

2016 Fare Benchmarking Report



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Introduction

This is the second of our fare benchmark reports. As noted in our 2015 report, bus, rail and ferry fares are often the subject of scrutiny and questioning by the customers who are most affected by price and product changes. With few or no alternatives other than private cars and taxis, transit customers are often at the mercy of the governments and operators who make the decisions about the prices to be charged for the services they provide.

This has not changed in the last 12 months. In fact, in Australia at least, public transport fares have been the subject of public scrutiny with reviews of fare structures and products occurring in both Queensland and NSW with significant changes to fare structures and levels being implemented or planned for the near future.

Public transport fares have also been at the forefront of elections, both locally and in London where a fares freeze was a key election promise of Sadiq Khan, now the Mayor of London.

As we hoped for last year's benchmarking study, the 2016 report is intended to contribute to the public debate about fares and fare levels by providing some comparative data about fares across a number of cities across the world. The analysis represents a small slice of the potential ways to think about and analyse the impact of the cost of transport for public transport users.

Our approach

Our approach to this year's fares benchmarking report is consistent with our 2015 report¹. As a result, with the exception of two cities included in the report for the first time, the results outlined in this report can be directly compared with the results from last year. We have again normalised the price of fares using published minimum wage rates for each of the cities included in the study. We use this information to estimate the number of minutes that a person who earns minimum wage would have to work in order to earn sufficient money to pay for public transport under a number of scenarios. These scenarios include the number of minutes of work required to pay for:

- The cheapest return fare
- The fare required to undertake return travel 15 kilometres in each of the benchmarked cities and regions.

The minimum wage, represents a useful tool to allow comparison between different fares for a service that is not traded internationally and which is not directly comparable across cities let alone countries. The minimum wage in each country is also similar to public transport fares because both set by administrative or political means rather than by the market.

We understand that using the minimum wage does not reflect many customers' actual incomes. For example, students and pensioners may be on a substantially lower income than someone on the minimum wage who works full time. It is also noted that it is not necessarily the case that those who are employed at the minimum wage rate are able to enjoy the same standard of living across each of the cities and regions in the study.

Pricing is not the only comparator, of course. A more complete benchmarking exercise might take into account service frequency and coverage to provide a more complete value for money assessment.

¹ Our 2015 report can be downloaded at <http://ninesquared.com.au/2015-fares-benchmarking-report/>

Benchmarked cities and regions

Last year we reviewed the fares and ticket products in 24 cities across North America, Europe, Asia as well as New Zealand and each of the capital cities in Australia. This year we added two additional cities – Houston, Texas in the United States of America and Istanbul in Turkey – to take the number of cities included in this report up to 26.

Between them, these 26 cities operate transit systems with 31 different fare structures, tickets or prices. Cities in the study that have more than one system included because of pricing or product differences between modes are London, Sydney, Paris, Chicago and Beijing.

As last year, the cities in the study are of various geographic and economic scales. Differences in population, population density, employment, economics activity and geographic distance can all impact on the financial viability of public passenger transport within urban environments and the appropriateness of different fare structures.

While the cities in the study are all different, the impact of these differences on the fares that are charged (at least once normalised against local minimum wages) appears limited. There is very little correlation between population or population density and the minutes that a person on minimum wage has to work.

There appears to be a much stronger correlation between the fare structure and the distance that the transit system in each city has to cover in order to provide services to its customers. Unsurprisingly perhaps, this manifests itself in the provision of flat fares compared to distance based fares. Transit systems that cover long distances are more likely to have distance based fares than flat fares, and the longer the maximum distance able to be travelled in a system, the more zones that system is likely to have.



