




The Modern Tram in Europe

"The tramway is the urbanistic idea of the century."


Alain Chénard, former mayor of Nantes

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"The Modern Tram in Europe"

Dear Exhibition Visitor,

The tram was the world's first form of motorised urban transportation. It connected the fast-growing American cities with their surrounding areas in an era when rural regions were still dominated by horse-drawn carriages. In Europe at the beginning of the 20th century, hundreds of cities, from metropolises such as Paris to small towns such as Bad Kreuznach, had tram networks to enable their citizens to move around.

For a short time in the 1960s and 70s, both politicians and planners around the world believed that future urban transportation needs could largely be met individually. Ever since the first oil crisis in 1973, however, it has become clear that, even in American cities supposedly built for the car, a good public transport system remains a crucial requirement for a viable and liveable city. By building an efficient subway network as its base transport system, Munich has laid down a solid foundation for its transportation needs. The city has also recognized, however, that only a networked system, in which buses and trams also play a significant role, is economical and attractive to inhabitants. Consequently, over the past 15 years it has also significantly modernised its tram system, so that it is now faster, more efficient, economical, customer-friendly and sustainable. Now Munich's tram system is set for another expansion phase.

Our exhibition, entitled "The Modern Tram in Europe", shows that Munich is not alone in focusing so much attention on its tram network. In many other places in Europe too, trams are once again being used as a means of driving forward sustainable urban development. Our exhibition deliberately avoids "showcasing" individual transport companies and cities, and instead focuses on a number of themes that illustrate the relations between cities and transportation. Visitors will discover that, in many cities in Europe, the tram is contributing significantly to the revitalization of inner cities, to the strengthening of city-centre retailers, and to urban regeneration and expansion. For many cities in Europe, inner city renaissance is closely linked with the tram – for spatial, environmental and aesthetic reasons, and to combat congestion.

We hope you enjoy exploring the European tram.



Herbert König
Chief Executive



Gunnar Heipp
Head of the Strategic
Planning Projects Division

A stylized handwritten signature in blue ink.

Herbert König
Chief Executive

A stylized handwritten signature in blue ink.

Gunnar Heipp
Head of the Strategic Planning Projects Division

The Renaissance of the Tramway

The tram is back

The tram is coming. Worldwide it's experiencing a boom. Particularly in Europe and North America, existing networks are being expanded and abandoned lines are being brought back to life. In many cities where the tramway had long since vanished from the scenes, it is once again pulling into the station. For a mode of transport that city planners had all but given up for dead, it is the greatest comeback imaginable.

The sharp rise of the tram

The development of the street railway began in 1832 with the opening of a horse-drawn line in New York. The world's first electric tram went into test operation in May 1881 in Lichterfelde, a borough of Berlin. The tram quickly developed into a form of transport for the masses and exerted great influence on the growth and planning of cities. This development culminated in the year 1920: Trams graced the cityscape of over three thousand cities in Europe, America and Australia.

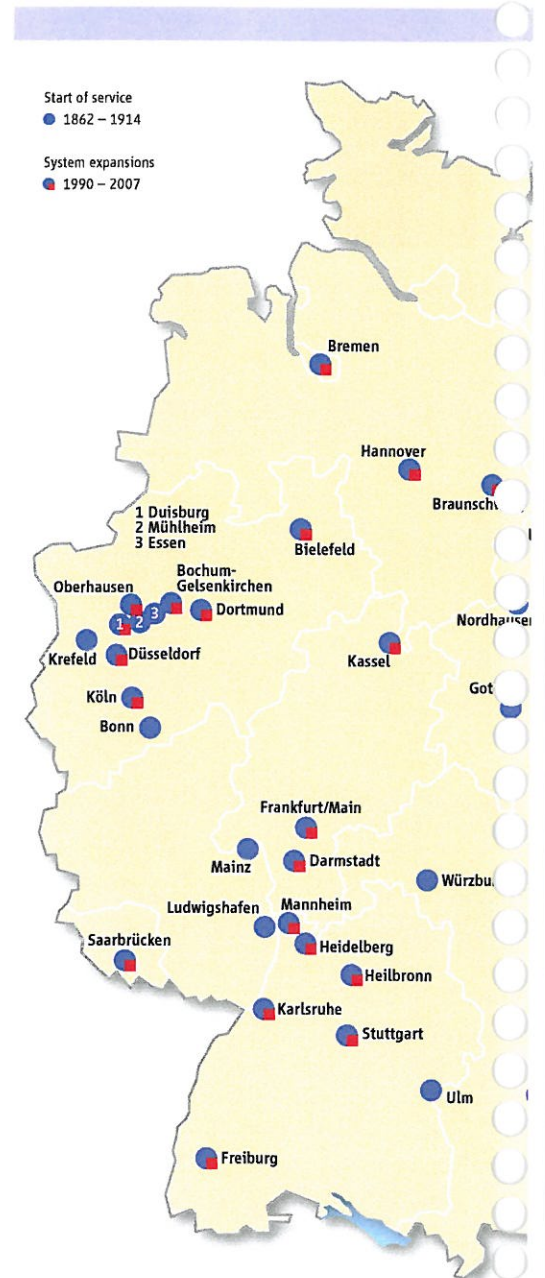
Competition with the car

The rise of the automobile put the brakes on the tram: The number of trams sank as that of cars rose. What is more, in many countries the tram was practically abolished, such as in the USA, United Kingdom and France. At the same time, however, in several other countries it remained the star of the transport system, as in Germany, for example.

The comeback of the tram

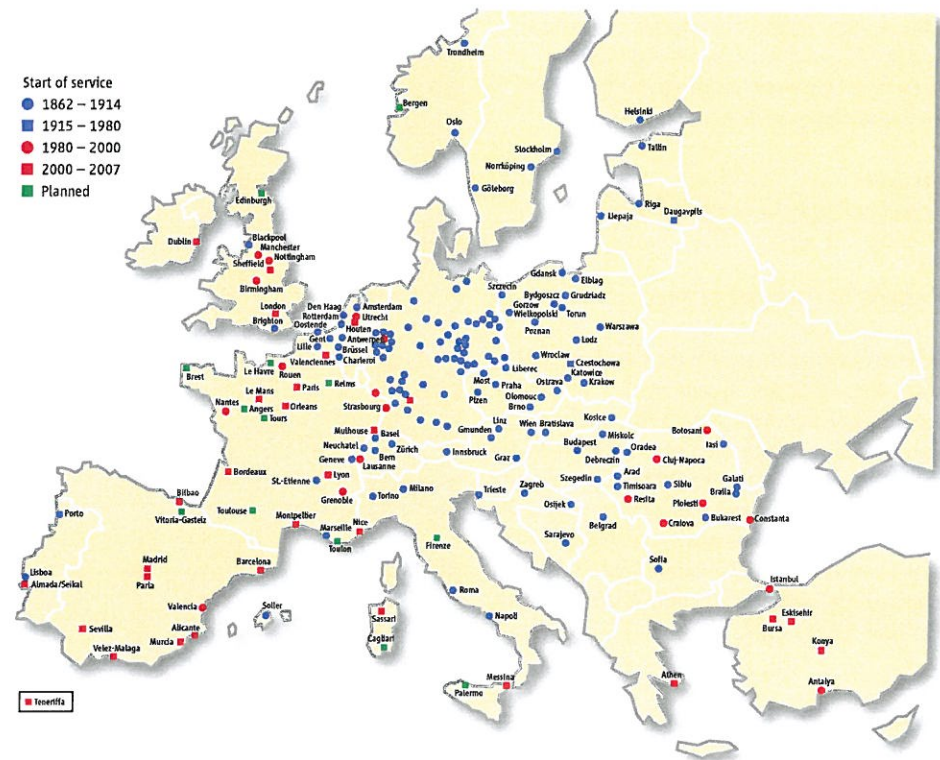
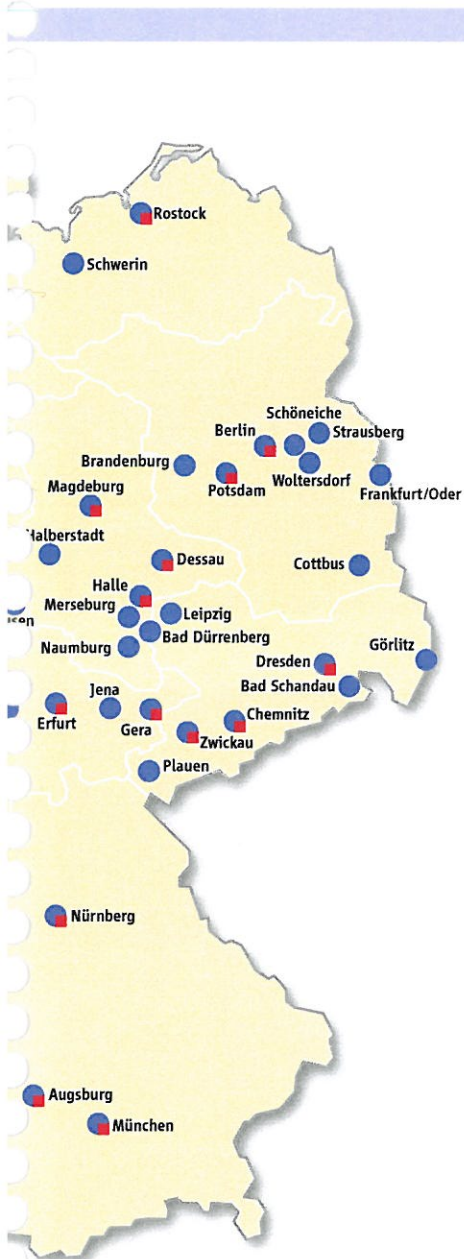
The extreme growth in automobile traffic and the oil crisis of 1979/ 1980 brought about a change in the trend: The tram was rediscovered as a high-performance and flexible transport mode – first in North America, followed shortly thereafter by Europe. In 1980 there were only three hundred cities in the world with tram systems; now that number is nearly four hundred. Alongside these there are an additional one hundred tram systems under construction or being planned.

