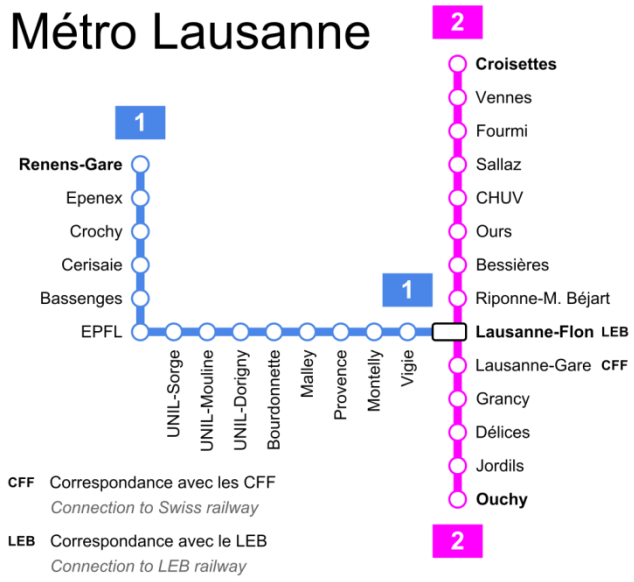
Light Rail Case Study
Lausanne

Summary description

Lausanne has a similar population and land area to Cambridge; other similarities include two universities, a teaching hospital, high-tech industry and a wide commuting basin. A key difference, however, is that Lausanne has excellent public transport on a very successful underground metro, with annual ridership of ~41m. This level of ridership far exceeded expectations. The 7.8 km, mainly overground, M1 line with 15 stations opened in 1991. The 5.9 km long fully automated, driverless, M2 line is mainly underground with 14 stations, and alone has an annual ridership of ~28m. The metro has transformed public transport in Lausanne, with both bus and tram usage increasing by 10–15% since 2010.

The M2 line cost ~£333m or ~£56m /km to construct, a modest sum compared to projects such as Crossrail in London. This is despite the high cost of living in Lausanne and its extreme engineering requirements, with the steepest inclines (up to 12%) of any metro system in the world.

Of M2 passengers, 15% did not use the public transport network at all before the M2 line was opened. Most of those 15% starting to use the M2 line live outside the city, demonstrating how an excellent public transport system can encourage commuters out of cars by choice, rather than by more forceful measures. Of international visitors using the M2 line, 18% previously travelled by car when visiting Lausanne.



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Case Study authors & date	Dr Kevin Rathbone, May 2016; Colin Harris (ed), Jul 2016.
Location	SW Switzerland
City population	125 759 (2002, when public voted for M2 line); 146 372 (Nov 2015)
Regional population	309 000 (Mar 2015): Lausanne functional urban area (commuter basin)
City area	41.38km^2
Regional area	
Modal share	40%
Number of lines	Two (M1, M2); third line to open 2018
Number of stations	M1 15 (3 underground); M2 14; Total 29
System length	M1 7.8 km; M2 5.9 km; Total 13.7 km
Length underground	M1 ~1.5 km (~20%); M2 majority (70-90%) underground.
Length dedicated alignment	M1 mainly dedicated. M2 fully dedicated.
Length on street	M1 has some street crossings at grade. M2 none.
Service frequency	M2 every 3 min central; every 6 min elsewhere.

