



An Urban Infrastructure Case Study
By Julia Eyerund
October 30th, 2015

Location Overview



Vienna:

Population (1 July 2015)	
• City	1.812.604 ▲
• Density	4,326.1/km ² (11,205/sq mi)
• Metro	ca. 2,419,000
• Ethnicity ^{[1][2]}	61.2% Austrian 38.8% Other
Statistik Austria, ^[3] VCÖ – Mobilität mit Zukunft ^[4]	

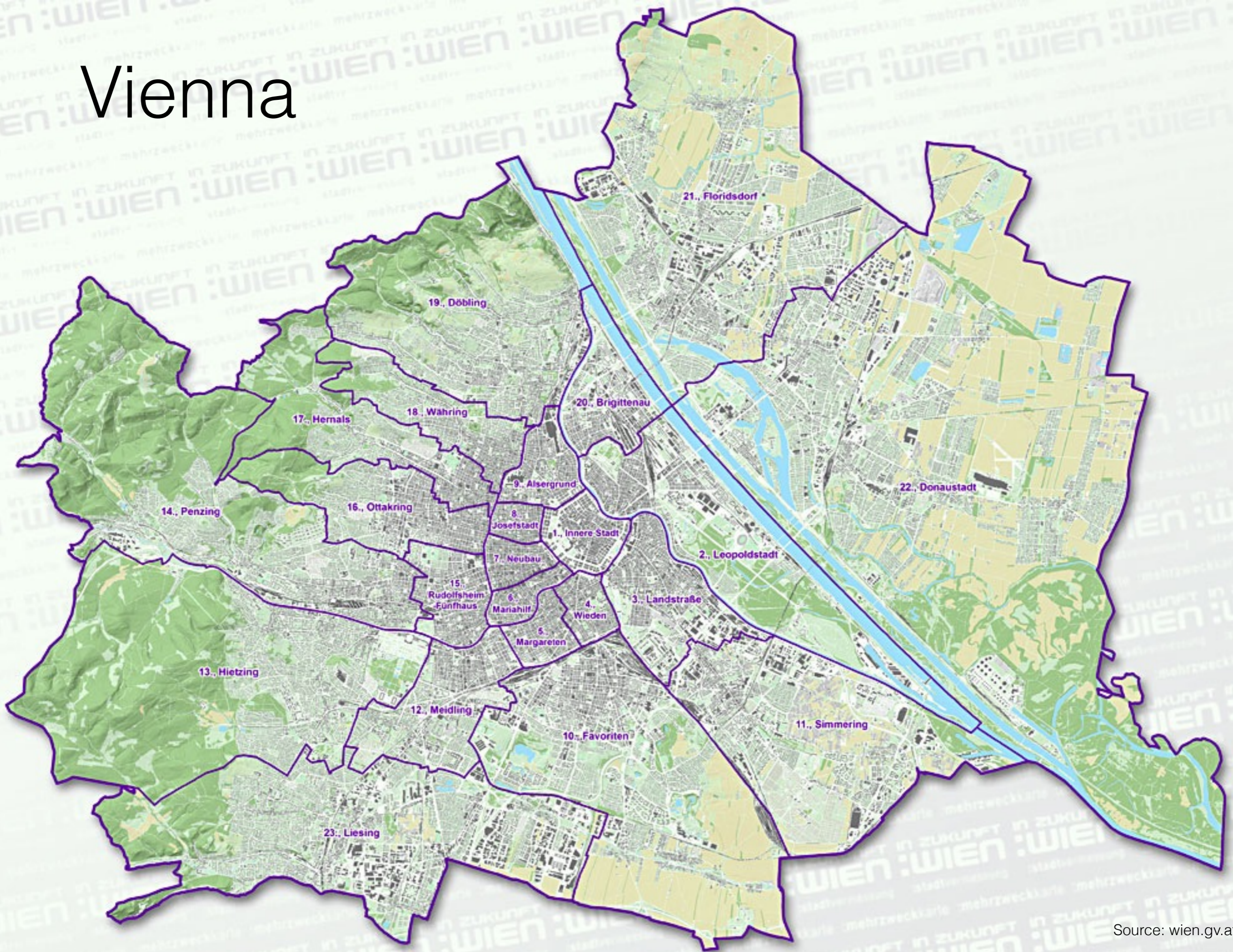
VS.

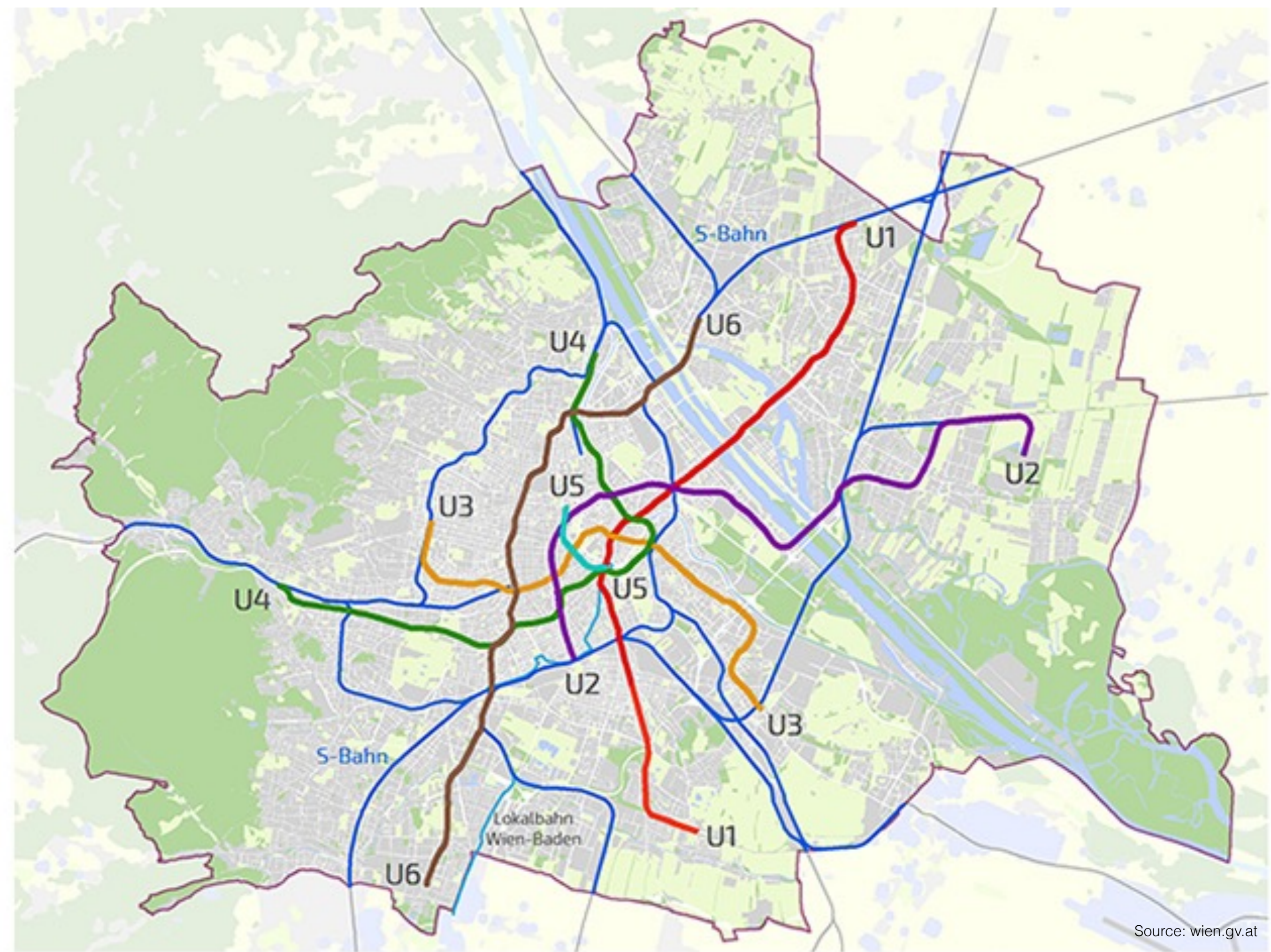
Vancouver:

Population (2011) ^{[1][2]}	
• City	603,502 (8th)
• Density	5,249/km ² (13,590/sq mi)
• Urban	2,135,201
• Metro	2,313,328 (3rd)

