

“The Impact of Congestion on Bus Passengers”

Professor David Begg

Foreword by Sir Peter Hendy
About the Author
Acknowledgements

Executive Summary

Table of contents

- 1. The need for this study**
- 2. Methodology**
 - a. Economic assumptions**
 - b. Case studies**
- 3. Research findings**
 - a. Bus journey times are increasing**
 - b. Impact on bus passengers**
- 4. The challenge going forward**
 - a. Congestion getting worse**
 - b. Space wars**
- 5. Recommendations: *Five Point Plan***
- 6. APPENDIX: Case studies**
 - i. London**
 - ii. Edinburgh**
 - iii. Manchester**
 - iv. Bristol**
 - v. Brighton**
 - vi. Hull**

About the Author

Professor David Begg is a former chairman of the Government's Commission for Integrated Transport and was the chairman of the Transport Committee of the City of Edinburgh Council when the radical Greenways bus priority measures were introduced in the 1990s. He has been a board member of First Group, Transport for Greater Manchester and Transport for London. He is currently owner and proprietor of *Transport Times*, Chairman of EAMS, a non-executive director of Heathrow Airport and Chairman of the Greener Journeys Advisory Board. He is a visiting professor at Plymouth University.

Acknowledgements

This report is dedicated to bus drivers and their passengers who suffer from the impact of congestion on a daily basis.

I have been fortunate to have been able to discuss the economic analysis in this report with some of the best transport economists in the UK: Professor Peter Mackie, Professor Peter White and Professor Stephen Glaister. The final analysis is my own and any errors are entirely down to me.

I have become immersed in bus timetables and observed the huge frustration bus operators experience trying to run a punctual and reliable service in the face of worsening congestion. Special thanks to Martin Dean (MD, Buses, Commercial Director, Go-Ahead), Les Warneford (former MD, UK Bus, Stagecoach), Mark Yexley (MD, Buses, Arriva), Neil Barker (First Group), Nigel Serafini (Head of Commercial & Business Development, Lothian Buses), James Freeman (First Group), Peter Shipp (Chairman and Chief Executive, East Yorkshire Motor Services) Mike Best (Brighton and Hove Bus Company) and Martin Harris (MD, Brighton and Hove Bus Company).

They not only have supplied me with copious amounts of data, but they have educated me further on the sector. Martin has gone out of his way to dig up archived bus timetables stored at the Kithead Trust. I am indebted to Philip Kirk, who does a fantastic job looking after this archive, which is such a rich source of information (www.kitheadtrust.org.uk).

Roger French, former MD of Brighton and Hove Buses has been an invaluable mentor for me in this research. He has left a fantastic legacy in Brighton.

Leon Daniels (MD Surface Transport), Garrett Emerson (CEO, Surface Transport) and Ben Plowden (Strategy & Planning Director, Surface Transport) from Transport for London have ensured that the major challenge the capital is facing, with rising congestion and sharp reductions in bus speed over the last few years, is accurately covered in this report. The new mayor would be well advised to listen to their concerns!

Jon Lamonte and his colleagues from Transport for Greater Manchester, Rod Fawcett and Mike Renshaw, have demonstrated to me in some detail the efforts they are making to speed up bus journey time in the face of a proliferation in road works and a rapid growth in city centre employment and demand for transport. They have been resolute in their policy objective of expanding bus priority in the face of stern criticism from some local politicians.

Anthony Smith and his colleagues at Transport Focus have guided me and reinforced my concern that congestion is the main challenge facing the sector. Joan Aitken has given me a Traffic Commissioner's view on the factors which are slowing up traffic in Edinburgh and how it impinges on bus operations.

David Brown (Group Chief Executive, Go-Ahead) and Giles Fearnley (Managing Director, First Bus) have provided wise counsel as have David Leeder, Chris Cheek (TAS Partnership) and Steven Salmon (CPT).

Vince Stops from London Travel Watch has been a passionate supporter of bus users in London and kept me right on the capital and Marshall Poulton, former director of transport at the City of Edinburgh Council, has been my go to man on Scotland's capital.

Sir Peter Hendy has kindly written an insightful foreword. He may now be Chairman of Network Rail but buses will always be in his DNA and he leaves behind him a fantastic legacy from the his time 15 years at TFL , both as director of surface transport and subsequently Transport Commissioner.

A big thanks to David Fowler and Kirsty Walton at *Transport Times* for making this report read much better than it otherwise would and to Katie Allister for her vital contribution on research and the case studies. It has been a pleasure to work with her again.

Executive Summary

Traffic congestion is a cancer which if left unchecked will destroy the bus sector. I hesitate to make such a dire and sensational prediction, but the evidence I have uncovered in this research leads me to no other conclusion. On historical, current and future trends it's a question of when, not if. There is a distinct trend across our urban conurbations in the UK of bus journey times rising by – on average – almost 1% per annum. Over the last 50 years, bus journey times have increased by almost 50% in the more congested urban areas. If we had protected bus passengers from the growth in congestion there would arguably be between 49% and 68% more farepaying bus passenger journeys today. If the trend is allowed to continue, then our urban buses will no longer represent a viable mode of transport for the majority of its customers and will be populated largely by people with mobility difficulties. Already in London some buses on some routes run at close to walking speed.

The need for this study

Everyone in industry, local government and Whitehall knows we have a problem. Until now it has not been properly quantified. I personally have been surprised at the true extent to which congestion has been corrosive to the bus sector. It has been caught in the vortex of three vicious downward spirals:

1. Slower speeds leading to higher costs, higher fares, fewer passengers, service decline, fewer passengers.
2. Slower speeds leading to increased journey time, fewer passengers, service decline, fewer passengers.
3. Slower speeds, punctuality and reliability decline, fewer passengers, service decline, fewer passengers.

Bus operators are forced to respond to congestion in one of two ways. First, to try to maintain service frequency. If they do this, then every 10% decrease in operating speeds leads to an 8% increase in operating costs¹. If this is passed on to passengers through higher fares it results in a 5.6% fall in patronage (DfT fares elasticity of 0.7)².

The second response is to operate at lower frequency. A 10% deterioration in operating speeds would lead to a 10% reduction in frequency and 5% fewer passengers (based on a frequency elasticity of 0.5). A combination of the two responses is also likely. The end result – whether it's a greater peak vehicle requirement (PVR – the number of buses required to operate the service) or reduced frequency, or a combination of both – is pretty much the same in terms of patronage decline.

To the above we need to add the response passengers have to spending longer on board buses. This would lead to a further 5% fall in passengers (because of an in-vehicle elasticity of 0.5). The net result is a direct correlation between operating speeds and patronage: a

¹ The TAS Partnership:

² DfT elasticity

10% decrease in speeds reduces patronage by at least 10%. I say at least because congestion puts pressure on punctuality and reliability which can increase waiting time at bus stops. Passengers place a value two to three times as high on waiting at a bus stop as they do for in-vehicle time.

Chronic traffic congestion is not just a headache for passengers it's also a nightmare for bus drivers. It makes it much harder to attract the very best customer focused bus drivers into the industry, it prevents bus drivers giving the best service they can to passengers, and those who are committed and loyal often find the task so frustrating it encourages them to leave the industry - or not join in the first place. Many bus companies are once again struggling to attract enough drivers and have significant vacancies (especially in large conurbations)

London "falling"

Despite London Buses being one of the Capital's transport success stories over the past 15 years, more recently bus speeds have been declining faster than anywhere in the UK. This comes after decades of relative success in protecting bus passengers from traffic congestion through effective bus priority measures, such as red routes and other initiatives, and the central congestion charging zone introduced in 2003. If the average bus speed in the UK's congested urban areas has historically been decreasing by almost 1% p.a., then for one-third of London bus routes the decline has been more than five times this average over the past year. This has become a crisis for the capital and something the new Mayor, Sadiq Khan, must prioritise. London, which for more than a decade has been the UK's bus success story, with passenger numbers doubling since the formation of TfL in 2000, is now facing the fastest decline in bus use anywhere in the UK.

There is a key lesson we can learn from this. You can get all the other ingredients right: modern bus fleet, cashless buses with the most advanced smartcard ticketing system in the world, a level of integration which is the envy of other UK cities, state-of-the-art passenger information at the bus stop and on mobile devices. Add to this population and employment growth and you should have a recipe for the London bus success story continuing. But all these laudable ingredients cannot offset the rapid deterioration in bus journey times.

TfL are facing swinging cuts to their revenue budget. London's Public transport system is expected to operate without any revenue subsidy by 2019, the only city in the world that is required to meet this objective, with the exception of Hong Kong. The new Mayor has committed to a fares freeze which raises the question who is going to pay for bus services in London if it's not coming from the taxpayer and passengers will not make up the difference in higher fares. The solution is to operate buses more efficiently by improving their speed. If London is to eliminate the £350 million per annum subsidy to its bus network then bus speeds would have to improve by 24%. (reference this: been told orally by TfL surface transport –waiting for email confirmation)

Former London Mayor Boris Johnson was right to warn that his successor will have to use tougher congestion charging measures to tackle London's growth in congestion, but it is a

pity he did not take action on his watch. He exacerbated the problem by removing the western extension of the congestion zone and by reducing road capacity in central London by 25% through the introduction of cycle superhighways – without taking action to curtail traffic in central London.

Why does it matter if bus journey times increase?

Slow buses are bad for our city economies. If the trend for bus journey times increasing by almost 1% per annum continues we can expect to continue to lose access to around 5,000 jobs per year as a consequence.³

Buses are vital to the health of local economies. More people commute by bus than all other forms of public transport combined and those bus commuters generate £64bn in GDP. Around 400,000 people are either in a better, more productive job, or only in a job at all, as a result of the access the bus service provides. Buses are also the primary mode of access to our city centres, facilitating 29% of city expenditure.

Slow buses are also bad for pollution. Fuel efficiency measured in kilometres per litre has declined by 35% since 2000, and carbon dioxide emissions per bus km in urban conditions have risen by 25%. While there are factors other than congestion driving this trend, such as larger buses, stop-start conditions caused by congestion are a key factor. Under heavily congested conditions, tailpipe emissions can be increased by a factor of three or four.⁴

What can we do about it?

The mantra from too many political decision-makers at local and national level is to give the public “choice”. The problem is that in urban areas this means all road users have no choice other than to put up with chronic traffic congestion which will continue to grow. The way we run our road system in urban areas resembles the last remnant of a Stalinist state: we regulate traffic volumes by congestion (queueing) in the same way the former Soviet Union used to ration bread. It is bad for urban economies and their environment. Without road pricing there is no solution to urban congestion.

We need to return to the ethos of the 1998 White Paper on Transport⁵ which recognised the necessity of changing travel behaviour and the importance of demand management. It led to the London's congestion charging system and dedicated the revenue raised being used mainly to improve bus services.

More cities need to follow the lead of London, with the implementation of congestion charging, Nottingham, with its workplace parking levy, and Bristol, with essential car parking restraint measures. All three cities have been prepared to use both the carrot (improved sustainable transport) and the stick (car restraint). Public transport improvements on their own are not a panacea for urban congestion. They have to be accompanied by traffic restraint measures.

³ Daniel Johnson, Institute for Transport Studies, Leeds University

⁴ Environmental Factors in Intelligent Transport Systems, Prof Margaret Bell. IEE Proceedings: Intelligent Transport Systems, Vol 153 Issue 2, 2006

⁵ A New Deal for Transport: Better for Everyone. White Paper, July 1998
www.persona.uk.com/bexhill/Core_docs/CD-05/CD-05-16.pdf

If we can extend London-style cashless buses with contactless payment and smart ticketing to the rest of the UK, we could improve bus journey times by up to 10% by halving dwell time at bus stops. In urban conditions dwell time makes up between 25% and 33% of total journey time. The big five bus operators in the UK have set a target to introduce contactless bus transactions by 2022. They should do everything possible to accelerate this, and it is realistic for them to achieve this goal in the large conurbations within three years.

The Buses Bill should set out guidance encouraging local authorities and bus operators to set targets for average bus speeds. The minimum requirement should be for bus speeds to stop declining. Local authorities need to give priority on roads and at junctions to buses.

Edinburgh is one of the few cities in the UK to have bucked the trend in falling bus speeds, at least for a decade. Between 1986 and 1996, scheduled bus speeds increased by 5% as a result of better conventional bus priority culminating in the radical Greenways bus priority scheme. However, this legacy has been allowed to dissipate through weaker enforcement, a trial on removing bus priority during off-peak periods, and a failure to paint the lanes green and properly maintain them. As a result, in the last 20 years Edinburgh has reverted to the UK norm with bus speeds declining by 20%.

Space wars: political decision-making

Too little focus is placed on the importance of the bus because bus passengers carry too little weight with opinion-formers and political decision-makers. The socio-economic profile of bus passengers is very different from rail users, motorists and cyclists, with a much higher percentage of those on lower income travelling by bus. It helps to explain why fuel duty has been frozen for six consecutive years despite rock bottom oil prices: the motoring lobby is powerful. Cheaper fuel reduces the competitive position of the bus versus the car. It also explains why rail has won £38bn investment up until 2019.

We need more bus champions in the UK in local, devolved and central government. The bus is the most efficient user of road space, crucial for the health of our city economies and a vital part of an environmentally-friendly local sustainable transport system.

Bus companies need to get better at communicating with their customers to keep them better informed. This would also help them to mobilise support from their customers for pro-bus measures such as bus priority. At present, it would be a rare event for a bus passenger to lobby politicians for improved bus priority; it's much more common for non-bus users to complain about priority measures. Local politicians who are making brave decisions to allocate road space for bus passengers need as much support as they can get from their local bus companies as well as their customers.

A sensible balance needs to be struck between making our cities pedestrian-friendly and ensuring that bus passengers can get close to their destination. It's important to remember that shopping is the purpose of around one-third of bus journeys in the UK, and bus users spend an estimated £27bn on shopping and leisure. The more accommodating city centres are to pedestrians, the more attractive they become to retail and businesses generally. Bus routes radiate from the city centre: the more people travel to our city centres, the more

populated our buses are. City retail faces stern competition from out of town shopping centres and a newer threat which is growing exponentially, that of – online shopping. Bus companies are often the first to protest about pedestrianisation, but it would serve them well to acknowledge that city retail is facing a major battle to hold on to customers. The viability of city centre retail and bus companies are inextricably linked.

