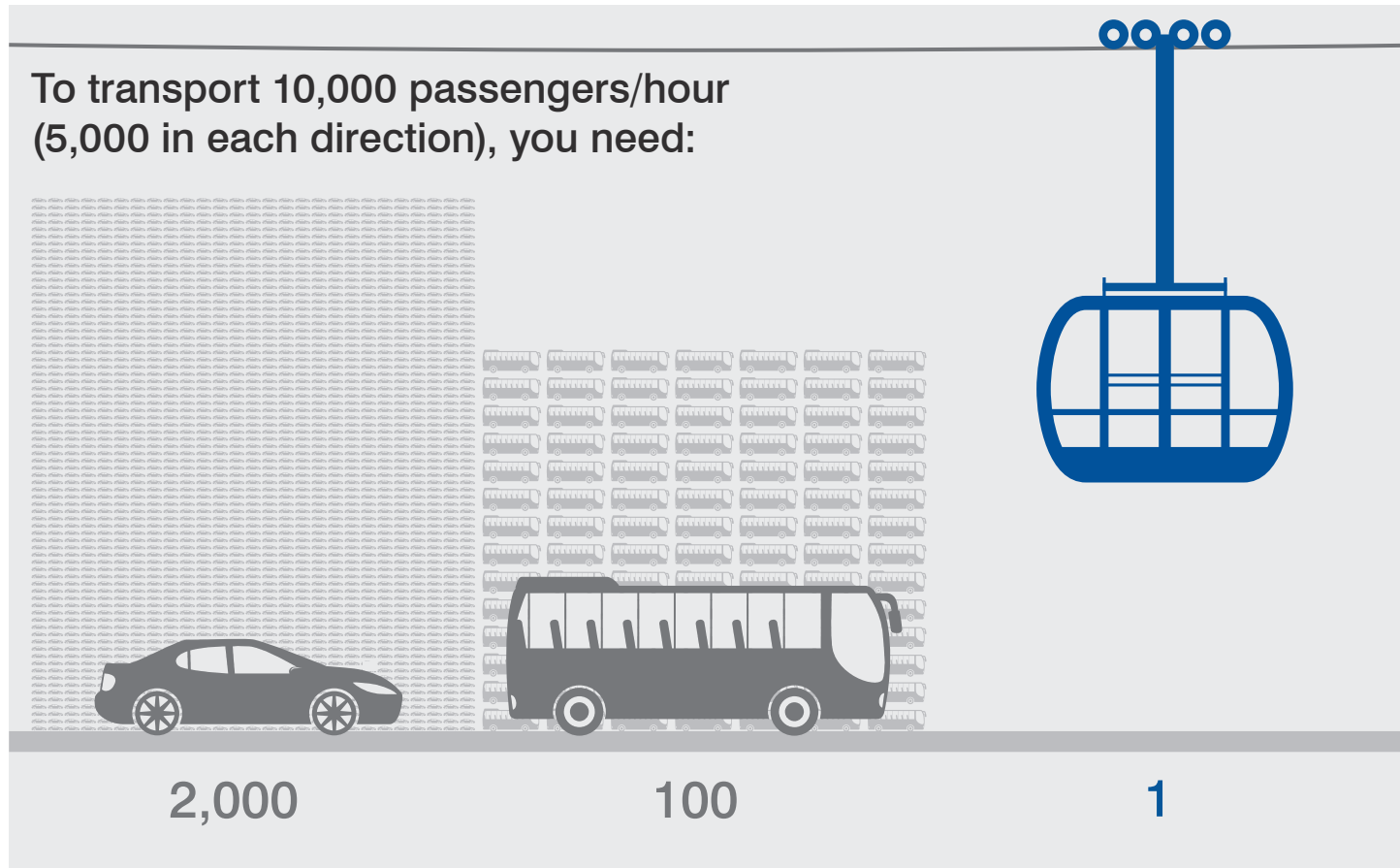
Greater mobility in the city

A ropeway can resolve a host of urban transport problems – as an additional means of public transport. Multimodal transport, i.e. an optimal mix of different forms of transport, is the hallmark of modern, urban networks. The special features of rope-propelled systems make them particularly well suited to fulfilling the transport functions shown opposite and put them way ahead of other means of transport.