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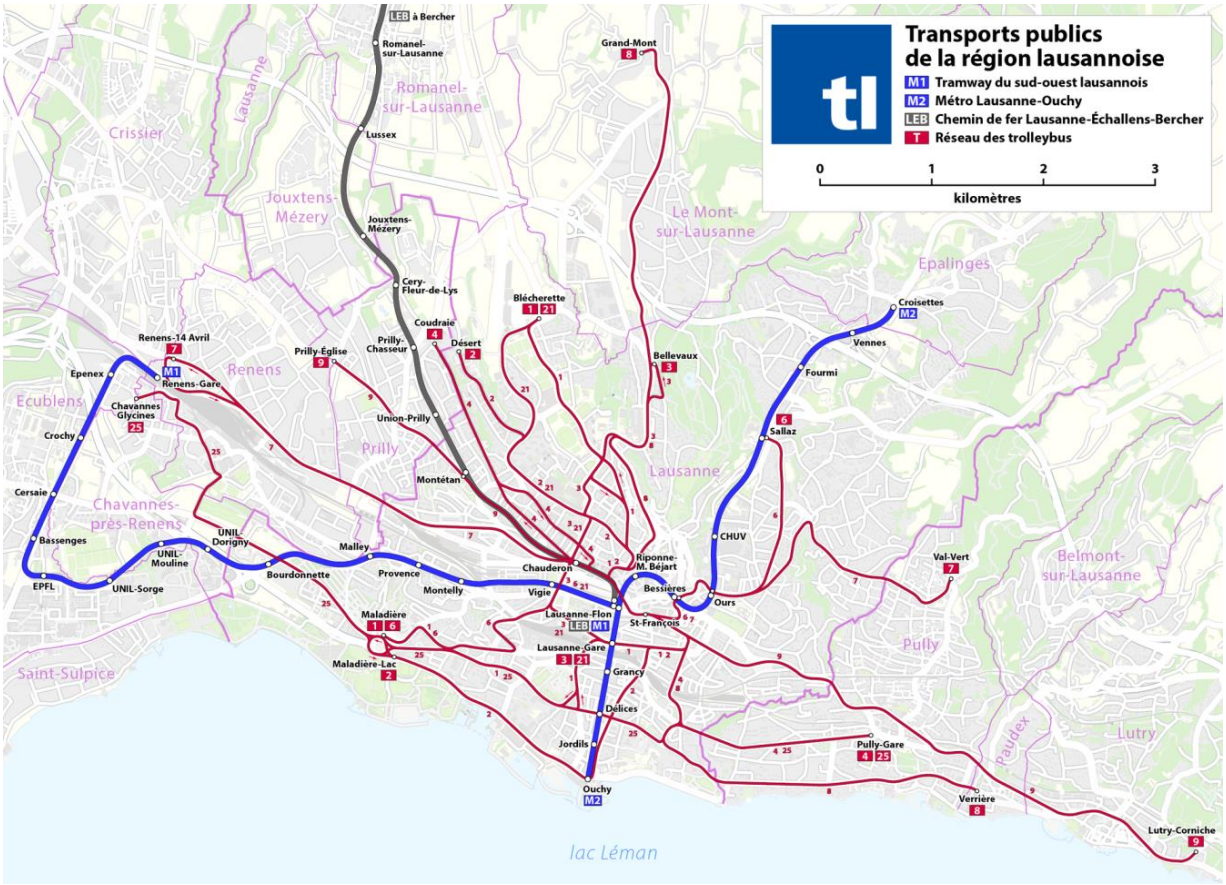
Top / Average speed	60 km/h; Avg 20 km/h (M2)
Track gauge	1435 mm
Number of trams by supplier(s)	M1 18x older LRVs; M2 15x 2-car MP89 (Paris metro type, Alstom)
Catenary-free?	M1 No; M2 Yes
Autonomous vehicles	M1 No; M2 Yes
Opened (year)	M1 1991; M2 2008; public voted to proceed with M3, opening 2018
Total cost (year)	M1 ? (1991); M2 £333 m (2008) (CHF765 m)
Cost per km	M1 ?; M2 £56.4m /km
Passengers /year	M1 12.8m ; M2 28m (2014) – Total 41m over network per year.
Passengers /day	M1 35k; M2 76.7k (2013) designed for 6600 pax/hr in each direction
Operating costs (annual)	Unknown
Operating revenue (annual)	~£100m – assumed 41m pax journeys @ ~£2.50 average fare.
Operating profit / loss (annual)	Unknown
Typical fare	Fares based on zones / duration of validity. ~£4 peak 2h for two zones
Safety record (incidents / pkm)	Unknown
Environmental / historic values	Yes. The old city of Lausanne is listed on Inventory of Swiss Heritage Sites
Other comments	LRVs include rubber tyres owing to relatively steep grades.

Network map (Maximilian Dörrbecker, Creative Commons 2016)



References	http://www.unil.ch/files/live//sites/ouvdd/files/shared/URBIA/urbia_13/articles/4._Le_metro_M2_a_Lausanne-_C._Jemelin__49-62.pdf http://en.forumviesmobiles.org/printpdf/2881 http://www.scris-lausanne.vd.ch/Default.aspx?DomId=2022 https://en.wikipedia.org/wiki/Lausanne_Metro http://www.numbeo.com/cost-of-living/rankings.jsp