

Urban Bus Transport Mobility Comparison

All data extracted for bus ridership, average bus speeds for cities are of pre-covid period

City	Population	Average Daily Bus Trips	Daily Bus Ridership wrt Total Population	Average bus speed (KM/H)	Availability of multi-operator and multi-modal tickets	Average Daily Bus Transport Revenue (£)	Average bus fares	Air Quality Index (AQI)	Daily Unlimited Bus Travel Pass Price for Adult (£)	Overall Bus Satisfaction (%)	Annual Bus Crime/Harrasment Reports	Annual Public Capital Spending on Public Transport (£)	Capital Spending per head of Population (£)	Road User Charging
Glasgow	1,681,000	425,000	↓ 25%	16	Yes - SPT Zonocard and Glasgow Tripper	412,250	0.97	26	4.1	88	441	61,200,000	36	None - LEZ planned
Singapore	5,685,807	4,099,000	→ 72%	20	Yes - EZ-Link Card	1,269,946	0.31	76	10.8 of which 5.4 is refunded upon return of the card - includes all transport services	97.3		4,658,715,744	819	None - Though Singapore has banned registration of all new vehicles since 2020, plans emission standards based restriction on bikes from 2023
London	9,002,000	5,730,000	→ 64%	15.45	Yes - Oyster card	3,920,548	0.68	36	4.65 - includes Tram	85	16753	2,080,000,000	231	ULEZ across Greater London, Congestion charge within Central London
Stockholm	1,664,651	2,000,000	↑ 120%	16.5	Yes - SL Card / Contactless Payment across the transport network	2,072,285	1.04	35	12.40 - Entire Transport Network	96		481,025,455	289	Two LEZs - 1. Stockholm has a low emission zone in place in Hornsgatan (street) covering passenger cars, mini buses and vans since 15 January 2020. 2 The existing central city area lorry and bus low emission zone allows lorries and buses that are less than 6 years from the date of first registration, LEZs in Stockholm cover the entire city centre
Hong Kong	7,481,800	5,996,100	→ 80%	12.9	Yes - Octopus Card	163,882	0.03	70	6.09 - Most but not all Transport Services	92.4		MTR operates self sufficient financial model and does not require spending from Public sources		LEZ - Covering three major junctions in Central, Causeway Bay and Mong Kok for franchised buses, no restriction to other vehicles
Amsterdam	863,000	1,195,405	↑ 139%	15.2	Yes - OV Chip card			24	7.19 - Entire Transport Network					The low emission zone covers the area within the A10 motorway, including north of the river Het IJ. The A10 is not part of the Low Emission Zone. Excluded within the A10 are: Coenhaven, Vlothaven, northern side of Mercuriushaven, access to RAI congress centre, northern bank opposite Coentunnel
Tokyo	37,393,128	4,361,643	↓ 12%		Yes - PASMO and Suica card			61	10.25 - includes Rail, Tram, Subway and Buses					None - Though Tokyo has been operating retrofit program from 2000s, restricting vehicles under minimum standards and retrofitting old diesel vehicles
Helsinki	1,320,826	967,123	→ 73%	16.5	Yes - HSL ticket valid across the transport network			29	12.68 - Entire Transport Network			299,970,575	227	Environmental Zone - The environmental zone covers the city centre from Helsinki to the south of Hakamäentie
Berlin	3,562,000	4,520,547	↑ 127%	17	Yes - BVG ticket valid across the transport network	1,759,398	0.39	46	8.46 - Entire Transport Network	83				City Low Emission Zone - Covers 10% of Central Berlin, inside the S-Bahn ring
Paris	2,185,574	3,138,764	↑ 144%	16.8	Yes - Ticket T+ allows travel between Tram and Bus within 90 minutes of journey	8,741,827	2.79	63	10.15 - Entire Transport Network	68				Paris low emission zone covers Paris city center inside the ring road (Boulevard périphérique)
New York	8,175,031	1,892,628	↓ 23%	19.01	Yes- Metro Card valid for subway and Buses	485,839	0.26	106	No Daily Pass - Weekly Pass costs 20.8 valid for all subways as well	77	619	3,224,388,200	394	None - Congesion Charging Planned covering cordon zone in Manhattan below 60th Street - Not in operation yet
Edinburgh	527,620	339,726	→ 64%	14.9	Yes - Lothian Bus Card valid for Buses and Tram	461,474	1.36	30	4.4	95				None - ULEZ planned
Manchester	2,750,120	497,100	↓ 18%	15.6	Yes - System One Travel Network provides AnyBus ticket	432,477	0.87	40	6 - Unlimited travel across all bus operators within Greater Manchester	87				None - CAZ planned from 2022 covering all 10 local authorities within Greater Manchester
Liverpool	906,443	400,000	↓ 44%	16.1	Yes - BusPlus lets travel across most bus operators on same ticket			24	4.2 - Liverpool BusPlus unlimited daily travel across liverpool on multiple bus operators	91				None