The development of tramways throughout Germany



With the most kilometres in service in western Europe, Germany

Germany and Europe



The reopening of tramway lines since 1980 has been concentrated in western Europe, above all in France, Spain and United Kingdom. In Germany and eastern Europe the existing systems have been and continue to be expanded and modernised.

Countries, facts and figures

Country	Cities	Net (km)	Country	Cities	Net (km)
Belgium	5	332	Poland	14	1,445
Germany	56	2,768	Portugal	2	65
France	11	202	Romania	14	461
United Kingdom	7	156	Sweden	3	186
Italy	7	209	Switzerland	2	112
Croatia	2	57	Slovakia	3	68
The Netherlands	5	280	Spain	4	206
Norway	2	47	Czech Republic	7	333
Austria	6	313	Turkey	5	66
			Hungary	4	188

Germany is practically the land of the tram.

Selected European countries with the number and total length of their tramway systems (UITP, 2004 and MVG, 2007).

The Tramway in Europe

"Many cities, in their automotive euphoria, had liquidated their trams; today they are regretting this throw-away mentality and are labouring to build new lines."

Urs Heller:
Schweizer Eisenbahn Revue 7–8/1997

France: The model of success

In France, the renaissance of the tramway is taking place with particular dynamism. Ten cities have reintroduced tramways since 1985, while by the year 2012 an additional ten cities intend to follow suit with their own. In the year 2000 alone the country saw 70 new kilometres built. But it is not just the speed of the development that is noteworthy: The high aesthetic aspirations that are built into the new tramways in France have caused a sensation that has been felt worldwide.



As blue as the skies of southern France – the tramway in Montpellier (opened in 2000).

Germany: The land of the tram

Germany boasts the greatest number of tramway systems in Europe. Trams are indelible parts of the urban scene of roughly 60 German cities. Taken as a whole, the tram networks in Germany stretch over 3,000 kilometres. Munich too has taken to the tram with renewed enthusiasm. After the opening of the Eastern Tangent and Line 17 in 1996 and 1997, respectively, Munich's tram network is once again being expanded with the introduction of a new line: Beginning in 2009, the approximately three-kilometre-long Line 23 will connect the heart of the Schwabing district – Münchner Freiheit – with the Parkstadt Schwabing development.



In Barcelona the tram has been gliding over grass and under palm trees since 2004.

Timeless and valuable rather than a passing trend

The tramway is a modern mode of transport. It is environmentally-friendly and boasts a low output of greenhouse gases. It is comfortable, fast and high-performance. The current renaissance of the tramway presents an excellent opportunity for cities to give themselves a makeover. For urban transport plans that have already managed to ward off automobile dominance and have instead turned to other transport modes, the tram is an ideal building block.

City planning considerations aside, the tram has another argument in its favour: Quite simply, it is lovely to ride along, look out the window and enjoy one's surroundings.

"Fortunately there are cities in which what to me is the most beautiful variant of urban progress can still be found: The tramway. (...) Nothing compares to the tram. (...) I would love to be able to ride them in many more cities."

Th. Opitz,
Süddeutsche Zeitung,
18./19.11.2006



The tram in Lyon is reminiscent of silkworms (since 2000).



Back in the cityscape since 1997:
The tramway in Saarbrücken.



Trams are once again rolling in the United Kingdom as well: In Nottingham since 2004.

What is a Tramway?

Street railway = railway in the street

Tramways are light railways for urban transport with electrical propulsion. They run on rails on normal streets. But a tramway is by no means a typical railway: It is adapted to meet the special requirements of city traffic.

On the street, trams either operate in mixed traffic or they run in their own so-called dedicated right-of-way. They are thus highly versatile.

At stops, passengers can board and exit the vehicles. In order to speed up this process, each tram has several sets of wide doors. Low floors allow boarding to be done at ground level, saving time and reducing the hazard of trips and falls.

The trams use current collectors called "pantographs" to draw the electricity that powers their motors from overhead wires (called "catenary") suspended above the tracks.

Tramways are often known by nicknames unique to their regions. In Switzerland or in Munich one simply refers to the "tram". Someone from Vienna or Leipzig would call it a "bim" or "bimmel", respectively, referring to the German word for jingle. Each of these nicknames reflects the special relationship between a city's residents and its tramway.



The new trams in Porto: Modern and dynamic.



Unhindered by car traffic, the tram in Strasbourg glides over English grass.



A tram stop in Montpellier: An unmistakable symbol in the public space.

On the Tram

(lyrics translated from German)

(...)

*The motors under the floor rattle,
From the contacts sparks crackle.*

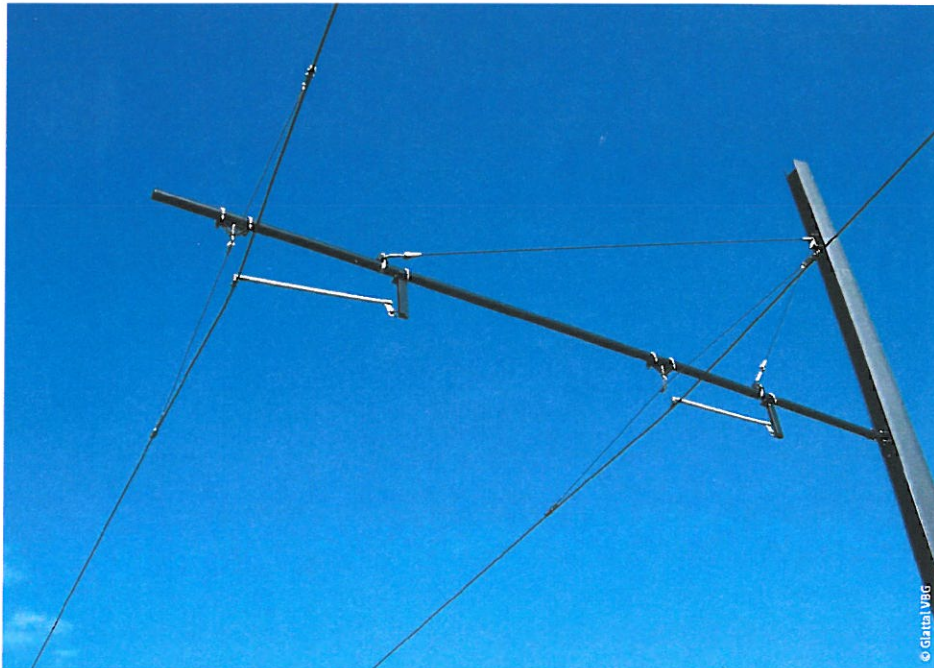
(...)