1. The need for this study

We have a good deal of evidence of the impact traffic congestion has had on the economy. The Cabinet Office has calculated the cost of congestion to the urban economy to be at least £11bn per annum, while the costs to society of poor air quality, ill health, and road accidents in urban areas are each similar to congestion, exceeding £40bn ⁶.

However, there has been little research on the impact rising congestion has had on the bus sector and consequentially our city economies and their environment.

The bus sector has been hit the hardest by congestion. Bus operators often cite congestion as a major factor in their failure to hit punctuality targets, but there is little documented evidence of the link between congestion, rising operating costs, fares and disappointing patronage figures. Motorists and freight and delivery drivers are able to view congestion hot spots on satnav and take alternative routes. This is not an option for bus drivers.

When I started my research for this report I knew that growing urban congestion was a serious problem facing the UK bus sector, but it was only after some detailed analysis that I appreciated just how acute and crippling the problem is. It is a cancer, and if left unchecked will kill the sector.

There is a debate to be had about the merits of bus regulation versus deregulation. This is *not* something which this research is concerned with. Traffic congestion had an adverse impact on bus passengers prior to the 1986 Transport Act and the advent of de regulation; it has impacted on them since and will remain a major problem in any future franchise regime. It is becoming such an acute problem in London that there has been a marked reversal in the upward trend in patronage.

This paper analyses one of the most potent headwinds facing the bus sector: traffic congestion. It ranks as one of the top three most powerful headwinds that have held the bus sector back, the other two being rising car ownership (car-owning households make 66% fewer bus trips per annum than non car owning households) and the migration of retail and business to out of town locations built around car access. In more recent times these trends have been exacerbated by online shopping and the advent of Uber.

In London bus speeds on some routes are close to walking pace and if we allow this trend to continue it will eventually only be those with mobility difficulties who travel by bus.

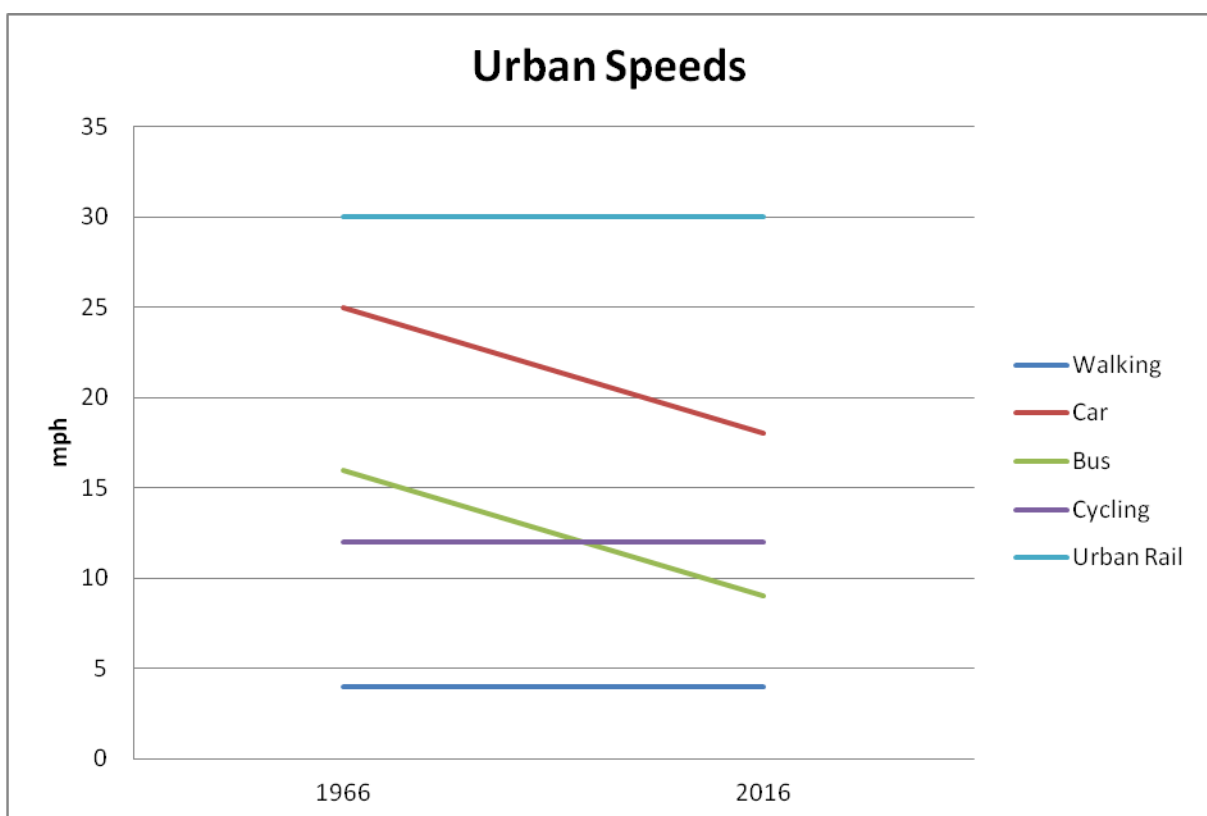
This report attempts to quantify what the growth in patronage would have been if bus journey times had remained constant over the last 50 years, using elasticity analysis (elasticity is a means of quantifying how demand for a service changes in response to changes in fares, frequency and in vehicle time) It will estimate the impact the growth in journey times has had on our city economies and their environment. It will look at what

⁶ An Analysis of Urban Transport, Cabinet Office Strategy Unit, November 2009.
<http://webarchive.nationalarchives.gov.uk/+/http://www.cabinetoffice.gov.uk/media/308292/urbantransportanalysis.pdf>

policies we need to implement to reverse this debilitating downward spiral of rising congestion, higher costs, higher fares, and fewer passengers. It will look at what operators can do to improve fare transaction times and reduce dwell time at bus stops.

There are many factors outside the scope of this study which can explain why rail patronage has doubled over the last 20 years while bus patronage (outside London) has been disappointing in comparison. The graph below shows the trend in average speeds in urban areas for the different modes. Urban rail, walking and cycling have remained fairly stable over the last 50 years; car speeds have declined. But it's the fall in bus speeds which has been most marked, with an average decline of almost 50%.

In the mid 1970s bus speeds became slower than cycling and the gap has widened since. On current trends average urban bus speeds will slower than walking in 60 years' time. The speed of the number 11 bus in London is already down to 4 mph for part of its route ⁷. Urban traffic congestion is becoming worse with each passing decade.

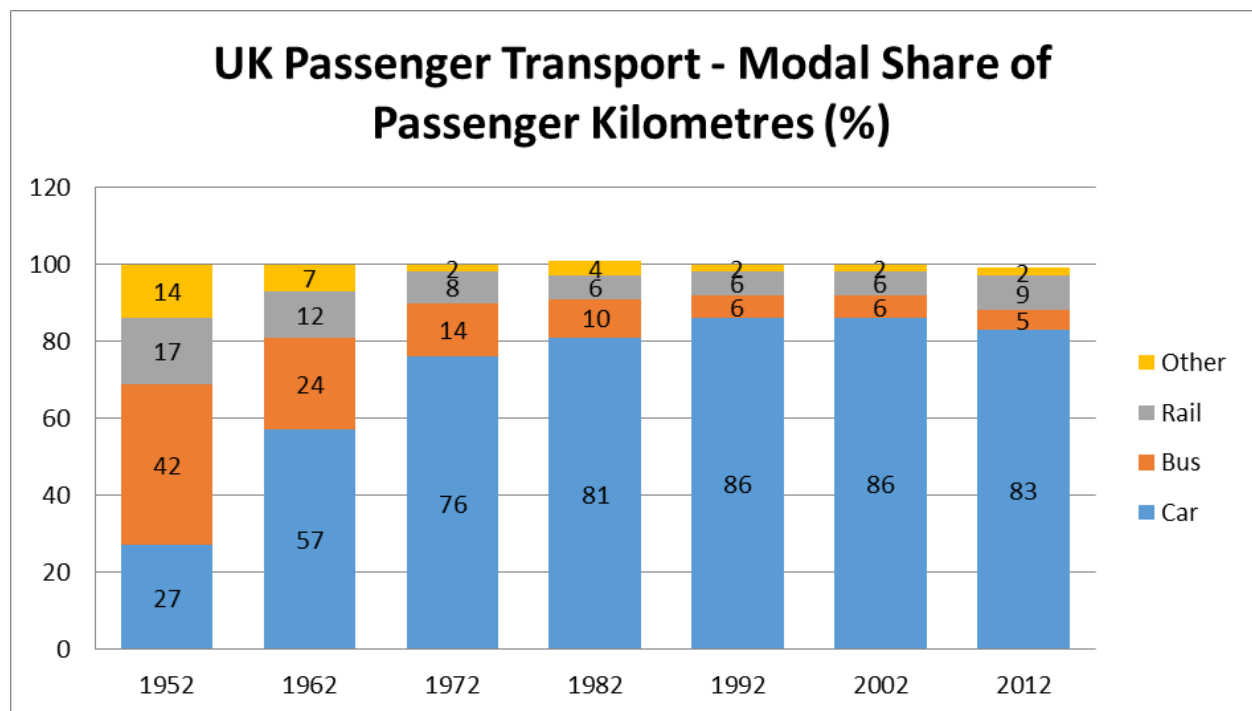


Bus speeds have been declining faster than any other mode of transport. Urban rail, walking and cycling have remained fairly static but urban car speeds have been declining, but not as fast as bus.

⁷ Number 11 bus speed

The bar chart below shows that public transport has made a comeback over the last 20 years, but it has been rail rather than bus which has been achieving modal shift from the car. This is the result of many factors: innovation in the rail industry, especially in marketing and ticketing; the advent of wi-fi, which makes it more attractive to travel by train; and the cost of motoring relative to rail fares to mention just three. Congestion is undoubtedly a key reason. Traffic congestion is the friend of the railways but the enemy of the bus. This report highlights just how corrosive congestion is to bus patronage, and this research has given it a much higher weighting in my opinion when ranking the factors which explain modal split trends.

If we are to emulate the success in rail, and achieve modal shift from car to bus, then we have to protect bus passengers from congestion.



Source: Lazarus Partnership: *Public Transport – Smartening up: Technology’s role in modal shift*, September 2014

Why it matters – the economy

Buses are crucial for the wider economy. More people commute to work by bus (2.5 million daily plus 1 million as vital back up) than all other forms of public transport combined, and they generate £64bn in economic output every year. Buses are the primary mode of access to our city centres – even more than the car – and responsible for facilitating 29% of city centre expenditure.

One in ten bus commuters would be forced to look for another job or give up work all together if they could no longer commute by bus. Around 400,000 people are in a better, more productive job, as a direct result of the access the bus service provides. It has been estimated that if bus journey times for commuters in England could be improved by 10% it

would be associated with over 50,000 more people in employment ⁸. If this 1% p.a. increase in journey times continues we can expect to continue to lose around 5,000 jobs annually as a consequence

There is also a direct impact on jobs. Around 90,000 of the 140,000 or so active holders of passenger-carrying vehicle (PCV) licences are engaged in driving local buses. A 50% increase in passengers would require 12.5% more drivers, or 11,250 new jobs (appendix 3). This direct employment impact underestimates the true figure as it doesn't include the extra jobs that would be created in the supply chain.

Environmental impact of slower speeds

Lower operating speeds are bad for pollution. Fuel efficiency measured in kilometres per litre has declined by 35% since 2000 ⁹.

Congestion dramatically increases carbon dioxide emissions from vehicles. Under heavily congested conditions tailpipe emissions can be increased a factor of three or four ¹⁰.

⁸ Daniel Johnson, Peter Mackie and Jeremy Shires: Buses and the Economy II
Institute for Transport Studies, University of Leeds, July 2014
http://www.greenerjourneys.com/wp-content/uploads/2014/07/Buses_and_the_Economy_II_main_report_july.pdf

⁹ Prof Peter White, University of Westminster: Impact of bus priorities and busways on energy efficiency and emissions. Greener Journeys [September 2015]

¹⁰ Environmental Factors in Intelligent Transport Systems, Prof Margaret Bell. IEE Proceedings: Intelligent Transport Systems, Vol 153 Issue 2, 2006

2. Methodology

a. Economic assumptions

The assumptions made on elasticities are critical to the assessment of what impact declining bus speeds have on patronage. I have been fortunate to have had some of the best transport economists in the UK guiding me and there are some differences of opinion on elasticity. This is especially true for long-run elasticities. This study is looking at a 50-year period and this very long run period results in higher elasticity levels than short or medium term ones.

An elasticity which I'm confident in using is the 0.8 ratio between speed and operating costs. This is accepted by academics and bus operators (ref- TAS)¹¹. I then made the assumption that increases in operating costs were passed onto the fare box – in reality this would vary depending on market conditions. However, someone has to pay for higher costs and in the long run it's a reasonable assumption to make.

Traffic congestion has three distinct impacts on bus use:

1. Higher operating costs and higher fares.
2. Higher in-vehicle time
3. Deteriorating punctuality and reliability

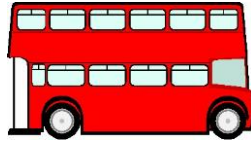
I have looked at a low and a high scenario on elasticities (see Table 1):

	Low	High
Speed/operating cost	0.8	0.8
Fares/price elasticity	0.7	1.0
Fares impact	$0.8 \times 0.7 = 0.56$	$0.8 \times 1 = 0.8$
In –Vehicle time.	0.4	0.5
Punctuality/reliability.	0	0.1
Total	0.96	1.4

¹¹ The TAS Partnership:

High Elasticity Scenario

Buses 10% slower every decade



In vehicle time elasticity = 0.5

Punctuality and reliability deteriorate

How do operators respond?