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Nottingham	794,008	227,397	↓ 29%		Yes - NCT EasyRider Card/Robin Hood ticket (multi modal) and PlusBus ticket			17	5 - PlusBus	95				Only the Local Bus operators required to meet Euro 3 Standard entering city centre
Newcastle	453,515				Yes - Network One tickets and PlusBus			19	10 - all zone Network One day ticket, 4 - PlusBus ticket valid across most bus operators	70				None - CAZ Planned
Leeds	2,325,000	396,164	↓ 17%	19.2	Yes - Mcard valid across all buses/Trains and Plusbus			47	4 - PlusBus ticket valid across all bus operators	67				None
Zurich	1,412,403	1,846,575	↑ 131%		Yes - All transport operated by VBZ - Ticket/Pass valid across the network	2,088,179	1.13	33	4.3 for 2nd class and 7.16 for First class - Valid across entire transport network in city			977,324,020	692	None
Rotterdam	1,012,660	650,000	→ 64%	22	Yes - RET provides all transport services across entire city	1,079,622	1.66	18	7.18 - Valid across entire transport network	79	505			Two Low Emission Zone covering centre and north of the city and port area and complete lorry transt ban on specified road called s-Gravendijkwal, electric lorries are exempted
Dortmund	588,462	DSW21 does not publish data for bus/transport ridership			Yes - VRR tickets provide access across the transport network			49	No daily pass - Monthly pass costs 80.80 euros that is valid across the VRR network					Low emission zone covering most of the city area (entire city centre) and Transit ban on vehicles over 7.5 tonnes weight
Dresden	541,000	410,958	→ 76%	19	Yes - DVB pass provide access across transport network	357,003	0.87	36	5.49 - across transport network			296,876,216	549	No LEZ as such but Parts of the city centre are closed for vehicles with a gross vehicle weight of more than 3.5 tonnes though Access is allowed for delivery vehicles and camper vans.
Bilbao	349,000	36,339	↓ 10%		Yes - Bilbao card provides access to entire Transport Network		0.00	26	8.45 - Access across the Transport Network	86				None
Valencia	814,208	110,500	↓ 14%	14.4	Yes - VLC card provides access to entire Transport Network	101,990	0.92	26	No particular unlimited travel ticket though it has Tourist Card that costs 12.68 that includes free entry to tourist destinations as well	75				No specified LEZ although Emergency restrirction in place where specified areas within the city centre are banned from parking in case of threshold breach of air quality
Turin	870,456	600,000	→ 69%	13.68	Yes - GTT ticket valid across the network	1,028,964	1.71	25	No particular unlimited travel ticket, 1.27 for single urban ticket valid for 90 minutes and 5.5 for bulk buy of 5 tickets virtually unlimited travel for the day	88				Low emission zone covering most of the city area, vehicles not allowed to enter city center at certain times - tourist buses need prior access permissions
Dunkirk	125,765	46,460	↓ 37%		Free Transport (Bus) Access		Free	32	Free Public Buses	94				None
Vienna	1,897,491	2,632,054	↑ 139%	19.3	Yes - Wiener Linien Travel Pass valid accros the entire network			34	6.78 - Valid across entire network			190,746,000	101	LEZ and Emergency Scheme - Ban on Trucks under EURO 3 standards in entire city of Vienna. Ban on internal combustion engine whenever PM10 levels exceed 50 micro grams per meter cube for more than 25 days.