Continuous movement ropeways come into their own on routes of up to roughly ten kilometers and a capacity of up to 5,000 passengers per hour and direction.

Modern systems can incorporate intermediate stations for changes of direction. They also allow the construction of an entire ropeway network where passengers transfer from one installation to the next.

In addition to aerial ropeways based on continuous or pulsed movement systems, automated people movers (APMs) and funicular railways are also used for urban applications. These use dedicated routes which are independent of other traffic.



What are the functions performed by a ropeway?

Fill gaps

Ropeways are particularly well suited to filling gaps between facilities that generate traffic such as hospitals or commercial zones and other outlying infrastructures. By acting as a connecting link, they extend and enhance the existing network.

Connect

Ropeways connect facilities which are organizationally linked but located far apart, such as on a campus, factory site or exhibition grounds. They can also be used as a car park shuttle to link buildings with their parking garages. Conventional forms of transport such as shuttle buses are often too expensive and too personnel-intensive.

Bridge

Ropeways cross barriers which cannot be passed using conventional public transport systems or only

at great expense. Not only topographical obstacles such as mountains or rivers but also transport infrastructure such as rail tracks or highways can be crossed in order to expand the transport network.

Create new transport networks

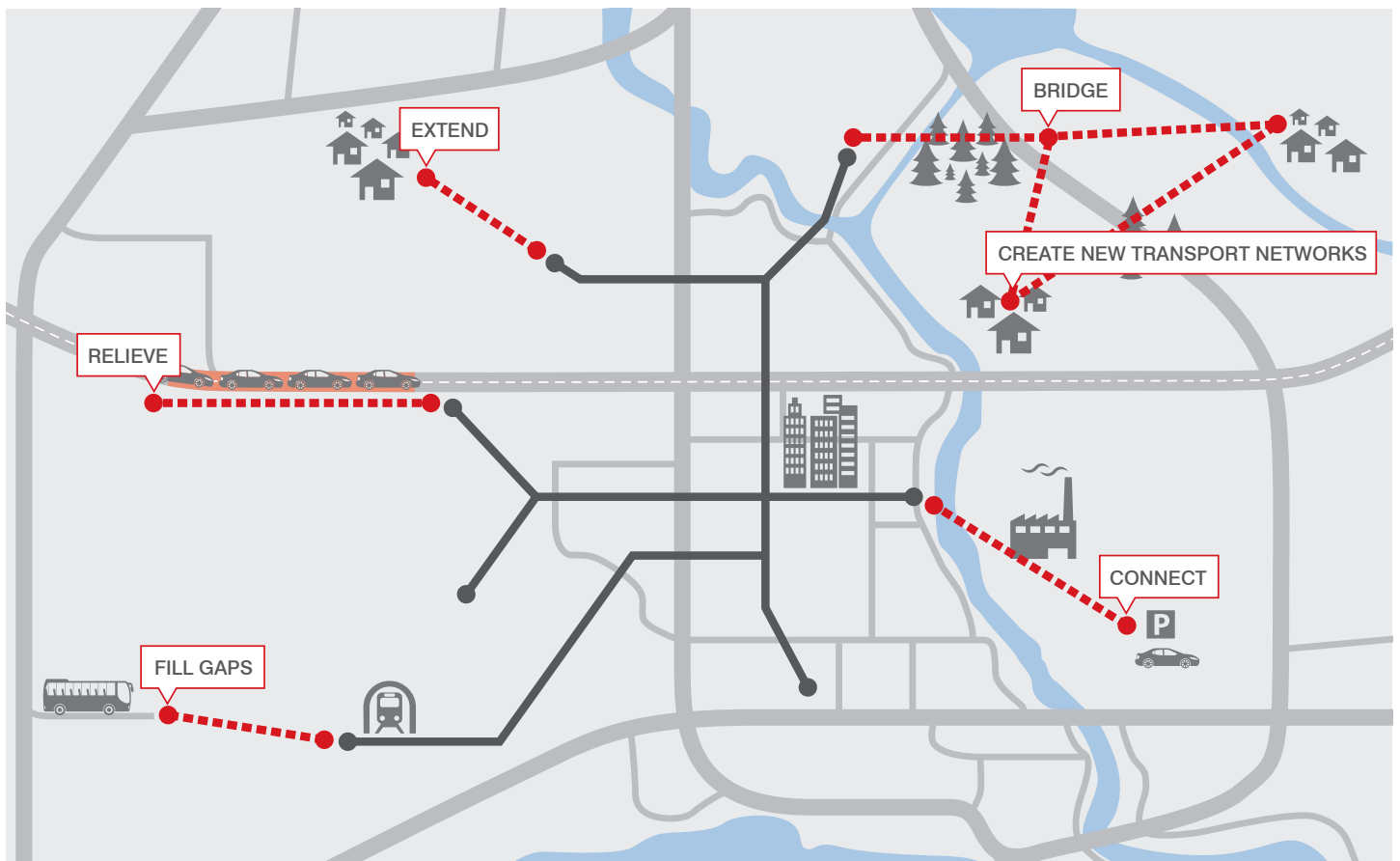
In urban areas with inadequate transport infrastructure, ropeways create a new transport network by linking up several ropeway lines.