*Roughly waltzing and
Swaying is the car floor,
My senses waltz, sway along!
Full power! Full power!*

*The whole car, with
The people inside,
Scoots and hums and sings
With my senses.
The car's singing booms, it swells!*

*Suddenly the bell shrills!
The power's song is over –
I get off –
The tram waltzes further on.*

Gerrit Engelke (1913)



Overhead wires of the Glattal Light Railway near Zurich: Delicate elegance.

Advantages of the Tramway

Environmentally-friendly

The energy use of trams is very low: A journey by tram uses just a fifth of the energy that would be consumed by the equivalent car journey. This is thanks to the low rolling friction of steel wheels on rails, the tram's high energy efficiency and to the advantages of electric propulsion in general. In addition, the energy generated by braking is returned to the power grid. And of course, the electrical propulsion produces no pollution on-site.

Low noise levels

Another advantage of tramways is their low level of noise production: Modern trams are quiet, particularly when they run on so-called grass track, whereby the trackbed is covered by a layer of grass.

Studies in Zurich (H. Boesch: Die Langsamverkehrs-Stadt, Zurich 1992) have shown that although a tram can be 6 to 7.5 decibels louder than a car, the perceived disturbance on the street is no higher than that of a car. The noise per passenger is thus many times lower than that of a car.

Attractiveness bonus

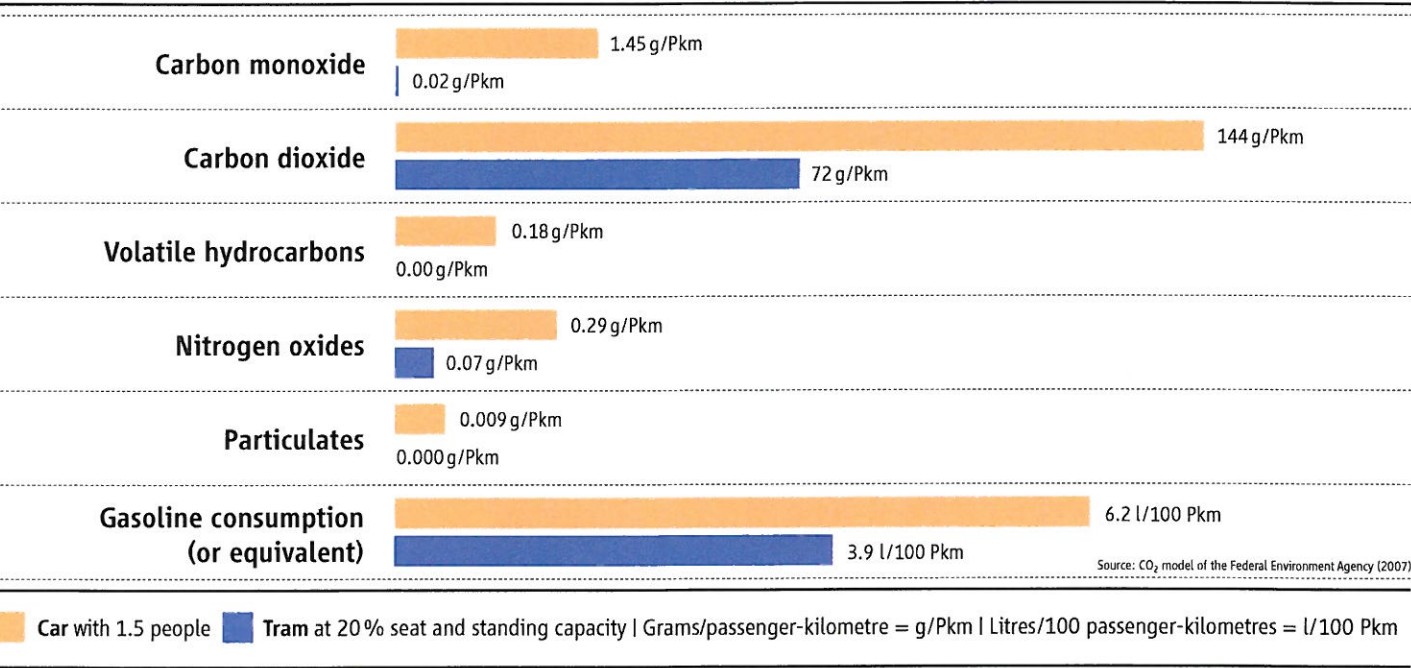
When trams replace buses, it typically leads to higher ridership figures. This "tram bonus" amounts to roughly 25 percent more riders, although in some cases it is even higher. Take, for example, the so-called Munich East Tangent from Max-Weber-Platz to Ostfriedhof, which opened in 1997: After opening, the transport demand increased by roughly 50 percent in comparison with the bus line that was replaced.

Trams are becoming more and more popular with the people of Munich: Between 1995 and 2005 Lines 18 and 19 witnessed ridership growth in the range of 30 percent, whereas Line 27 exceeded this with an impressive 45 percent. The total system-wide increase in riders during this period was approximately 20 percent.

Big performance in a small package

The tramway can take on an important role in urban transport. Its range of possible applications is quite broad. Whereas buses are usually employed for lower transport volumes and subways can actually be more economical to operate with very high volumes than trams, the tramway is perfectly suited to covering medium to high transport volumes. Thus there are approximately 60,000 riders per day in

Comparison of pollutant emissions of selected transport modes



both directions on each of the most heavily-used lines in Munich: the 19, the 20/21 and the 27.

The tram is a space-saving mode of transport. This is due to the fact that a 40-metre tram can hold as many passengers as two articulated buses. This helps ease the situation on the streets in the city. Moreover, putting one tram in service in place of two buses reduces the personnel needs by half. The most heavily-used tramway lines in the world operate in Budapest. The 54-metre "giant tram" comes every one and a half minutes during peak hours. This makes it possible to transport up to 250,000 riders per day in both directions on the ring line 4/6.

If the conditions call for it, a tram can take full advantage of its efficiency. The city of Zurich, with its 370,000 residents, handles nearly half of its total

traffic volume with buses and a dense network of tramways. The automobile is used for just 25 percent of daily trips. In total, 270 million riders take the tram and bus per year in the city. What helped make the tramway in Zurich such a success? They have dedicated lanes at their disposal almost everywhere in the city as well as priority at traffic signals. Furthermore, the shifting of traffic from automobiles to the tramway was part of a coordinated plan and parking violations are strictly punished.

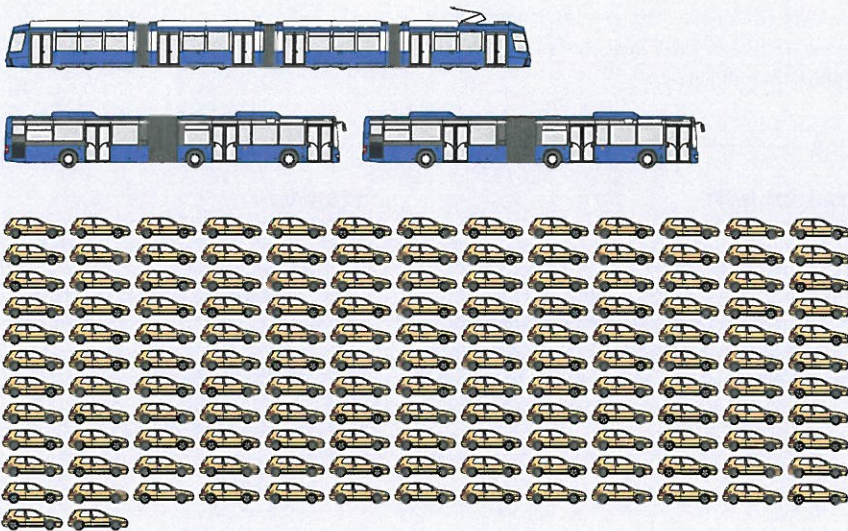
Flexibility

No other high-capacity transport mode is by nature as flexible as the tramway. On fast lines with dedicated right-of-ways they deliver travel time savings, while in central areas they can make sharp turns all

the way into the city centre, thereby making optimal inner-city service coverage possible.

User-friendliness

The tram is a safe and user-friendly mode of transport. The riders can easily orient themselves and do not have to negotiate any steps when boarding. The vehicles run quietly and provide a high level of comfort. Even better, looking for parking places in the centre of Munich becomes unnecessary. The tram network is tightly woven into the fabric of the city, meaning one need not walk far to find the nearest stop. The trams run with short headways and the waiting times are typically brief.



218 people = 1 tramway = 2 articulated buses = 145 automobiles

Munich example: Comparison of transport capacities.