$0.5 \times 10\%$
= 5% fewer passengers

$0.2 \times 10\%$
= 1%

A

B

Maintain frequency by running more buses: 8% ↑ in costs

$0.1 \times 10\%$
= 1%

If costs passed on to fares: 8% ↑ in fares

Frequency / supply elasticity = 0.5

Fare elasticity = 1.0

$1 \times 8\% = 8\%$ fewer passenger journeys

$0.5 \times 10\% = 5\%$ fewer passenger journeys

In this higher elasticity scenario maintaining frequency leads to a larger fall in patronage

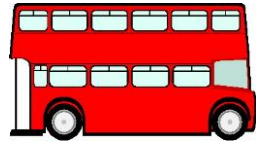
5% + 1% + 8% = 14% fewer

Bus journeys every decade



Low Elasticity Scenario

Buses 10% slower every decade



How do operators respond?

A

B

In vehicle time elasticity = 0.4

$0.4 \times 10\% = 4\%$ fewer passengers

Maintain frequency by running more buses



If costs passed on to fares: 8% ↑ in fares

Fare elasticity = 0.7
 $0.7 \times 8\% = 5.6\%$

Frequency cut by 10%

Frequency / supply elasticity = 0.5

$0.5 \times 10\% = 5\%$ fewer passenger journeys

Similar outcome

$4\% + 5.6\% = 9.6\%$ fewer passenger journeys every decade



In the low elasticity scenario I have deployed a DfT fares elasticity of 0.7 and the low range of the in-vehicle time (TRL 2004 0.4 to 0.7)¹², and because of the difficulty in estimating negative impacts on punctuality and reliability I have given this a zero value.

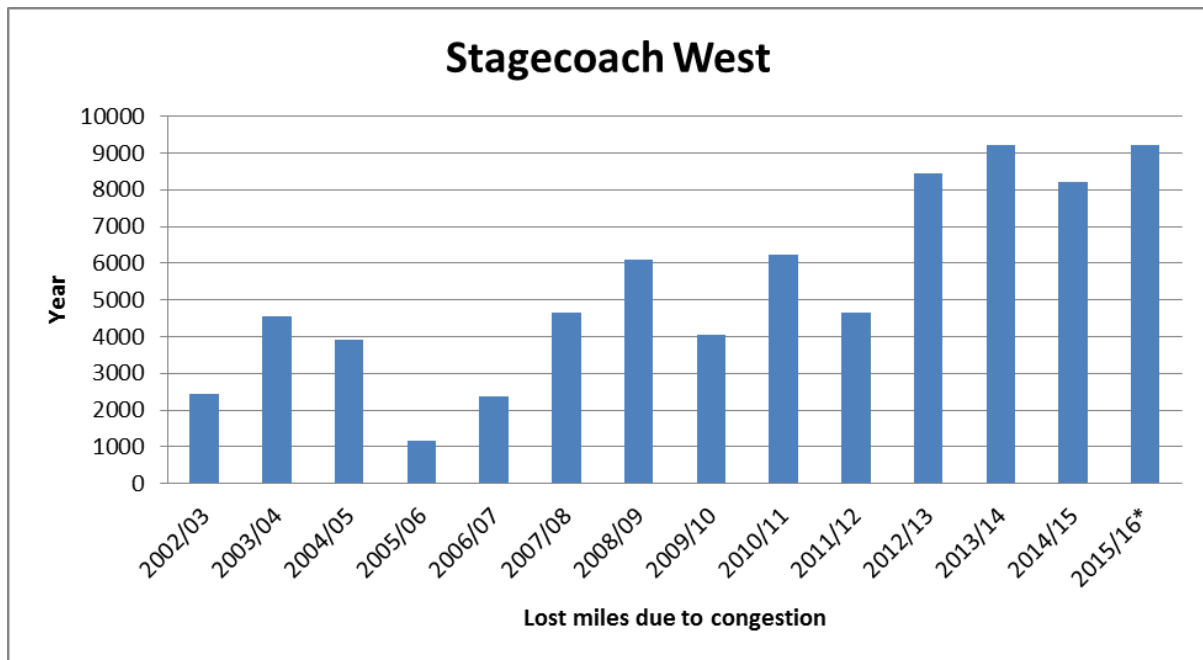
In the high elasticity scenario (some of my fellow transport economist's have suggested this should be labelled "medium") I have gone for a fares elasticity of 1.0. The long run fares elasticity varies between 0.7 and 1.2 (TRL, 2004). I have gone for a modest estimate of 1.0 so as not to over egg it. I have built in an estimate for punctuality/reliability in the high elasticity scenario of 0.1. I felt it was important to do this as waiting at a bus stop is valued twice as high as in-vehicle waiting time (ref: TRL, 2004). For in vehicle time I have used 0.5 in the high elasticity scenario, well below the high end of the range(0.7)

In short , my aggregate high elasticity scenario is 1.4. If I wanted to lean towards the top end of the range it would have been 1.8. I have judged that this is too high.

The above elasticities are an average and would obviously vary depending on what alternative modes of transport were affordable and available. In London, for example, bus patronage has declined by 5% over the last year, partly because for many – particularly those travelling on the north side of the Thames – there is an extensive Tube network which they can switch to. The better the alternatives available the higher the fares and in-vehicle time elasticity.

Concessionary travel accounts for around one-third of bus trips in the UK. Concessionary travellers are immune from the fares effect of higher operating costs, but they will be affected by higher in-vehicle times and poorer punctuality and reliability. However, because this is too challenging to calculate I have excluded it from the model and focused on changes to fare-paying journeys only.

¹² The demand for public transport: a practical guide. R Balcombe (ed), TRL Report TRL 593, 2004



*based on first 11 periods grossed up.

The chart above shows lost miles due to congestion on Stagecoach West services between 2002 and 2016. Lost mileage is defined as scheduled miles minus operating miles; it can be divided into traffic lost miles (for example delays caused by congestion) and operating lost miles (for example caused by driver shortages and vehicle breakdown).

The chart shows a threefold increase in lost miles due to congestion. This results in a much less punctual and reliable service. I have only included the impact of this on bus use in the high elasticity scenario with a very low 0.1 elasticity. While it is difficult to quantify in the model, in reality lost miles on this scale create havoc with the timetable and erode passengers' confidence in the service.

How bus operators react to congestion

Bus operators either try and maintain frequencies, which means more buses (a greater peak vehicle requirement), or they let frequencies decline. The end result is pretty similar in the economic model used to forecast patronage impacts. If they deploy more buses then operating costs will rise by 0.8% for every 1% decline in speed. This reduces patronage by 0.56% in the low elasticity scenario ($0.8 \times 0.7 = 0.56\%$).

If they decide to reduce frequency then we get a 0.5% reduction in patronage using a frequency/ supply elasticity of 0.5. In reality a bus operator's response will depend on local market conditions and often will be a combination of the two reactions mentioned above.

In areas where there is day-long congestion, operators are forced to increase resources to maintain the same level of service, or look at widening headways or removing sections of route in order to implement an achievable timetable.

If the operator response to congestion is to operate with the same level of resources at lower frequency, in effect there is no change to variable driver or vehicle costs. Fewer miles are operated with the same number of buses and driver hours but using less fuel and tyre costs. This would reduce costs by 1.6% for each 10% reduction in miles, but a 10% reduction in frequency and miles might result in 5% reduction in passengers and revenue (short run supply elasticity 0.5).

If the operator response to congestion is to operate additional buses to maintain the same service frequency this would increase driver, fuel, tyre, and vehicle costs (depreciation, lease, licences) and maintenance costs (labour and materials). Stagecoach has calculated that this would increase costs by 7.9% for each 10% increase in resources – very similar to the TAS industry average calculation of 0.8% increase in operating cost for each 1% decline in operating speed.¹³

The difficult judgement for an operator faced with worsening punctuality is whether to reduce frequency and risk patronage loss, or to maintain frequency with increased resources. On balance it is unlikely that operating at the same frequency, albeit more punctually, will generate sufficient additional revenue to offset the additional costs unless there are other factors generating patronage growth.

¹³ Cost issues in public transport operation, CfiT, January 2008
<http://webarchive.nationalarchives.gov.uk/20110304132839/http://cfit.independent.gov.uk/pubs/2008/index.htm>

Bus use is influenced by a number of factors—these not only relate to the bus service itself, but the supporting infrastructure and the attractiveness of other modes

Policy

Modal shift

Buses

Attribute	Evidence of Impact ¹
Fares	• Bus fare elasticities average -0.4 in the short-run to -1.0 in the long run (i.e. a 10% rise in fares will lead to a 10% fall in patronage in the long run) – responsiveness of demand to fare changes is less sensitive in the peak
Journey time	• The elasticity of bus demand to in-vehicle time for urban buses has been estimated to be roughly in the range of -0.4 to -0.6
Service levels	• The elasticity of bus demand to vehicle kilometres is approximately +0.4 in the short-run and +0.7 in the long run
Ride quality	• Studies in London have indicated that a smooth vehicle motion is worth 10.5p per passenger (1996 prices and values)
Real-time information	• Passengers in London valued countdown boards at 9.0p per trip (1996 prices and values)
Safety	• Bus users value CCTV at stops and on the bus at 16.6p and 5.8p respectively (2001 prices and values)
Waiting environment	• The provision of information at bus stops has been valued at 4-10p per passenger
Interchange	• Passengers dislike having to interchange – the 'penalty' associated with the need to interchange is equivalent to 5 minute journey time even before waiting time and the cost of an additional fare is factored in
Car costs	• Bus use is sensitive to changes in the costs of fuel. A 10% fall in petrol costs for motorists is estimated to reduce bus demand by 21%
Income	• Each 10% increase in income reduces bus use by 5%-10%, this includes the impact of higher car ownership

Policy implication: there are a number of ways to influence the level of bus demand – the list above is not exclusive; and these interventions do not just relate to bus service attributes—interventions off the bus, such as an improved waiting environment and better information, can have a significant impact on demand

(1) TfL, (2004) The demand for public transport: a practical guide

The above table showing the top ten factors influencing bus use, the top three on the list are affected by congestion: fares, journey time and frequency. Source: An Analysis of Urban Transport, Cabinet Office Strategy Unit, November 2009

b. Case studies

The UK has the most congested road network in Europe¹⁴. This was the case when the Commission for Integrated Transport benchmarked the UK against European best practice in 2001 and has been confirmed since by extensive data from companies such as TomTom and INRIX through the monitoring of live traffic flows.

The latest TomTom congestion index shows seven UK cities in Europe's top 30 most congested: Belfast, London, Manchester, Edinburgh, Brighton, Hull and Bristol. Congestion in the UK's biggest cities is 14% worse than it was just five years ago.

Across the rest of Europe, average congestion is actually 3% down over the same period.

The annual Traffic Index from TomTom shows average UK journeys in 2015 took 29% longer than they would in free-flowing conditions – up from a 25% delay in 2010.

The TomTom index measures the difference between off-peak and peak traffic speeds. As Belfast has relatively good off-peak speeds compared with other cities this exaggerates ITS congestion problem. Intuitively, based on personal observation and experience, I do not believe Belfast has a worse congestion problem than London, or indeed the other UK cities. I have therefore used a combination of INRIX and TomTom data to determine the cities that I would scrutinise in this report.

The INRIX data has Belfast as the third most congested city in the UK, behind London and Manchester. The INRIX index measures urban motorway traffic delays, so would exclude Edinburgh and Brighton, which are mainly devoid of urban motorways.

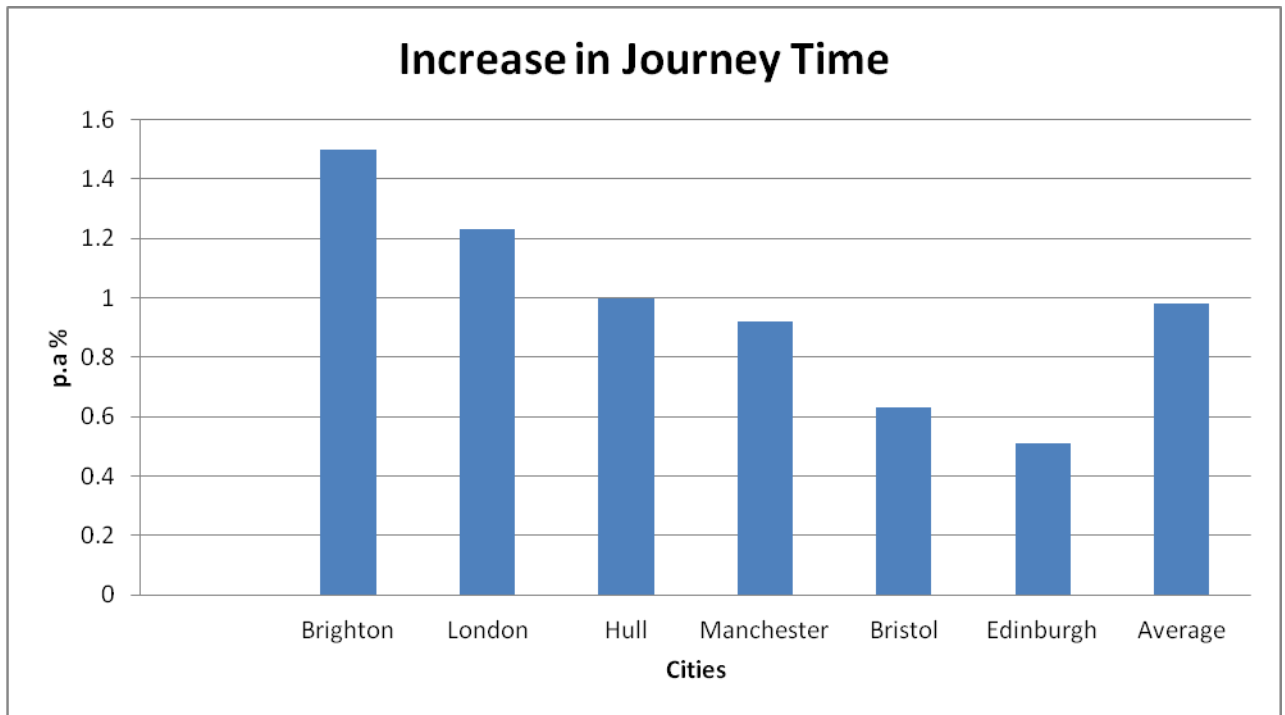
Balancing the two indexes I have included the following cities in the case studies: London, Manchester, Edinburgh, Brighton, Hull and Bristol. Due to difficulty in obtaining bus journey time data from Belfast I have not included it in the study.