DVB reported Total Dresden Transport Public Transport Capital Spending includes 93 Million Euros spent in Infrastructure development, rest of the funding is to cater the cost shortfall.

Zurich transport was paid 897 Million CHF for Transport services, after subtraction of operating revenue cost shortfall of 320 million CHF was further paid by the municipalities in 2019. (Cost shortfall rose to 390 Million CHF during Covid struck 2020). The quoted revenue includes both recurring spending (897 Million CHF) and additional spending for cost shortfall (320 Million CHF)

Stockholm Transport Committee reported Net Profit in Public Transport (Total expenses minus total fares revenue) to be 52,438,596 GBP for 2019, the quoted numbers are the total investment budget on Public Transport minus this Public Transport Profit. Also, the total fares revenue includes the entire Public Transport Fares and are not limited to bus only travel fares revenue while Bus only daily ridership was reported to be 780,000 per day

Bilbao numbers are required to be read with the understanding of fact that its modal share has 64% journey made on foot or cycling, 23% on public transport and only 11% is through car

Vienna, Stockholm, Berlin, Turin, Rotterdam and Dresden daily ridership includes entire transport network ridership including buses

After the introduction of Free Public Bus transport in Dunkirk, the daily ridership increased from 25,250 (2018) to 46,460 (2019).

The numbers quoted against Leeds for daily bus ridership is for the entire West Yorkshire and hence the population used is also for the same to get a fair idea of bus ridership per head of population

The transport ridership and population quoted for Zurich includes the entire region where ZVV (Zurich's transport company) operates, as the total passenger trips in the annual report include all journeys within Greater Zurich, hence it made more sense to quote the entire population as well.

Revenue quoted is for the entire Transport network in Paris; Average daily passenger travel across all public transport modes in Paris is 12,931,506, using revenue/ridership; average fare would come out to be 0.676

Transport in Turin (Turino) is operated by GTT and its revenues are quoted as a whole in the table; also the passenger ridership is also for the entire GTT transport network

Transport in Dresden is managed by DVB Dresden and their annual financial report only includes total sales revenue for the entire network, the quoted figures for ridership are also for the entire network as highlighted in yellow

Annual Fares revenue for ZVV (Zurich public transport) is consolidated income of the entire network, used to calculate the average fare by dividing it with the consolidated ridership

Glasgow bus passengers based on analysis of company account data and Transport Scotland statistics - see Info Note. 2021 population estimate from <https://worldpopulationreview.com/world-cities/glasgow-population>

Berlin data is provided through the BVG financial report of 2019, the fare data however is consolidated and the group does not provide bus only fares revenue

Daily Passenger trip travel is also Combined Transport numbers of BVG Berlin including bus

MTA New York annual revenue for buses is 177,331,550 GBP, these quoted numbers are average daily revenue through fares for its bus network, while total passenger trip for the same is 6,715,068 trips with total network average daily fares revenue to be 17,249,315 GBP per day, hence revenue/ridership for New York would be 2.56 for entire Transport network

Hong Kong has 5 Franchised bus operators and few other govt bus operators, of those five, (LWB) has publicly accessible financial report, revenue quoted is of that franchised operator only. We were also able to extract its average daily passenger trip to be 125,490 and hence revenue/passenger trip comes out to be 1.3

Hong Kong's MTR reported 1.6 Billion GBP profit in 2018, it utilizes that from Public Transport Investment

Hong Kong bus average speed numbers are from 2013, those were the latest available, however the literature review suggests these numbers have stayed stagnant till the pre covid period

The AQI scale used for indexing the real-time air pollution is based on the US EPA standard, using the Instant Cast reporting formula

Daily Unlimited Travel Cost has been calculated based on Travel Pass/Ticket/Card's ability to let an adult travel any and everywhere within the respective city using Public Transport

Edinburgh numbers are based on Lothian Buses

Bus Satisfaction Survey percentage is quoted as such from various surveys conducted in respective cities under the question of 'Overall satisfaction with Public Buses/Transport in their city'

