Rail changes the city

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Transportation for Nation-Building

Strasbourg LRT: Lessons learnt

Interesting history

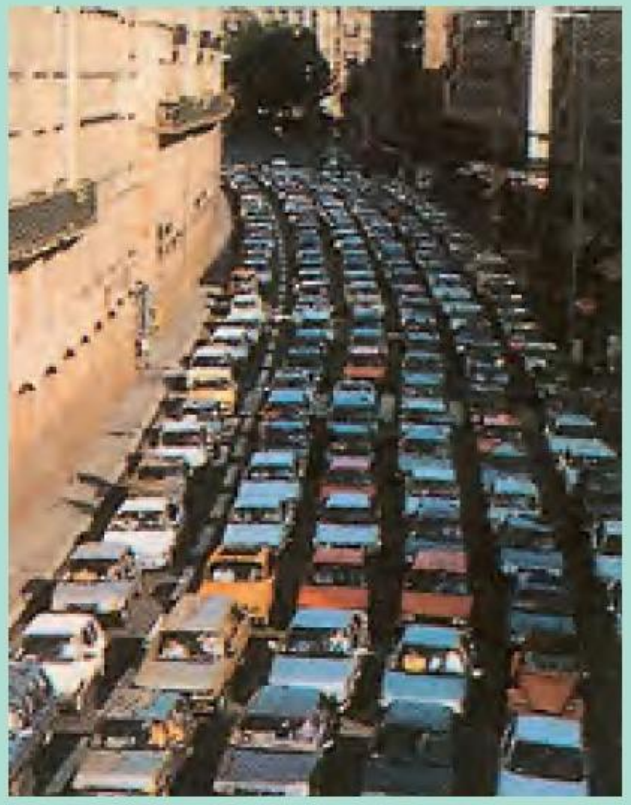
1884 –Horse rail company

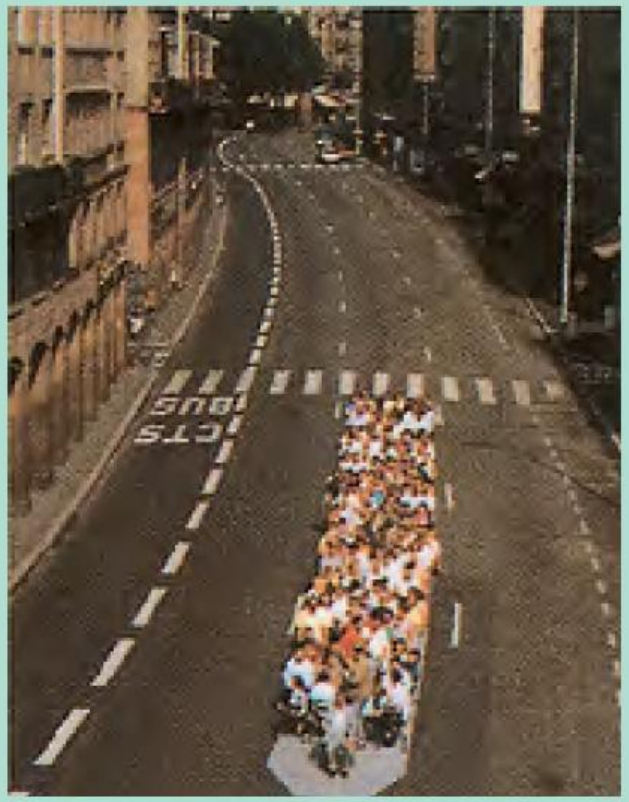
1930 –The decline of tramways system began