¹⁴ European best practice in delivering integrated transport. Commission for Integrated Transport, November 2001
<http://webarchive.nationalarchives.gov.uk/20110304132839/http://cfit.independent.gov.uk/pubs/2001/index.htm>

3. Research findings

a. Bus journey times are increasing

The trend in bus journey times is for them to increase by between 0.5% and 1.5% per annum - for city wide services (daily average) over the past 30 years, with an average increase of 0.98% per annum for the six case studies as shown in Fig xx.



[notes to chart]

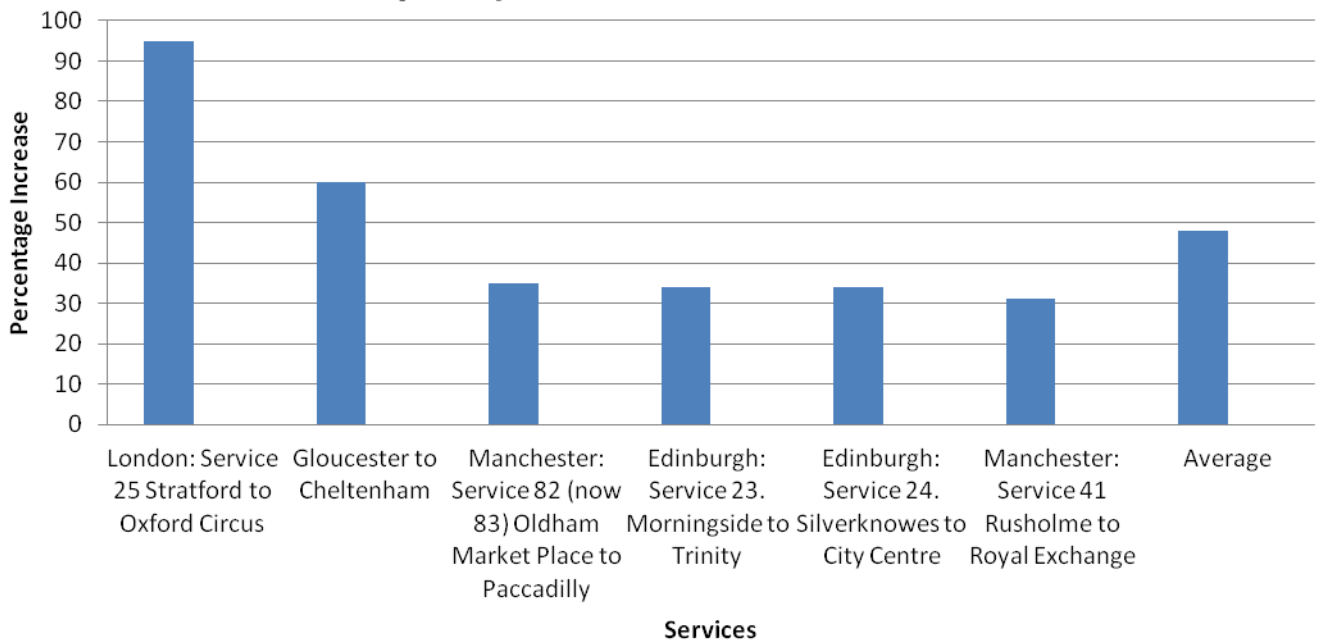
Fig 0.98% Increase in average bus journey times.

Data covers 1986-2006 except for:

Brighton: 2008-2016. The south coast town has experienced a sharp increase in congestion levels .

London: 2003/4 (from peak levels just after congestion charging) to 2015/16. It covers central, inner and outer London

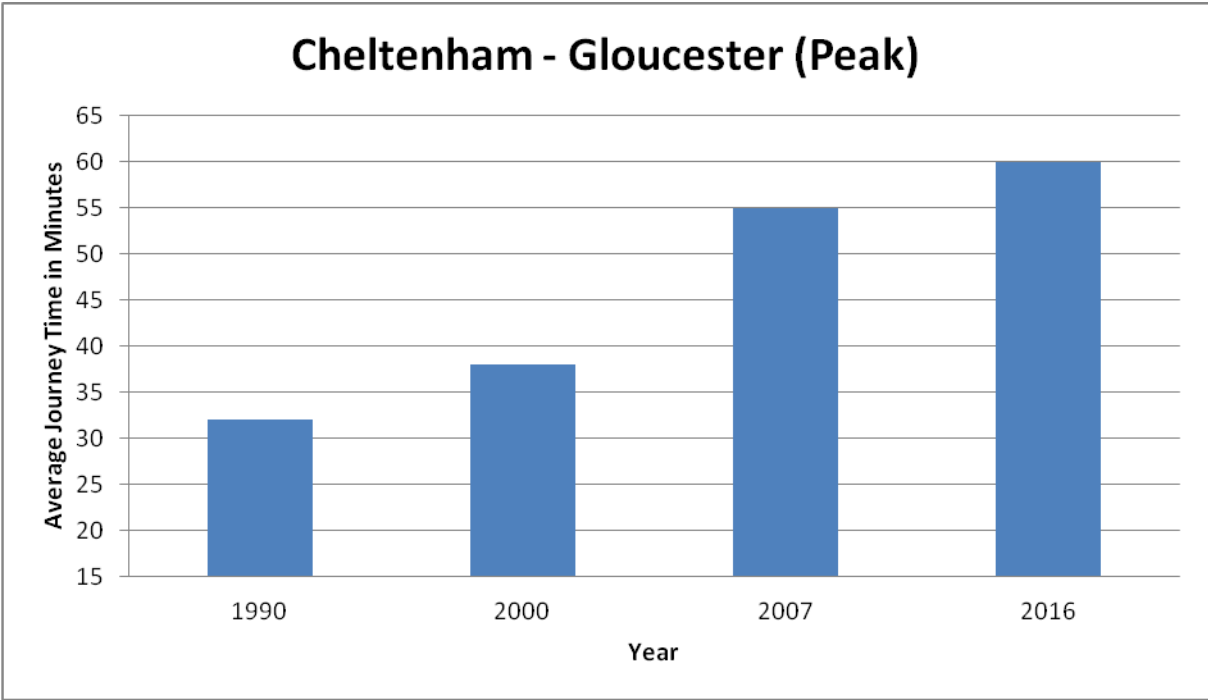
Increase in journey time on selected services (am peak) from 1966 to 2016



The data in the bar chart above is derived from archived timetables for 1966 and compares journey times then, with a section of the same route from today's timetable. Journey time on the 25 from Stratford to Oxford Circus in the a.m. peak has increased from 40 minutes in 1966 to 78 minutes today. The journey time has almost doubled. We have to bear in mind that the move to one man operated buses impacts negatively on journey times for the longer term data going back to the 1960's.

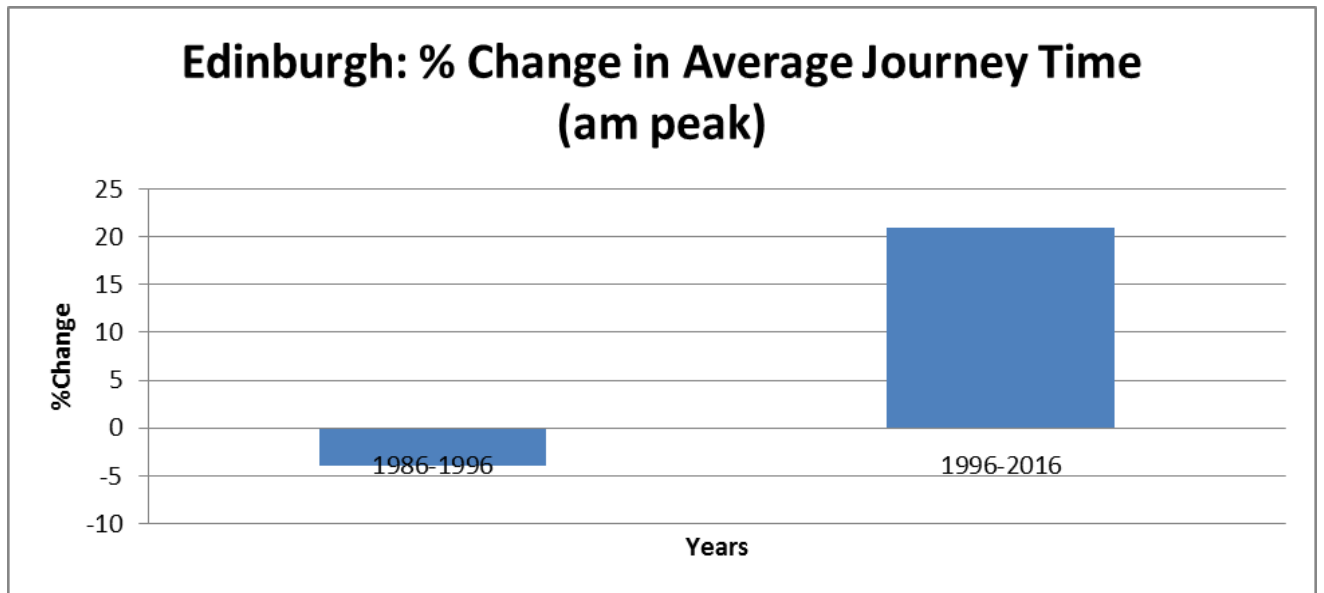
Decline in bus speeds not confined to urban conurbations.

While this research has focused on the trend in bus speeds in the six most congested urban areas in the UK the problem is not confined to them. If market towns such as Cheltenham and Gloucester are representative then the trend is much more endemic!

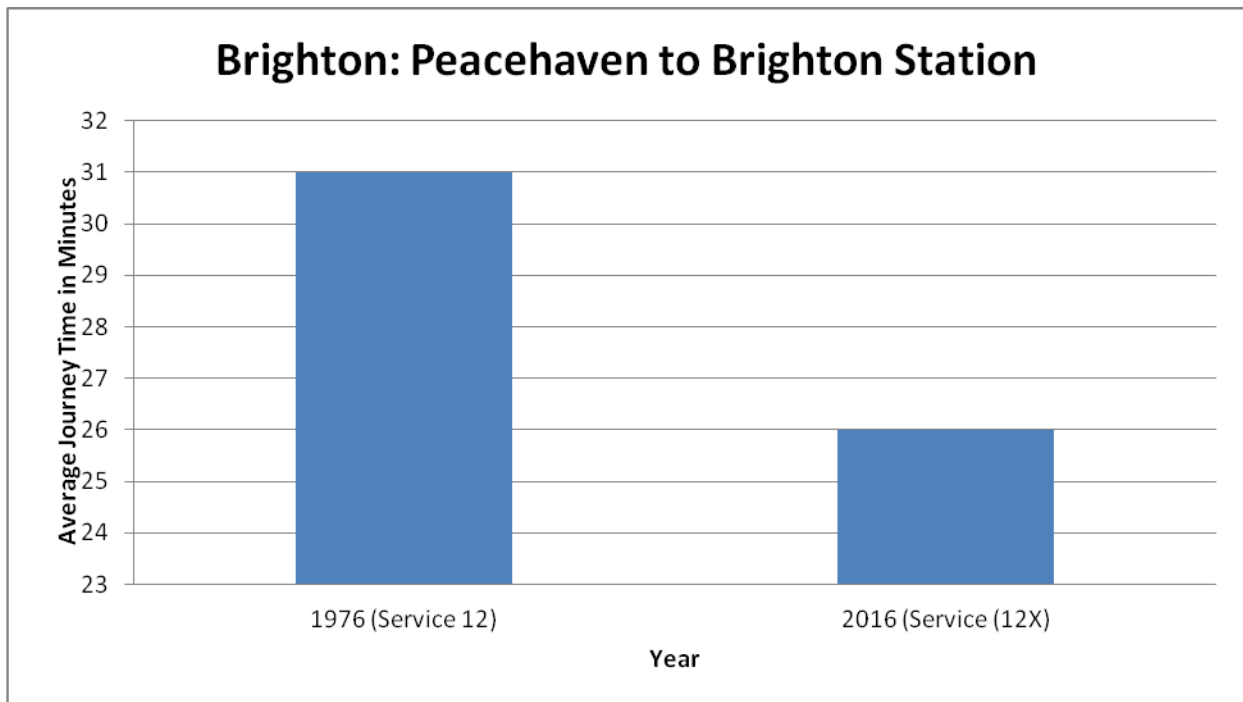


87% increase in journey time. 3.34% increase p.a. Stagecoach data.

It doesn't have to be this way. We can protect bus passengers from traffic congestion if there is the political will. Indeed, the example below shows how we can improve journey times by bus if radical action is taken.



In Edinburgh, the introduction of Greenways bus priority in 1996, following years of good conventional priority measures, resulted in a 4% improvement in journey times between 1986 and 1996. Alas, for reasons you can read about in more depth in the case study on Edinburgh in the appendix, this was not sustained: weaker enforcement, removal of priority during off peak and lack of maintenance of bus lanes.



In Brighton, on the Peacehaven to Brighton Station service, there has been a 16% improvement in journey time since 1976 and a 4% improvement per annum thanks to highly effective bus lanes along the A259 coastal corridor. Journey time between Brighton Station and Peacehaven is actually seven minutes less today than it was in 1966. It shows what can be done and how we do not have to accept declining bus speeds as being inevitable.

b. Impact of increased journey times on bus use

If average bus speeds in the most congested urban areas decline on average by almost 1% per annum, this means that operating costs due to congestion are increasing by around 0.8%¹⁵. Assuming that costs are passed on to the passenger in fares, and we apply an elasticity of 0.7, this results in a 0.56% decline in passengers every year as a result of the operating cost impact. To this we need to add the decline in passenger numbers due to increased in-vehicle waiting time. With an in-vehicle elasticity of 0.5, this leads to a 0.5% decline in passengers. If we add the two together we get an 10.6% decline in passengers every decade from the congestion impact on buses on the low elasticity scenario. On the high elasticity scenario we get a 14% decline in bus use every decade as a result of congestion. If we had protected bus passengers from rising congestion over the past 50 years, then fare-paying patronage in the cities covered in this report would be at least 50% higher than today's figure. I have chosen this time period as the mid-1960s is when car ownership and traffic began to grow exponentially.