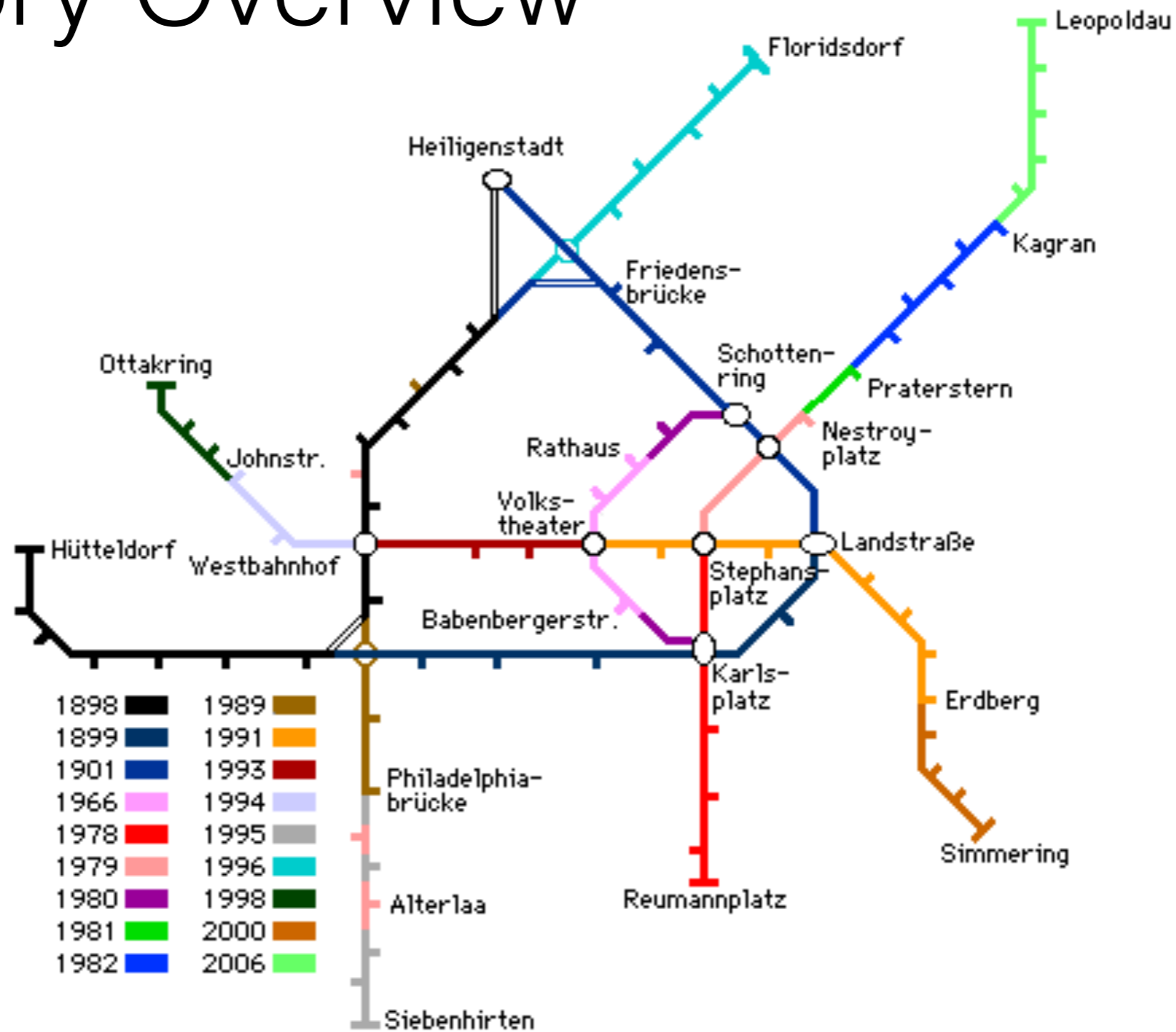
Source: wikipedia.ca

Vienna

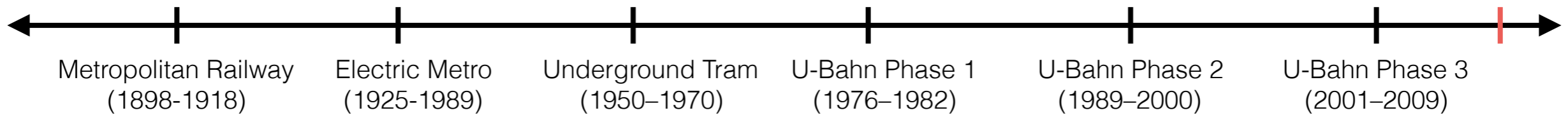




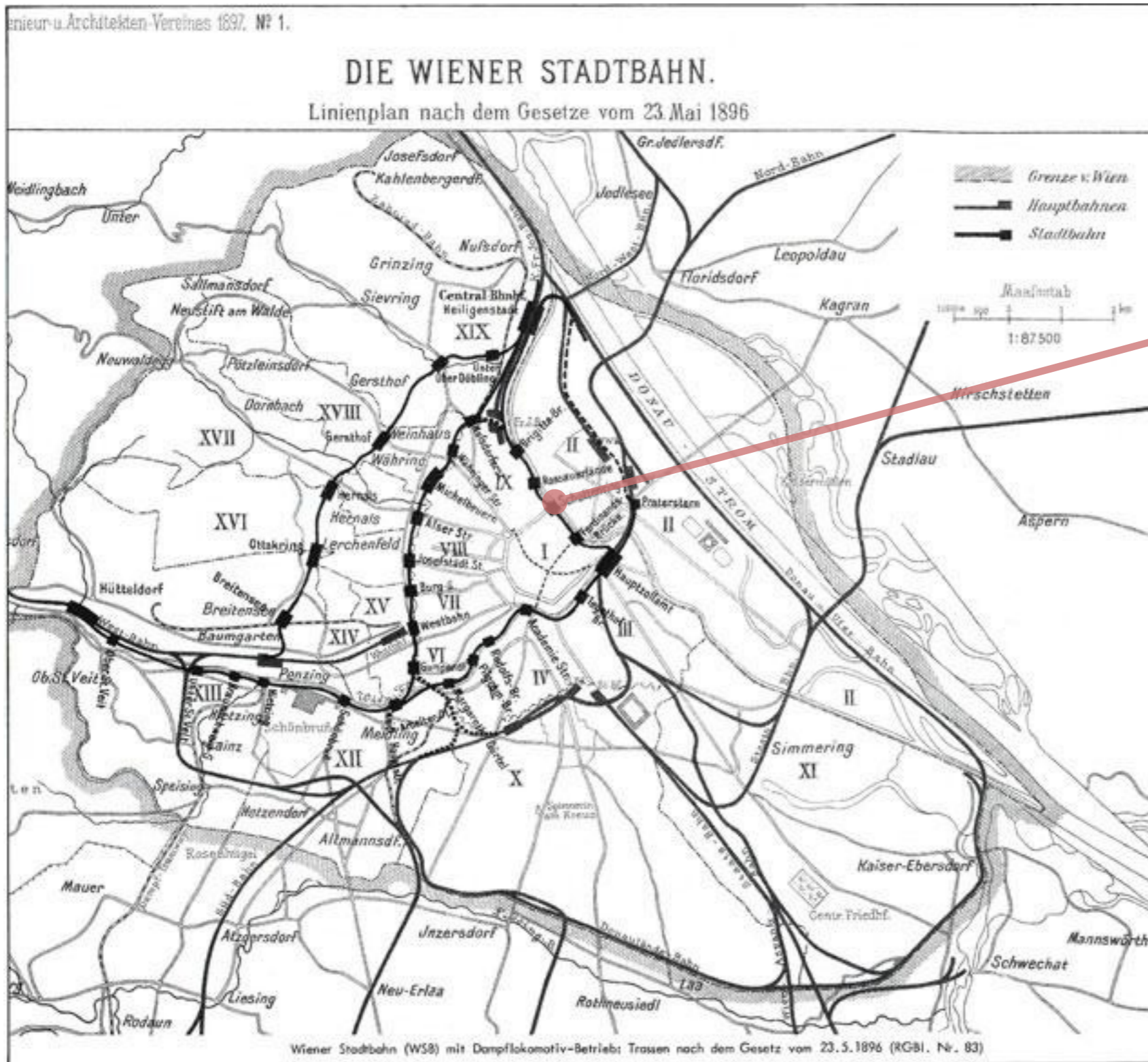
History Overview



U-Bahn Phase 4
(2017)



Metropolitan Railway (1898-1918)



Schottenring Station



Gumpendorfer Straße Station

Electric Metro (1925-1989)