Standard today: Barrier-free boarding.

Tramway Networks

Types of networks

There are many different forms of tramway networks. There are matured networks, which over time become more and more intricate and thus more complex. There are new networks, which owing to their young age are clearly planned and structured. Then there are so-called mixed networks, in which subways, tramways and buses operate side-by-side.

Most tramway networks conform to the first type and matured over time. Most saw their development along the main street axes. Until the 1930s, the growth of tramway systems occurred in tandem with land development. Sometimes they were even expanded in anticipation of new residential areas. This changed after World War II; suddenly, new city districts were also commonly built without connection to the tramway networks.

Matured Networks

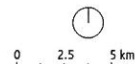
Examples of surviving matured networks can be found in the cities of Leipzig, Zurich or Amsterdam, among others. They extend evenly across the city and weave their way into all parts of town. On important axes several lines may overlap and share track segments with one another. This offers a high service frequency on the shared segments as well as direct connections within the city centre. On the edge of the city the lines separate. Until the 1970s, this sort of dense network could also be found in Munich.

Leipzig

Geographical line map

Tram in service
Tram built 1990 – 2007

Tram network length: 149.9 km
City size: 297.60 km²
Population: 506,578
Population density: 1,702 persons per km²



New networks

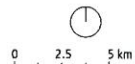
New networks often have simple structures. In Grenoble, Nantes or Strasbourg, for example, only the few most heavily-patronised routes in the city are served by tramway lines. However, these lines have without exception very high frequencies. Buses are employed as feeders and are used to extend the reach of the tramways. In extreme cases, such as Orléans, there is so far just one single tram line. One aspect all four of these cities have in common is that between 1950 and 1965 they all dismantled their old networks completely.

Nantes

Geographical line map

Tram in service
Tram built 1990 – 2007

Tram network length: 39 km
City size: 65.19 km²
Population: 280,600
Population density: 4,147 persons per km²



Mixed networks

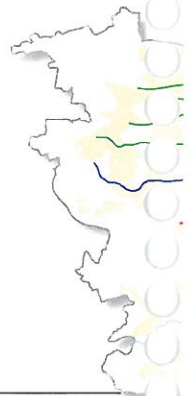
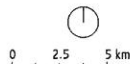
In mixed networks, trams and subways share the workload. In some cities – such as Prague, for example – the subway was planned only on the most important axes as a connector to large new developments on the outskirts of the city. The tram coverage was thus hardly disturbed by the development of the subway.

Prague

Geographical line map

Tram in service
Tram built 1990 – 2007
Subway

Tram network length: 136 km
City size: 496 km²
Population: 1,184,075
Population density: 2,387 persons per km²



The Munich network

Munich is also home to a mixed network. In the sixties and seventies there were plans to completely replace the tramway with subway and bus lines. Ultimately these plans proved not to be viable: The construction necessary would have been too expensive and the lines themselves not necessarily cost-effective. Eventually the development of the subway network was limited to only the strongest alignments and we are thus left with approximately 70 kilometres of tramway routes remaining today. The network has been continually modernised and upgraded since 1991.

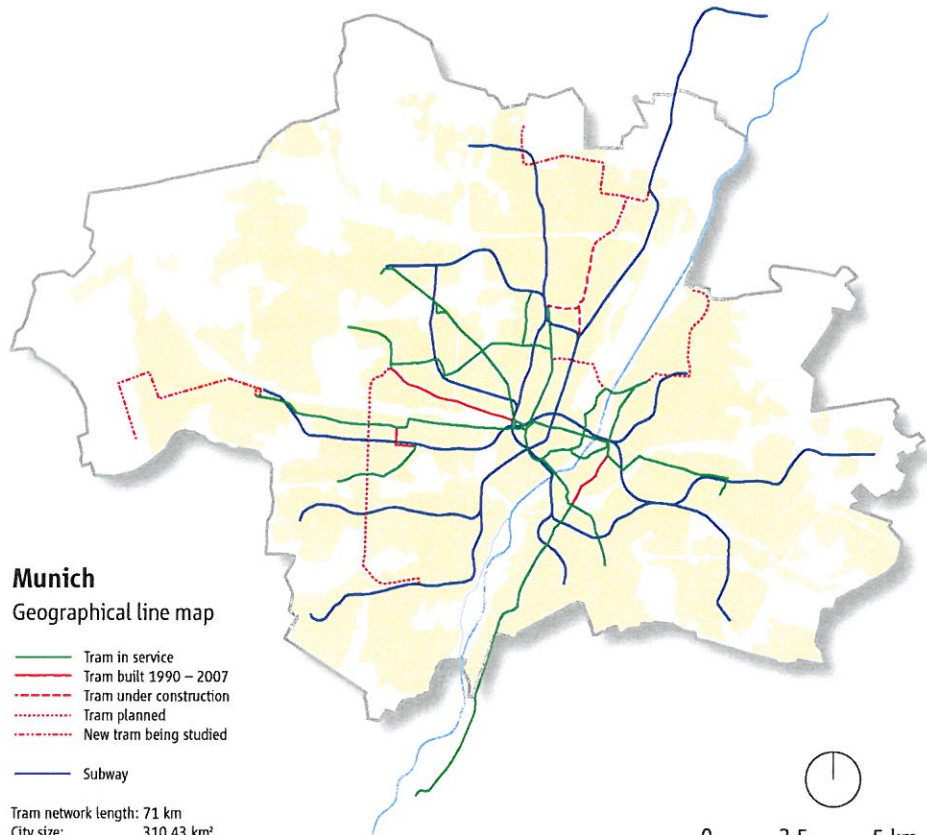
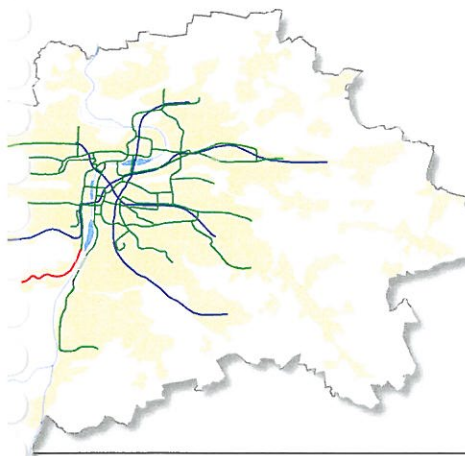
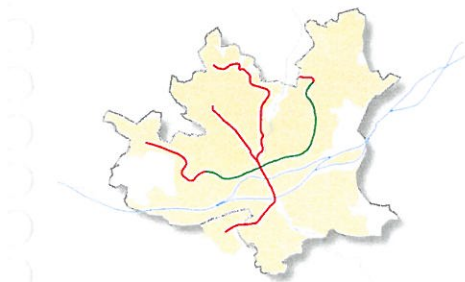
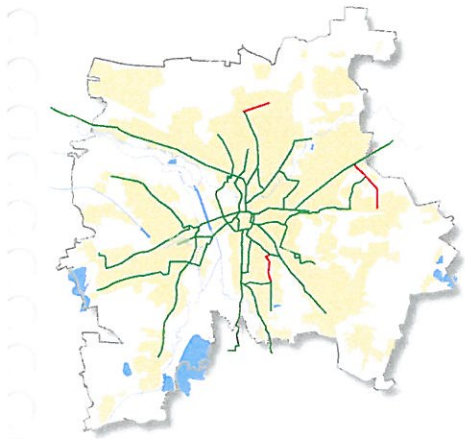
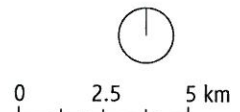
The tram in Munich's public transport system

In Munich the tramway is an important component of the public transport system and has a clear role: It supplements the subway network in those parts of the city where the subway would provide more capacity than necessary for medium-sized passenger volumes or where it would be too expensive to build. Furthermore, the tram is employed in areas where buses alone are not sufficiently productive. In outer areas it works as a feeder to the subway and regional railway systems. In addition, it takes some of the strain off the major public transport transfer points in the city centre, while at the same time tangentially connecting the various outer neighbourhood centres with one another.

Munich Geographical line map

- Tram in service
- Tram built 1990 – 2007
- Tram under construction
- Tram planned
- - - - New tram being studied
- Subway

Tram network length: 71 km
City size: 310.43 km²
Population: 1,336,983
Population density: 4,307 persons per km²



The Tram as a Tool for City Planning

New opportunities for the city

When tram lines are built or overhauled, it involves more than purely technical transport connectivity. A construction project of this sort can help with the realisation of city planning and urban design goals. In other words, a tramway can make a city more attractive and livable.