London "falling"

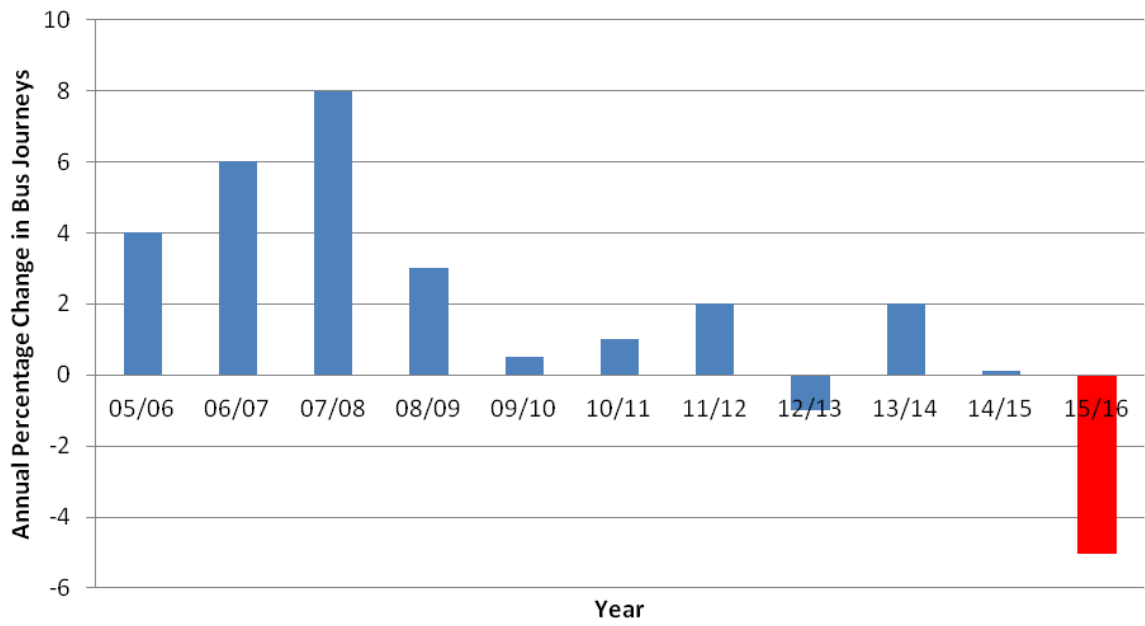
In London bus speeds have been declining faster than anywhere in the UK over the last few years. This comes after decades of relative success in protecting bus passengers from traffic congestion through effective bus priority measures, such as red routes and other initiatives, and the central congestion charging zone introduced in 2003. If the average urban bus speed in the UK has historically been decreasing by almost 1% p.a., then for one-third of London bus routes the decline has been more than five times this average over the past year. This has become a crisis for the capital and something the new mayor must prioritise. London, which for more than a decade has been the UK's bus success story, with passenger numbers doubling since the formation of TfL in 2000, is now facing one of the fastest declines in bus use anywhere in the UK.

There is a key lesson we can learn from this. You can get all the other ingredients right: modern bus fleet, cashless buses with the most advanced smartcard ticketing system in the world, a level of integration which is the envy of other UK cities, state-of-the-art passenger information at the bus stop and on mobile devices. Add to this population and employment growth and you should have a recipe for the London bus success story continuing. But all these laudable ingredients cannot offset the rapid deterioration in bus journey times.

Boris Johnson was right to warn that his successor will have to use tougher congestion charging measures to tackle London's growth in congestion, but it's a pity he did not take action on his watch. He exacerbated the problem by removing the western extension of the congestion zone and by reducing road capacity in central London by 25% through the introduction of cycle superhighways – without taking action to curtail traffic in central London.

¹⁵ The TAS Partnership, [1] op. cit

Bus use in London



4. The challenges going forward

a. Congestion is getting worse

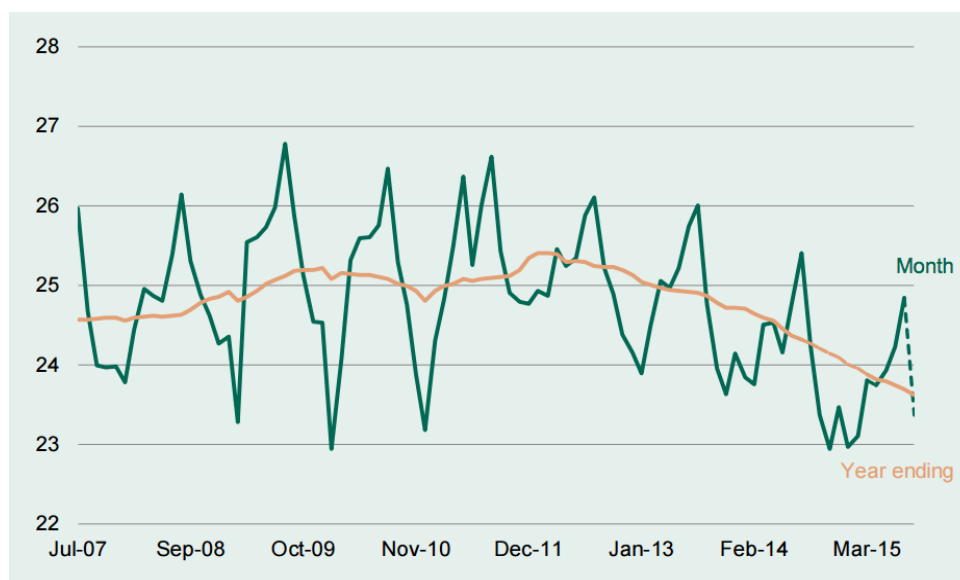
The average speed of general traffic on local roads was 23.4mph in year ending December 2015. In November 2015 it was 3% slower than in November the previous year, and in December 2015 it was 2.9% slower than the previous December.

The average traffic speed in Bristol, Reading, Slough, Manchester and London is less than 10mph.

The DfT's 2015 forecast was that traffic will grow by between 19% and 55% between 2010 and 2040.

Congestion on local authority managed A-Roads, England

Average vehicle speeds (miles per hour)

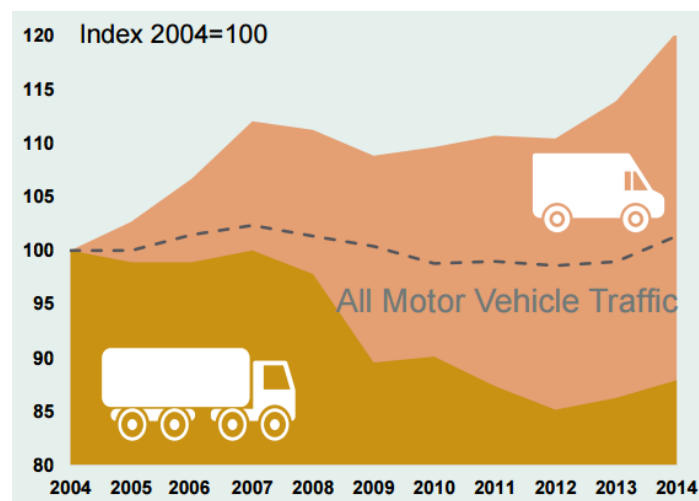


There has been a rapid decline in traffic speed over the last five years on A-roads, as shown in Fig zz. The key causes in urban areas are: delivery vans, private hire vehicles, road works and traffic lights.

Delivery vans

The rapid growth in delivery vans is a result of the proliferation of online shopping. This represents a double blow to the bus sector: first, it increases operating costs due to more congested roads, and second, there is less revenue for buses as fewer shopping trips are made (shoppers account one-third of all bus journeys).

Growth of LGV and HGV Traffic



Van traffic has risen faster than that of any other vehicle type, with van miles increasing by 6.1% between Dec 2014 and Dec 2015 to a new peak of 47.7 billion vehicle miles. This represents a 24% increase compared with 10 years ago and a 73% increase compared with 20 years ago.

The biggest four online shopping markets in the world are predicted to double in size over the next three years as consumers buy increasing amounts of goods through the internet.

British shoppers already spend almost £1 in every £5 of their shopping via the internet and the online shopping revolution will continue.

Online retail expenditure in the UK is forecast to grow by 44.9% in the coming five years to reach £62.7bn in 2020.



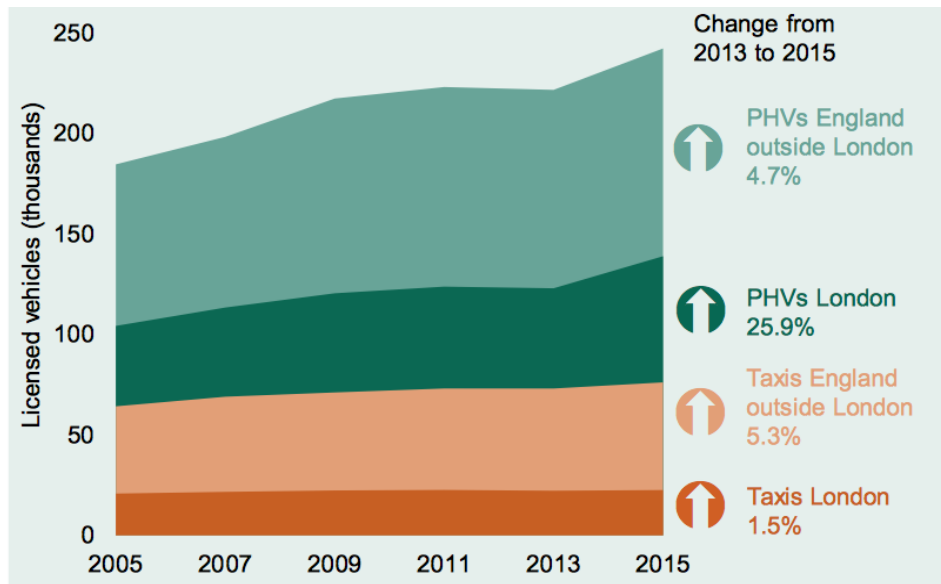
It is surprising that more household parcels are not delivered in the evening when the roads are quieter and people are more likely to be at home. The proliferation in the number of vans is becoming such a problem that it is worth investigating the impact a charging scheme could have to incentivise deliveries off-peak, especially during the evening.

Growth in Private Hire Vehicles

Private hire vehicle numbers have risen by almost 28% in the last ten years, from 120,000 in 2005 to 166,000 in 2015.

- In England outside London the number of PHVs rose by 4.5% between 2013 and 2015.

Taxis and Private Hire Vehicles by Type and Area: England 2015



Private Hire Vehicles in London

Between 2013 and 2015, there was a 26% rise in PHVs in London. Licensed PHVs increased from 60,000 in 2013 to 94,000 in 2015; PHV licenses are being issued at a rate of 600 every week, and so they could potentially rise from 94,000 to 124,000 by the end of 2016.

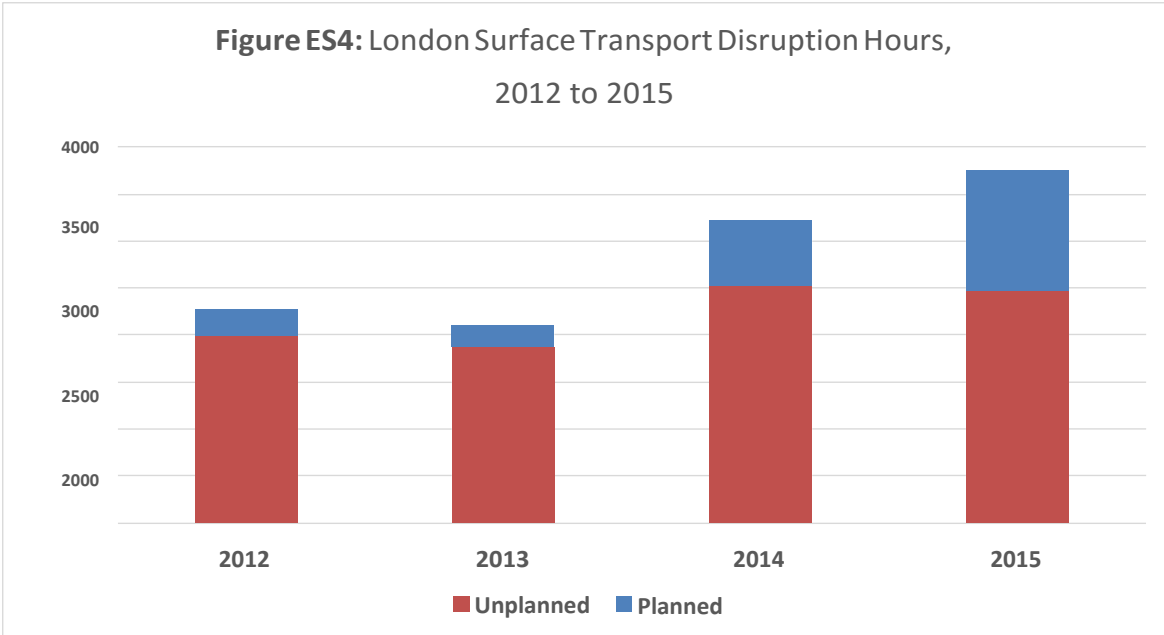
The number of new minicabs has risen by 56% in the last two years, largely due to Uber.

The increase in PHV activity in London has lengthened journey times by over 10% over the past 12 months. Uber in London has gone from having zero to 20,000 PHVs registered with it in three years (ref: GLA transport committee) ¹⁶

More Road Works

Congestion, as always, is caused by demand exceeding supply. What is interesting about the recent sharp rise in congestion in central London – increasing by 12% per annum since 2012 (Inrix London congestion trends May 2016), is that it mainly a supply side problem. Demand for road space has remained relatively flat, with the growth in LGV's and private hire being largely offset by a decline in car traffic. It is the substantial reduction in road space, with planned roadworks increasing by 362% over the last 3 years, which has led to significant increases in congestion. It is to be hoped that many of the road closures are temporary with major capital works such as Crossrail and Cycle Superhighways reducing available road space.

¹⁶ GLA Transport Committee:



Hours

ref: Inrix London Congestion trends May 2016.