Table 1 Benchmarked cities - key demographic statistics

	City / Region	Population	Land area (km ²)	Density (persons per km ²)
1	Tokyo	37,750,000	8,547	4,400
2	Jakarta	31,320,000	3,225	9,700
3	Seoul	23,575,000	2,266	9,100
4	New York	20,685,000	11,642	1,800
5	Beijing	20,390,000	3,937	5,200
6	LA	15,135,000	6,299	2,400
7	Istanbul	13,520,000	1,360	9,900
8	Paris	10,870,000	2,845	3,700
9	London	10,350,000	1,738	5,600
10	Chicago	9,185,000	6,856	1,300
11	Toronto	6,550,000	2,287	2,900
12	Houston	6,005,000	4,828	1,200
13	Berlin	4,085,000	1,347	3,000
14	Sydney	4,070,000	2,037	1,900
15	Melbourne	3,955,000	2,543	1,500
16	South East Queensland	2,870,000	2,854	1,006
17	Vancouver	2,310,000	1,150	1,900
18	Portland	2,000,000	1,357	1,400
19	Perth	1,785,000	1,566	1,000
20	Auckland	1,370,000	544	2,500
21	Glasgow	1,235,000	368	3,300
22	Adelaide	1,150,000	852	1,300
23	Canberra	420,000	472	800
24	Wellington	375,000	184	2,000
25	Darwin	83,000	112	700
26	Hobart	51,000	80	700

Fare facts

As part of the benchmarking study, we not only reviewed the fares in each of the cities and regions but also the suite of fare and ticket products offered by each transit agency.

As we found last year, there were slightly more transit systems with flat fares than with distance based fares in the study group. Of the 26 cities and 31 systems we reviewed, 53 percent offered flat fares to their customers. The remaining 47 percent offered distance based fares with the number of ticketing zones ranging from 3 (Hobart, Vancouver and Sydney Buses) to 23 (South East Queensland).

This year we also reviewed the number of transit systems that offered discounts for customers using smartcards or mobile ticketing in preference to paper tickets. Of the 31 transit systems, 54% offered some level of discount for the use of smartcards or mobile ticketing.

These discounts ranged from 1.6% in Tokyo to up to around 50% in London and Beijing. The average discount across the 13 systems that offered a discount was 23%. A number of the systems had discontinued the sale of paper tickets and, consequently, did not offer any discount for using smartcards or mobile, had discontinued the sale of paper tickets. These cities were excluded from our analysis of the proportion of cities that offered discounts (Figure 2).

As in last years' analysis, every city offered a single fare product – either on smartcard and / or as a paper ticket. Monthly, weekly, daily periodic products or, the alternative of a daily, weekly or monthly cap were the next most widely offered products by the transit agencies in the study. Twenty-two out of the 31 transit systems offered some kind of periodic ticket or capped product.

Figure 1: Proportion of systems offering flat fares and distance based fares

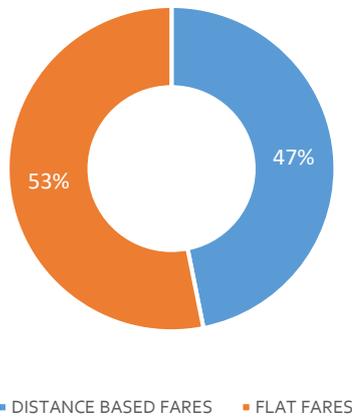


Figure 2: Proportion of systems offering discounts for smartcard or mobile use compared to those who do not