1960 –The retirement

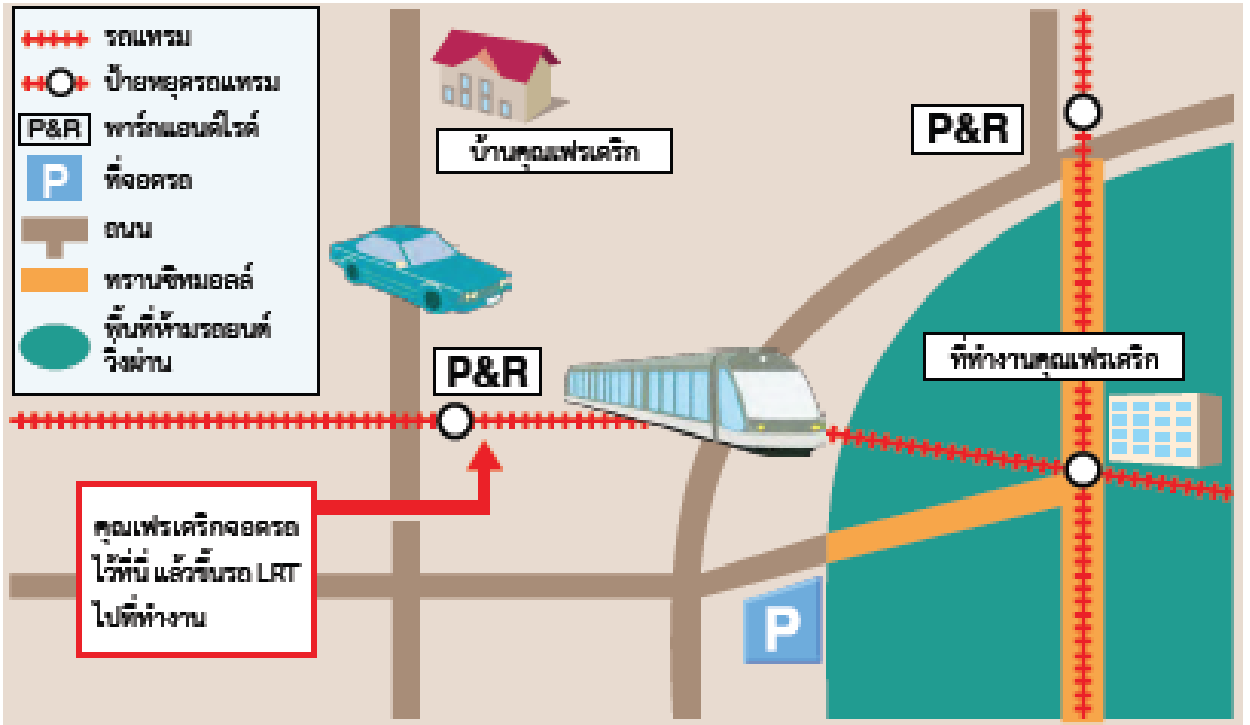
1994 –The tram was reintroduced as part of the redevelopment of the city

Indeed, the rationale behind the tramway's reintroduction was the perceived negative effect of the automobile's omnipresence in the city (pollution, congestion, disorderly parking).





The network's construction was accompanied by town planning operation with intention of promoting city centre access by tram.



- Access of the city centre was closed off to cars in 1992.

Reorganization of traffic and parking

- Park&ride facilities were also built near suburban stations in order to encourage motorists to use the tram.

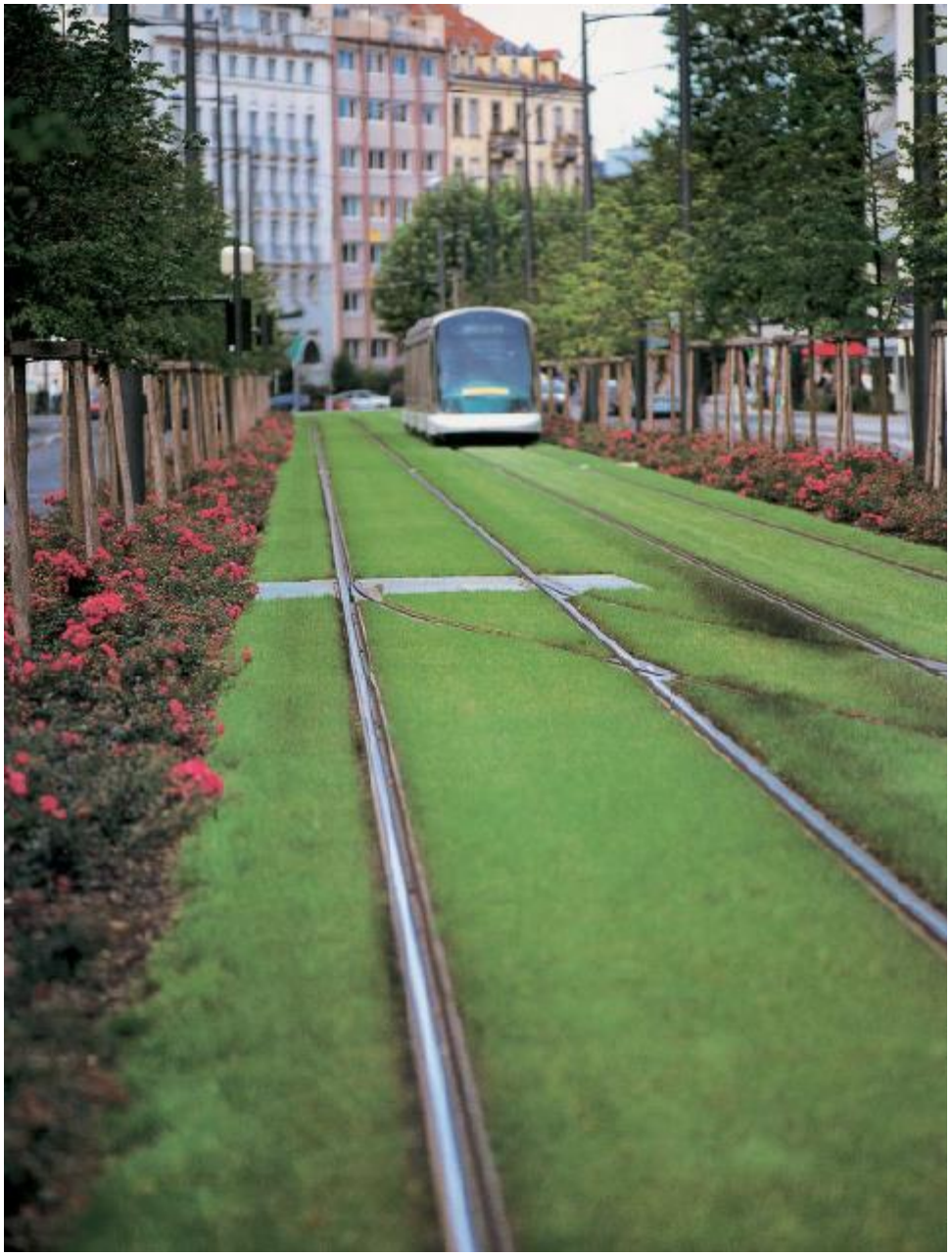
Shopkeepers in the city centre were in favour of the system underground.

