



Regional Integration of Public Transit - From the Perspective of a Transit Company

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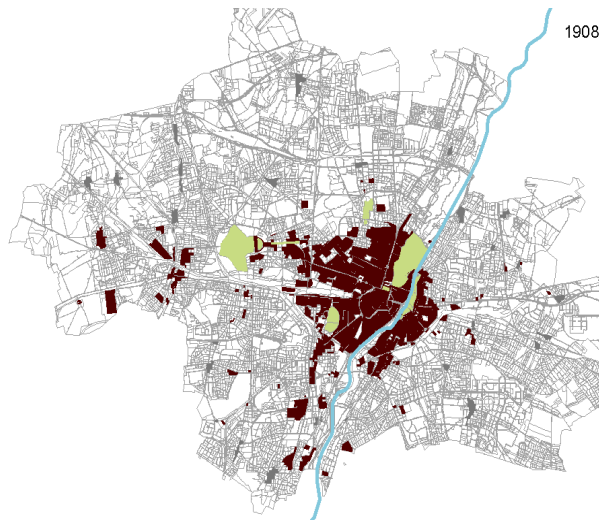
- Capital of the State of Bavaria
- Population: City ca. 1.5 million
- Greater Munich area: 3 million
- Munich Metropolitan Area over 5 million
- In the city almost 1 million jobs
- Area: 310 km² (City)
- Density: 5,000 inhabitants/km²



Transport as Key Factor for Munich's City Development



1858: Population 137,000
Munich is the growing capital of the kingdom of Bavaria – limited by walking.



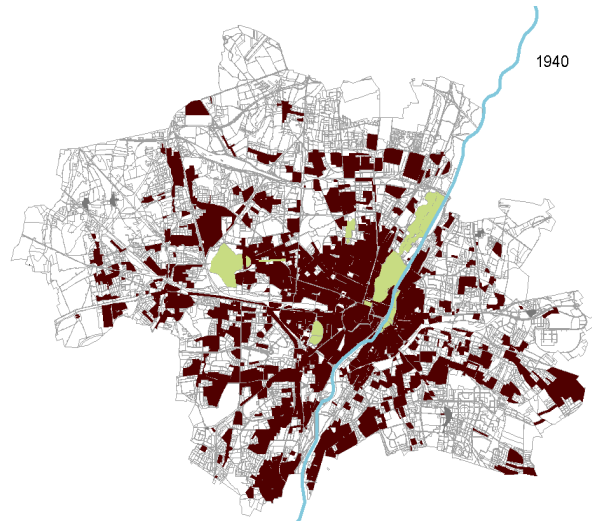
1908: Population 600,000

Munich can grow, because of the tram (electric operation since 1895)



Transport as Key Factor for Munich's City Development

1940/1950: City Population 800,000
The car as new challenge.



Quick recovery after the war: Karlsplatz has heaviest traffic in all of Europe



1960s: Population 1,000,000
Decisions for urban underground system and suburban rail systems



Transport as Key Factor for Munich's City Development



1971: Founding of MVV Verkehrsverbund

(Founded by Munich's public transit department and German Railroad – represented by the Mayor of Munich and the Federal Minister for Railroads), regional buses operated by federal railroad and German Post Service were integrated

Biggest obstacle: financing and distribution of farebox revenue

First section of U-Bahn (municipal subway) starts operation



Transport as Key Factor for Munich's City Development



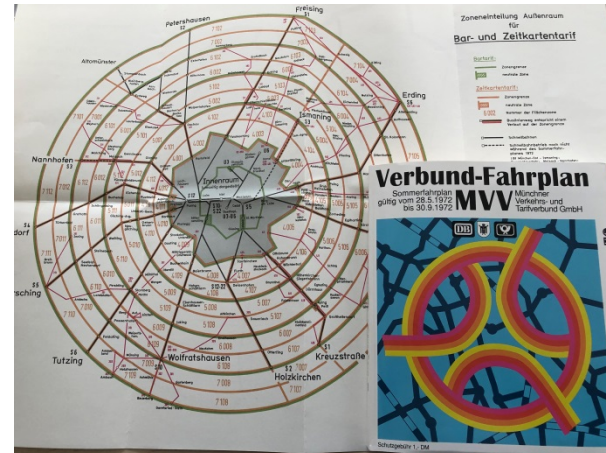
1972, Olympic Games in Munich:

Common Tariff gets into effect

Suburban S-Bahn-system starts operation

Principle: One network, one ticket, one time table

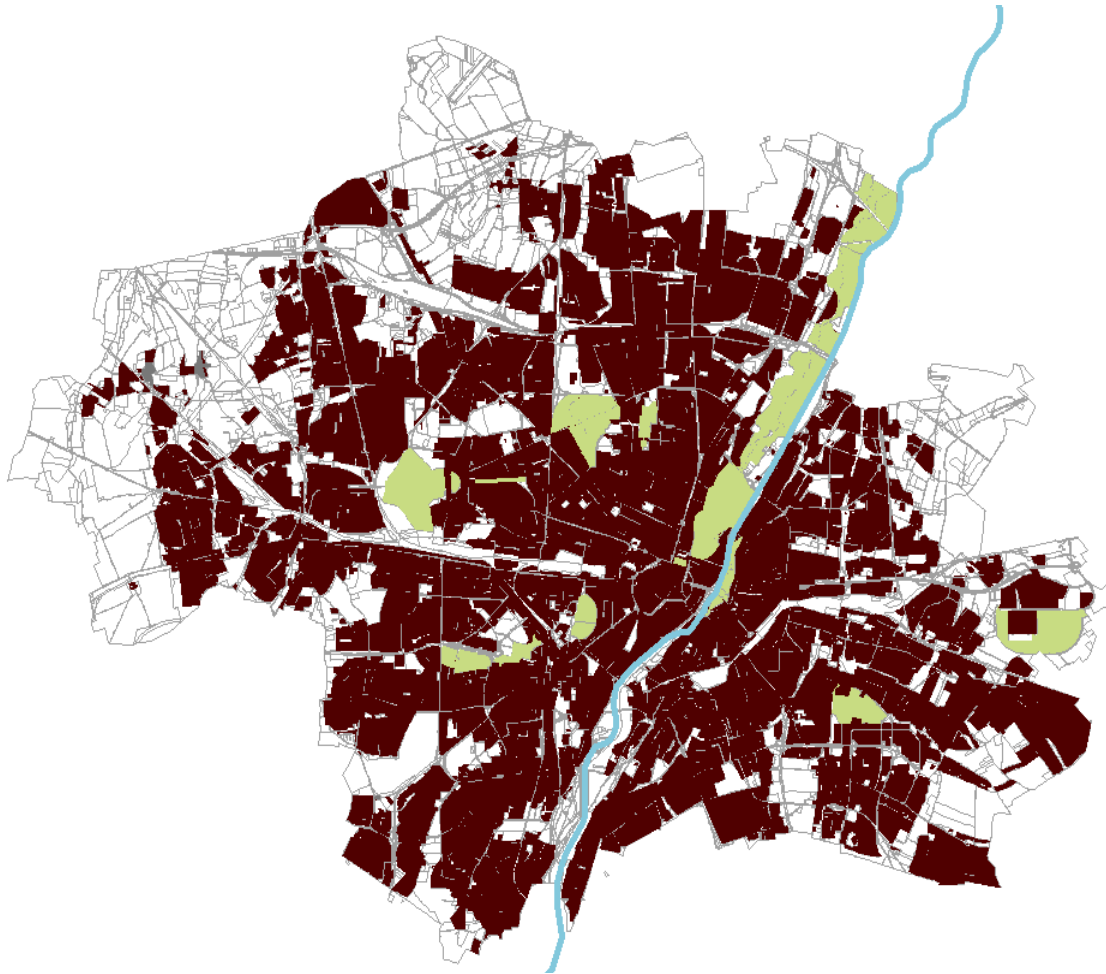
In following years integration of private bus companies and bus lines of surrounding counties



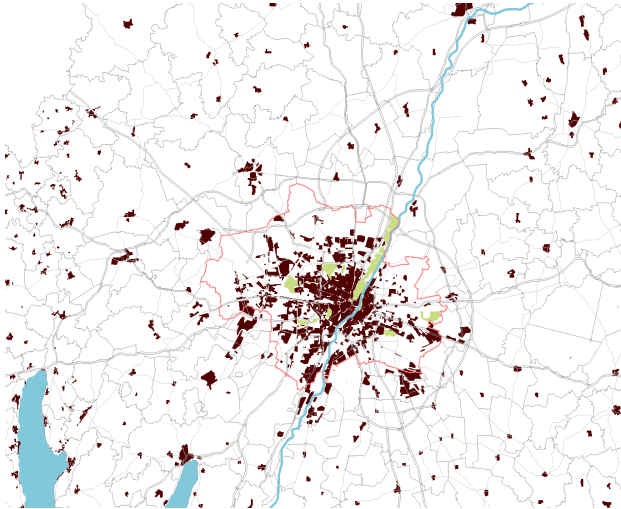
Transport as Key Factor for Munich's City Development