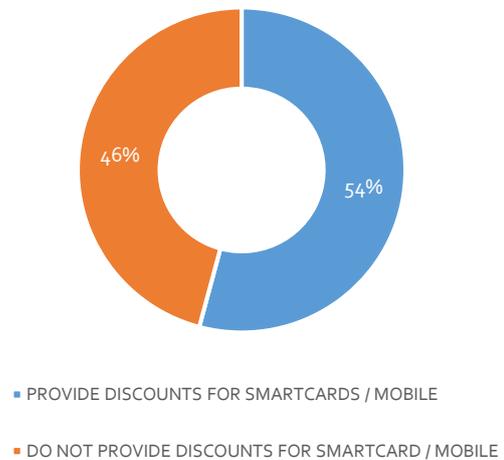
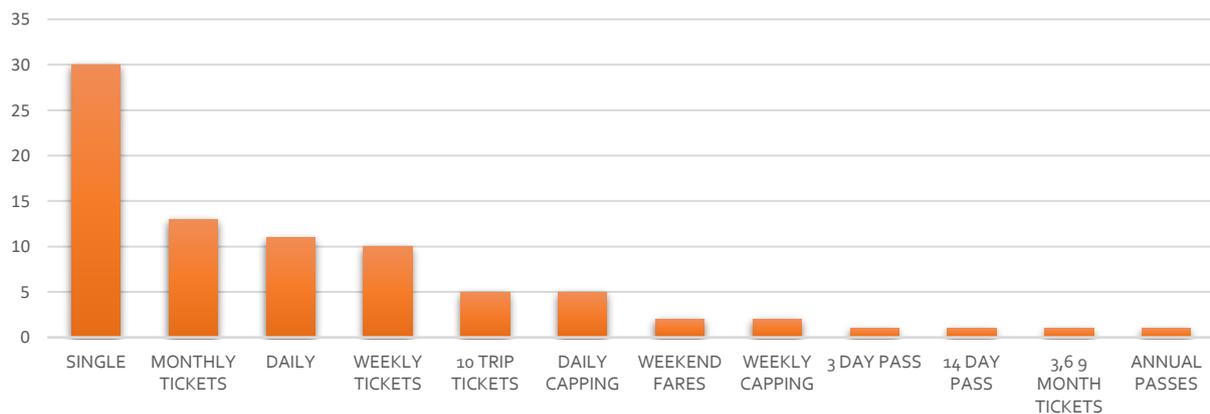


Figure 3: Number of transit systems offering specific products



Changes between 2015 and 2016

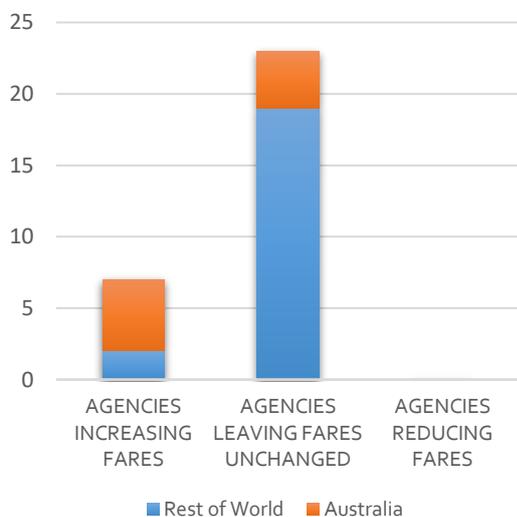
Our methodology measures two things – fare levels and minimum wage rates. Both fare levels and minimum wages are set through administrative and political processes and may or may not change from year to year. How the two measures move will depend on the changes that are seen in the benchmarking results outlined later in this report.

Fares

Based on the available data, of the 24 cities included in last years' fares benchmarking study, only seven increased fare levels. And of these, one city – London – only increased fares for a 1 zone ticket and left all other fares the same as 2015.

Of the remaining six cities, five cities were in Australia (Perth, Melbourne, Adelaide, Canberra and Hobart). The only other city that increased fares from the 2015 study period was Toronto. No city reduced their fares.

Figure 4 Number of cities changing 1 zone / flat fares between 2015 and 2016



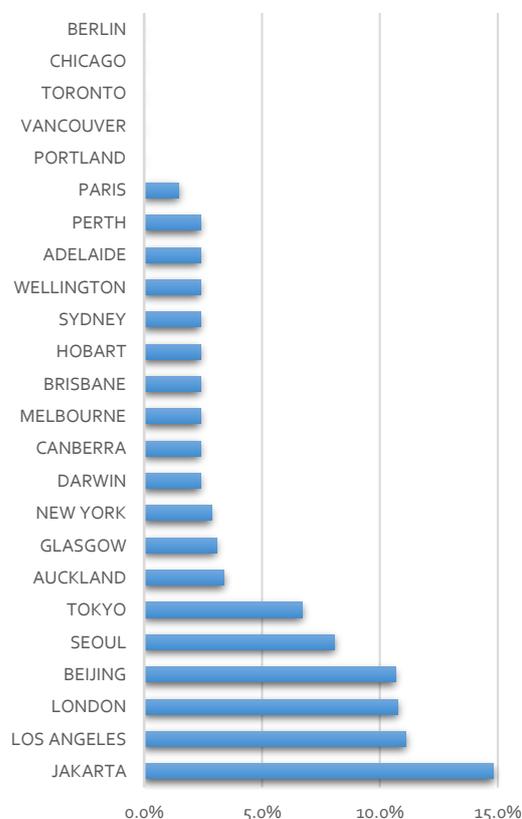
When fares were changed, the percentage change was relatively small. The average for Australian cities was 3.0% while a slightly average higher increase in fares (of 3.96%) was observed in overseas cities. Note that this is only for one zone fares. As mentioned above, London only increased fares for zone 1 travel so the overall average increase in fares is substantially lower when spread across all of the zones in the London underground system.