- Meanwhile, the opposition campaigning for the tramway emphasized its cost-effective relative to the metro (VAL system).
- 1 km of VAL track cost as much to build as 4 km of tramway

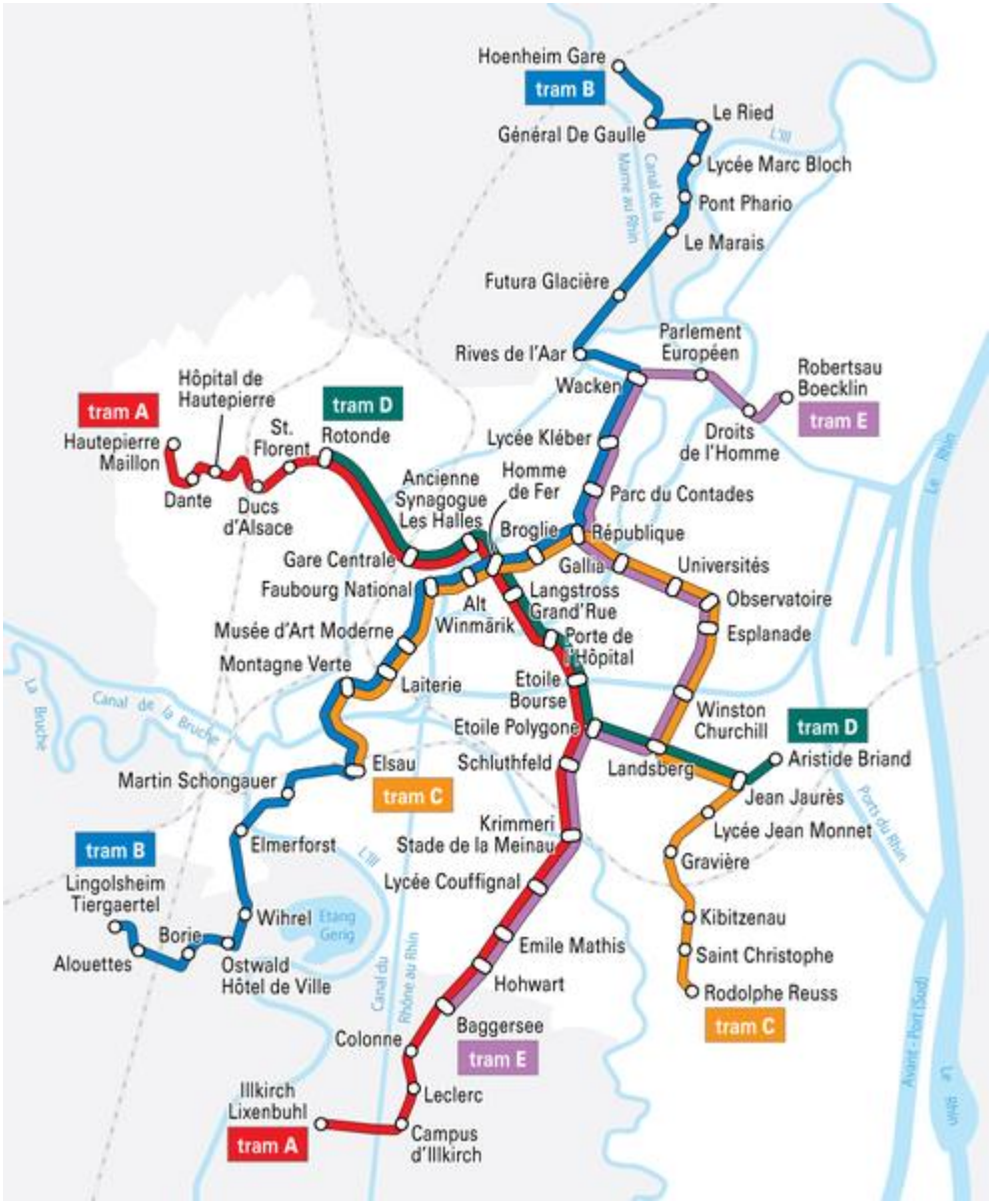
- In pedestrianized city centre, the tram shares space with pedestrians and bicycles.