Today: Population 1,550,000 – Growths 1970-2000 mainly in the suburbs, since 2000 strong growth (+20%) in city itself

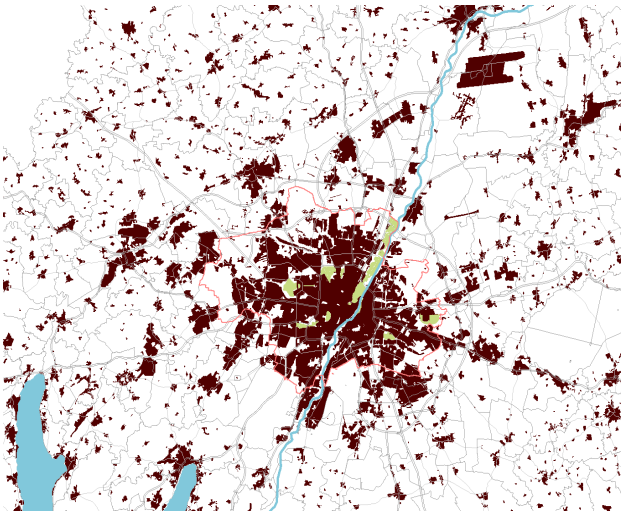


Transport as Key Factor for Munich's City Development



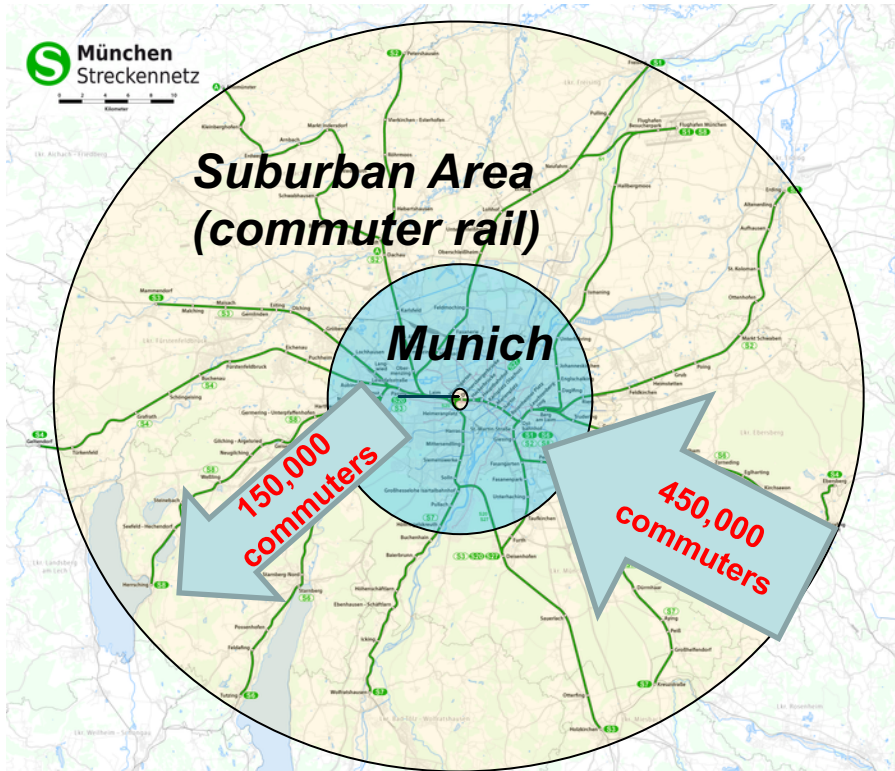
1950: Greater Munich Area, population around 1 million inhabitants (City 800,000, Surrounding area 200,000)

- 47,000 cars
- Suburban Rail: 30 million passengers
- Tram: 200 million passengers