France: The tram as whole-city project

In the last ten years, France has aimed to reinvigorate its inner cities. Nearly all tramway projects in the country are framed in the context of this sort of overall plan. The cities have built new tramway lines and at the same time reduced automobile access to their city centres. Public spaces have been transformed. Pedestrians and cyclists have gained more space. Many cities have even managed to improve disadvantaged neighbourhoods through the construction of a tramway or to reconnect far-flung parts of the city. These measures have given each city a new face.



Nantes: A bird's eye view of the newly-remodeled Cours des 50 Otages.

A new centre for Nantes

The Cours des 50 Otages is a large, vibrant corridor separating Nantes' medieval Old Town from 18th-century additions.

Its reconfiguration was the first step in the concept of "Nouvelle Centralité pour Nantes". With the construction of Line 2 of the tramway, the Cours des 50 Otages was completely redesigned. Automobiles were largely banned from the roadway – and city life thereby gained a new public space. Today, the tramway shares the Cours with pedestrians, cyclists, cafés, restaurants and small parks.



In the Old Town of Orléans.



Orléans: A tram passing through a suburban area.



On grass in front of the university in La Source.

Orléans: The tramway ties the city together

Orléans-la-Source is a university, residential and commercial area in Orléans, which came about in the sixties and seventies. It lies some ten kilometres from the city centre of Orléans.

Tramline A has connected the two parts of the city since 1985. With the tram, the ability of the residents of Orléans-la-Source to take part in urban life has become much easier. The satellite community has become a conscious part of the city and is once again part of the whole city's planning.

The construction of the tram was additionally used to enhance the public spaces along the route and to concentrate economic development along this transport axis.



With a route shaped like a paper clip, tramline A connects with the city centre and La Source.



The stations of Line A in Orléans.

The City Grows, and so Does the Tram

No urban expansion without the tram

When a city grows, transport problems often arise if integrated transport planning is not envisioned from the start. For large urban developments it has proven to be valuable to utilise the tram as the backbone of the transport concept and to organise all other modes around it. For many people, a good public transport connection is an important criterion in deciding where to live. If a tram is thus built on an exclusive right-of-way with signal priority at intersections, it represents a modern, fast and high-performance connection from the new neighbourhood to the rest of the city.

Coverage – foresight and planning

New neighbourhoods benefit greatly when public transport coverage is not provided as a measure of last resort but is instead included from the beginning of the construction process – sort of like a down payment. This can make the tram an incentive for people and businesses to choose to locate in the new development. It in this way becomes a draw for the area. This helps speed up the settlement of the development. A successful example of the advantageous effect of a tram connection can be seen in Freiburg im Breisgau, where the new quarter of Rieselfeld was built. Business and industry only settled in as construction of the tram line was wrapping up.

Example: Freiburg-Rieselfeld

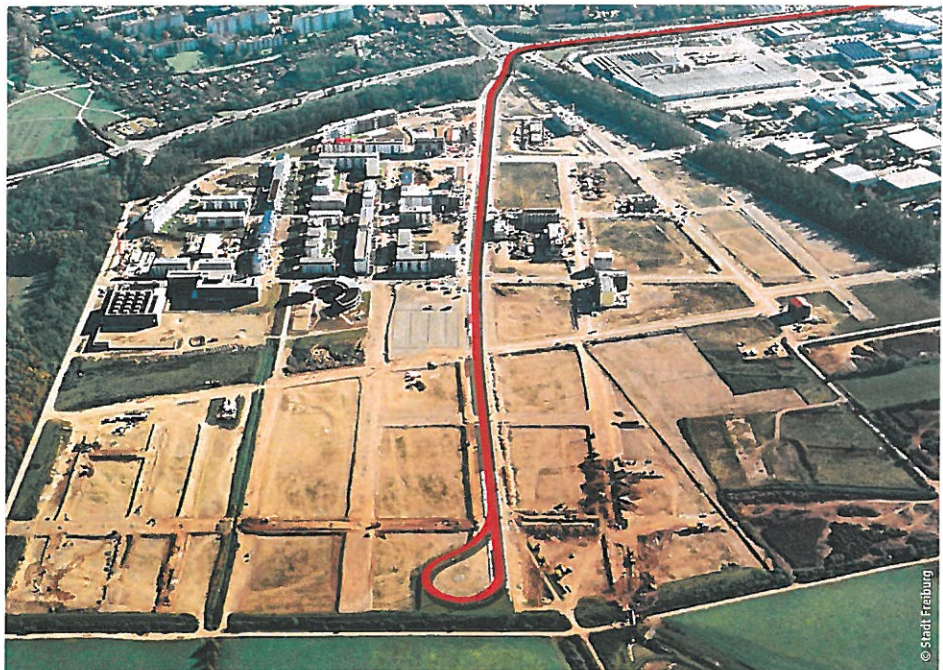
In Freiburg-Rieselfeld a tram line runs right through the middle of the development. There are no apartments or places of employment that lay further than 400 metres from the three stations on this part of the line.

The tramway was put into service in 1997. At that time, the population of Rieselfeld was one-tenth of what it is today. When it entered service, the tram ran through what were still open fields. This was intentional and achieved the desired effect: The tram was running in the model neighbourhood from the beginning. This helped encourage the residents to forgo the car and instead choose the more environmentally-friendly tramway.

Munich: Parkstadt Schwabing gets a tram

There will soon be over 6,000 new residents and 18,000 jobs between Schenkendorfstraße and Frankfurter Ring – the north of Schwabing is booming. Parkstadt Schwabing is rising on what were previously military and industrial grounds. The high density of the new quarter was only made possible by the fact that the rail connection was considered from the beginning in planning instruments (e.g. zoning plans, urban agreements). Thus the number of parking spaces needed could be sizably reduced and a space-saving design was able to be realised.

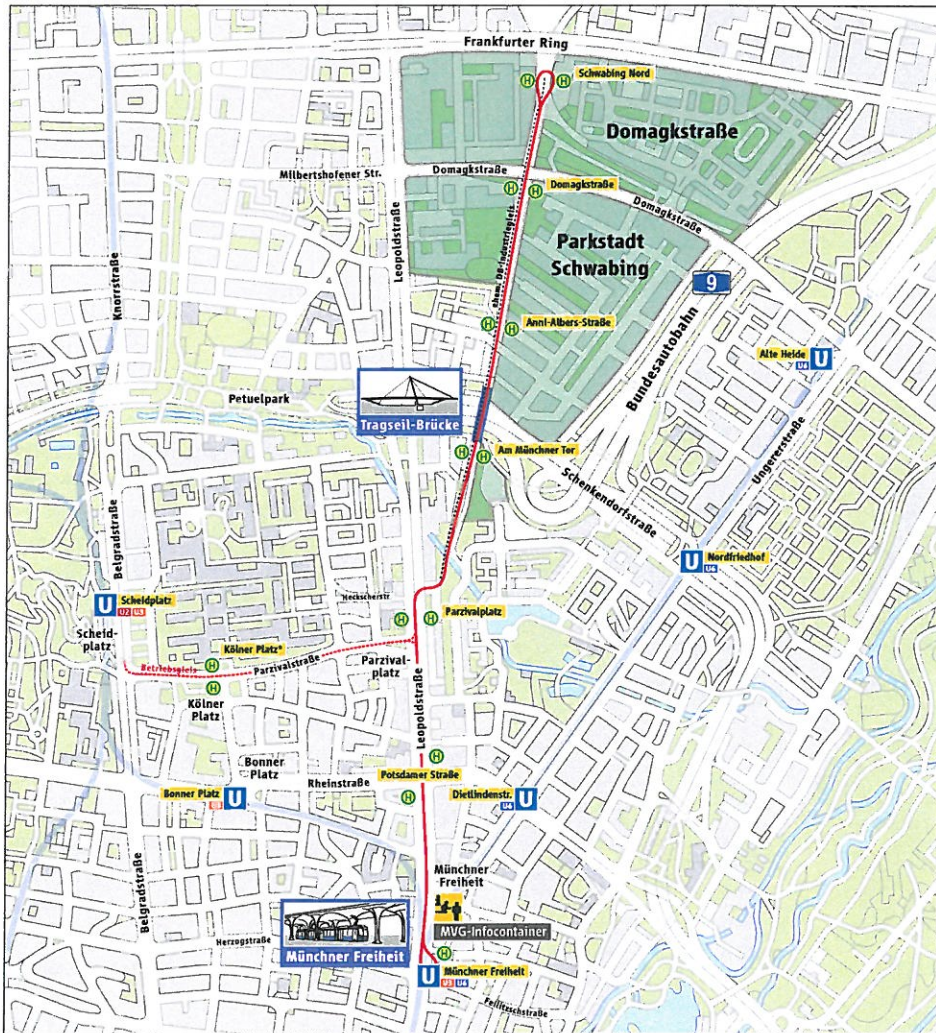
The distance to the heart of Schwabing is not far: When it goes into service in 2009, the new Tram 23 will only need around eight minutes from the end station Schwabing Nord on the Frankfurter Ring to Münchner Freiheit. This convenience will help foster development in Parkstadt Schwabing.