Minimum wage rates

Minimum wage rates increased in all but five of the cities or regions in the study. Minimum wage rate increases ranged from 1.5% in Paris to 14.8% in Jakarta.

In addition to the changes in the minimum wage rates, we have amended the nominated minimum wage rate used for Australian cities and regions. The 2015 Fares Benchmarking Report used the minimum rates specified in the Fast Food Workers Award as a proxy for the minimum wage. For this report, we have used the minimum wage rate specified by Fair Work Australia. This decreases the wage rate and consequently increases the number of minutes a person would need to work in order to afford public transport. For year on year comparisons, we have used last year's rates escalated by 2.4% which is the amount by which the minimum wage rate was adjusted in 2016. In all other cases, we have used the minimum wage rate of \$17.70.

Figure 5 Percentage change in minimum wage rates



Results

Table 2 lists cities and regions from most expensive to least expensive based on the number of minutes a person would have to work at minimum wage to afford a return journey on public transport in that city. The data in table 2 is based on a person travelling on the

least expensive ticket product excluding short trip tickets which are offered by some transit agencies for those taking extremely short trips. If travel was cheaper using a smartcard, then we used the cheaper ticketing option to calculate the minutes that needed to be worked.

Table 2 City ranking – most expensive to least expensive at the lowest fare

2016 rank	2015 rank	Transit system	Mode	Lowest single fare	Minimum wage	Minutes of work required to purchase return travel
1	1	London	Underground	£2.40	£7.20	40.00
2	2	Berlin	All	€ 2.70	€8.50	38.12
3	3	New York	All	\$ 2.48	\$9.00	33.07
4	4	Chicago	Rail	\$2.25	\$ 8.25	32.73
5	5	Portland	All	\$2.50	\$9.25	32.43
6	8	Glasgow	All	£2.00	£6.70	32.24
7	6	Vancouver	All	\$2.75	\$ 10.25	32.20
8	7	Toronto	All	\$2.90	\$11.00	31.64
9	9	Chicago	Bus	\$2.00	\$8.25	29.09
10	-	Istanbul	All	2.30 ₺	10.29 ₺	26.81
11	13	Melbourne	All	\$ 3.90	\$17.70	26.44
12	10	London	Bus	£1.50	£ 7.20	25.00
13	11	Paris	Bus	€2.00	€9.67	24.82
14	18	Adelaide	All	\$3.48	\$17.70	23.59
15	19	Sydney	Train	\$3.38	\$17.70	22.92
16	20	South East Queensland	All	\$3.35	\$17.70	22.71
17	16	Paris	Rail	€1.80	€9.67	22.34
18	15	Tokyo	Rail	¥170	¥907	21.83
19	12	Jakarta	BRT	RP 3,500	\$19,375	21.68
20	14	Los Angeles	All	\$1.75	\$10.00	21.00
21	17	Seoul	Subway Rail	₩1,050	₩6,030.00	20.90
22	-	Houston	Bus	\$1.25	\$7.25	20.69
23	21	Darwin	Bus	\$3.00	\$ 17.70	20.34
24	22	Canberra	Bus	\$ 2.91	\$ 17.70	20.20
25	23	Hobart	Bus	\$2.56	\$ 17.70	17.36
26	24	Perth	All	\$2.55	\$17.70	17.29
27	26	Sydney	Bus	\$2.10	\$ 17.70	14.24
28	25	Auckland	All	\$1.70	\$15.25	13.38
29	27	Wellington	All	\$1.66	\$ 15.25	13.06
30	28	Beijing	Subway Rail	¥1.50	¥ 18.70	9.63
31	29	Beijing	Bus	¥1.00	¥18.70	6.42

2016's biggest movers

Overall, the biggest winners amongst the cities and regions in the study were associated with those cities that saw significant increases in minimum wage rates but which did not change fares.