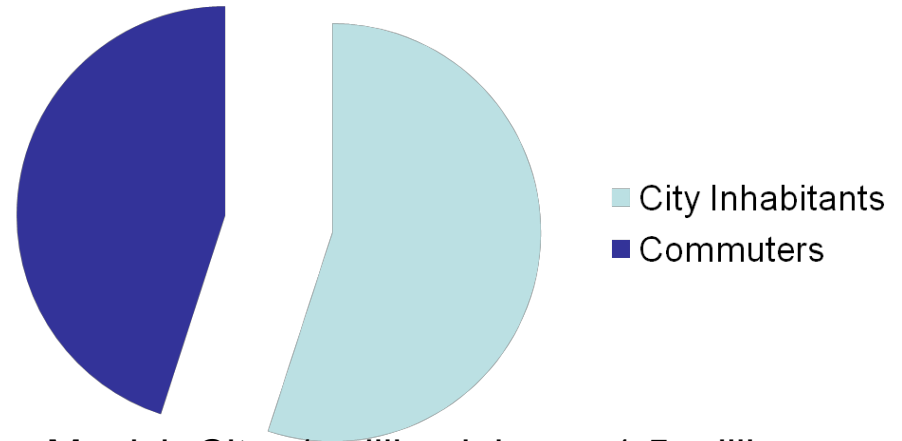


Today: Greater Munich – population 3 million (1.5 million within city, 1.5 million within surrounding area)

- 1,400,000 cars
- Suburban Rail: 250 million passengers per year
- Tram: 120 million passengers
- Metro: 410 million passengers
- Bus: 210 million passengers (City)
- Regional/suburban bus: 60 million passengers

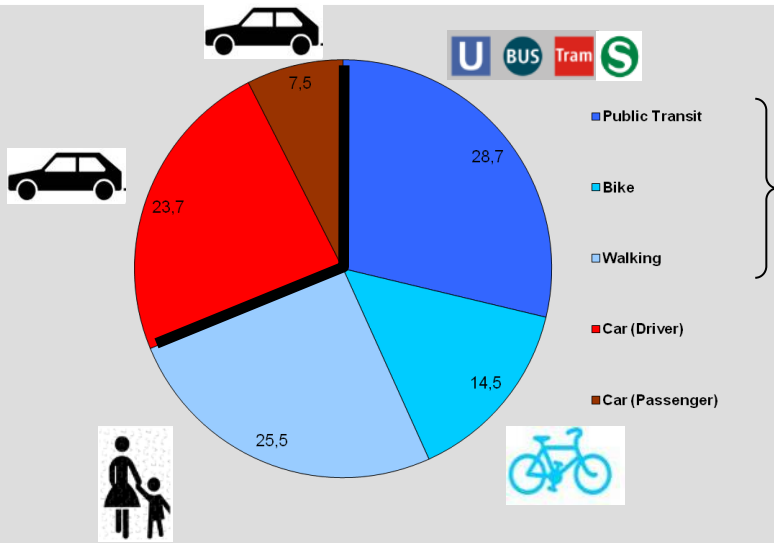


Jobs in Munich

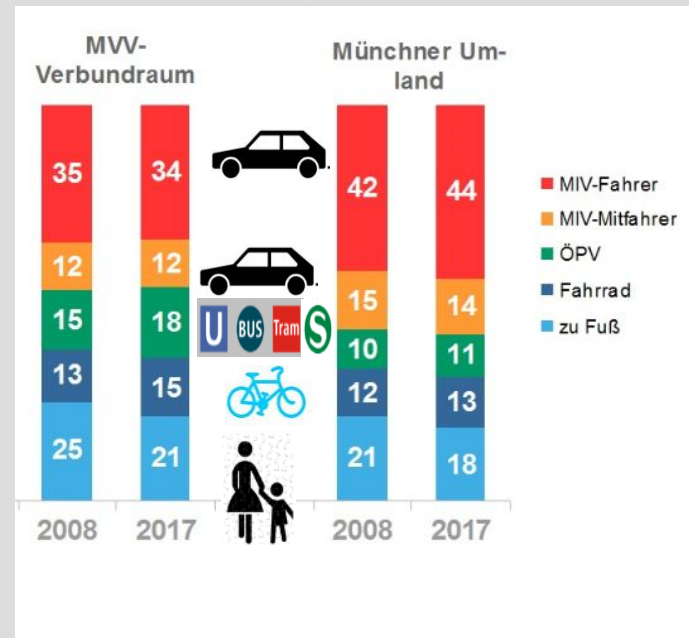


- Munich City: 1 million jobs on 1.5 million inhabitants
- 45% of jobs occupied by commuters