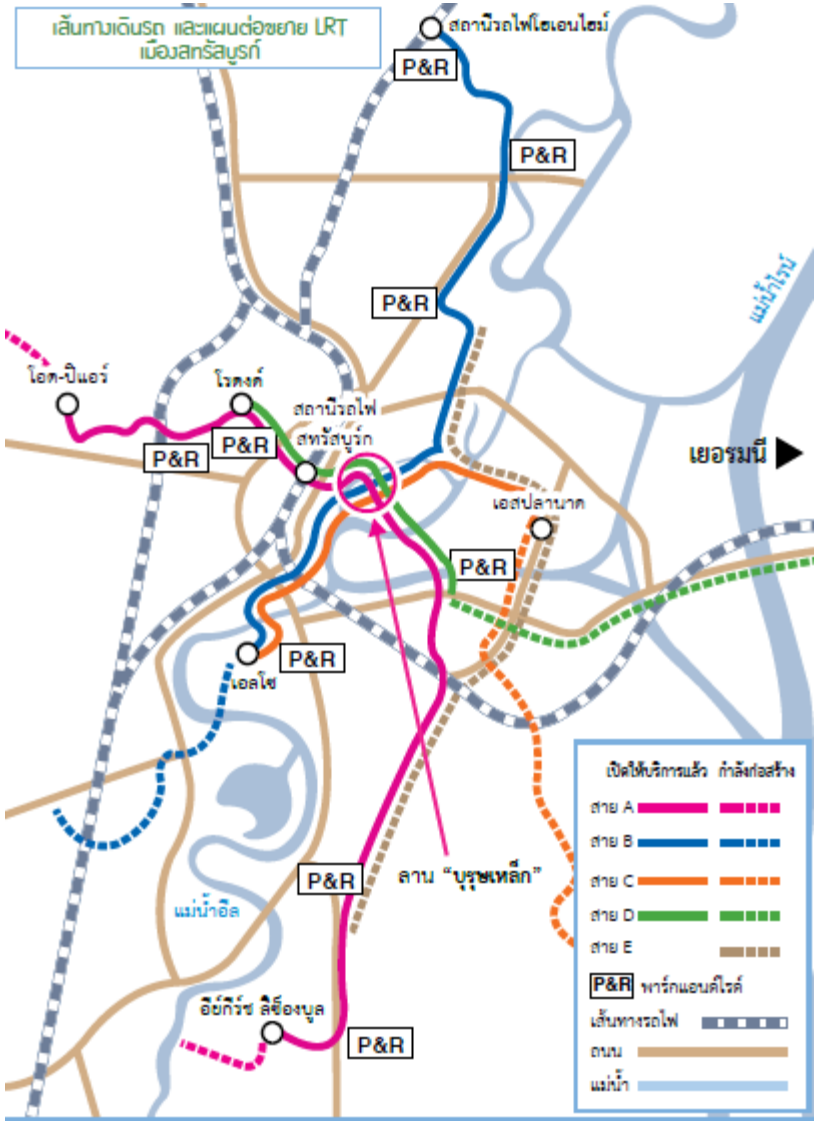
- Tram & bus have their timetable coordinated to ensure transfer are always possible even in the late evening.

- Several different tickets available to satisfy different needs.