Extend

Ropeways provide a practicable means of extending existing public transit routes (rail, subway, streetcar and bus lines).

Relieve

When conventional forms of transport and existing infrastructure reach their limits, ropeways can be used to alleviate traffic congestion.



Taking mobility to new heights



Low energy consumption

Ropeways are part of the trend towards electric mobility. Compared with other means of transport such as buses or streetcars, their energy requirement per person and kilometer is much lower. This is attributable to the ropeway's excellent ratio of payload (passengers) to self-weight.

High transport capacity

Modern ropeways such as the system in Coblenz (DEU) consume 0.1 kWh (kilowatt-hour) to carry one passenger over a distance of one kilometer, based on a capacity of 3,600 passengers per hour and direction. By way of comparison: A hair dryer consumes the same amount of energy in five minutes.

No electrosmog

Rope-propelled systems have no high-voltage power lines and tractor units. As the drive power is provided centrally, there are no cable masts and consequently electrosmog is not an issue. This is often a decisive argument in public consultation procedures.



Left: Emirates Air Line, London, GBR
Right: Mi Teleférico, La Paz, BOL

Safety

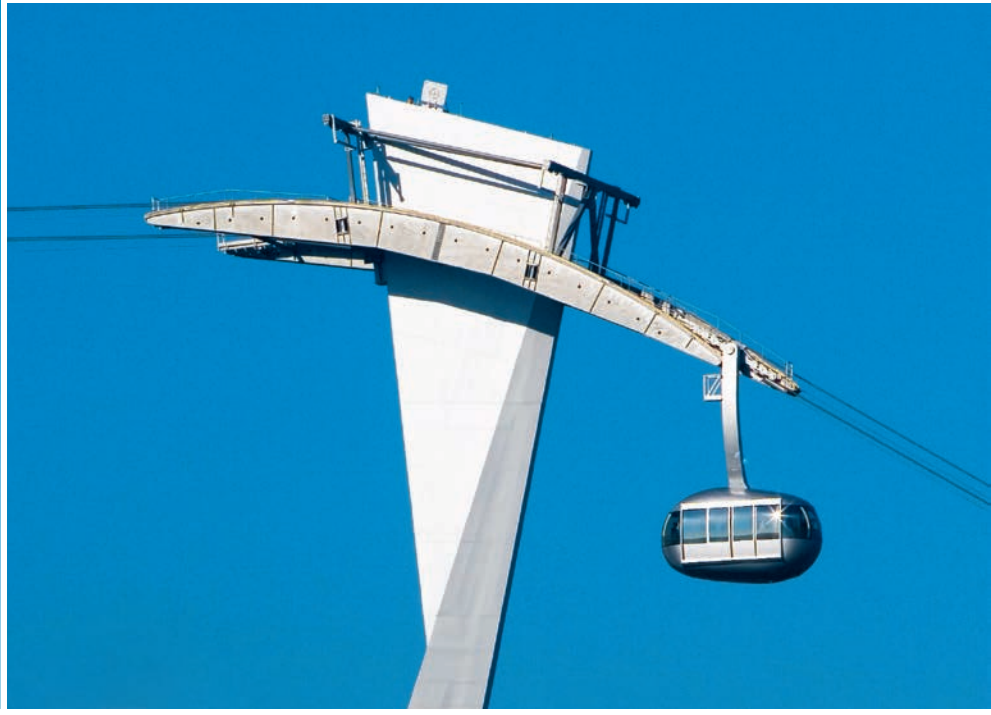
Ropeways can be equipped with an audio and visual communications system and centrally monitored. A certified recovery concept based on multistage backup systems ensures that the ropeway remains operational even if individual technical components should fail. All cabins can always be returned to the stations.