Vienna after WWII



Image source: <http://www.wien-vienna.at/geschichte.php?ID=601>

1960 Map of the Underground Tram

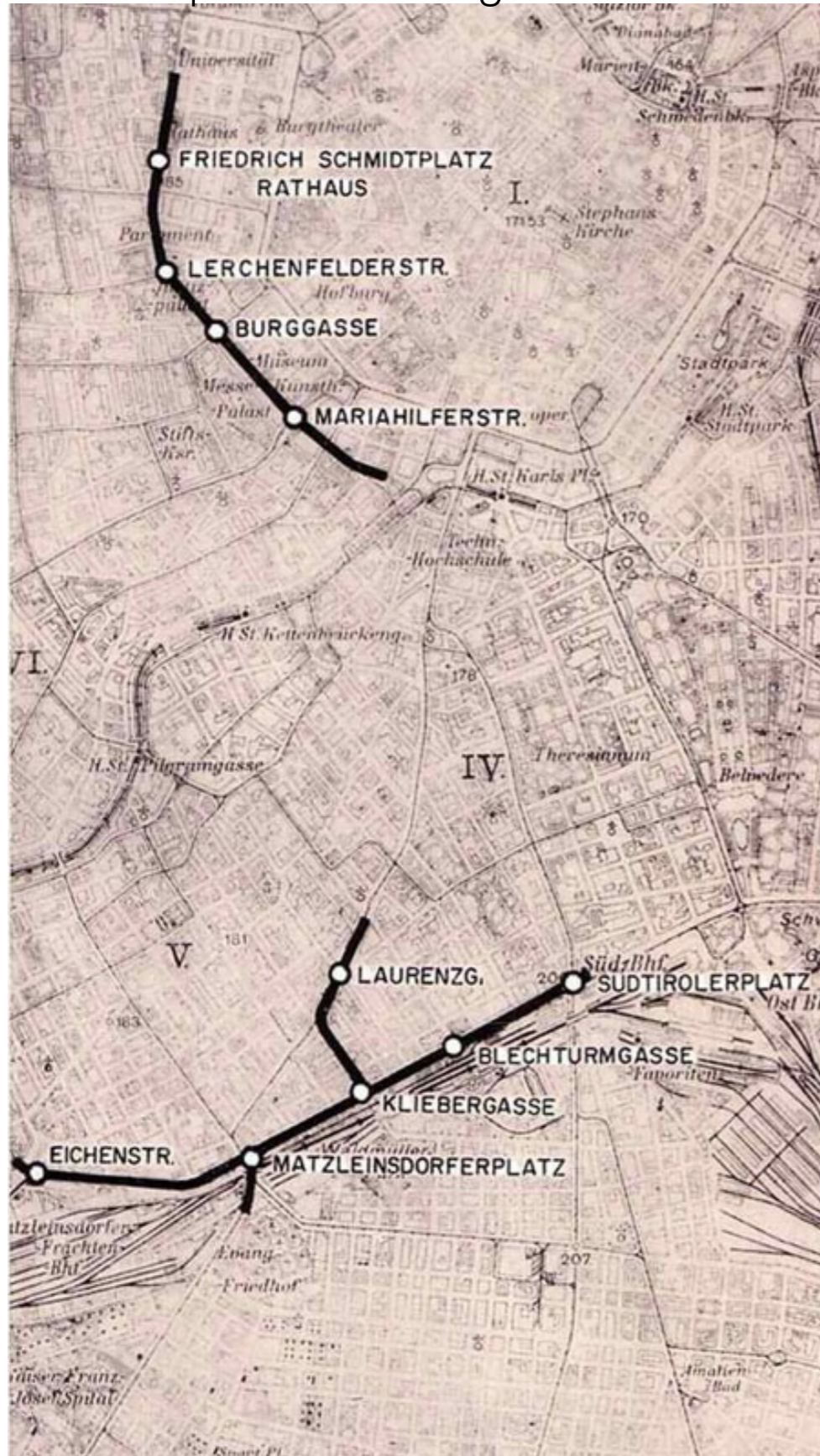


Image sources: wien.gv.at

Underground Tram (1950–1970)



Image sources: <http://www.tramway.at/zukunft/index.html>

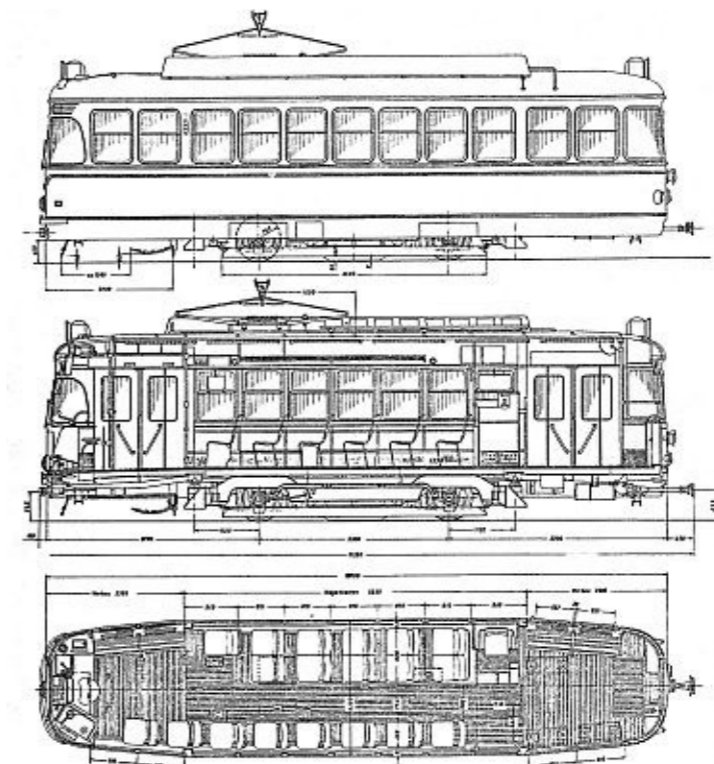


Image sources: schienenfahrzeuge.netshadow.at

The automobile

Karlsplatz before the construction of the subway started



Image sources: <http://www.fpdwl.at/forum/stadtverkehr-wien/r-tsel/gel-ste-r-tsel/8937-3x-stau-gel-st/seite-2>

Car ownership in Vienna:

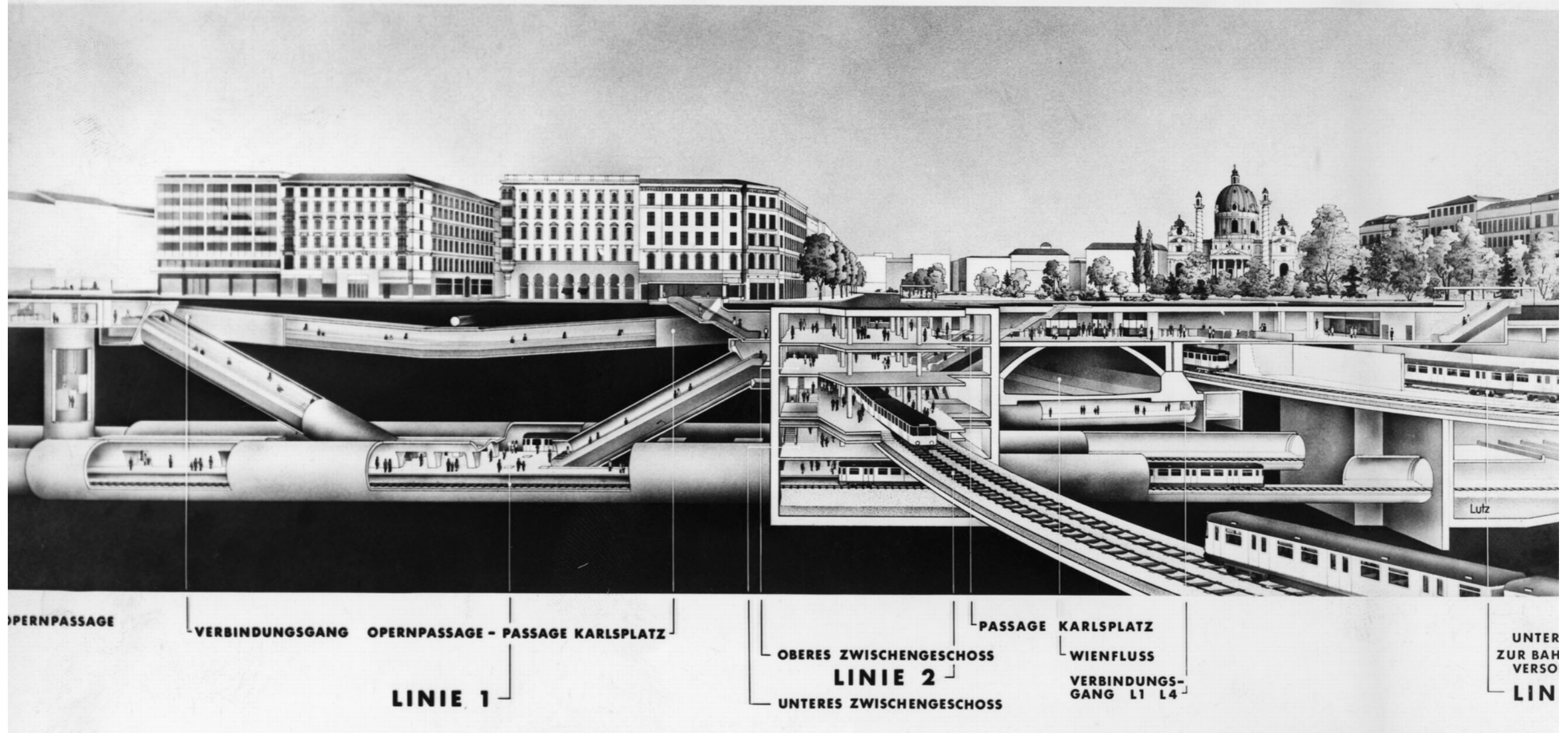
1950 = 67,000

1960 = 203,000

1970 = 415,000

U-Bahn Phase 1 (1976–1982)

U-BAHN-KNOTEN KARLSPLATZ PLANUNGSSTAND : JÄNNER 1969



U-Bahn Phase 1 (1976–1982)