Jakarta was the largest winner of the cities in the study jumping 6 places (taking into account the introduction of Istanbul and Houston). Jakarta's minimum wage rate increased 14.8% which contributed to a 12.9% reduction in the number of minutes required to be worked at minimum wage in order to buy a flat fare ticket on the Jakarta Bus Rapid Transit System.

Los Angeles (10% reduction in minutes worked), Seoul (7.5% reduction) and Tokyo (6.3% reduction) all jumped several places. Beijing also had a significant reduction (9.6%) across both bus and rail modes and continues to represent the cheapest of all of the transit systems in the study. Each of these cities had relatively large increases in the minimum wages and no increase in their minimum fare levels.

Despite being the most expensive city in the study, London commuters also saw a reduction in the number of minutes they needed to work at minimum wage (at least in percentage terms). The minimum wage in London increased 10.8% between 2015 and 2016. At the same time, the fare for zone 1 travel on the Underground increased by 10 pence – an increase of 4.4%. The difference between the minimum wage and the one zone fare increase saw a reduction in the number of minutes required to be worked to afford a return journey (by approximately 2 minutes or 5.8%). Importantly, this analysis only applies to one zone fares on the London Underground. Other than the one zone fare, all fares in London were frozen between 2015 and 2016. The result is those public transport users travelling beyond one zone saw a reduction of 9.7% in the number of minutes that they would have to work in order to undertake return travel. Interestingly, if the zone one fare had not been increased in line with other fares in London, the Underground would have continued to be the most expensive of the cities in the study with the number of work minutes required to pay for two trips would have dropped from 40 minutes to 38.34 minutes, just in front of Berlin.

In contrast to the winners, the biggest loser amongst the cities in the study was Glasgow. Glasgow had a modest increase in its minimum wage and no increase in the single journey fare. Glasgow, however sells a return ticket that is less than the price of two single tickets and the price of this ticket was increased from £3.20 to £3.60 – an increase of 12.9%. The combination of minimum wage rates and an increased return fare means that Glaswegians are having to work an additional 2.5 minutes to afford a return ticket – an increase of 9.1%.

Australian Cities

Nine Australian cities were included in the study. Importantly, last year, fares for Australian cities were normalised using the Fast Food Workers Award rates. These rates are above the national minimum wage rates set by Fair Work Australia. However, for this study we have used the lower national minimum wage Rate. The result of this is that all of the Australian cities increased the number of minutes that a person would have to work to afford return travel compared to last year.

The reality, however, is that since the national minimum wage rate increased between 2015 and 2016 and as a number of Australian cities did not increase fares in the same period, at least some public transport users are better off (in the sense that they have to work less on minimum wage to afford two public transport fares) than they were in 2015. To adjust for the change in minimum wage rates and to allow comparison between years, we applied the percentage increase in the minimum wage to the wage rate used in last year's report.

On this basis, the jurisdictions that did not increase fares (South East Queensland, Sydney and Darwin) saw a 2.3% decrease in the number of minutes required to be worked. Melbourne saw the biggest increase in the number of minutes (1.3%). Interestingly, none of these changes resulted in a change in any Australian city or region's position in Table 2 relative to each other.

Multiple trips

The analysis on the previous pages does not include consideration of additional discounts that many transit providers offer customers when purchasing multiple tickets. Of the cities included in the analysis, 12 offered ten trip tickets, weekly tickets or weekly capping. Four cities, Darwin, Glasgow, Los Angeles and Portland offered both 10 trips products and weekly products.

In general, weekly tickets are priced above 10 trip tickets, which in turn are often sold at a discount to the single ticket price. Alternatively, some product offerings include caps on the cost of daily or weekly travel.