Resilience

Ropeways can also be used in regions which are exposed to extreme weather conditions. That includes high wind speeds which have long since ceased to be a problem for modern high-capacity installations. Operation is possible at wind speeds of up to 100 km/h, depending on system type.

Comfort

Heated in the winter – air-conditioned in the summer and in tropical regions. For enhanced comfort, Wi-Fi can be provided on ropeways – enabling infotainment systems, advertising and useful passenger information.



Top left and bottom: Emirates Air Line, London, GBR
Top right: Coblenz gondola lift, Coblenz, DEU
Center: Marquam Hill, Portland, USA

Greater planning and design scope

Ropeways can be easily integrated into the existing transport network and the urban environment thanks to their low space requirements. Apart from the towers and the stations, the actual transport level is in the air.

The alignment can be adapted to suit the local surroundings and the project planning is relatively straightforward. This makes ropeways a very flexible

means of transport that can be installed rapidly. In view of the fact that construction sites in cities disrupt traffic, a short building phase represents another major benefit for the urban environment.


Ropeways blend in effortlessly with existing architectural concepts. Stations and towers can be individually designed and provide an unmistakable landmark in many cities.



Flexible, sound, reliable

Urban ropeway projects create a dynamic all of their own. For this reason, the Doppelmayr/Garaventa Group offers comprehensive services tailored to suit the customer, which go far beyond project engineering and ropeway installation:

- Analysis of the transport situation
- Passenger flow studies
- Total cost of ownership analysis
- Personnel training
- Maintenance and spare parts management
- Management of all ropeway operations