Mobility in Munich – Mostly Without Cars



City: Mobility without cars = 68 %
(MVG research)



MVV Area (total):
54% mobility without cars

Suburban Area (only):
42% mobility without cars

MVG: Münchner Verkehrsgesellschaft / Munich's Municipal Transit Company

- Owner:** Municipal Enterprise, part of Stadtwerke/City Works Munich (electricity, water, gas and public transit)
- Responsible for:** Metro, bus and tram, including network planning, building and timetable planning (except underground lines – planned and built by the municipality, handed over after construction to MVG)
- Number of Lines:** 8 Metro, 13 Tram, 75 Bus
- Employees:** 3,900
- Annual Ridership:** Metro 410 million, Tram 120 million, Bus 210 million
- Network:** Metro: 95 km, Tram: 82 km, Bus: 505 km



S-Bahn München

Owner:	Deutsche Bahn AG / German national railroad
Responsible for:	S-Bahn (rapid rail commuter system connecting Munich with the region)
Number of Lines:	10
Employees:	1,000
Annual Ridership:	250 million
Network:	442 km



Münchner Verkehrs-und Tarifverbund (MVV):

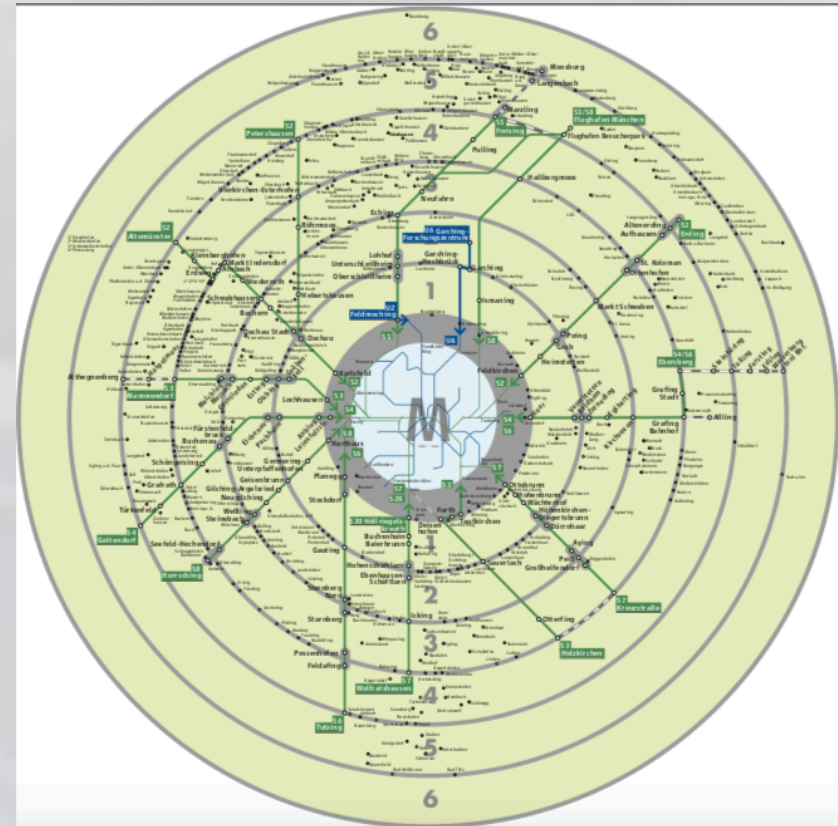
Owner:
City of Munich, districts and communities around Munich, State of Bavaria

Responsible for:
Unified tariff, cooperation between transit companies, transit planning for region around Munich

710 million passengers yearly in service area (population 3 million)

Service Area 5.530 square kilometers

Average trip length: 10 km



Institutions involved in public transport within MVV area:



Federal government: provides money for regional rail transit to state government, State has own company to organize, finance and plan regional rail transit and makes contracts with railroad companies



City government: owns municipal transit company, municipal transit company provides subway, city bus and tram (costs covered by farebox revenue)



Suburban Counties/districts: Finance suburban bus and define guidelines for planning, MVV plans suburban bus lines and makes contracts with different bus companies