Table 3 10 trip, weekly and monthly products and minutes required to be worked

Single trip	Transit system	Mode	10 trips	Rank	Weekly	Rank	Monthly	Rank
1	London	Underground	200.0	1	270.0	1	1,037.5	2
2	Berlin	All	190.6	2	211.8	5		
3	New York	All	165.3	3	206.7	6	776.7	3
4	Chicago	Rail	163.6	4	240.0	2	727.3	5
5	Portland	All	162.2	5	168.6	9	648.6	8
6	Glasgow	All	161.2	6	138.8	11	411.9	15
7	Vancouver	All	122.9	12			532.7	11
8	Toronto	All	158.2	7	230.5	4	771.8	4
9	Chicago	Bus	145.5	8	240.0	2	727.3	5
10	Istanbul	All	134.1	9				
11	Melbourne	All	122.9	11	123.4	12	444.3	12
12	London	Bus	123.4	10	176.7	8	679.2	7
13	Paris	Bus	87.5	23			434.3	13
14	Adelaide	All	110.1	13			379.1	16
15	Sydney	Train	96.3	19	189.9	7		
16	South East Queensland	All	95.4	20				
17	Paris	Rail	87.5	23			434.3	13
18	Tokyo	Rail	109.2	14			1144.4	1
19	Jakarta	BRT	108.4	15				
20	Los Angeles	All	105.0	16	150.0	10	600.0	9
21	Seoul	Subway Rail	104.5	17				
22	Houston	Bus	103.4	18				
23	Darwin	Bus	63.3	28				
24	Canberra	Bus	94.3	21				
25	Hobart	Bus	81.0	24				
26	Perth	All	80.7	25				
27	Sydney	Bus	59.8	29				
28	Auckland	All	66.9	26			550.8	10
29	Wellington	All	65.3	27			195.9	17
30	Beijing	Subway Rail	48.1	30				
31	Beijing	Bus	32.1	31				

The cost of an 'average' trip

The concept of an average trip is specific to location. We assumed an average trip to be 15 kilometres which is the approximate average trip length in South East Queensland. For cities that have distance based fares, we identified the zone that is situated 15 kilometres from the central business district (CBD) and used the fare from that zone to the CBD². For cities that use flat fares, we used the flat fare. Note that in the table, the lower the ranking, the cheaper it is to travel in that city or region relative to the other cities or regions in the study.

Again the London Underground and Berlin top the table as the most expensive (in terms of minutes required to be worked) of the cities in the study. However, a number of cities and regions that use distance based fares and that scored relatively well when examining the cheapest fare, become relatively more expensive as distance increases. Of particular note is Auckland and Houston. Both of these cities have moved from being amongst the cheapest cities for those travelling short distances to amongst the most expensive cities when travel length increases. South East Queensland and Sydney rail services also become more expensive as distance increases relative to the other cities in the study.

It is interesting to examine why Auckland and Houston moved so much in comparison with other cities and regions. Both cities have relatively low 'one zone' fares but have a significant jump in the number of minutes needed to be worked once a person moves to the next fare level. A person earning the minimum wage in Auckland, for example, would have to work and additional 10.2 minutes or an additional 67% in time to afford a two zone journey. Similarly, in Houston, a person on minimum wage would have to work an additional 12 minutes, equating to an additional 60% of the time required for a one zone journey. In contrast, passengers in South East Queensland only have to work an additional 3.7 minutes (or 17% extra working time) to afford a two zone fare. In Seoul, a passenger only has to work 1.99 minutes or just 10% extra time to travel an additional zone.

² It should be noted that in some cities, a 15 km trip can be lower or higher than a trip into the CBD. For example, South East Queensland uses a 'zones used' approach to calculating the fare which means that a 15km trip that starts in zone 2