More traffic lights



A sharp increase in the number of signal-controlled junctions means that there is one set of lights for every 5.5 miles of road (a figure that will be much higher in urban areas), a rise of two-thirds since 2000.¹⁷

It is important that buses get as much priority as possible at junctions.

94,000

b. Space Wars: political decision-making

The mode of transport we use personally has a significant bearing on the priority we think it should be given. The majority still view the transport problem from behind the wheel of a car and this all too often is reflected in political decision-making. I would like to be able to say that decision-making is more objective and informed by investment appraisal and cost-benefit analysis which looks at economic, social and environmental factors. But transport decision-making is much more subjective than that. Our cities deserve better.

The more affluent and generally well educated the traveller, the more vocal and powerful a lobby they form to be able to effect change that is advantageous to their choice of mode. This helps to explain why, for the sixth year running, fuel duty has been frozen despite

¹⁷ We're Jammin': A comprehensive nationwide study into how traffic management is leading to costly delays for the UK taxpayer. Grant Shapps MP. British Infrastructure Group, May 2016 <http://www.shapps.com/wp-content/uploads/2016/05/Were-Jammin-FINAL1.pdf>

record low oil prices. The motoring lobby is powerful. It also helps to explain how rail has been allocated £38bn to maintain and improve the network until 2019, despite buses accounting for a greater proportion of trips than rail. It is the bus passenger who has the least profile and is the furthest from the ear of the politician.

People in the highest-income households travel almost five times as far by rail as people in the lowest income households, whereas people from lowest income households travel 2.4 times as far by bus as people with the highest income level. People in households of highest income group travel 2.6 times as far by car as people in lowest income households.

What is less well known is how relatively affluent cyclists are compared with bus passengers. Transport for London describes the London cyclist as “typically white, under 40, male with medium to high household income”. A report by the London School of Hygiene & Tropical Medicine’s Transport & Health Group in 2011¹⁸ describes cycling in London as disproportionately an activity of white, affluent men. Only 1.5% of those living in households earning under £15,000 cycled compared with 2.2% of those living in households earning over £35,000.

While I am the first to support more sustainable forms of transport, and the critical importance of reducing cycling accidents, we have to be careful that cycling improvements are not to the detriment of bus passengers. Despite the commendable efforts of Bus Users UK, Transport Focus and the Campaign for Better Transport, the voice of bus passengers does not seem to be heard by decision makers. This can partly be explained by the lack of coverage and exposure the bus receives in the mainstream media whose management are far more likely to drive or use the train, than they are to catch the bus to work. This lack of public profile for buses means there is less pressure on politicians to invest properly in the sector.

Roads are one of the most valuable and scarcest resources our city authorities have at their disposal. City authorities are still too focused on moving vehicles rather than people. With an average occupancy of around 1.2 for commuting trips, cars are the most inefficient users of road space.

One of the most radical reallocations of road space that has occurred on UK roads in recent years has been London’s cycle superhighways, whereby 25% of road space has been allocated to cyclists in central London. This would not have happened with a non-cycling mayor. Boris Johnson cycled as a schoolboy, as a university student at Oxford and since. It is much more common for local and national politicians to view transport problems from behind the windscreen of a car or through the window of a train.

When I was appointed chair of the Transport Committee in Lothian Region (succeeded by City of Edinburgh Council) in 1994, I inherited a tram scheme which was led by Alistair Darling – and which I supported as a member of his committee – before he was elected to the House of Commons. When I was told by council officials that we had minimal resources

¹⁸ Steinbach, R; Green, J; Datta, J; Edwards, P; (2011) *Cycling and the city: a case study of how gendered, ethnic and class identities can shape healthy transport choices*. Social science & medicine, Vol 72 (7), April 2011. <http://researchonline.lshtm.ac.uk/1179/>

at our disposal – and certainly nothing like sufficient to build the two line scheme that was proposed – I asked what plan B was. It was Greenways bus priority.

Greenways was unique among bus priority schemes in the UK in that it was extensive and involved a much higher level of enforcement. It was and still is controversial.

For me, the decision was straightforward. Bus trips accounted for 50% of the trips into Edinburgh city centre during the peak so it was only fair that we allocated 50% of the road space to them. If I had seen local government as a stepping stone to Westminster or Holyrood, I would not have implemented it. The winners were bus passengers; winners are not vociferous and bus passengers are not anyway, certainly when compared with the perceived losers, motorists, who are very vociferous and much more influential. They are more likely to be business leaders, newspaper editors and opinion formers.

Politicians are much more likely to find members of the public attending their local surgeries to complain about bus priority than to ask for measures to speed up bus times.

We need more bus champions in the UK in local, devolved and central government. The bus is the most efficient user of road space, the most environmentally friendly of the motorised modes and the one most used by those on the lower end of the income scale who are all too often less vocal, and less likely to be heard.

Movement space versus people space

The desire to create more a pedestrian-friendly environment has resulted in movement space being squeezed in many cities. This has had an impact on traffic flow.

While there is often a conflict between catering for cyclists and bus passengers, and the London cycle superhighways are a topical case in point, policies favouring pedestrians and buses are more complementary and have greater synergy between them than many think.

The more accommodating city centres are to pedestrians, the more attractive they become to retail and businesses generally. Bus routes radiate from the city centre: the more people travelling to city centres, the more populated our buses are. There is at times a conflict: sometimes buses are denied access to parts of the town centre as part of a general vehicle ban. Conversely, Oxford Street in London and Princes Street in Edinburgh are two good examples of streets where pedestrians and buses compete for space.

City retailing faces severe competition from out of town shopping centres and a newer threat which is growing exponentially, online shopping. Bus companies are often the first to protest about pedestrianisation; it would serve them well to acknowledge that city retailers are facing a major battle to hold on to customers, and that the viability of city centre retail and bus companies are inextricably linked. A sensible balance needs to be struck between making our cities pedestrian-friendly and ensuring that bus passengers can get close to their destination. It is important to remember that shopping represents around one-third of bus journeys in the UK.

5. Recommendations: *Five Point Plan*

1. Set Bus Speed Targets

The Buses Bill should set guidance encouraging local authorities and bus operators to set targets for average bus speeds (with a minimum requirement of stopping bus speeds declining any further). This should apply in both a regulated and deregulated environment. In the latter, it should be a requirement for the new Enhanced Quality Partnerships proposed in the upcoming Buses Bill.

Local authorities would deliver their side of the partnership by giving priority on roads and at junctions to buses, and bus companies would focus on significant improvements to dwell times by accelerating the programme for off-bus ticketing, smart cards and contactless payment. Paying cash on a bus is archaic and should be made a relic of history as quickly as possible.

ITSO smartcards have considerably slower transaction times than those in London. It's imperative that the rest of the UK emulates the high bar that London has set in ease of ticketing and speedy transaction times.

2. Demand Management

There has been a fundamental change in transport policy over the last 20 years, away from changing travel behaviour to giving people choice. The consequence of this laissez-faire approach is rising congestion, slower traffic speeds and gridlock becoming all too often the norm. This is bad for our city economies and their environment.

It is interesting to note the comments below from TomTom Traffic Vice President, Ralph-Peter Schaefer. They could have been taken straight out of the 1998 White Paper on Transport:

“Transport authorities are managing congestion with well-engineered policies, but you can't just build your way out of traffic jams. Studies have shown that policies of 'predict and provide' are unsustainable. Building new motorways and ring roads doesn't eliminate congestion. More must be done to better manage existing road space and to spread demand. People simply aren't doing enough to change their travel habits – such as working flexible hours, avoiding peak commuting times, making use of real-time traffic information and trying alternative travel modes. If only 5% of us changed our travel plans, we could improve traffic congestion on our main roads by up to 30%.”

Choice means no choice but to suffer worsening congestion

The problem with this policy shift is that it means that all users of our city roads, from bus passengers to motorists, from delivery and freight vehicles to taxis, all now have no choice but to sit in ever-worsening traffic jams. Without some form of demand management, from parking restraint to the more effective congestion charging, coupled with improved public transport, we will regulate traffic volumes in our cities through congestion. This explains

why peak hour city centre traffic volumes have remained fairly static over the last 30 years, and why the morning and evening peaks continue to lengthen. We reached saturation point and road users responded by adjusting the time of day they travelled. While many motoring and freight trips have some flexibility in the time of day they are made, this does not apply to buses. Nor are bus drivers able to take advantage of satellite navigation to negotiate their way through traffic jams. They have to stick to their route.

Stick needed as well as carrot

While it is crucial that we do everything we can to provide better public transport, this is not a panacea for city traffic congestion. If we are successful in shifting car trips to public transport, the road space that is vacated will be taken up by latent demand – road trips that people did not make because congestion proved to be a deterrent, until they were enticed back on to the road network as congestion declined.

I was sharply reminded of this when the Commission for Integrated Transport studied Munich.¹⁹ We chose the Bavarian capital because it was one of the best examples of what a strong devolved regional and city government could achieve on the public transport front. It had everything we aspired to in the UK in excellence in public transport provision, and yet traffic congestion continued to rise. The city transport officials in Munich recognised that they were powerless to prevent this without demand management measures to constrain the growth in car use. It has long been acknowledged that we need the stick as well as the carrot. However, politicians find the latter much easier to deliver than the former.

London's successful congestion charge

Introduced in 2003, the London congestion charge achieved its objective of cutting traffic volumes in the charging zone by 20%. (This has since been more than cancelled out as road space has shrunk in central London through road works, cycle superhighways, growth in delivery vehicles and private hire). The congestion charge had the added benefit of providing a valuable revenue stream to improve bus services and hold down fares. The bus sector benefited most from congestion charging, not just from the hypothecated revenue stream but from improved journey times and reliability.

In the first year of congestion charging, bus speeds in the central zone improved by 7% and excess waiting time was cut by 30%. The congestion charge gave a bigger boost to bus passengers than any other single measure. Speeds increased by 14.6% (comparing three months before with three months after introduction) in the Congestion Charging Zone (CCZ) following the introduction of the charge. However since 2004 bus speeds in London have been gradually decreasing to below pre-congestion-charging levels. This trend grew worse from 2014, in line with increased road congestion caused by the economic recovery and construction of major road schemes.

¹⁹ Commission for Integrated Transport: Study of European best practice in the delivery of integrated transport: report on stage 2 – case studies: 3, Munich, Germany November 2001.
<http://webarchive.nationalarchives.gov.uk/20110303161656/http://cfit.independent.gov.uk/pubs/2001/ebp/ebp/stage2/03.htm>

The predecessor to new Mayor Sadiq Khan - Boris Johnston rejected demand management as a policy weapon and immediately on his election removed the western extension to the congestion charging zone. The introduction of cycling superhighways, 25% of road space in central London has been reallocated without doing anything to compensate by reducing traffic. The result has been worsening congestion and slower traffic speeds. Bus passengers have been the main losers.

Boris Johnson's parting shot as London mayor was to warn his successor that they will have to take action to cut traffic volumes by increasing the congestion charge. This raises the question as to why he did not act on his own advice during his eight years as mayor.

The other good example of a city adopting a radical demand management measure is Nottingham with its workplace parking levy. It is well known that if people have a free parking place at work it is very difficult to get them to use public transport. It is no coincidence that Nottingham is one of the few cities in the UK to have experienced a decline in traffic volumes and city centre congestion over the past decade. The success has been built on carrot and stick.

The proliferation in the number of delivery vans in London is becoming such a problem in cities that it is worth investigating the impact a charging scheme could have to incentivise deliveries off-peak, especially during the evening.

Back to the future

We need to return to the ethos of the 1998 White Paper on Transport which accepted the necessity for demand management in our cities and the crucial importance of bus priority. It was right then, and the passage of time has made its conclusions and recommendations even more essential.

Those cities that have embraced this agenda, such as London and Nottingham, have been successful in cutting traffic congestion. In the case of London, the early success of congestion charging has been eroded by capacity reductions on the road network and the failure to build on the very positive legacy of the congestion charge when first introduced in 2003.

The Conservative Government in the 1990s also accepted that we could not have a free-for-all in our cities and proposed a “roads hierarchy” which gave priority to pedestrians, cyclists, bus passengers and motorists, in that order (Reference – Steven Norris, Minister for Transport).²⁰ This was nothing to do with being anti-car, but a logical acceptance that cars, with an average occupancy of around 1.2 for commuter journeys, are highly inefficient users of road space. One of the most precious and scarcest of resources that local authorities have at their disposal is road space. They can choose how they allocate it. The enlightened ones recognise the roads hierarchy and are not afraid to make the tough decisions.

3. Bus priority

²⁰ Steven Norris:

The road network needs to move people and goods efficiently if we are to ensure the social and economic wellbeing of our communities. Buses have a vital role to play in this, as they can make excellent use of limited road space, carrying many more passengers than a private car for a given amount of space. However, the potential benefit of the bus is stifled by traffic congestion. Local authorities and bus operators need to work in partnership to make buses a more attractive alternative to the car by releasing them from the congestion delays experienced by other road users. This in turn will improve reliability and help make the bus an attractive choice for more car users as well as providing quicker journeys for both bus and other road users.

Experience from schemes around the country shows that bus lanes may reduce bus travel times by 7 to 9 minutes along a 10km congested route and also improve their reliability. Reliability means buses operate in accordance with their timetables on every journey, which is important to bus users. Measures to assist buses in one metropolitan city have halved the variation in journey times that operators experienced in that corridor, enabling them to operate their buses more efficiently.

By introducing bus priority with other improvements, services can become more attractive to potential passengers. For example, a comprehensive quality corridor initiative in a major conurbation delivered a 75% increase in bus passengers over 5 years, with 20% being new customers.

In a 2014 report for Greener Journeys, KPMG estimated that bus priority schemes can typically generate £3.32 of benefits for every £1 invested by the Government and in some cases £7 benefit for every £1 invested²¹. This represents excellent value for money, compares well with other forms of urban transport investment, and scores more highly than many much larger transport infrastructure projects. Bus priority schemes are also cheaper to build and maintain, and quicker to implement, than many traditional transport schemes.