Construction at Karlsplatz 1970



“Wiener Maulwurf”(the Vienna mole) - boring machine

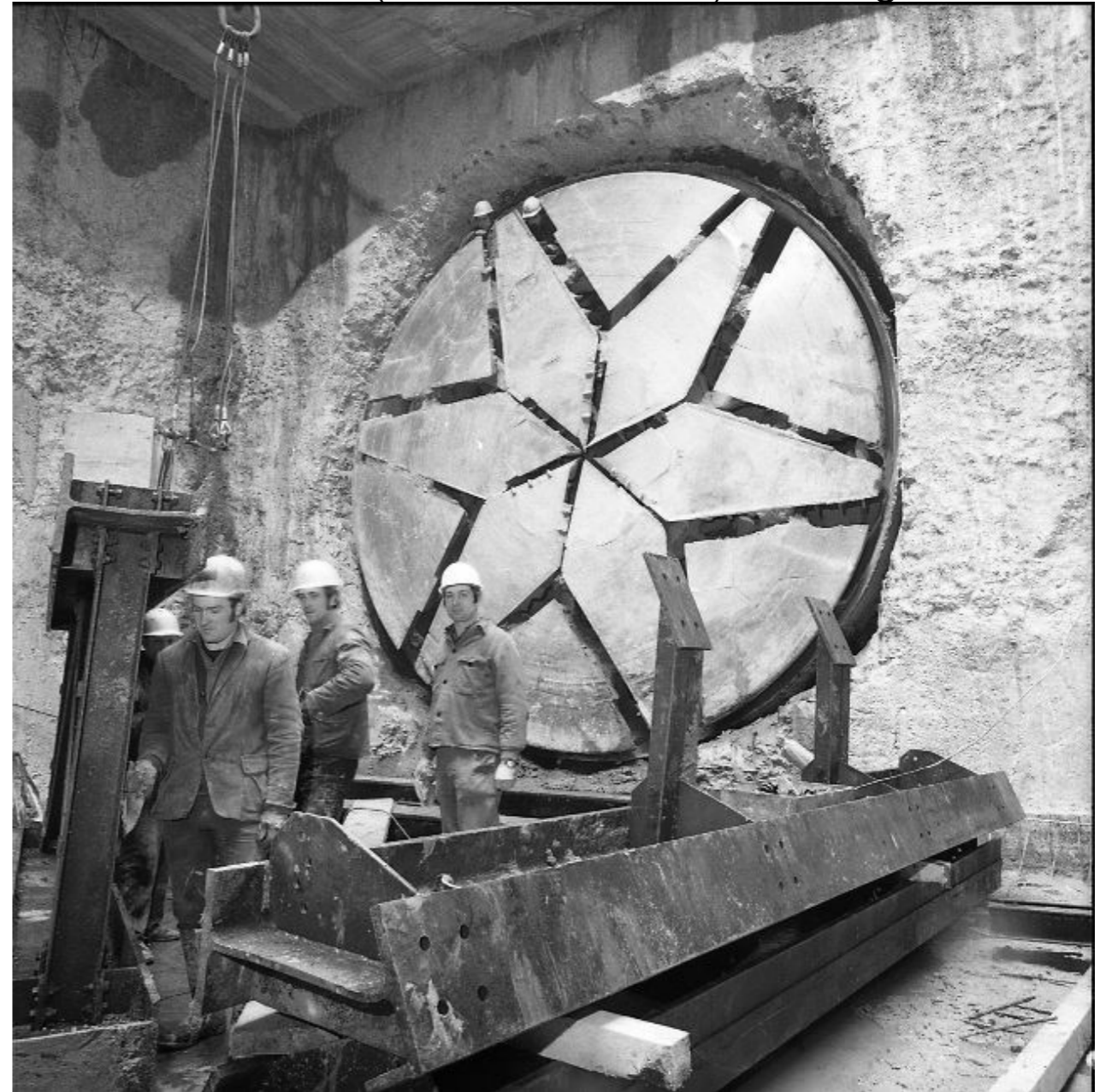


Image sources: <http://blog.wienerlinien.at/meilensteine-der-wiener-linien-1969-u-bahnbau-startet/>

U-Bahn Phase 1 (1976–1982)

Construction of bridge and U-bahn line across the Donau



Image sources: http://wiener-untergrund.at/chronik_78-82.shtml

1978 - Opening Day



Image sources: http://wiener-untergrund.at/chronik_78-82.shtml

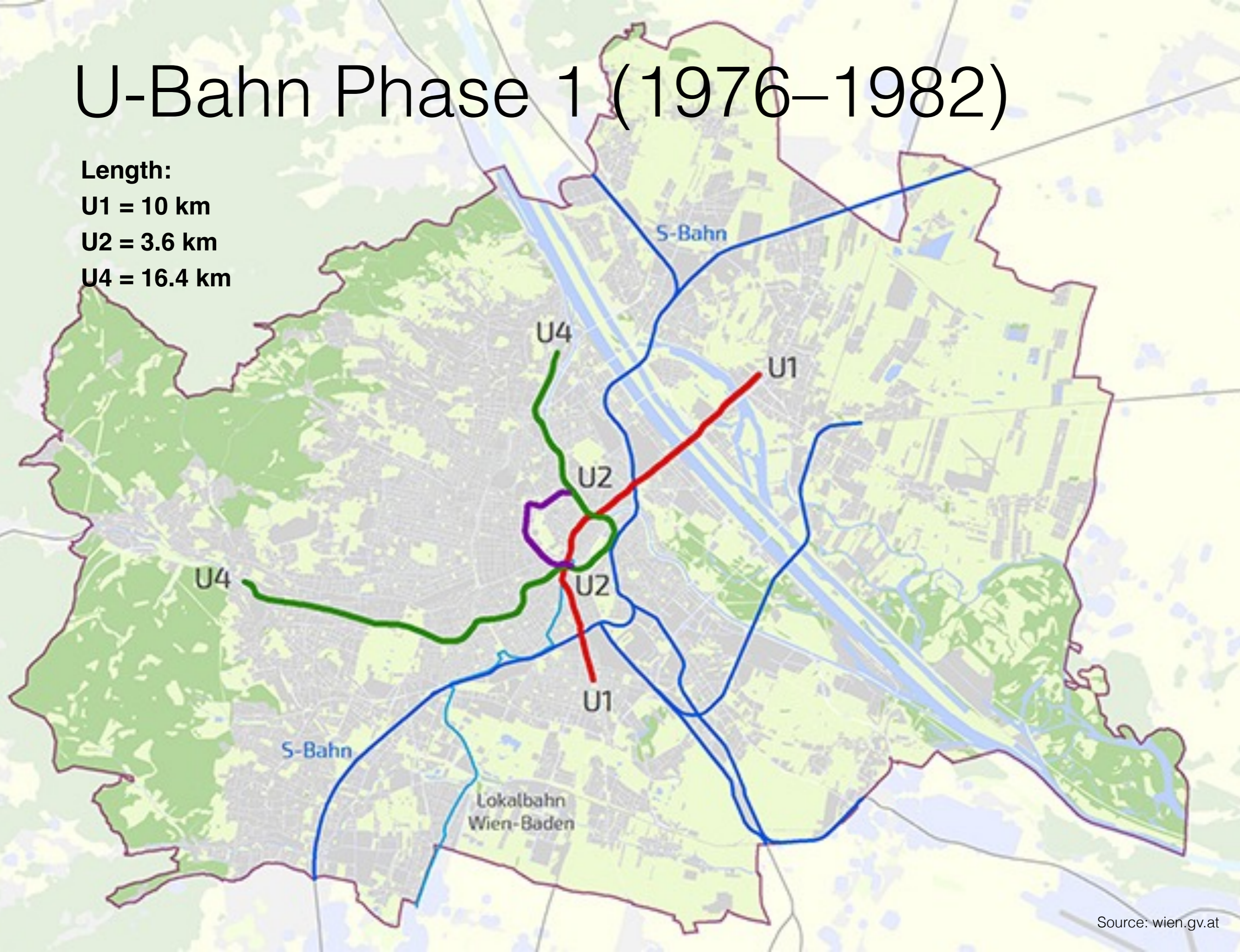
U-Bahn Phase 1 (1976–1982)

Length:

U1 = 10 km

U2 = 3.6 km

U4 = 16.4 km

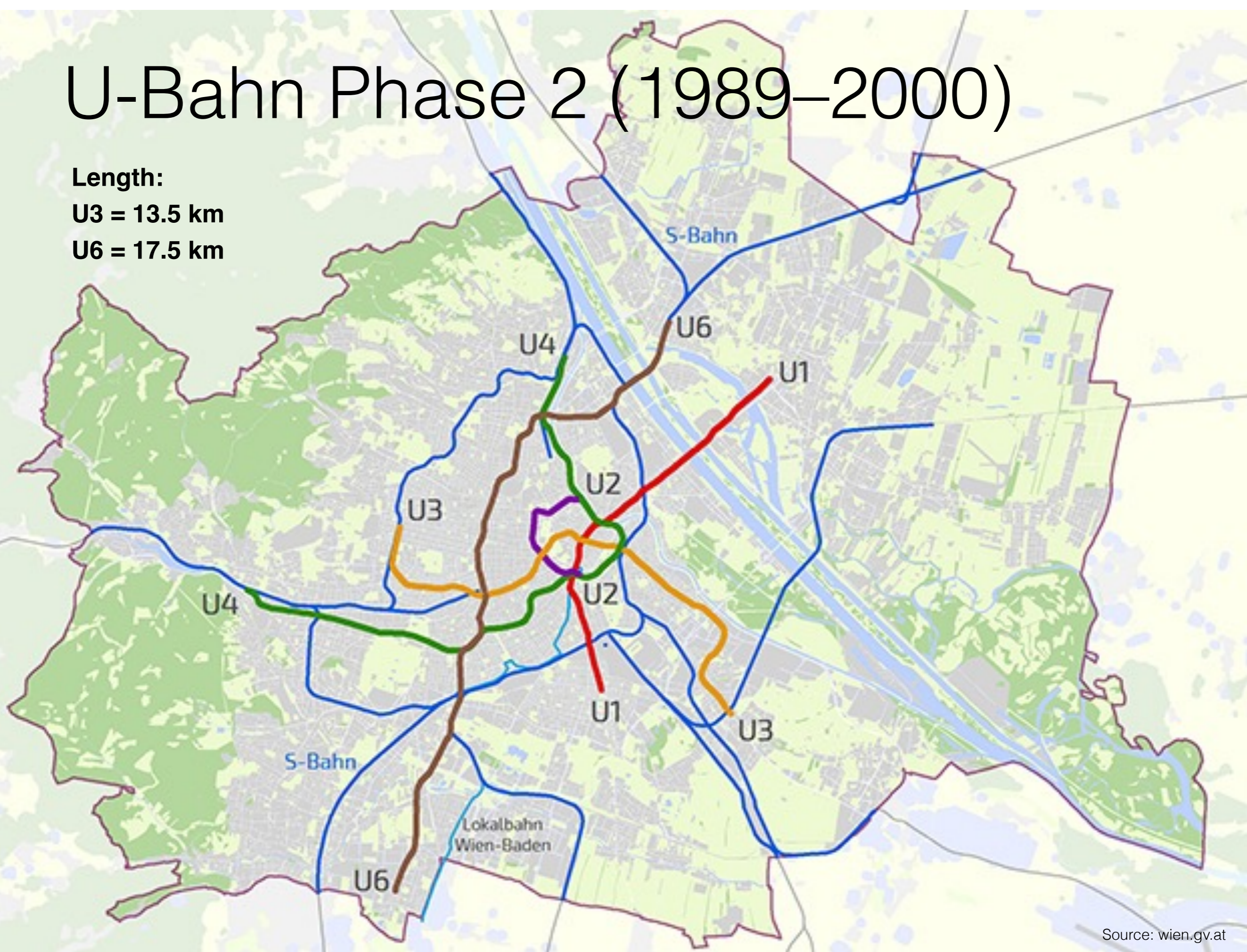


U-Bahn Phase 2 (1989–2000)

Length:

U3 = 13.5 km

U6 = 17.5 km

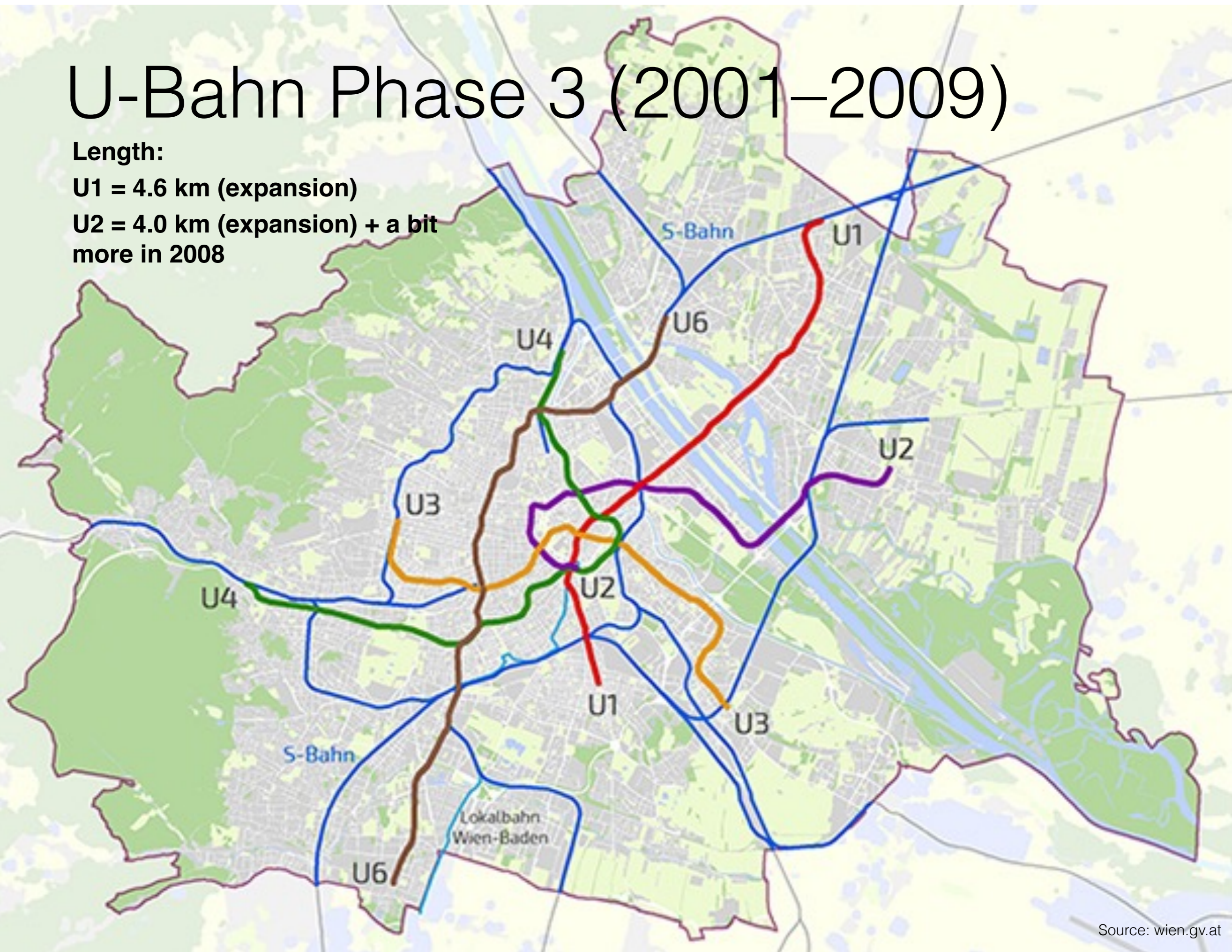


U-Bahn Phase 3 (2001–2009)

Length:

U1 = 4.6 km (expansion)

U2 = 4.0 km (expansion) + a bit more in 2008



U-Bahn Phase 4 (2007-2017)

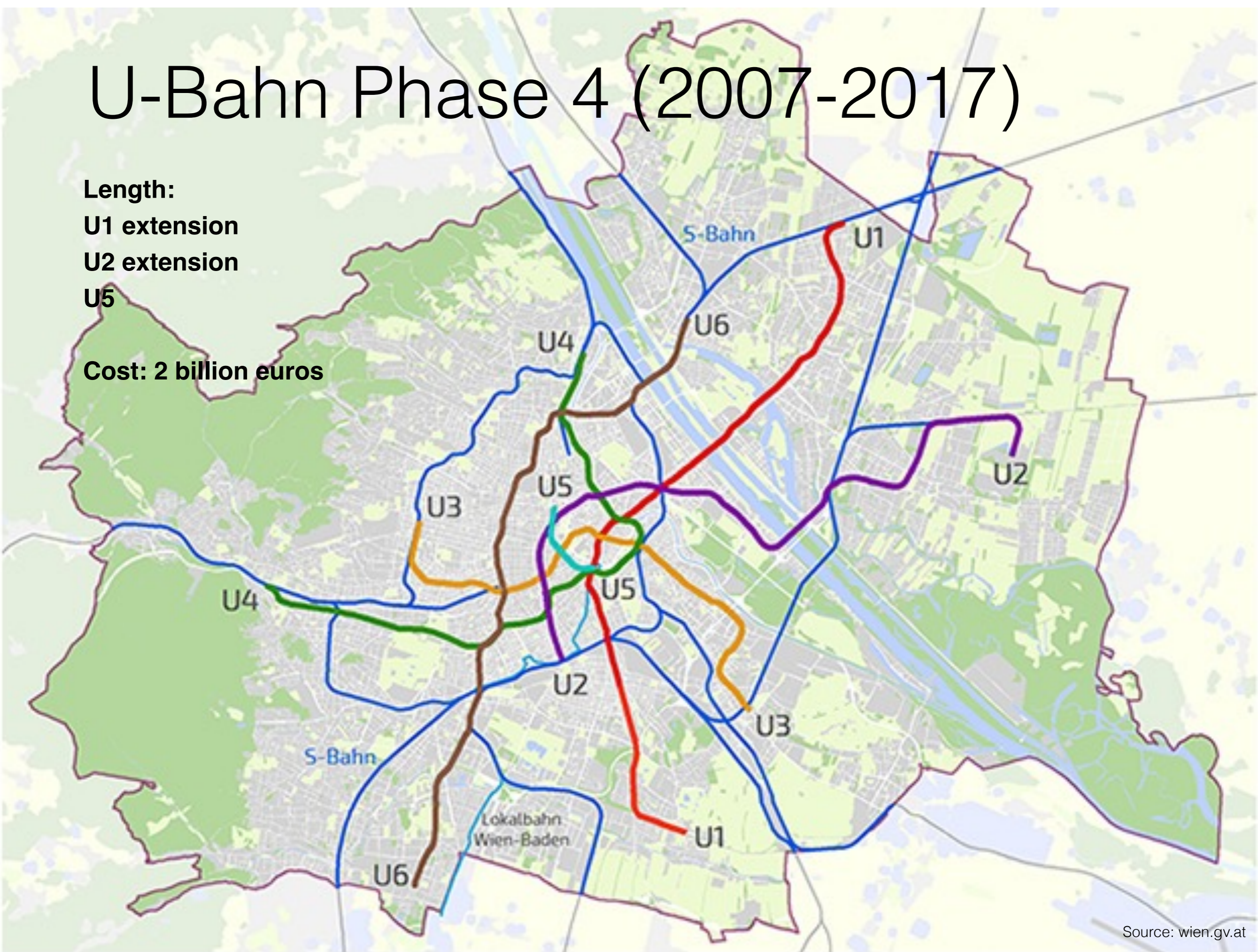
Length:

U1 extension

U2 extension

U5

Cost: 2 billion euros



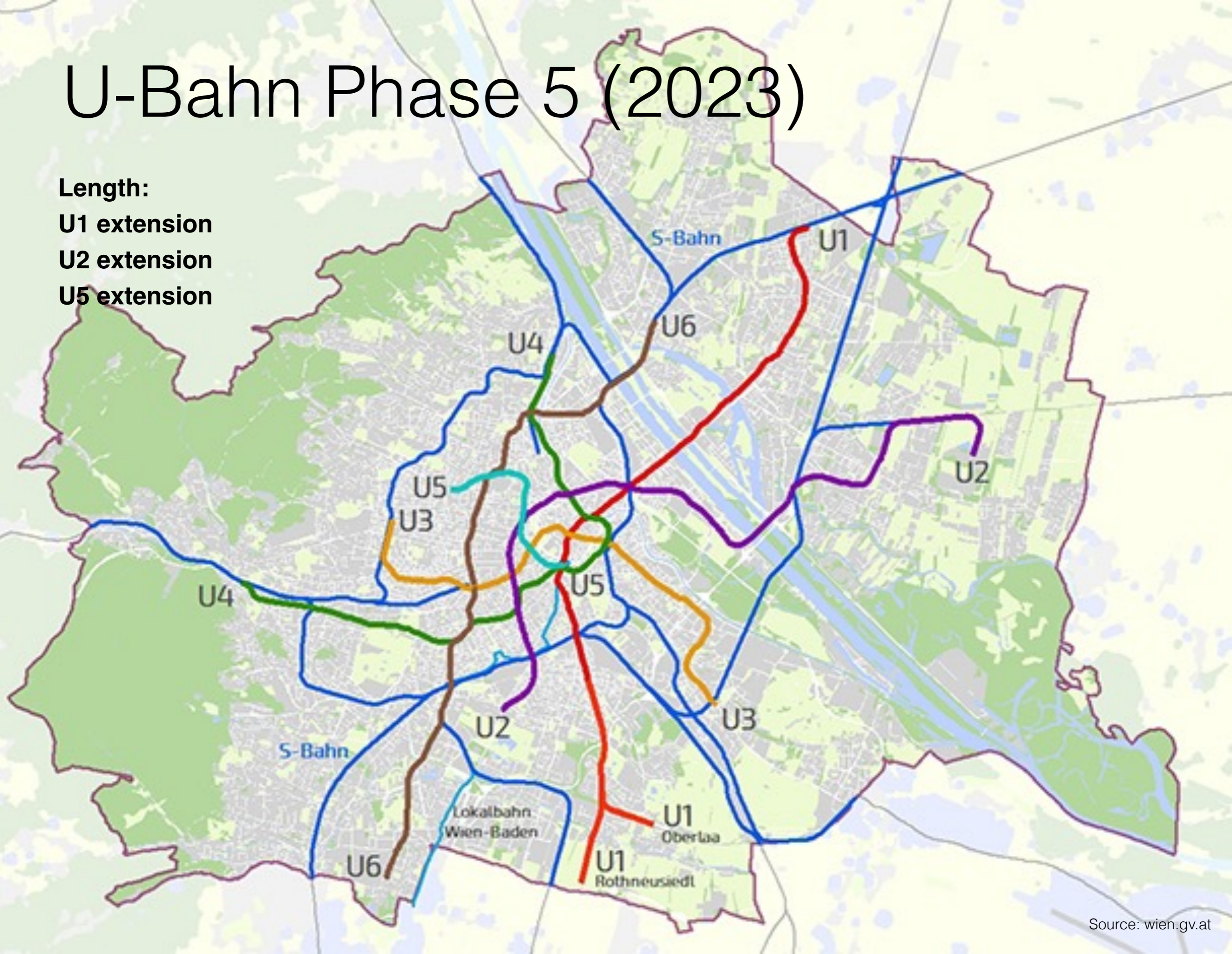
U-Bahn Phase 5 (2023)

Length:

U1 extension

U2 extension

U5 extension



Video: Timelaps

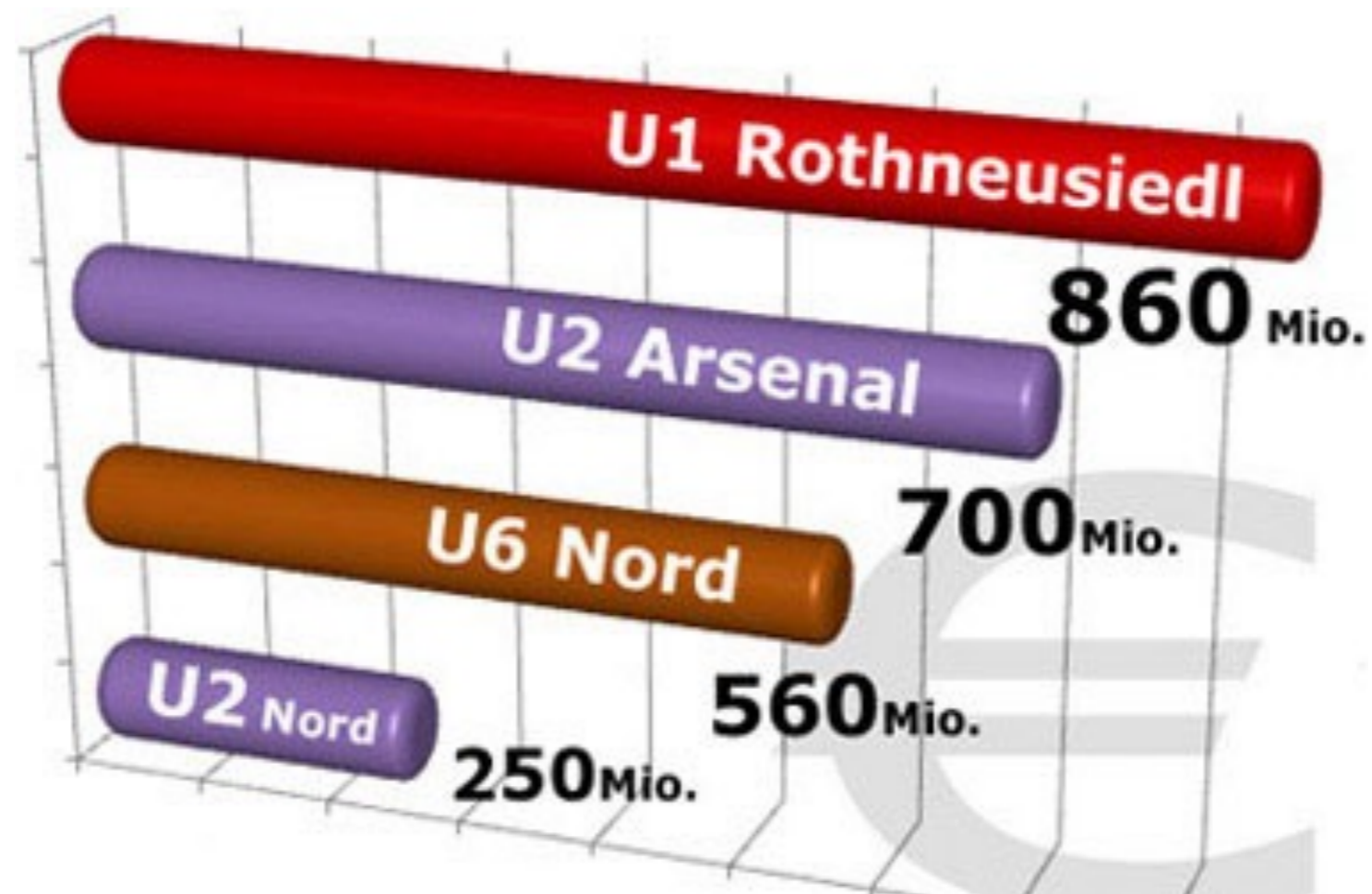
<https://vimeopro.com/wienerlinien/wlv/video/67707423>



Source: <http://www.airvienna.com/vienna/10-things-you-should-keep-in-mind-while-travelling-in-vienna>

Cost

- Founded by the municipal government (tax-payers) + federal
- **1 km = 150 - 250 million euros**
- U4 modernization project (2020) = 335 million euros
- U2 was the most expensive line



Statistics U-Bahn



Opened:	1898; electrified 1925, modernised 1976 onw.
Length of route (2000):	38.13miles / 61.6km total (of these 20.31miles / 32.5km are below surface)
Total length of track (2000):	116.4miles / 186.3km
Gauge:	1.435m
Voltage:	750V DC
Number of stations (2000):	76
Number of coaches (2000):	690
Passengers p/a (2000):	395.6 million
Train intervals:	Regular traffic: all lines: 5mins Peak hours: U1: 2-4mins; U2: 5mins; U3,U4: 3-4mins; U6: 2-3mins Evenings: all lines: 7-8mins
Maximum speed:	50 mph / 80 kph
Average travel speed:	19.6 mph / 31.3 kph
Longest journey without change:	Floridsdorf to Siebenhirten (U6), 10.75miles / 17.4km, travel time 36mins.
Longest continuous tunnel:	Hintermayergasse to Spetterbrücke (U3), 5.87miles / 9.39km
Average distance between adjacent stations by rail:	0.47miles / 0.76km
Longest distance between adjacent stations by rail:	Heiligenstadt to Spittelau (U4), 0.99miles / 1.59km
Shortest distance between adjacent stations by rail:	Museumsquartier to Volkstheater (U2), 0.21miles / 0.34km
Highest point:	Ottakring (U3), 227 metres above sea level.
Deepest point:	Schwedenplatz (U1), 142 metres above sea level
Greatest elevation from ground level:	Spittelau (U6), +13.6 metres
Maximum depth below ground level:	Karlsplatz (U1), -24.6 metres
Deepest lift:	Westbahnhof (U3), to Gerstnerstrasse, 22.25 metres
Longest escalator:	Zippererstrasse (U3), vertical rise 17.7 metres, length 53 metres
Station with the most escalators:	Karlsplatz (U1, U2, U4), 26