 Urban ropeways -
the new mobility in cities



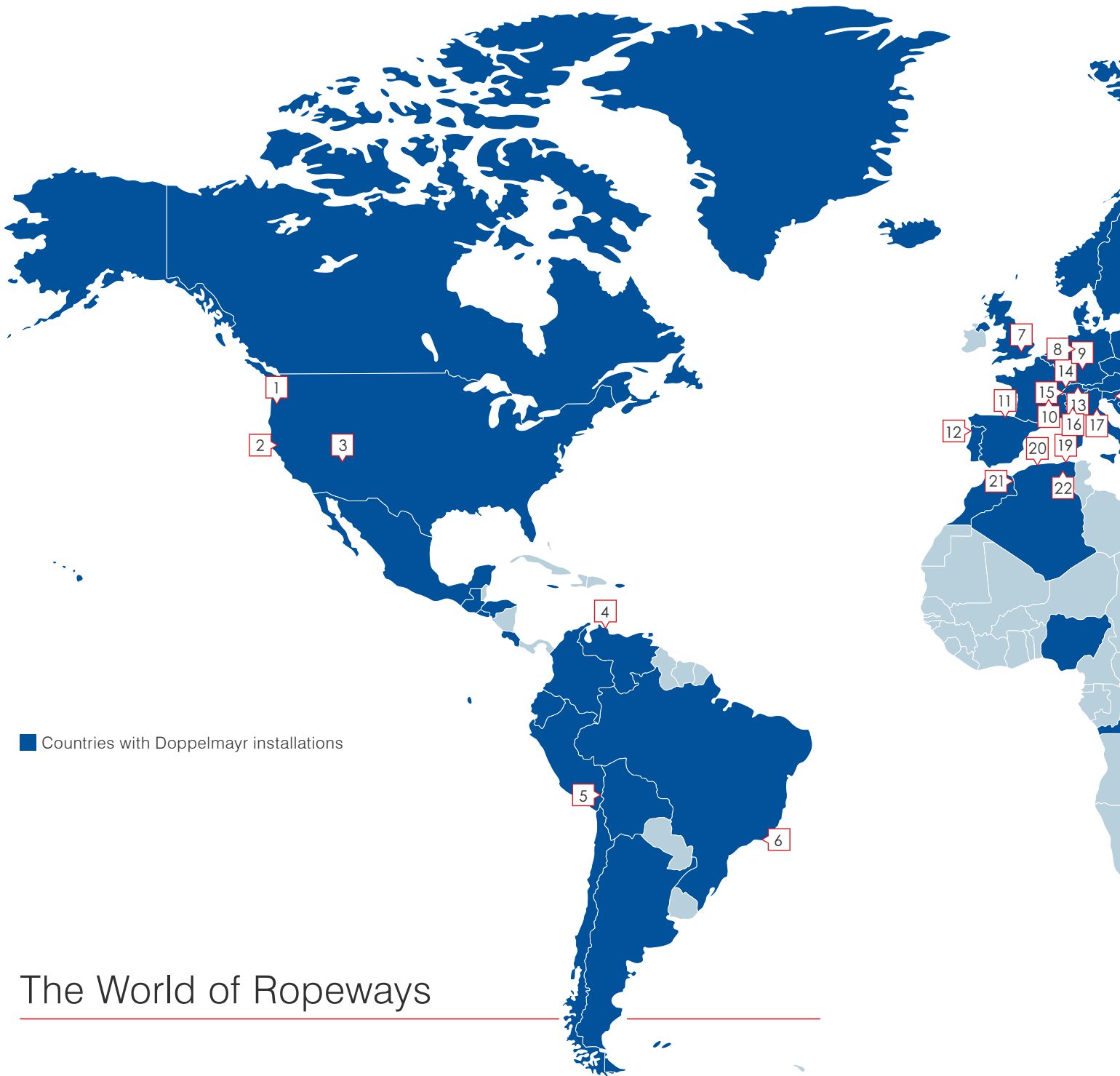
Left: Singapore Cable Car, Singapore, SGP
Center: Constantine, DZA
Right: Taksim-Kabatas, Istanbul, TUR

Key features at a glance

Urban ropeways open up a free, previously unutilized level for passenger transport:

- Fully automatic operation possible
- High capacity thanks to continuous operation
- Short construction phase, low costs
- Low space requirements
- Optimal integration into existing transport networks
- Barrier-free
- High comfort
- The world's safest means of transport
- Minimum environmental impact