The tramway (red line) runs through the still nearly-empty Rieselfeld in Freiburg.



Coming in Autumn 2009 to Parkstadt Schwabing: Tram 23 in Munich (artist's rendering).

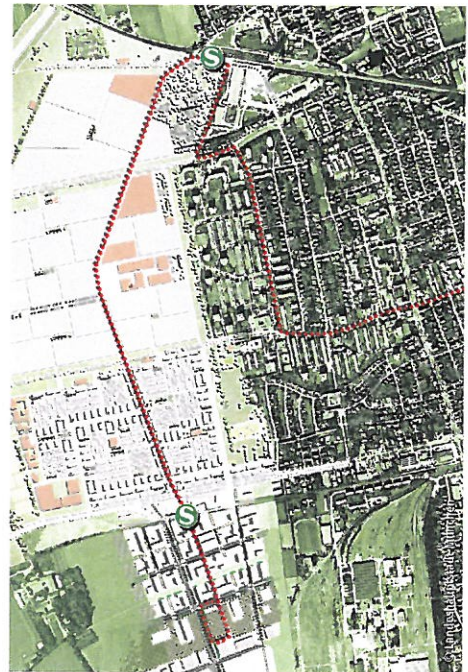


The approximately three-kilometre-long newly-constructed alignment of Tram 23 (red line).

Munich-Freiham: Extension of Tram 19

On the edge of Munich, in Freiham, a compact, urban and green district is being planned on an area of approximately 350 hectares. There will be around 18,000 to 20,000 residents and 7,500 workers in the new district. An important component of the new district is the tram.

With the possible extension of Line 19 from Munich-Pasing to Freiham, the new district can have optimal transit coverage right from the start – helping it grow to be an attractive part of the city. The structure of the district and the arrangement of the transit stops are very strongly related. Many people will live quite close to the tramway – their walk to the nearest stop will be very short.

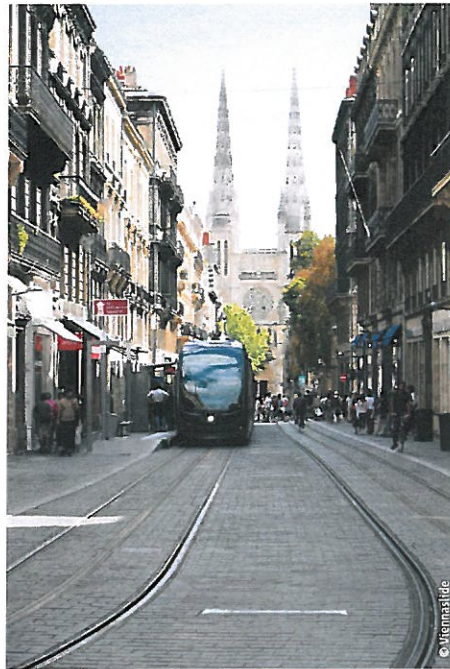


Possible route alignment (red line) in Freiham.

The Tram – Impulse for City and Economy

Location-factor Tram

Scientific studies – such as the one from Dr. Graham Campton, Univ.-Prof. Dr. Carmen Hass-Klau and Dr.-Ing. Volker Deutsch on the topic “Building and operation of light-rail systems: The economic impacts” (from “Der Nahverkehr”, 3/2005) – and in particular practical experiences show that a tramway line can have a positive influence on the economic development of a city. The enhancement that comes with the new alignment and the surrounding street and civic spaces improves the image of the part of the city through which it runs. And that spurs economic development.



Largely auto-free: The old town of Bordeaux.

Fresh air for Bordeaux

“The previously constantly gridlocked city centre is today largely auto-free; cyclists and pedestrians benefit from the new freedom of movement. In the historic centre the building facades have been cleaned, monuments were restored, and retail business is flourishing. And on those spots nearby where the tram runs, the real-estate prices are rising.”

Die Zeit, 01.02.2006: “Die Tram kommt”



New office buildings along the tram show the economic upswing in Nantes.

The Nantes example

In the 1980s and 1990s the ship-building industry in France collapsed and consequently the city of Nantes was hard-hit. But the city quickly rebounded, turning itself into a service industry metropolis. With the growing self-confidence, Nantes realised it had a new symbol for the city: Its white tramway. The tram has become the motor of the development of Nantes. Between 1990 and 2000 the population of the city rose by more than ten percent; in the re-urbanised city centre the number is no less than 20 percent. In contrast, the outer areas registered much lower growth of only around two percent. The service sector in the city centre grew by two-thirds. Surrounding the light rail line there has been a significant increase in offices, shops, light industry and residences. Residential areas along the tram have seen values rise by up to 15 percent due largely to improved accessibility and livability.

The tram stimulates business

The tram improves the appearance of the pedestrian zone. It brings its passengers directly to their destination. And it improves the perception of safety for passers-by in the quieter evening hours. Thanks to its high performance, the tramway can bring more people to the city centre than could possibly arrive solely by car. The city's commerce is the beneficiary here. Examples in France show customer numbers increasing by up to 20 percent. With the tramway providing the necessary impulse, entire city centres can be resuscitated – as was strikingly shown to be the case in Heilbronn with its program "Design Offensive: City Centre", initiated by the city at the end of the 1990s.



Every five minutes a tram comes – otherwise there is plenty of space for strolling and shopping in Munich.



Bahnhofstraße in Zurich with four tram lines.



The Heilbronn example: The successful resuscitation of the centre of a "smaller" city with the help of the tram.

The Tram – Guarantor of Urbanism and City Culture

Tramway as part of the city

A “city-friendly” tramway makes the city urban and livable. Accordingly, the latest standards for vehicle design and infrastructure are quite high. The tramway can either be integrated harmoniously and unobtrusively into the cityscape or can substantially improve the cityscape through meticulously-designed infrastructure on streets which were previously heavily trafficked. The best-case scenario would have the tram even becoming a sightseeing feature in and of itself – one which the people of the city are proud of and which could even become a signature of the city for marketing purposes, much like the silkworm-like trams in Lyon.

There is a prerequisite for public life in the city: There must be space for it to take place in. For this purpose the tram is the perfect mode of transport. It is high-performance while at the same time taking up very little space in the city. The public space continues to belong to the people.



Strasbourg: Before and after the opening of Line A. Hustle and bustle dominates the scene at the central tram stop.



Symbol of urban life

In its heyday (1850 to 1920), the tram was a symbol of progress and urban development. Today we think differently about those cities in which trams can be found running. One associates trams with urbanism, since one expects to see them only in large cities. There are even cities in which trams are run specifically for tourists in order to attain a certain urban flair, such as Christchurch in New Zealand or Sóller on Mallorca.



Montpellier: Eating right next to the tram? No problem!

Strasbourg: Reclaiming the city

The tram in Strasbourg stands at the centre of a comprehensive vision for an urban city. The space for automobile traffic was significantly reduced, benefiting the pedestrian, cyclist and tram alike – and thus benefiting the city as a whole. Before construction of the tramway in 1994, 50,000 automobiles made their way through the narrow alleys of the historic city centre every day. Today the situation by comparison is visibly more relaxed.

"The extent of the measures that go into building a tramway provides a one-time opportunity to design the city we all dream of: A less-hecktic, quieter city with spaces open to all, where everyone can stand and look around."

Alfred Peter, landscape architect;
planner of the tram in Strasbourg



er station Homme de Fer. The rotunda has become a landmark of the Strasbourg tramway.

"Now people in the city centre can talk with each other without being drowned out by traffic noise."