Source: <http://homepage.univie.ac.at/horst.prillinger/ubahn/english/facts.html>

U-Bahn 2013



LINIEN

Anzahl der Linien	5
Anzahl der Betriebsbahnhöfe	3
Anzahl der Haltestellen	104
Mittlerer Haltestellenabstand (m)	754,6
Mittlere Linienlänge (km)	15,7
Mittlere Reisegeschwindigkeit (km/h) im Spitzenverkehr, tagsüber und abends	32,5

LÄNGEN (KM)

Baulänge	82,9
Betriebslänge	79,1
Linienlänge	78,5
Gesamtgleislänge	236,9
Rillenschienengleise zu Vignolschienenengleise	2% zu 98%

BAULICHE ANLAGEN

Spurweite (mm)	1.435
Hauptgleise (km)	158,2
Anzahl der Weichen	599

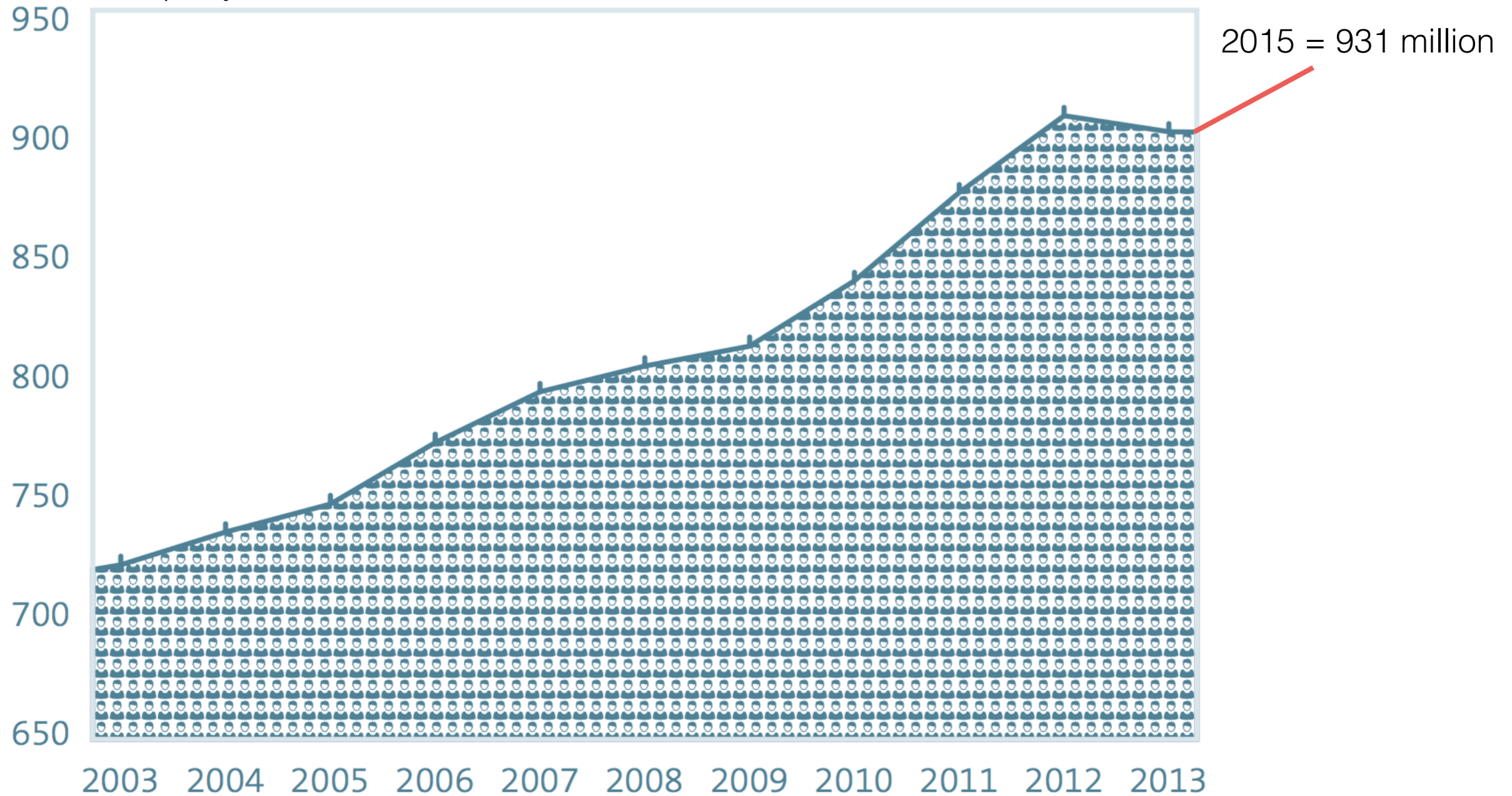
FAHRZEUGE

Durchschnittlicher Zugauslauf (Mo–Fr)	115
Triebwagen insgesamt	762
U-Bahn-Triebwagen	446
V-Wagen	192
Gelenkwagen in Niederflurbauweise	124
Beiwagen (Steuerwagen)	96
verfügbare Plätze	128.832
durchschnittliches Platzangebot je Fahrzeug	150,2

Source: [wienerlinien.at](http://www.wienerlinien.at)