Helsinki Public Transport Expenditures only include recurring expenses (Total Operating costs minus the fares revenue) and does not include any planned transport infrastructure investments

Vienna total daily average ridership for buses is 537,260 and for Singapore its 4,099,000 and total ridership is 7,691,000

Capital Spending Estimates are total Annual Net Public Transport Expenditure spent on Transport in respective cities, it includes Finances spent on Transport Infrastructure development unless stated otherwise for any given city

Useful Resources

1. Population Estimates

<https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/mid-year-population-estimates/mid-2020>

<https://data.worldbank.org/indicator/SP.POP.TOTL?locations=SG>

<https://populationstat.com/sweden/stockholm>

<https://data.worldbank.org/indicator/SP.POP.TOTL?locations=HK>

<https://www.statista.com/statistics/753235/total-population-of-amsterdam/>

<https://www.populationu.com/cities/tokyo-population>

<https://populationstat.com/finland/helsinki>

https://www.destatis.de/EN/Themes/Society-Environment/Population/Current-Population/_node.html

<https://www.statista.com/statistics/1047271/forecast-paris-population-france/>

<https://www.census.gov/quickfacts/newyorkcitynewyork>

<https://data.london.gov.uk/dataset/londons-population>

<https://populationstat.com/spain/bilbao>

https://www.dresden.de/media/pdf/stadtplanung/verkehr/Staedtische_Strassenbahnsysteme_engl.pdf

<https://www.wien.gv.at/english/administration/statistics/population.html>

2. Bus Ridership

<https://www.statista.com/statistics/1006198/singapore-daily-public-bus-ridership/>

https://data.gov.sg/dataset/public-transport-utilisation-average-public-transport-ridership?resource_id=552b8662-3cbc-48c0-9fbb-abdc07fb377a

<https://data.london.gov.uk/dataset/public-transport-journeys-type-transport>

<https://www.sciencedirect.com/science/article/pii/S2590198220301536>

<https://www.gov.hk/en/about/abouthk/factsheets/docs/transport.pdf>

https://www.td.gov.hk/en/transport_in_hong_kong/transport_figures/monthly_traffic_and_transport_digest/2019/201906/index.html

<https://www.statista.com/statistics/1177304/japan-toei-bus-passenger-volume-in-tokyo/>

https://www.stat.fi/tup/suoluk/suoluk_liikenne_en.html

<https://www.emta.com/spip.php?article81>

<https://new.mta.info/coronavirus/ridership>

<https://www.transport.gov.scot/publication/transport-and-travel-in-scotland-2019-results-from-the-scottish-household-survey/public-transport-and-aviation/#sec17>

https://www.lta.gov.sg/content/dam/ltagov/who_we_are/statistics_and_publications/statistics/pdf/PT_Ridership_2015-2020.pdf

https://www.td.gov.hk/mini_site/atd/2020/en/section5_t_2.html

https://www.censtatd.gov.hk/en/data/stat_report/product/FA100065/att/B72104FB2021XXXXB0100.pdf

https://www.censtatd.gov.hk/en/data/stat_report/product/B1010003/att/B10100032019AN19B0100.pdf

<https://www.internationaltransportforum.org/Pub/pdf/13Compendium.pdf>

<https://www.greatermanchester-ca.gov.uk/news/new-greater-manchester-bus-service-improvement-plan-marks-next-step-towards-delivering-bee-network/>

<https://www.liverpoolcityregion-ca.gov.uk/what-we-do/transport/>

<https://www.nottinghampost.com/news/nottingham-news/passenger-numbers-up-nottingham-city-3550592>

<https://www.ssatp.org/sites/ssatp/files/publications/Toolkits/ITS%20Toolkit%20content/case-studies/zurich-switzerland.html>

<http://www.obs-transport-gratuit.fr/travaux-164/etudes-175/dunkerque-effets-de-la-gratuite-totale-septembre-2019-billet-281.html>

<http://www.obs-transport-gratuit.fr/travaux-164/etudes-175/dunkerque-effets-de-la-gratuite-totale-septembre-2019-billet-281.html>