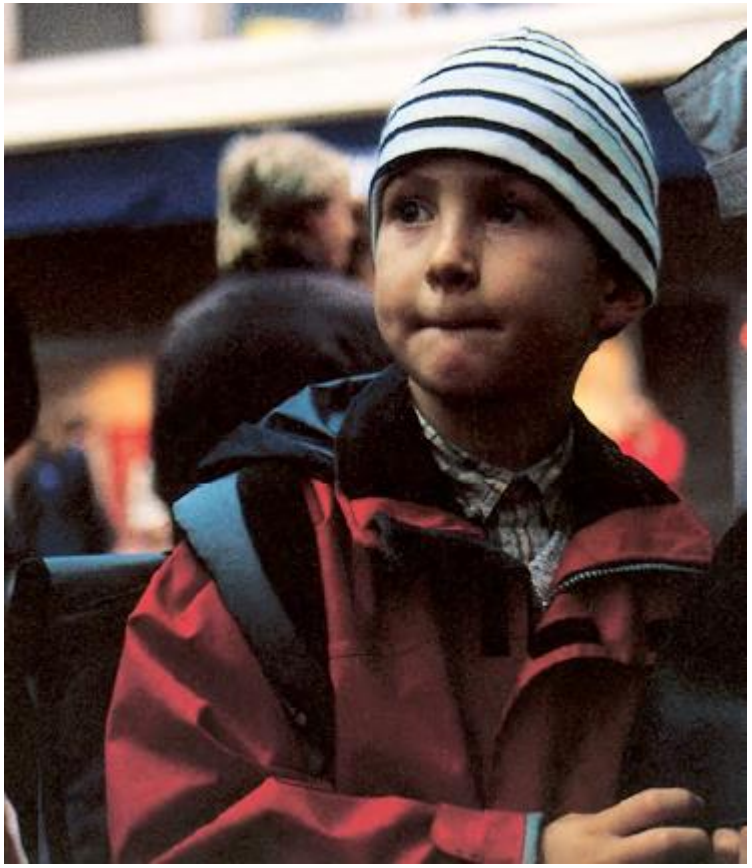


- In the suburbs, the tram shares the road with automobile, but trams are not subjected to the rules of the road.
- have priority over other traffic at all junctions.


Hoenheim Gare
tram B
Général De Gaulle
Le Ried
Lycée Marc Bloch
Pont Pharo
Le Marais
Futura Glacière
Rives de l'Aar
Parlement Européen
Robertsau Boecklin
tram E
Wacken
Droits de l'Homme
Lycée Kléber
Hôpital de Hautepierre
tram A
Hautepierre Maillon
St. Florent
tram D
Rotonde
Dante
Ducs d'Alsace
Ancienne Synagogue Les Halles
Homme de Fer
Parc du Contades
Broglie
République
Gare Centrale
Gallia
Universités
Faubourg National
Alt Winmärik
Langstross Grand'Rue
Observatoire
Musée d'Art Moderne
Porte de l'Hôpital
Esplanade
Montagne Verte
Laiterie
Etoile Bourse
Winston Churchill
tram D
Etoile Polygone
Aristide Briand
Martin Schongauer
Elsau
tram C
Schluthfeld
Landsberg
Jean Jaurès
Krimmeri
Stade de la Meinau
Lycée Jean Monnet
tram B
Elmerforst
Gravière
Lingolsheim Tiergaertel
Lycée Couffignal
Kibitzenau
Wihrel
Etang Gerig
Borie
Emile Mathis
Saint Christophe
Alouettes
Ostwald Hôtel de Ville
Hohwart
Rodolphe Reuss
tram C
Colonne
Baggersee
tram E
Leclerc
Illkirch Lixenbuhl
tram A
Campus d'Illkirch
Canal de la Bruche
Canal du Rhône au Rhin
Canal de la Marne au Rhin
Le Rhin
Avant-Port (Sud)


เส้นทางเดินรถ และแผนต่อขยาย LRT
เมืองสตรัสบูร์ก
สถานีรถไฟโซเอนไฮม์
P&R
โอต-ปิแอร์
โรดง์
สถานีรถไฟ
สตรัสบูร์ก
เยอรมนี
เอสปลานาด
เอลโซ
แม่น้ำอิล
ลาน "บุรุษเหล็ก"
อิย์กิร์ช ลิซ็องบูล
เปิดให้บริการแล้ว
กำลังก่อสร้าง
สาย A
สาย B
สาย C
สาย D
สาย E
พาร์กแอนด์ไรด์
เส้นทางรถไฟ
ถนน
แม่น้ำ