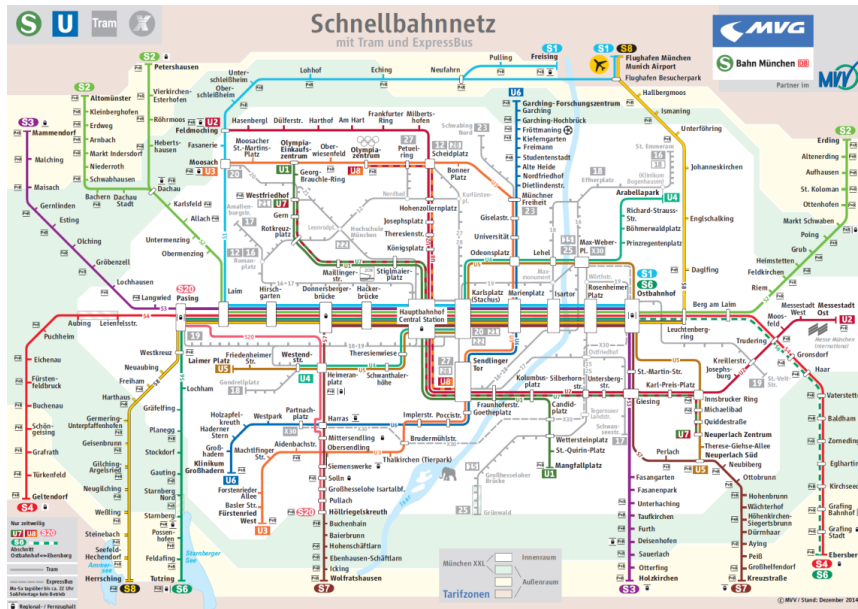
When is public transit an alternative to the car?



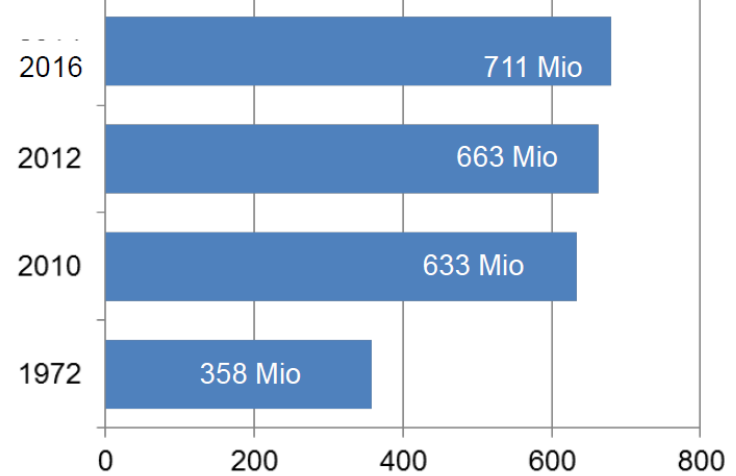
Public transit should be:

- Fast
- Reliable
- Going where you want to go - and when you want to go
- Comfortable
- Easy to use

Integrated Rapid Rail System

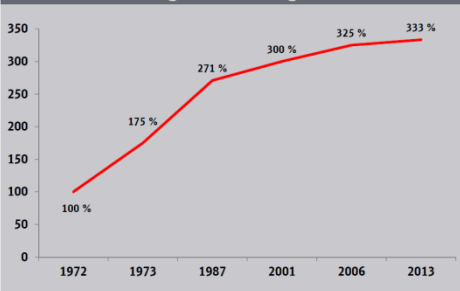


Fahrgäste pro Jahr (in Mio.)

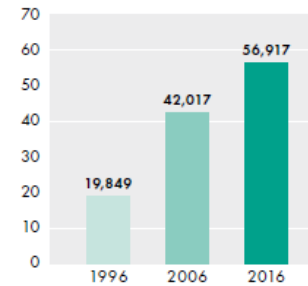


Annual passengers overall in MVV-area doubled since 1972 (complete linked trips counted)
 Population within MVV rose from 2.1 million (1972) to 3 million (today) : +40 percent

Das Wachstum der Fahrgastzahlen im Vergleich zu 1972 in Prozent



Commuter rail (S-Bahn) passenger growth in percent since 1972 till today 350% (from daily 240,000 to 840,000 now) (Passengers one year before integration in MVV: 160,000 daily)