In the words of the Urban Transport Group:

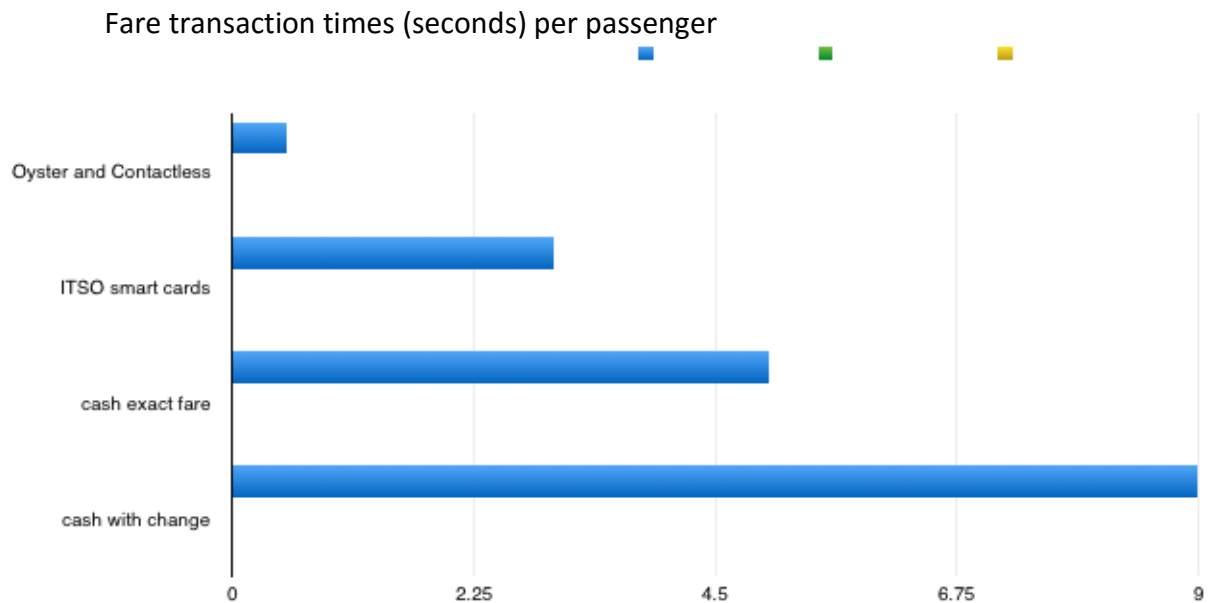
“Bus priority is about more than smoother bus journeys. Indeed, it is about more than improving transport. It can make a considerable contribution to local economies and quality of life. Bus priority schemes are significant projects which can provide the catalyst to assess how streets function, what people and businesses want from their local area and how to resolve longstanding issues effectively. This integrated approach delivers many benefits. They range from quicker journeys for all road users to greater access to employment, better trading conditions, safer streets, and public realm that makes for more enjoyable time in our towns and cities.”²²

4. Speed up dwell time at bus stops

²¹ *A National Statement on Local Bus Infrastructure*, Greener Journeys, June 2014.
<http://www.greenerjourneys.com/wp-content/uploads/2014/06/12.pdf>

²² *Bus priority works*, Urban Transport Group, July 2014
www.urbantransportgroup.org/resources/types/reports/bus-priority-works-business-shops-communities-and-growth

While this report has focused on the impact rising traffic congestion has on bus journey times, in urban environments between 25% and 33% of journey time is spent picking up and dropping off passengers (dwell time).



Time in seconds.

London has led the world on cashless buses, which have had a dramatic impact on reducing dwell time at bus stops. The 0.5 seconds per transaction on London buses is unrivalled anywhere in the world. Dwell time has been cut by at least half. Transport for London believes that the total run time of buses has been reduced by about 7-10%.

Most of the operating cost of buses is directly driven by run time, so that translates into a straight saving of some £120-180m annually. This dwarfs the one-off cost of introducing Oyster (£50m) and contactless (£68m).

If we could extend London-style cashless buses and contactless payments to the rest of the UK we could improve bus journey times by up to 10% by halving dwell time at bus stops.

The big five bus operators in the UK have set a target to introduce contactless bus transactions by 2022. This should be the very latest date for this to be introduced UK-wide, and everything possible should be done to accelerate it. It is feasible for bus operators to achieve contactless payments on buses in the major urban conurbations within the next three years.

5. Mobilise Bus Passengers

Too little focus is placed on the importance of the bus because bus passengers carry too little weight with opinion-formers and political decision-makers. The socio-economic profile of bus passengers is very different from rail users, motorists and cyclists, with a much higher percentage of those on lower income travelling by bus. It helps to explain why fuel duty has been frozen for six consecutive years despite rock bottom oil prices: the motoring lobby is powerful. Cheaper fuel reduces the competitive position of the bus versus the car.

We need more bus champions in the UK in local, devolved and central government. The bus is the most efficient user of road space, crucial for the health of our city economies and a vital part of an environmentally-friendly local sustainable transport system.

Bus companies need to get better at communicating with their customers to keep them better informed. This would also help them to mobilise support from their customers for pro-bus measures such as bus priority. It would be a rare event for a bus passenger to lobby politicians for improved bus priority; it's much more common for non-bus users to complain about priority measures. Local politicians who are making brave decisions to allocate road space for bus passengers need as much support as they can get from their local bus companies

INSERT TABLE SUMMARY OF *FIVE POINT PLAN* RECOMMENDATIONS

- 1. Bus speed targets**
- 2. Demand management**
- 3. Bus priority**
- 4. Speed up dwell time**
- 5. Mobilise bus passengers**

References

Executive summary

[1] the TAS Partnership

[2] Dft elasticity

[3] Daniel Johnson, Institute for Transport Studies, Leeds University

[4] Environmental Factors in Intelligent Transport Systems, Prof Margaret Bell. IEE Proceedings: Intelligent Transport Systems, Vol 153 Issue 2, 2006

[5] A New Deal for Transport: Better for Everyone. White Paper, July 1998
www.persona.uk.com/bexhill/Core_docs/CD-05/CD-05-16.pdf

Chapter 1

[6] An Analysis of Urban Transport, Cabinet Office Strategy Unit, November 2009.
<http://webarchive.nationalarchives.gov.uk/+http://www.cabinetoffice.gov.uk/media/308292/urbantransportanalysis.pdf>

[7] Number 11 bus speed

[8] Daniel Johnson, Peter Mackie and Jeremy Shires: Buses and the Economy II. Institute for Transport Studies, University of Leeds, July 2014 http://www.greenerjourneys.com/wp-content/uploads/2014/07/Buses_and_the_Economy_II_main_report_july.pdf

[9] Prof Peter White, University of Westminster: Impact of bus priorities and busways on energy efficiency and emissions. Greener Journeys [?] [September 2015 ?]
<http://www.greenerjourneys.com/publication/impact-of-bus-priorities-and-busways-on-energy-efficiency-and-emissions/>

[10] Bell, [3] op. cit

Chapter 2

[11] The TAS Partnership, [1] op. cit.

[12] The demand for public transport: a practical guide. R Balcombe (ed), TRL Report TRL 593, 2004

[13] Cost issues in public transport operation, Commission for Integrated Transport, Jan 2008
<http://webarchive.nationalarchives.gov.uk/20110304132839/http://cfit.independent.gov.uk/pubs/2008/index.htm>

[14] European best practice in delivering integrated transport. Commission for Integrated Transport, November 2001
<http://webarchive.nationalarchives.gov.uk/20110304132839/http://cfit.independent.gov.uk/pubs/2001/index.htm>

[15] The TAS Partnership, [1] op. cit.

[16] GLA Transport Committee

[17] We're Jammin': A comprehensive nationwide study into how traffic management is leading to costly delays for the UK taxpayer. Grant Shapps MP. British Infrastructure Group, May 2016

<http://www.shapps.com/wp-content/uploads/2016/05/Were-Jammin-FINAL1.pdf>

[18] Steinbach, R; Green, J; Datta, J; Edwards, P; (2011) *Cycling and the city: a case study of how gendered, ethnic and class identities can shape healthy transport choices*. *Social science & medicine* (1982), Vol 72 (7), April 2011. pp. 1123-30. ISSN 0277-9536 <http://researchonline.lshtm.ac.uk/1179/>

[19] Commission for Integrated Transport: Study of European best practice in the delivery of integrated transport: report on stage 2 – case studies: 3, Munich, Germany November 2001.
<http://webarchive.nationalarchives.gov.uk/20110303161656/http://cfit.independent.gov.uk/pubs/2001/ebp/ebp/stage2/03.htm>

[20] Steven Norris:

[21] *A National Statement on Local Bus Infrastructure*, Greener Journeys, June 2014.
<http://www.greenerjourneys.com/wp-content/uploads/2014/06/12.pdf>

[22] *Bus priority works*, Urban Transport Group, July 2014
www.urbantransportgroup.org/resources/types/reports/bus-priority-works-business-shops-communities-and-growth

APPENDICES – Case studies

Brighton

Brighton and Hove has long been considered to be a beacon of best practice on bus policy, resulting in strong bus growth and very high per capita bus use. The number of bus journeys in Brighton & Hove has doubled in the last twenty years with bus journeys rising from 22 million in 1992/93 to 44.8 million in 2012/13. This was in marked contrast to the national story on bus use where the figures showed a continuous decrease in passengers.

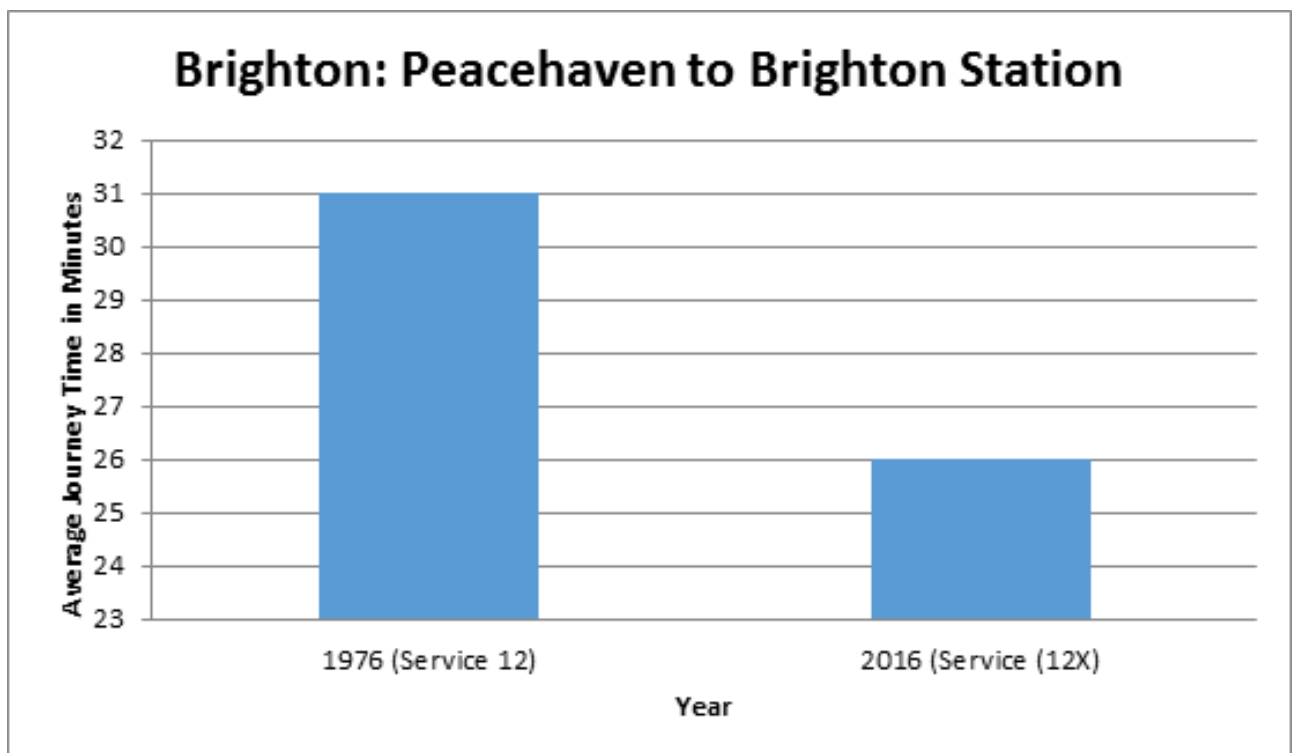
This impressive rise in bus use has been facilitated by the favourable climate created by an excellent local bus company working in partnership with Brighton & Hove City Council, who have implemented a number of pro-bus measures, including:

- A network of priority bus lanes on key routes, such as the Western Road/North Street corridor, the A259 coast road and the A270 Lewes Road.
- Real Time Information signs at bus stops that let people know when buses are due – these have also increasingly been installed in buildings so that people can time when they leave to avoid waiting for the bus. The system can also be accessed from mobile phones and Brighton & Hove Bus and Coach Company was the first bus company to launch an iphone app to do this
- Being the first council to introduce ‘talking bus stops’ for visually impaired people so they can access the ‘real time’ information and be independent travellers
- Bus priority at traffic signals which gives buses a head start in traffic, delivering passengers to their destinations quicker and helping with punctuality
- In 2004, Brighton & Hove became the only English city, outside London, to have a commercially viable night bus service when the bus route N7 was launched. This was subsequently joined by other commercially operated night buses by the bus company.
- A Quality Bus Partnership that has produced a number of initiatives, including making bus stops more accessible (providing a level surface from the pavement onto the bus)
- Joint work on specific projects with bus companies on improving routes, such as the Lewes Road transport corridor and the better bus area for Edward Street, Eastern Road and Valley Gardens
- Support through winning EU funding to enable the bus company’s smartcard (known as ‘the key’) to be available on local trains and tendered bus routes operated by other bus companies enabling people to prepay their journeys on a card that can be scanned on the bus. The bus company has also introduced extensive use of mobile phone based ticketing.
- Breeze Up to the Downs, a successful partnership service that links buses from the centre to some of the most popular countryside destinations outside the city

The most critical of these factors behind the impressive growth has been the council’s long held commitment to bus priority which has allowed for the creation of a virtuous circle

whereby the bus operators have been able to invest in new vehicles, smarter ticketing, more frequent services, encouraging more people to use the bus. From the mid 1990s to date, a significant length of bus lanes have been introduced: through the city centre, the Coast Road as well as the road accessing the two universities which allowed buses to bypass long, regular traffic queues.