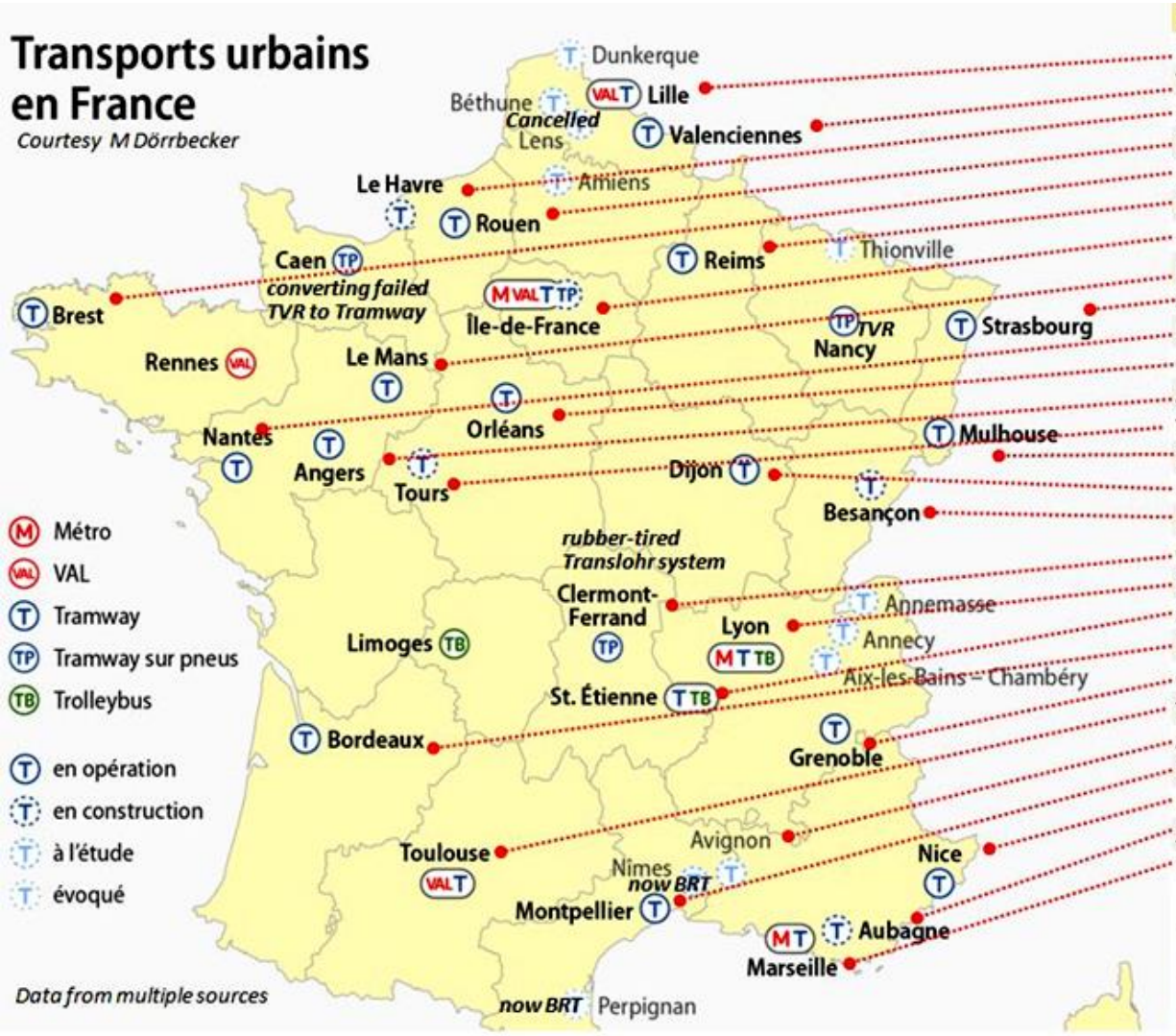
Speed: 60 kph –suburban
20 kph –downtown



- 7 years old girl travel alone.

Costs

- 23.5 million euro per km
- More expensive than average
- The different is due to the significant urban renewal projects undertake in Strasbourg as part of the tramway's construction.
- → is heavily subsidized by local authorities.



City	Population	Opened	Lines	km	pax/day
Lille	1,100,000	1994	2	22.4	32,000
Valenciennes	400,000	2006	1	18.3	33,000
Le Havre	610,000	2012	2	13	new
Rouen	530,000	1994	2	15.1	65,000
Brest	220,000	2012	1	14.3	new
Reims	290,000	2011	2	16.1	45,000
Paris	11,800,000	1992	4	41.4	315,000
Le Mans	150,000	2007	1	15.4	48,000
Strasbourg	640,000	1994	6	57.2	300,000
Nantes	800,000	1985	3	42.1	266,000
Orléans	120,000	2000	1	17.9	45,000
Angers	280,000	2011	1	12.3	35,000
Tours	300,000	2013	1	15.3	new
Mulhouse	250,000	2006	4	41.8	60,000
Dijon	250,000	2013	2	20	new
Besançon	140,000	2015	1	14.5	new
Clermont-Ferrand	260,000	2006	1	14.2	48,000
Lyon	1,760,000	2000	5	72.1	250,000
St-Etienne	320,000	1991	3	22.5	70,000
Bordeaux	1,010,000	2003	3	43.4	350,000
Grenoble	530,000	1987	4	36.4	210,000
Toulouse	1,100,000	2010	1	10.9	20,000
Avignon	90,000	2016	2	14.5	new
Montpellier	530,000	2000	5	54.4	282,000
Nice	350,000	2007	1	8.7	90,000
Aubagne	100,000	2014	1	9	new
Marseille	1,530,000	2007	1	11.5	87,000

700 kilometers of double-track on 65 routes serving 25 million people in 30 cities with 1200 trams/LRVs

Twelve tramway cities have a population below 250,000, two below 100,000.