<https://handshakecycling.eu/sites/default/files/Resource%20Documents/Towards%20a%20more%20active%20mobility%20system%20in%20Turin.pdf>

https://www.papercast.com/wp-content/uploads/2019/12/Papercast_Turin_Case_Study_2019.pdf

<https://www.icomera.com/success-stories/rotterdamse-elektrische-tram-ret/>

<https://www.statista.com/statistics/776381/urban-bus-passengers-in-bilbao/>

<https://www.eltis.org/discover/news/bilbao-leads-commitment-sustainable-mobility-spain>

<http://www.madrid.org/cs/BlobServer?blobkey=id&blobwhere=1272011328217&blobheader=application%2Fpdf&blobheadname1=Content->

<Disposition&blobheadvalue1=filename%3DS4+Transyt+Andr%C3%A9s+Monz%C3%B3n.pdf&blobcol=urldata&blobtable=MungoBlobs>

https://www.budgetdirect.com.sg/car-insurance/research/public-transport-singapore?__cf_chl_captcha_tk__=pmd_tvqqPoVRkIPQ7VX521uuMO6HkESKRwjojRgkKYSzt_I-1635849200-0-gqNtZGzNA2WjcnBszQcl

<https://www.wien.gv.at/english/administration/statistics/public-transport.html>

Bus Speeds

<https://tfl.gov.uk/corporate/publications-and-reports/buses-performance-data#on-this-page-4>
<https://www.mta.info/press-release/nyc-transit/mta-nyc-transit-unveils-comprehensive-plan-reimagine-bus-system-deliver>
<https://www.sll.se/verksamhet/kollektivtrafik/aktuella-projekt/Stombussar/>
<https://www.emta.com/IMG/pdf/brochure.pdf>
https://www.lta.gov.sg/content/dam/ltagov/who_we_are/statistics_and_publications/statistics/pdf/PT_Ridership_2015-2020.pdf
https://nanopdf.com/queue/introduction-to-bus-operations-in-hong-kong_pdf?queue_id=-1&x=1635183407&z=MTQ4LjY0LjI5LjE5Ng==
<https://cityobservatory.org/urban-buses-are-slowng-down/>
https://brtdata.org/indicators/corridors/operating_speed_corridor
<http://www.nyc.gov/html/dot/downloads/pdf/mobility-report-2019-print.pdf>
<https://www.economist.com/britain/2019/02/02/manchesters-mayor-considers-taking-back-control-of-buses>
<https://www.aph.com/community/holidays/commute-getting-slower-average-speeds-uks-major-cities-revealed-2017/>
<https://www.thetimes.co.uk/article/dublin-buses-are-worlds-slow-coaches-wpzmzqcx3cd>
https://www.dresden.de/media/pdf/stadtplanung/verkehr/Staedtische_Strassenbahnsysteme_engl.pdf
https://www.wienerlinien.at/media/files/2017/facts_and_figures_2016_213708.pdf
https://www.wienerlinien.at/media/files/2020/wl_betriebsangaben_2019_englisch_358275.pdf

Annual Bus Revenue

<https://www.lothianbuses.com/news/2019/06/were-investing-in-our-future/>
https://www.firstbus.co.uk/uploads/node_images/greater-glasgow/AW_LAR_Glasgow_Web.pdf
<https://content.tfl.gov.uk/tfl-annual-report-2019-20.pdf>
https://www.lta.gov.sg/content/dam/ltagov/who_we_are/statistics_and_publications/report/pdf/LTA_FS_FYE_31Mar2020.pdf
https://www.kcbh.com.hk/upload/Eng_annual_report.pdf
<http://www.lwb.hk/chi/pdf/moreLWB2020.pdf>
<https://www.euroweeklynews.com/2021/04/08/valencias-bus-company-loses-e22m-in-tickets-sales-due-to-pandemic/>
<https://www.statista.com/statistics/696147/total-revenues-of-the-italian-public-transportation-group-gtt/>
<https://www.dvb.de/-/media/files/die-dvb/dvb-jahresabschluss-2019.pdf>
https://www.zvv.ch/zvv-assets/ueber-uns/geschaeftsbericht_2020/zvv-gesch%c3%a4ftsbericht-2020.pdf
<https://corporate.ret.nl/en/finance/annual-reports#>