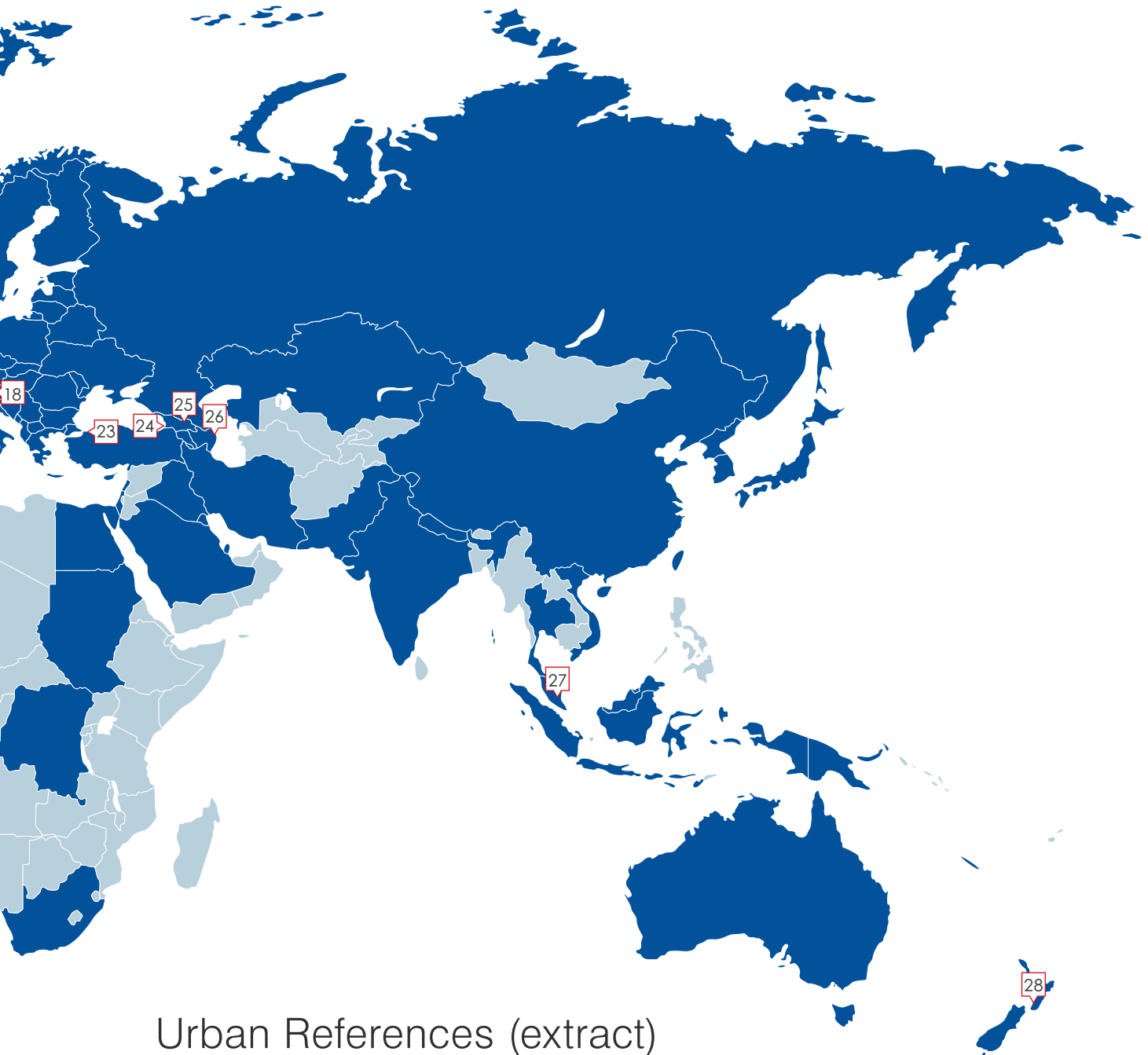


The World of Ropeways

As quality, technology and market leader in ropeway engineering, the Doppelmayr/Garaventa Group operates production plants as well as sales and service centers in over 35 countries worldwide. To date, the Group has built more than 14,500 installations for customers in over 88 nations.

With Doppelmayr/Garaventa, customers get top quality in modern design, user-friendly solutions and optimum service. From the initial idea to the completed project and throughout the entire lifetime of the product.

Flexibility, know-how and pioneering spirit make the Group ideally equipped to meet all the challenges of traditional and new markets.



Urban References (extract)

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|-------------------------|-----------------------------|-----------------------|
| 1 Portland, USA | 11 Bilbao, ESP | 21 Tlemcen, DZA |
| 2 Oakland, USA | 12 Vila Nova de Gaia, PRT | 22 Constantine, DZA |
| 3 Las Vegas, USA | 13 Zurich, CHE | 23 Istanbul, TUR |
| 4 Caracas, VEN | 14 Biel, CHE | 24 Batumi, GEO |
| 5 La Paz, BOL | 15 Neuchâtel, CHE | 25 Tbilisi, GEO |
| 6 Rio de Janeiro, BRA | 16 Mondivì, ITA | 26 Baku, AZE |
| 7 London, GBR | 17 Venice, ITA | 27 Singapore, SGP |
| 8 Koblenz, DEU | 18 Ljubljana, SVN | 28 Wellington, NZL |
| 9 Künzelsau, DEU | 19 Skikda, DZA | |
| 10 Lyon, FRA | 20 Algiers, DZA | |



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