Catherine Trautmann,
mayor of Strasbourg



Grenoble: 200 people are on the move in this picture – without any noise or pollution.

The Tramway in the Historic City

Old town – a special place

Old towns have narrow streets with limited access and parking options. There are many shops with product displays outside and pubs with outdoor seating. The architecture has a special character.

The tramway is the optimal extension to foot and bicycle traffic in old city: It carries many people while taking up little space. And it moves through the streets without emissions.

The tram blends in

When thoughtfully designed, even modern tramways with their longer trains blend in perfectly with their surroundings.

The vehicles that are put into service in the old town can easily navigate sharp turns. The design of the wagons is of equally high value as their surroundings. Track, stations and overhead wires are designed with exceptional sensibility.



It doesn't get much tighter – in Lisbon ...



... and Prague.



Munich: Delightful contrast – the aesthetic expression (C)



In Orléans, the color of the vehicles was coordinated with the



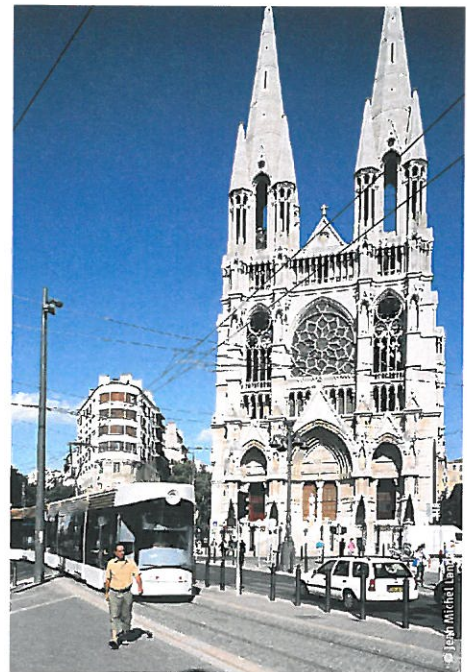
ferent epochs.



Bordeaux: Technology and history in harmony. No overhead wires; tracks integrated into the square.



nose of the various building facades – tram and architecture seem to have been poured from the same mold.



The old and the new in Marseille.

From Traffic Space to Living Space

Street spaces are living spaces

Streets are not merely functional spaces for traffic. They are above all urban living rooms. Traffic is a part of urban life and must remain subordinate to it – not the other way around. The city of Munich hit the nail on the head in describing the possibilities: One must decide between “the city parted by traffic” and “traffic as a part of the city” (from: LH München, Verkehr in München – Eine Bestandsaufnahme, 1995).

The tramway as a chance

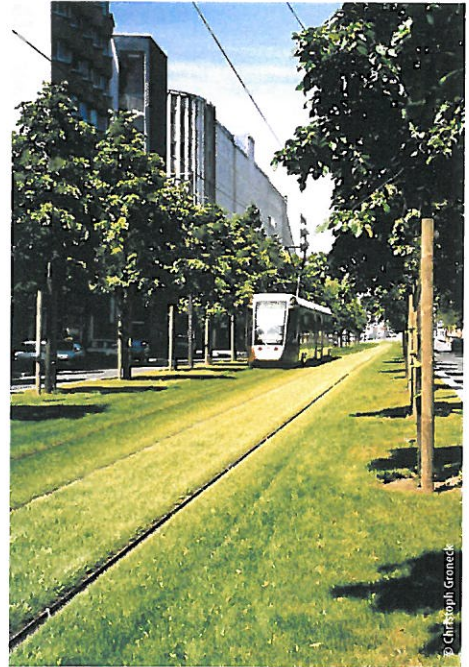
When the tram is integrated harmoniously into the urban environment, it increases not only the quality of life but also the overall acceptance of and regard for public transport. The construction of tramways can help protect public spaces from the negative effects of automobile traffic and improve the quality of the environs. Apart from the use of the financial resources of a tramway project as well as those of a street reconstruction project, a concurrent implementation of both projects is necessary for the realisation of a comprehensive redesign of the streetscape.

The backbone of civic space

Most of the public space devoted to transport is faceless. It needs to be rearranged. A tram line can give such a space a basis around which the design of the surroundings can be reoriented. Spaces that seem to fall apart can get the cohesiveness that they were previously lacking.



Avenue de Paris in Orléans before ...



... and after its redesign.



Avenue du Gal de Gaulle in Strasbourg before ...



... and after its redesign.

Line T3: A thousand trees for Paris

With the Line T3, much more than just a tram was reintroduced to France's capital city. The eight-kilometre-long project also helped heal wounds that had been inflicted on the city by automobile traffic. Thirty-six thousand square metres of grass and one thousand new trees transformed the alignment into a linear park stretching over eight kilometres through the metropolis. The city's goal is to reduce automobile traffic on this boulevard by a quarter. To this end and much to the benefit of the pedestrians, the cyclists, the greenery and the tram, the number of traffic lanes was reduced by one in each direction.



Paris – two before-and-after views: Poor "urban highways" became green boulevards.



After 70 years a tram runs again in Paris: The new Line T3.

"The Tram Brought Us a Park"

... say the people of Strasbourg.

Grassed track and tram avenues

The alignment of a tramway can contribute to the design of open space in a city. Many segments of a modern tramway can be built "green". For example, the alignment can be laid out as grassed track or can run along an avenue. Secondary components such as turning loops can be designed with trees and bushes so that they seamlessly blend in with their surroundings. These design possibilities can have positive effects on the climate and air quality of the city. As a whole, they improve the city's microclimate.

The green design of a tramway alignment has further advantages: They dampen the driving noise of the trams. And let us not forget that the greenery enhances the city's aesthetics.

The tramway in the greenery

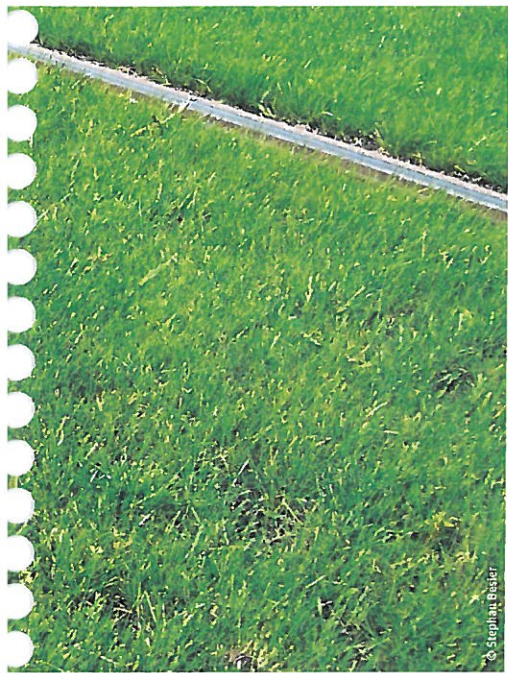
The tramway is quiet and emits no emissions on-site, thus allowing it to travel through sensitive or protected areas. This is particularly the case in or on the edge of green spaces or parks. Where automobile traffic would otherwise destroy the setting, the environmentally-friendly tramway is the perfect mode of transit.



Green carpeting for the tram: Grassed track in Strasbourg.



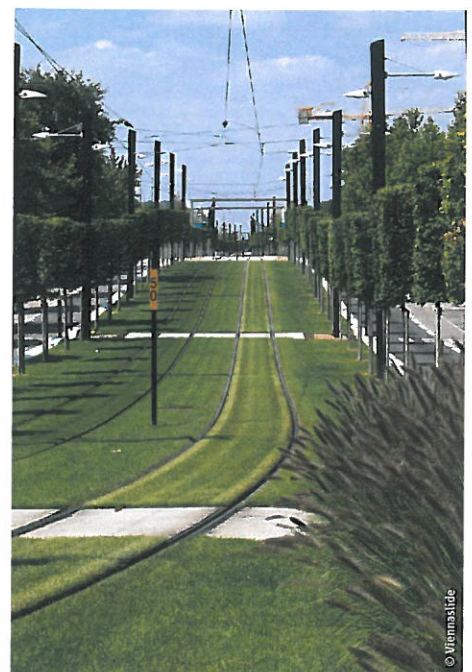
A tram glides along Promenadeplatz in Munich.



Tram avenue in Rouen.



Barely noticeable: A turning loop on Line 15 in the park at the Battle of the Nations Memorial in Leipzig.



English grass in Nantes.