Urban Access Charges

<https://urbanaccessregulations.eu/>
<https://www.green-zones.eu/en/low-emission-zones/the-netherlands/amsterdam>

Air Quality Index

<https://waqi.info/#/c/6.876/8.897/2.2z>

Bus Crime Statistics

<https://d3cez36w5wymxj.cloudfront.net/wp-content/uploads/2020/03/08184047/Bus-passenger-survey-autumn-2019-main-report.pdf>
<https://data.london.gov.uk/dataset/transport-crime-london>
<https://www1.nyc.gov/site/nypd/stats/reports-analysis/transit-bus.page>
<https://www.straitstimes.com/singapore/courts-crime/overall-crime-down-but-reports-of-molest-on-public-transport-up-60-per-cent>

Satisfaction Survey

https://www.firstbus.co.uk/uploads/node_images/greater-glasgow/AW_LAR_Glasgow_Web.pdf
<https://www.ptc.gov.sg/docs/default-source/default-document-library/annex---ptcss-2020.pdf>
<https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Sustainability/Our%20Insights/Elements%20of%20success%20Urban%20transportation%20systems%20of%2024%20global%20cities/Urban>
<https://www1.nyc.gov/html/dot/downloads/pdf/nycdot>
<https://lsecities.net/wp-content/uploads/2015/09/New-Urban-Mobility-London-and-Berlin.pdf>

<https://www.westyorks-ca.gov.uk/media/2847/transport-strategy-evidence-base.pdf>
<https://www.merseytravel.gov.uk/news/bus-boost-for-liverpool-city-region-as-it-bucks-the-national-trend/>
<https://www.nhtnetwork.co.uk/isolated/page/793>
<https://www.bizkaiatalent.eus/en/pais-vasco-te-espera/conocenos/transporte-publico-estado/>
<https://www.eltis.org/discover/news/bilbao-leads-commitment-sustainable-mobility-spain>
https://www.emtvalencia.es/ciudadano/index.php?option=com_content&view=article&id=299:emt-2010&catid=58&lang=en

Capital Spending on Public Transport

<https://www.london.gov.uk/about-us/londonassembly/meetings/documents/s89326/10%20-%20Mayor%20of%20Londons%20Capital%20Spending%20Plan%20for%202021-22%20-%20Appendix%201.pdf>
<https://www.straitstimes.com/singapore/transport/commentary-govt-puts-more-money-where-its-mouth-is-when-it-comes-to-buses-and>
<https://www.mof.gov.sg/docs/librariesprovider3/budget2021/download/pdf/51-mot-2021.pdf>
<https://www.regionstockholm.se/globalassets/6.-om-landstinget/ekonomi/bokslut/eng/annual-report-2019.pdf>
http://www.mtr.com.hk/archive/corporate/ch/investor/annual2018/mtr_ar2018_en.pdf
<https://new.mta.info/document/17661>
<https://new.mta.info/document/15221>
<https://www.emta.com/spip.php?article128>
<https://www.zvv.ch/zvv/de/ueber-uns/geschaeftsbericht/2020/rechnungsbericht.html>
<https://www.zvv.ch/zvv/de/ueber-uns/geschaeftsbericht/2020/rechnungsbericht.html>
<https://www.dvb.de/-/media/files/die-dvb/zahlen-daten-2021-englisch.pdf>
https://www.wienerlinien.at/media/files/2020/wl_betriebsangaben_2019_englisch_358275.pdf

AQI	Air Pollution Level	Health Implications	Cautionary Statement (for PM2.5)
0 - 50	Good	Air quality is considered satisfactory, and air pollution poses little or no risk	None
51 - 100	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
101 - 150	Unhealthy for Sensitive Groups	Members of sensitive groups may experience health effects. The general public is not likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
151 - 200	Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects	Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion
201 - 300	Very Unhealthy	Health warnings of emergency conditions. The entire population is more likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion.
300+	Hazardous	Health alert: everyone may experience more serious health effects	Everyone should avoid all outdoor exertion