Table 6.1 Technical, operational, and system characteristics of rail transit modes[a]

	Streetcar/Tramway	*Light Rail Transit*	*Rapid Transit*	*Regional Rail*
Vehicle/train characteristics				
Minimum operational unit	1	1 (4 to 10 axles)	1–3	1–3
Maximum train consist	3	2–4 (6 to 8 axles)	4–10	4–10
Vehicle length (m)	14–35	14–54	15–23	20–26
Floor height	Low/high	Low/high	High	High/low
Vehicle capacity (seats per vehicle)	22–40	25–80	32–84	80–175
Vehicle capacity (total spaces per vehicle)	100–250	110–350	140–280	140–210
Fixed facilities				
Exclusive ROW (% of length)	0–40	40–90	100	100
Vehicle control	Manual/visual	Manual/signal	Signal/ATC	Signal
Fare collection: self-service or:	On vehicle	On vehicle/at station	At station	At station/on vehicle
Power supply	Overhead	Overhead	Third rail/overhead	Overhead/third rail/diesel
Stations				
Platform height	Low	Low or high	High	High or low
Access control	None	None or full	Full	None or full
Operational characteristics				
Maximum speed (km/h)	60–70	60–120	80–120	80–130
Operating speed (km/h)	12–20	18–50	25–60	40–75
Maximum frequency				
Peak hour, joint section (TU/h)	60–120	40–90	20–40	10–30
Off-peak, single line (TU/h)	5–12	5–12	5–12	1–6
Capacity (prs/h)	4000–15,000	6000–20,000	10,000–60,000	8000–45,000
Reliability	Low-medium	High	Very high	Very high
System aspects				
Network and area coverage	Extensive, good coverage	Good CBD coverage, Branching common	Predominantly radial: good CBD coverage	Radial, limited CBD but good suburban coverage
Station spacing (m)	250–500	350–1600	500–2000	1200–7000
Average trip length	Short to medium	Medium to long	Medium to long	Long
Relationship to other modes in addition to walking	Can feed higher-capacity modes	P+R, K+R, Bus feeders	P+R, K+R, Bus & LRT feeders	Outlying: P+R, K+R, Bus

Characteristics	Mode / Type	Tramway - Streetcar	Light Rail	LRRT	Rapid Transit	Regional Rail
Right-of-way separation	None Some Grade crossing only Full					
Max no. of cars/train	1-3 4-10					
Station platform	Low High					
Power pick-up	Overhead Third rail (Diesel)					
Vehicle travel control	Driver/visual Permissive signals Forced stop signals Automatic					
Max. vehicle speed	≤ 70 km/h 71-100 km/h > 100 km/h					