Fahrgastzahlen 2003 – 2013

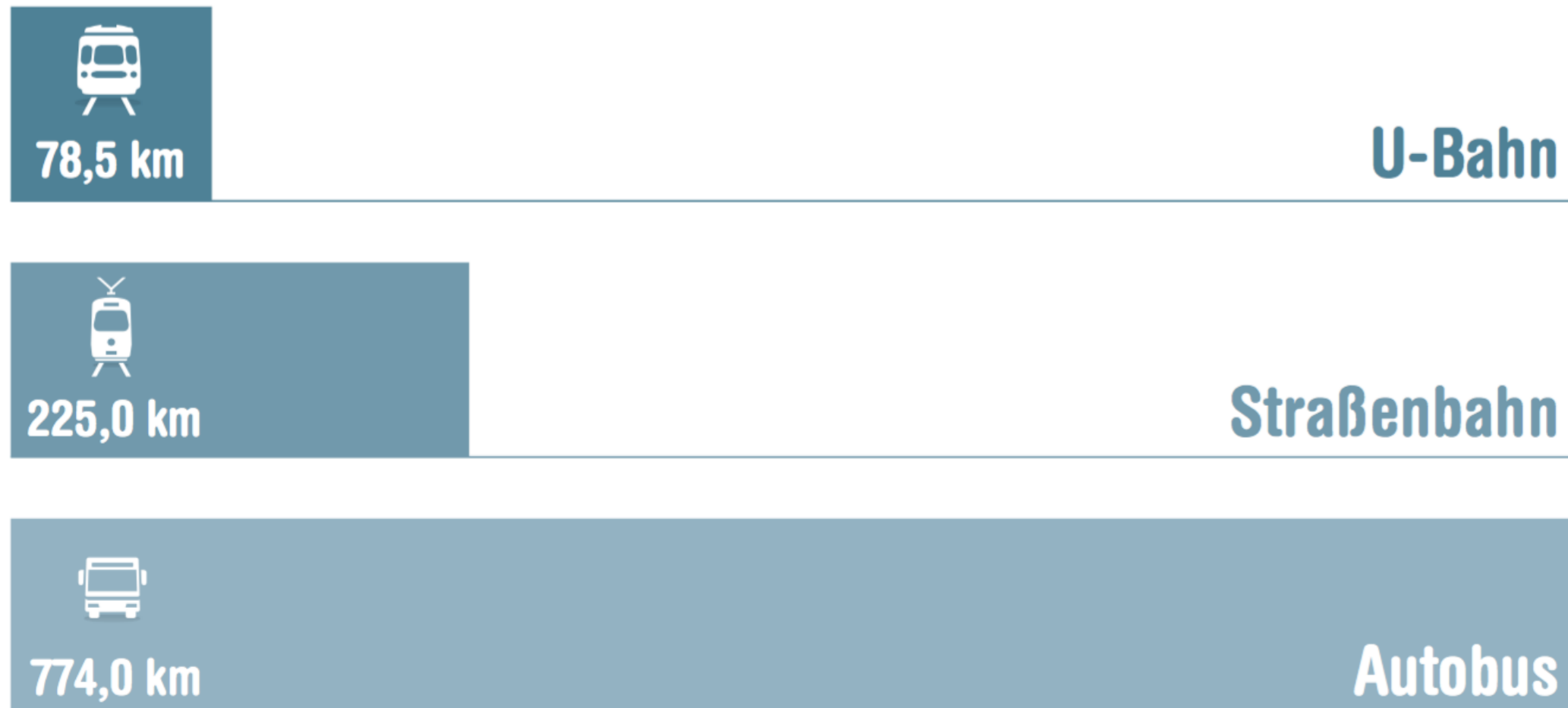
Travellers per year



Source: wienerlinien.at

Linienlängenvergleich

Comparison between different transit modes by length



Source: wienerlinien.at

Verkehrsmittelwahl

Choice of transportation



ÖPNV



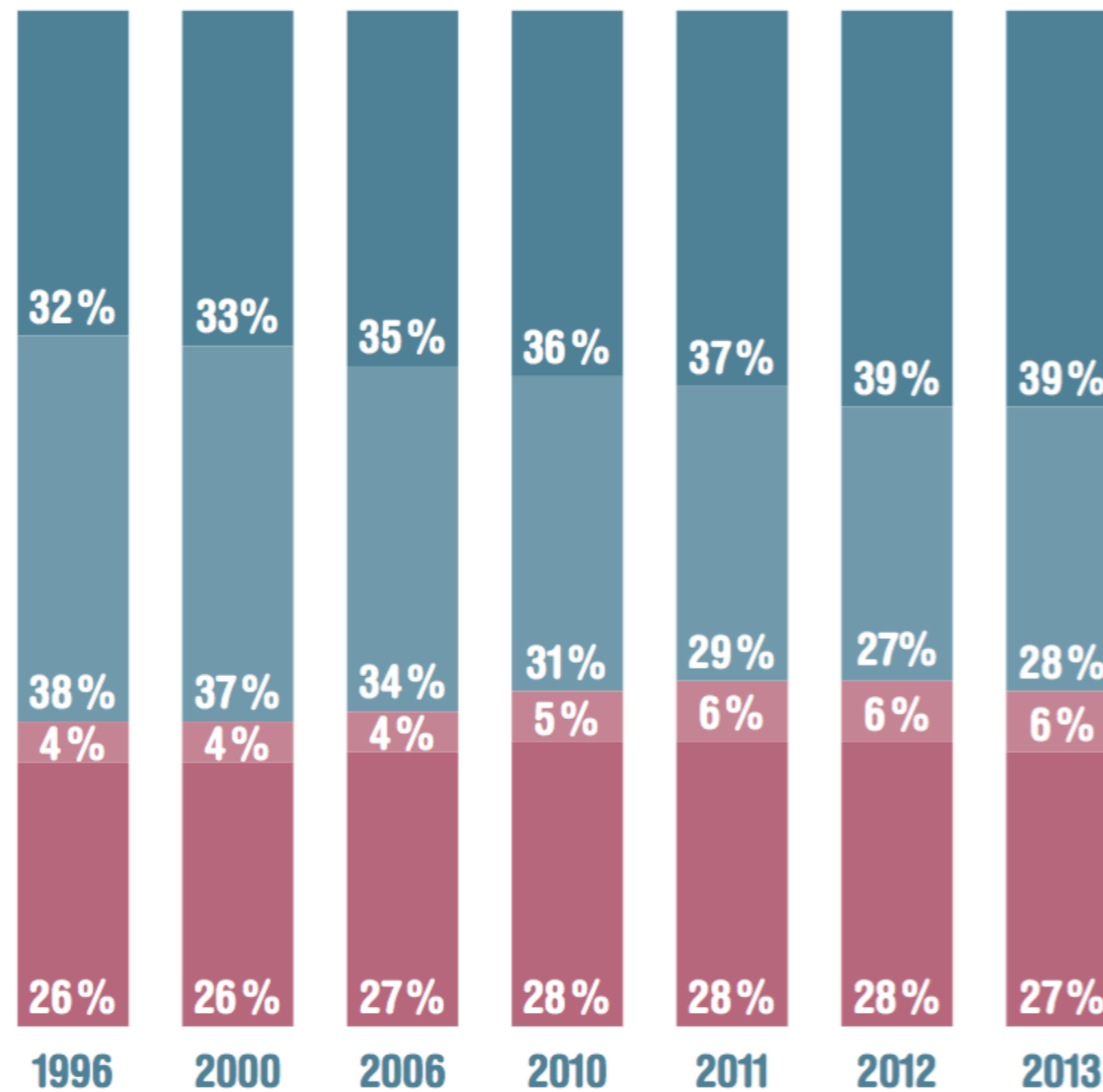
Fahrrad



PKW
(Fahrer und Beifahrer)

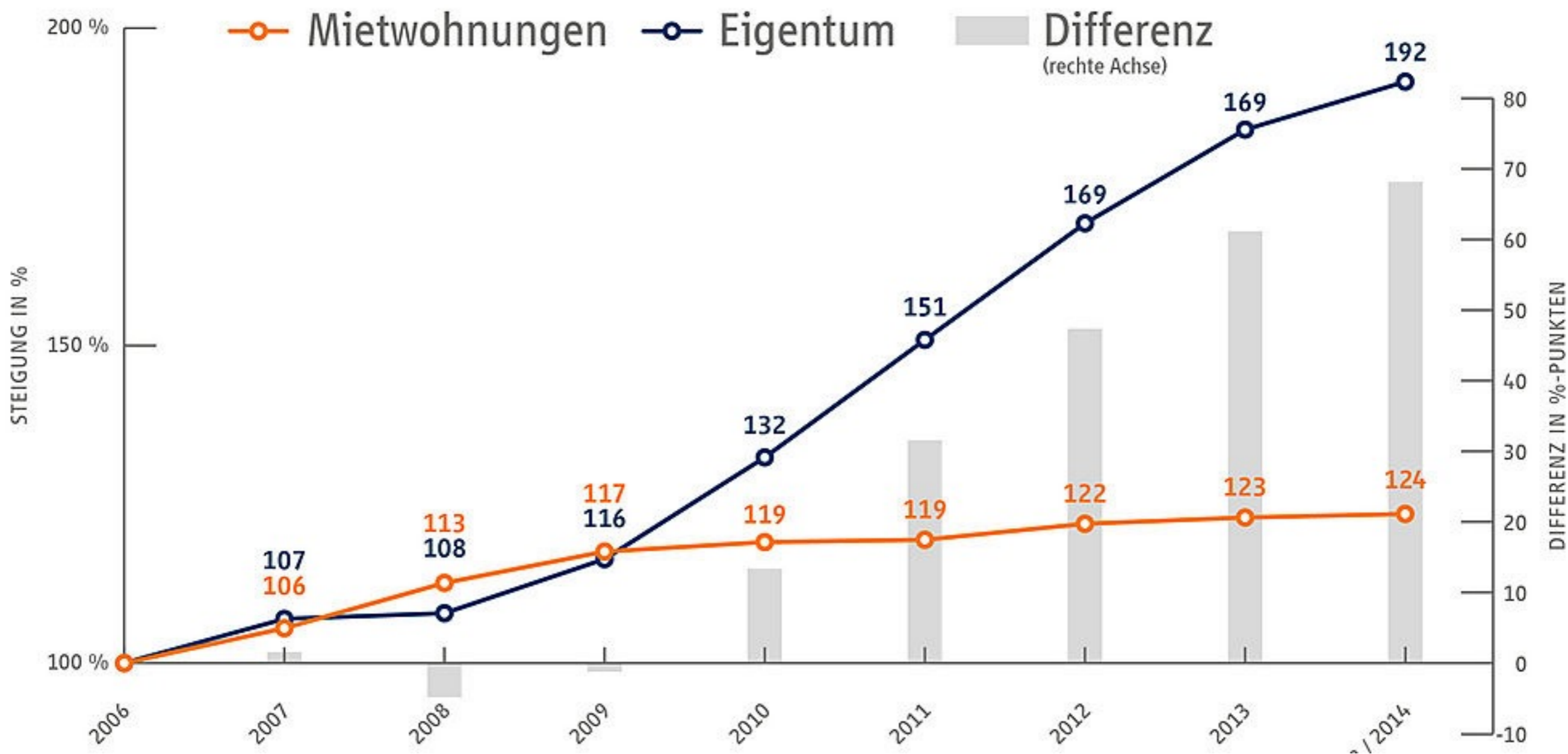


Zu Fuß



Bubble Indikator Wien

(2006 entspricht 100 %)



So What?



Text Sources

1. <http://homepage.univie.ac.at/horst.prillinger/ubahn/english/facts.html>
2. <https://www.wien.gv.at/stadtentwicklung/projekte/verkehrsplanung/u-bahn/planungsergebnis/>
3. <http://www.urbanrail.net/eu/at/vienna/wien.htm>
4. <http://www.tramway.at/zukunft/index.html>
5. <http://blog.wienerlinien.at/silberpfeil/>
6. https://de.wikipedia.org/wiki/U-Bahn_Wien
7. http://wiener-untergrund.at/chronik_78-82.shtml
8. <http://www.fpdwl.at/index.php?page=NewsOverview>
9. <http://blog.wienerlinien.at/meilensteine-der-wiener-linien-1995-1996-die-u6-faehrt-von-siebenhirten-bis-floridsdorf/>
10. http://wiener-untergrund.at/chronik_90-00.shtml
11. <http://www.wien-vienna.at/geschichte.php?ID=601>
12. <http://www.fahrgast.at>
13. <http://www.schnellbahn-wien.at>
14. <https://en.wikipedia.org/wiki/Reichsbrücke>
15. <http://blog.zoomsquare.com/immobilienpreise-wien/>
16. <http://derstandard.at/2000014189146/Stadt-schiesst-Wiener-Linien-74-Milliarden-Euro-bis-2031-zu>