Elegance and Aesthetics on Rails

The vehicle as an exercise in design

The vehicle is in many ways the face of the entire tramway system. Its design catches everyone's eye: Elegant forms that at the same time allow for maximum visibility from the inside looking out and for level access.

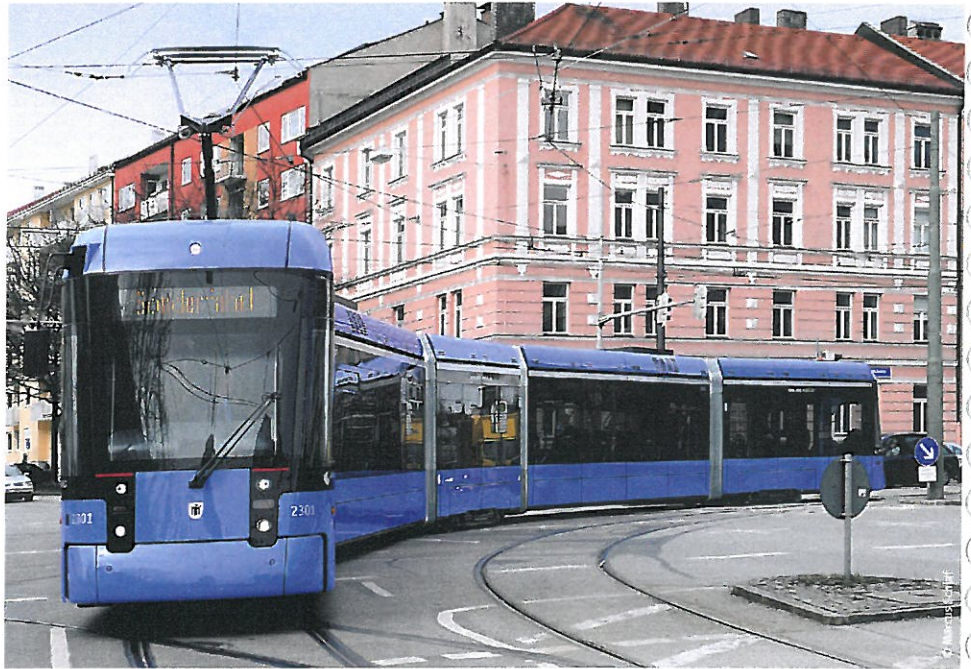
The interior of the tram is understood as being a special part of the public space and exudes a pleasant atmosphere. The vehicle invites people to use it. Its highly-recognisable design contributes significantly to the city's and its residents' sense of identity with the tramway.

The Discontented Tramway (lyrics translated from German)

*It hated the familiar line,
Jumped off the rails
And wanted to finally go straight,
Rather than around the curve.*

*There was an accident. And no trip.
Remind yourselves until you know it:
If one is born as a tram,
Then one needs tracks.*

Erich Kästner (1967)



The new tram of the MVG.



Target group "young people" – Montpellier is the French city with the youngest population.



Trams like sleek boats – in the port city of Marseille.



Modern and bright interiors in Marseille ...



... and Bordeaux.



Silvery elegance – the newest tram in Leipzig.

Those Who Have the Choice ...

The alignment makes the space

Tram lines are linear elements in the layout of the city. They align streets, squares and buildings along their routes with one another and put them into a cohesive spatial relationship with each other.

Right-of-way design

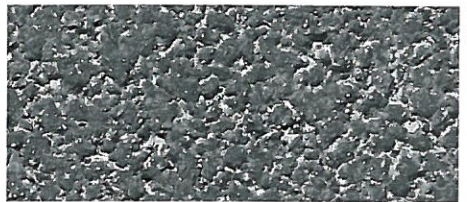
Tracks and technical equipment on the tramway are designed with painstaking care. This allows the right-of-way of the tramway to blend in harmoniously in nearly every urban setting. Furthermore, a tramway alignment can enliven the public space and be uniquely tailored to the surroundings of each portion of the line. Of course, the right-of-way does not need to be laid in asphalt. It can run across pavement, over packed sand, over grass or – for a particularly unique appearance – even over wood.



High-quality natural stone in Turin.

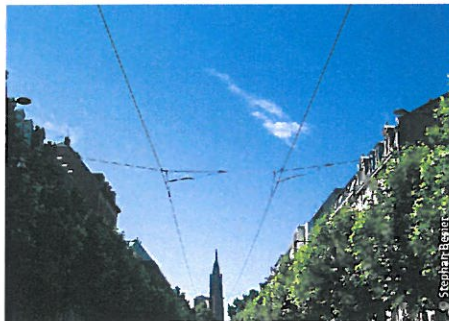


Plain and elegant: Asphalt in Lyon.

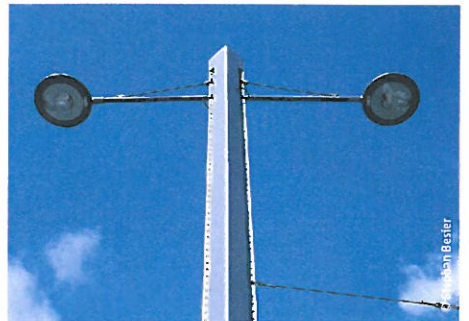


Overhead wires

Technical equipment like the catenary poles that support the overhead wires are carefully selected in order to prevent degradation of the city's aesthetics. Modern and simple power lines can meet both aesthetic and functional demands.



Barely visible:
Fine and simple catenary in Strasbourg.



Award-winning:
Catenary and streetlamp pole in Leipzig.



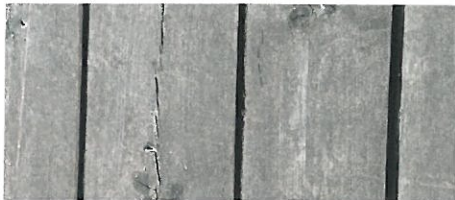
Chic grassed track in Leipzig.



Lovely wood panelling in Montpellier.



Like a path in a park: Packed sand in Strasbourg.



Plain and elegant:
Pole and catenary in Lyon.

Stops – the Calling Cards of the Tramway

A pleasant wait

Stops are the central elements of a tram system. For the customers they are the beginning and end-points of a trip. No rider likes to wait if the surroundings are unpleasant. But a stop where one feels comfortable makes waiting much more pleasant. If the stop is architecturally and functionally successful, it will serve as an advertisement for the tram. It will be clean, inviting and easy to locate. In addition it will offer protection from the wind and weather, places to sit and all necessary information that a rider might need.

Next stop: Change here!

At the intersections of several lines and multiple transport modes there are transfer points. These large stop facilities stand out in the cityscape. They are visited daily by many people. Due to this significance, extra attention is paid to their design: comfortable transfers for the rider, short and where possible barrier-free paths, easy orientation for locals as well as visitors. In many cities, sales points are provided at larger stops to meet the needs of riders.

We wish you
a pleasant journey!

Münchner Verkehrsgesellschaft mbH (MVG)



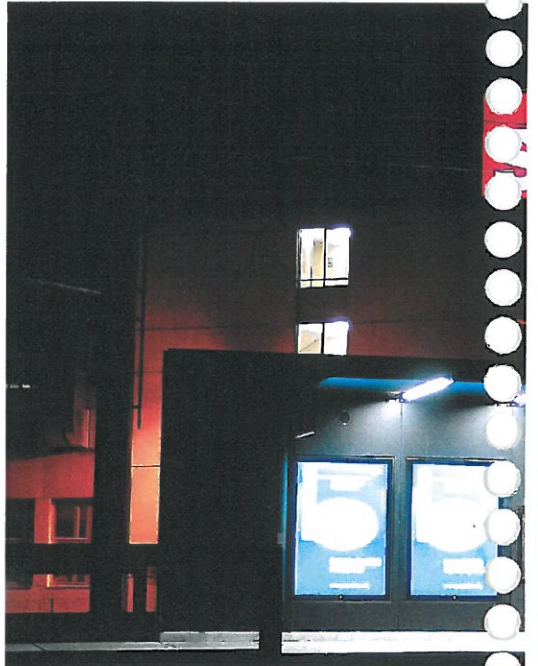
Futuristic stop in Kassel.



The future at Münchner Freiheit – terminus of Tram 2



Swooping roof in front of the Heilbronn railway station.



A veritable light show – stop in Zurich-Glattal.



tist's rendition).



Delicate pavilions under trees in Barcelona.



Stop during the day in Zürich-Glattal.



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