Table 4 Cost of an 'average' distance trip

2016 rank	2015 rank	Transit system	Minutes of work required to purchase return travel
1	1	London (Underground)	51.67
2	3	Berlin	38.12
3	2	Auckland	37.77
4	-	Houston	33.10
5	5	New York	33.07
6	6	Chicago (Rail)	32.73
7	7	Portland	32.43
8	11	Glasgow	32.24
9	8	Vancouver	32.20
10	9	Toronto	31.64
11	4	Tokyo	31.36
12	10	South East Queensland	29.49
13	13	Chicago (Bus)	29.09
14	12	Sydney (Bus)	28.48
15	15	Sydney (Rail)	26.58
16	14	London (Bus)	25.00
17	19	Melbourne	24.68
18	-	Istanbul	23.32
19	18	Seoul	22.89
20	16	Paris (Bus)	22.34
21	22	Paris (Metro)	22.34
22	23	Adelaide	22.03
23	17	Jakarta	21.68
24	21	Los Angeles	21.00
25	24	Darwin	18.99
26	25	Canberra	18.86
27	26	Hobart	16.20
28	20	Perth	16.14
29	27	Wellington	13.06
30	28	Beijing (Rail)	9.63
31	29	Beijing (Bus)	9.63

travels through the CBD and ends in zone 2 could be less than the 3 zone fare that is assumed in the analysis.

Data sources

Topic	Source
Demographics	<p>DEMOGRAPHIA WORLD URBAN AREAS 12TH ANNUAL EDITION (Built Up Urban Areas or World Agglomerations) TABLE OF CONTENTS Demographia World Urban Areas (Introduction) April 2016, http://www.demographia.com/db-worldua.pdf</p> <p>ABS - http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3218.02014-15?OpenDocument</p>
Fares	<p>http://www.firstgroup.com/greater-glasgow/tickets</p> <p>http://www.transperth.wa.gov.au/tickets-fares/fares</p> <p>http://www.turkeytravelplanner.com/go/Istanbul/Transport/fares.html</p> <p>http://www.kias.re.kr/subo6/subo6_o6.jsp</p> <p>http://www.bjsuperpass.com/</p> <p>http://www.bjbus.com/home/index.php</p> <p>http://www.transjakarta.co.id/</p> <p>http://www.transport.nt.gov.au/public/fares-concessions-and-subsidised-travel</p> <p>http://www.translink.ca/en/Fares-and-Passes/Single-Fares.aspx</p> <p>http://www.mvv-muenchen.de/en/tickets-fares/fares/index.html</p> <p>http://www.metrotas.com.au/fares/urban-fares/</p> <p>http://www.ridemetro.org/Pages/Fares.aspx</p> <p>https://www.adelaidemetro.com.au/Tickets/Fares#Concession_and_Tertiary_Student_Fares</p> <p>https://ttc.ca/Fares_and_passes/Prices/index.jsp</p> <p>http://www.action.act.gov.au/fares/bus-fare-increase</p> <p>http://www.metlink.org.nz/tickets-and-fares/</p> <p>https://at.govt.nz/bus-train-ferry/fares-discounts/bus-train-fares/</p> <p>http://trimet.org/fares/</p> <p>http://www.transitchicago.com/fares/</p> <p>http://www.tokyometro.jp/en/ticket/types/regular/index.html</p> <p>https://shop.bvg.de/index.php/tickets</p> <p>http://www.francetravelplanner.com/go/paris/trans/ratp/bus/city.html</p> <p>http://parisbytrain.com/paris-train-metro-week-pass-navigo-decouverte/</p> <p>https://www.metro.net/riding/fares/</p> <p>https://translink.com.au/tickets-and-fares/fares-and-zones/current-fares</p> <p>http://ptv.vic.gov.au/tickets/metropolitan-myki-fares-2016/</p> <p>https://www.opal.com.au/en/opal-fares/Opal_fare_changes/</p> <p>http://content.tfl.gov.uk/adult-fares.pdf</p> <p>https://www.tfl.gov.uk/fares-and-payments/fares/</p> <p>http://web.mta.info/nyct/fare/FaresatAGlance.htm#Fares</p>
Minimum wages	<p>https://www.fairwork.gov.au/how-we-will-help/templates-and-guides/fact-sheets/minimum-workplace-entitlements/minimum-wages</p> <p>http://www.wageindicator.org/</p> <p>https://www.gov.uk/national-minimum-wage-rates</p> <p>http://www.ncsl.org/research/labor-and-employment/state-minimum-wage-chart.aspx</p>

About NineSquared

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