Passengers of suburban bus lines tripled within 20 years to 57 million per year

One Ticket, One Tariff, One Timetable for All

**One ticket can be used for:
Suburban Rapid Rail, Metro, bus and tram**

- Easy transfer between the systems
- Most riders use monthly passes
- Ticket machines in all city buses and trams
- Boarding at all doors of city buses



Frequent Service 24 hours a day

- Metro in operation until 1:30 AM, on the weekend till 2:30 AM
- Frequency of trains up to every 2 minutes during peak hours
- Tram and bus network: 24 hours, day and night
- Public transit stops always in walking distance



Direct Access from the Region to the Heart of Munich

S-Bahn / Suburban Rail:
(Owner German National Railroad)

Responsible for: rapid rail commuter system connecting Munich with its region, within 40 km around Munich

Annual Ridership: 250 Million

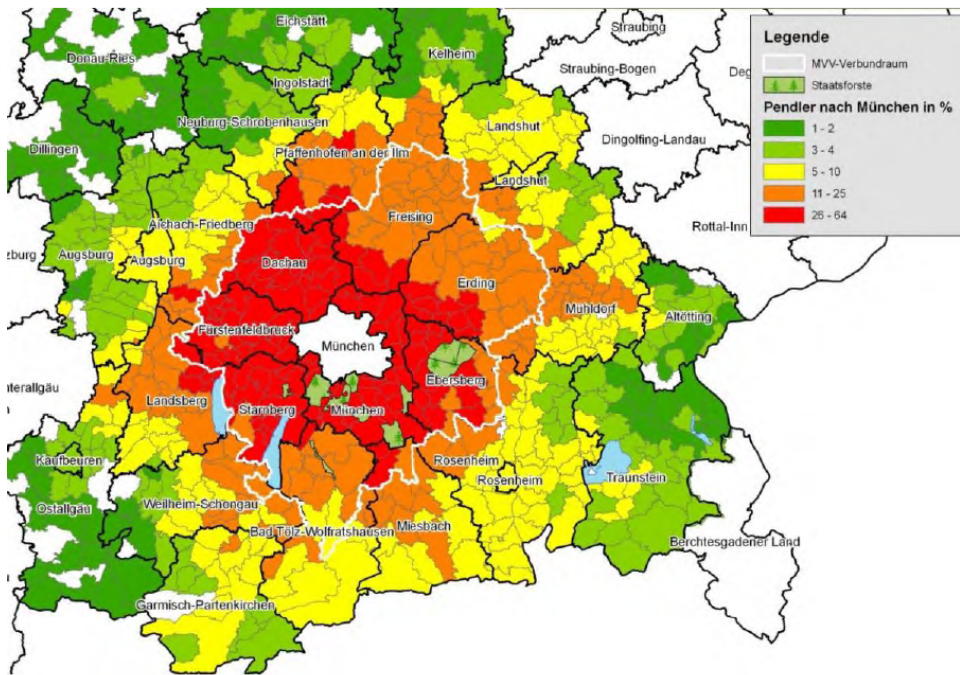
Network: 442 km



...up into the pedestrian area



Integration of additional counties and cities to match changed commuter patterns and longer commuter distances



Second central tunnel under construction to expand capacity and integrate larger commuter area into S-Bahn-system (commuter rail)



58 Verkehrsverbünde in Germany (population 82 million)

First founded as HVV in Hamburg (1965)

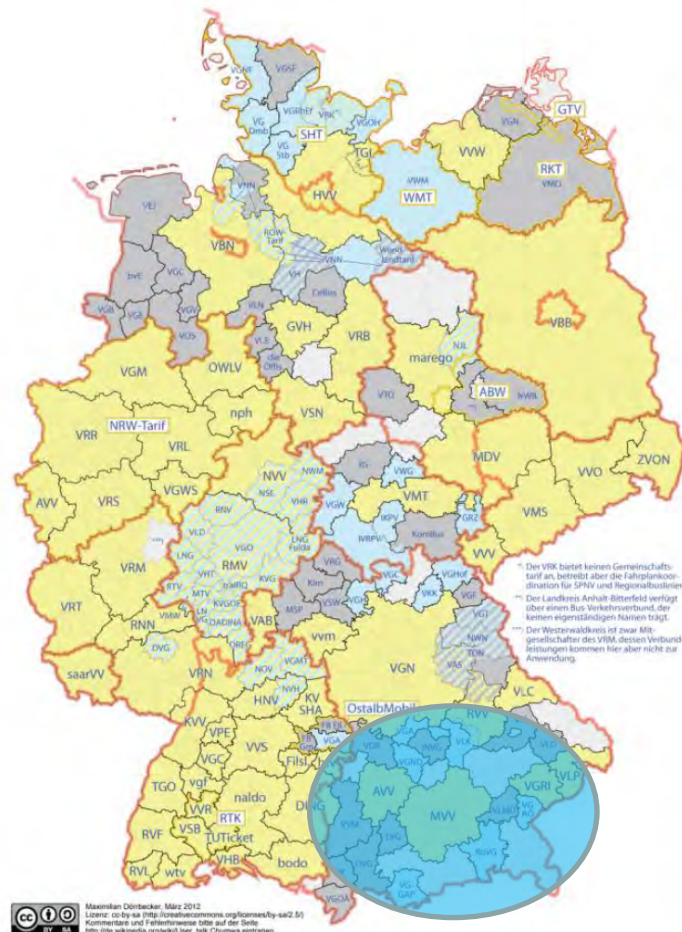
70% of the area with 85% of population are covered by Verkehrsverbünde