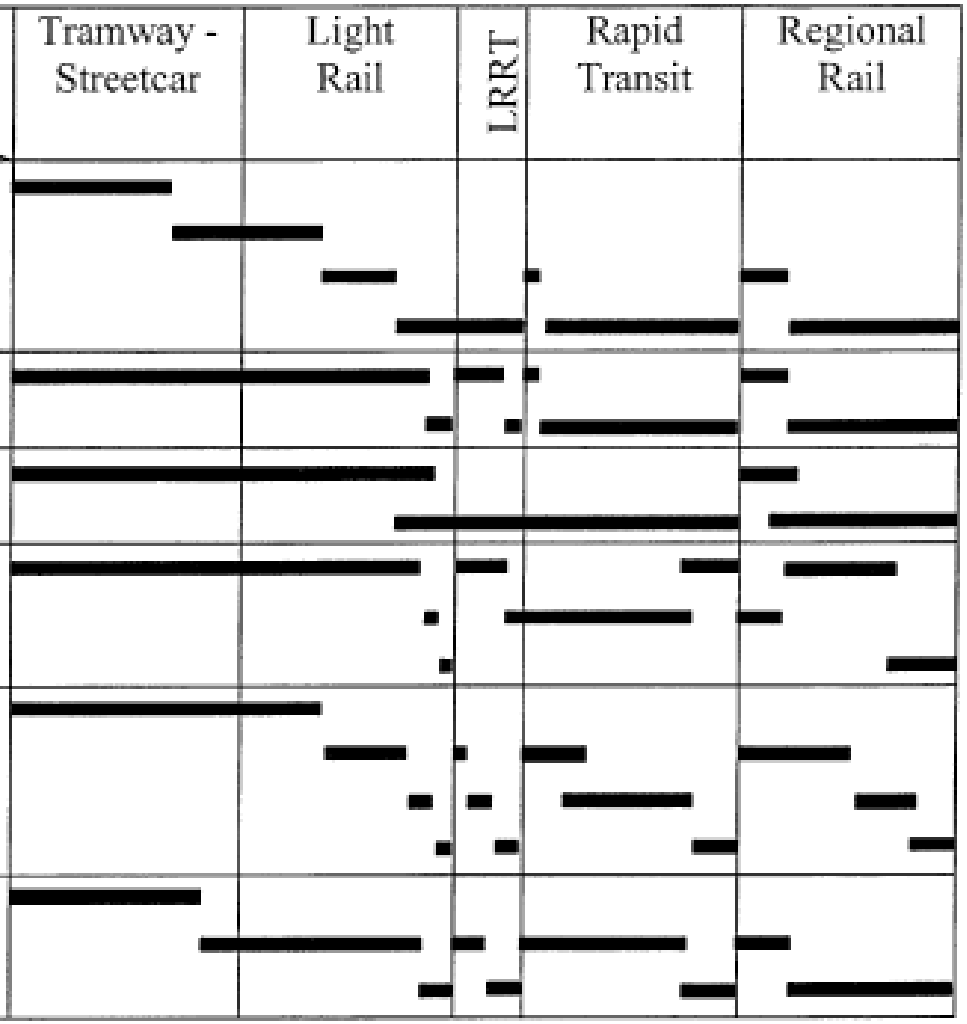
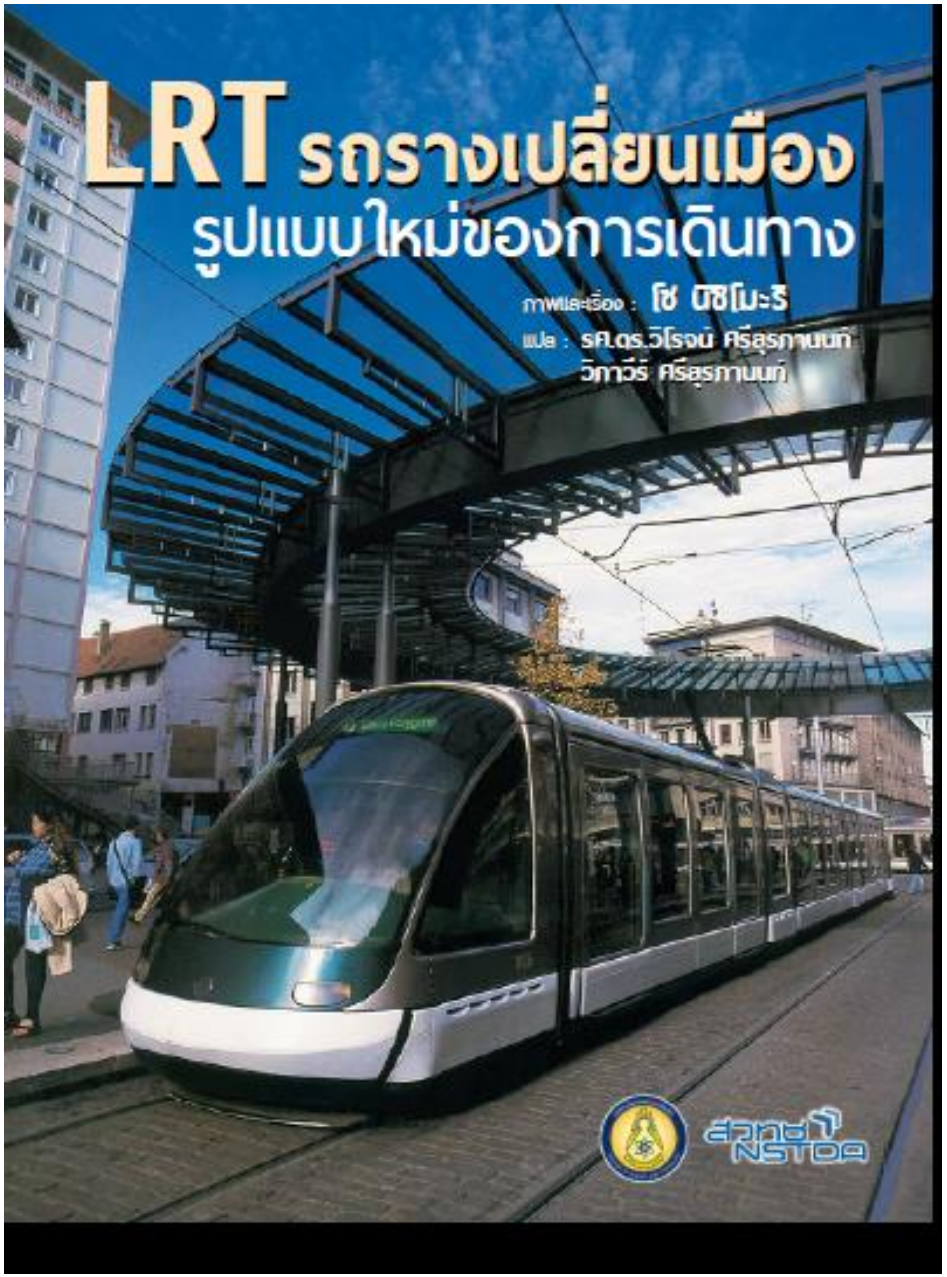


Figure 6.1 *Basic characteristics of rail transit modes*

Trams in Thailand

- 1888 began
- 1968 retired

- Will it come back somewhere in Thailand?


LRT รถรางเปลี่ยนเมือง
รูปแบบใหม่ของการเดินทาง
ภาพและเรื่อง : โช นิชิมะริ
แปล : รศ.ดร.วิโรจน์ ศรีสุรภานนท์
วิภาวี ศรีสุรภานนท์
สวทช
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