Financial aspects:

In Germany 76% cost coverage of public transport

In MVV-area over 80% by farebox revenue

MVG (municipal) 100% of operational costs (tram, subway, city bus) covered by farebox revenue



Proposed expansion to South Bavarian Verkehrsverbund

The future of yesterday -1970ies:

(In the past, the future used to be better, too)



Self driving electric cars

Personal Rapid Transit/
Cabintaxi
(Service on Demand)

Computer sind elektronische Maschinen, die bestimmte Abläufe speichern und so Vorgänge automatisch steuern können.

Elektronische Autos der Zukunft werden auf Elektrostraßen (3) computergesteuert.

Gasturbinenzüge erreichen mit 300 Kilometern in der Stunde die doppelte Geschwindigkeit der heutigen Züge. Das ist durch Turbinenantrieb möglich (1).

Kabinentaxis (2) werden in sechs bis acht Meter Höhe lautlos an Betonschienen durch die Städte gleiten. Sie sind dreisitzige Kästen aus Kunststoff, die völlig automatisch fahren.

Luftkissenfahrzeuge gleiten auf einem Luftstrahl, der aus Düsen an der Unterseite des Fahrzeugs ausgestoßen wird. Solche Fahrzeuge können in einer gewissen Höhe überall auf der Erdoberfläche fahren.

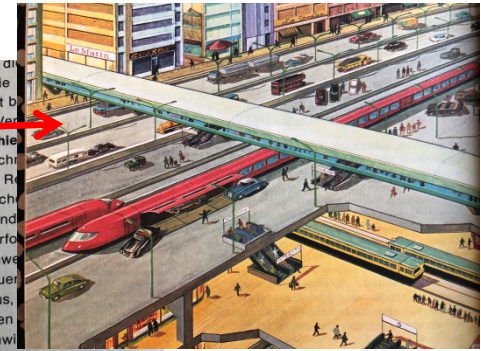
Magnetschienenbahnen erreichen sehr hohe Geschwindigkeiten. Das ist möglich, weil das Fahrzeug dabei ohne Reibung auf einem Magnetfeld gleitet (4), das von den Magnetschienen erzeugt wird.

Röhrenzüge (5) werden unterirdisch in einem Tunnel mit sehr hoher Geschwindigkeit dahinzurasen. Man will alle großen Städte durch solche Röhren miteinander verbinden.

Der immer d...
sich für die...
Straßen ist b...
eben die Ver...

Magnetschie...
pelt so schn...
Züge. Ein R...
nach Münch...
Die Verbind...
Städten erfo...
binen schwe...
pfeilern quer...
Warenhaus...
Die Straßen...
für Geschwi...

Kilometern in der Stunde haben...
bahnen gibt es keine Verkehrs...
steuern die Elektromobile. Der...
keinen Han...
wacht die h...
gens, währ...
kann. Das F...
fahrtstraße...
schaltung...
Noch schn...
schweben i...
können sow...
fahren. Übe...
turbinenzü...
Zukunft. Vie...
im Jahr 200...
zum Baden...



Hyperloop

Source: German children book from 1973

City of Hagen, Germany:
operating tram system (55 km length) was closed in 1976
in favor of projected PRT system
(above: test track in Hagen 1972-1978)

**Thank you for
your attention!**



**Today are the
good old days of
the future...**