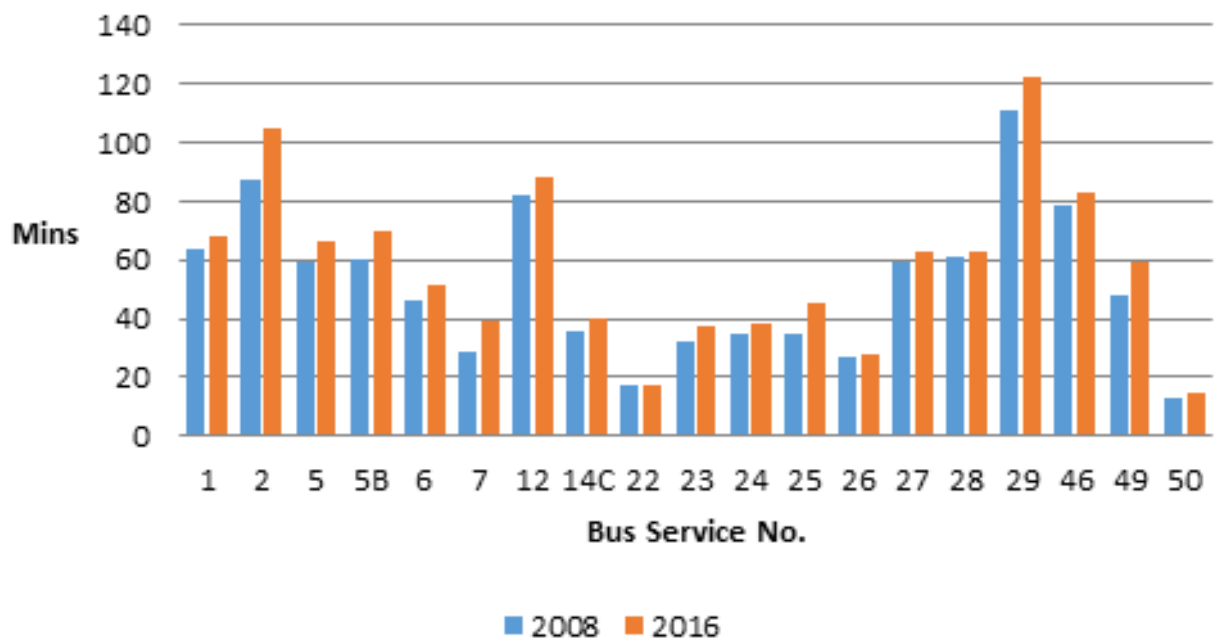
The most dramatic effects have been seen on the Coast Road where the reason for the bus lane was to bypass regular queueing traffic. On the Peacehaven to Brighton Station service (Route 12 and all its variants) since the bus lane was introduced not only are bus journey times shorter but they are much more predictable. There has been a 16% improvement in journey time since 1976 and a 4% improvement per annum. Journey time is actually 7 minutes faster today than it was in 1966. It shows what can be done and how we do not have to accept declining bus speeds as being inevitable. The number of passengers on the main route to use the bus lane has increased by 63% between 2007 and 2015, although data is not available on the extent of diversion from other modes.



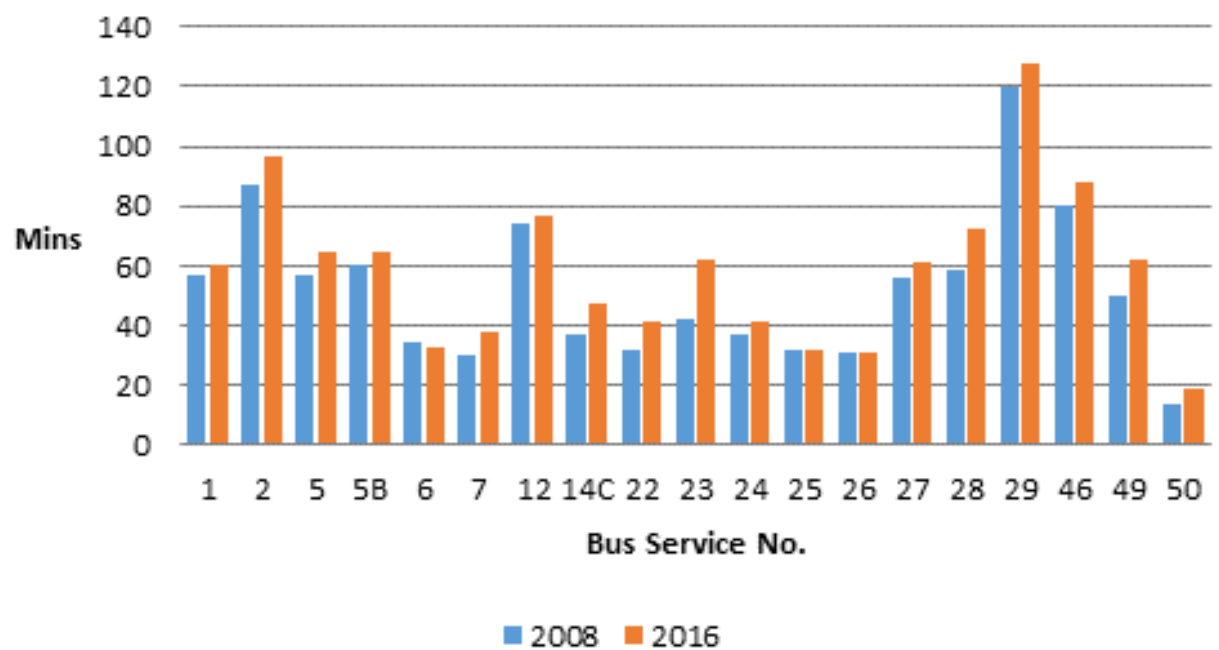
In 2012 the operator carried out a simple survey on the Coast Road by counting the number of vehicles and the number of occupants in each during the morning peak and found that buses made up 2% of the number of vehicles but carried 45% of the people.

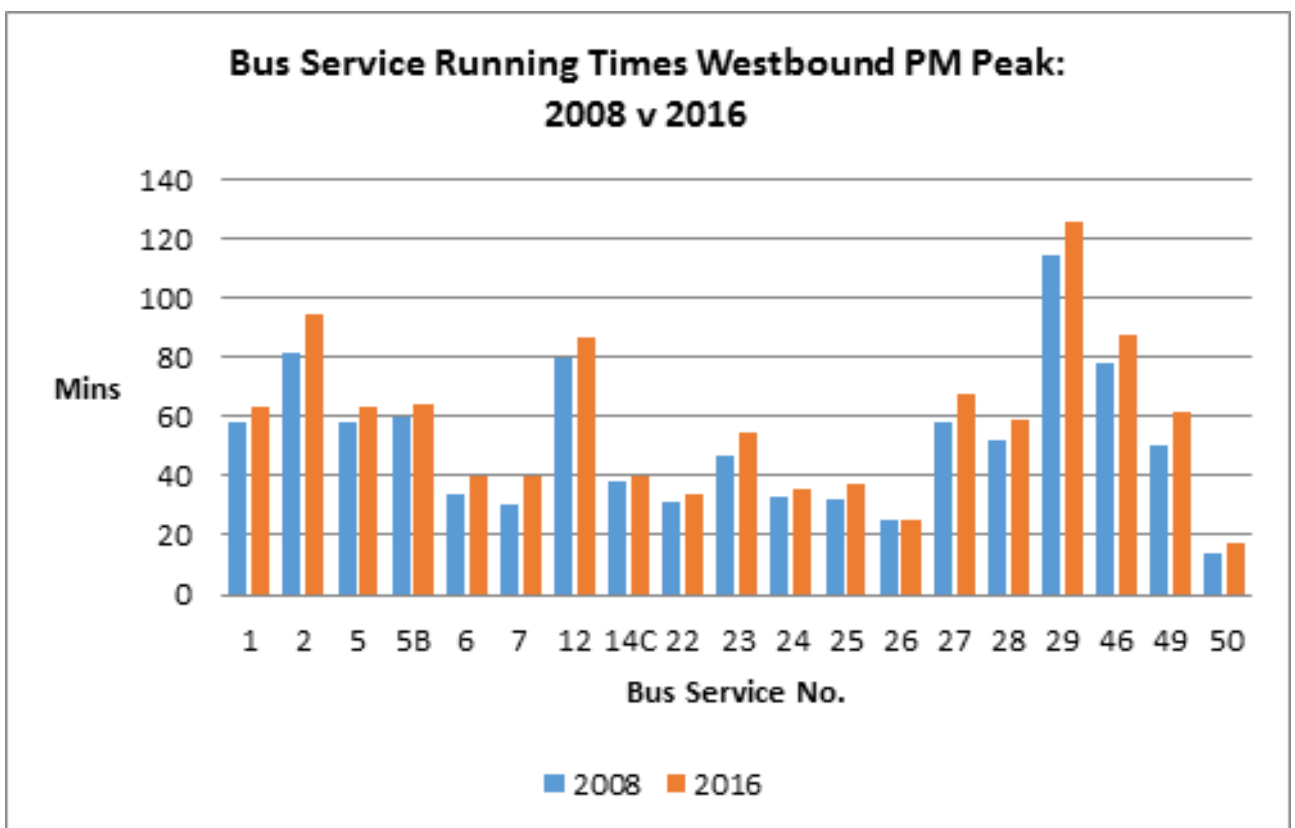
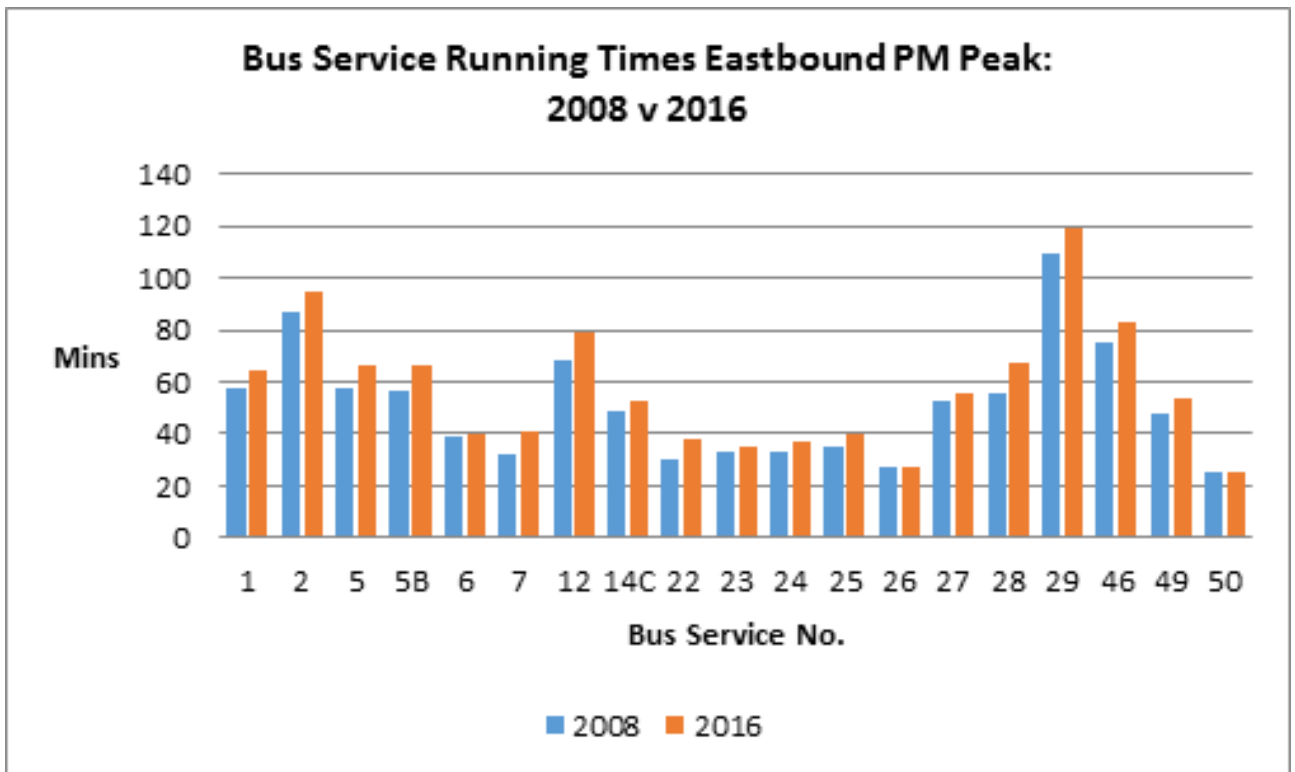
However, the south coast city has experienced a sharp increase in congestion levels over the past decade culminating in Brighton along with Gloucester coming out worst for congestion, with an average increase in journey time of 1.5% per annum. Unsurprisingly, this has had a detrimental effect on bus operations and without further action, could jeopardise the status of Brighton as a shining light in sustainable transport use.

**Bus Service Running Times Eastbound AM Peak:
2008 v 2016**



**Bus Service Running Times Westbound AM Peak:
2008 v 2016**





A study by one of Brighton's bus operators of running times (the maximum running time for each direction, by am peak, daytime, and pm peak) for each route shows that, on average,

peak running times in the city have increased by about 13% since 2008, or put another way, bus speeds have declined by this amount.

This has led to operators having to increase the PVR just over the last few years just to maintain the required service level in the face of this congestion. Another report showing worsening services (and operational costs increases) demonstrates how although the maximum running times appear reasonable, the peaks are starting earlier and finishing later. For example instead of using daytime running times until 4pm and then longer peak running times until 6pm, the longer peak running times are now needed between 3.30 and 6.30pm.

Bristol

Over the last decade and in particular since the four local authorities in the West of England (Bristol, North Somerset, South Gloucestershire and Bath & North East Somerset) came together to form a partnership to deliver on areas like transport, Bristol saw large improvements to bus priority, principally under the auspices of the Greater Bristol Bus Network.

The Greater Bristol Bus Net recognised the vital role that bus services had to play as the backbone of cost effective urban public transport systems. In effective partnership between the commercial bus operator and the local authorities delivered a series of bus network enhancements which brought 10 key routes up to showcase standard, with:

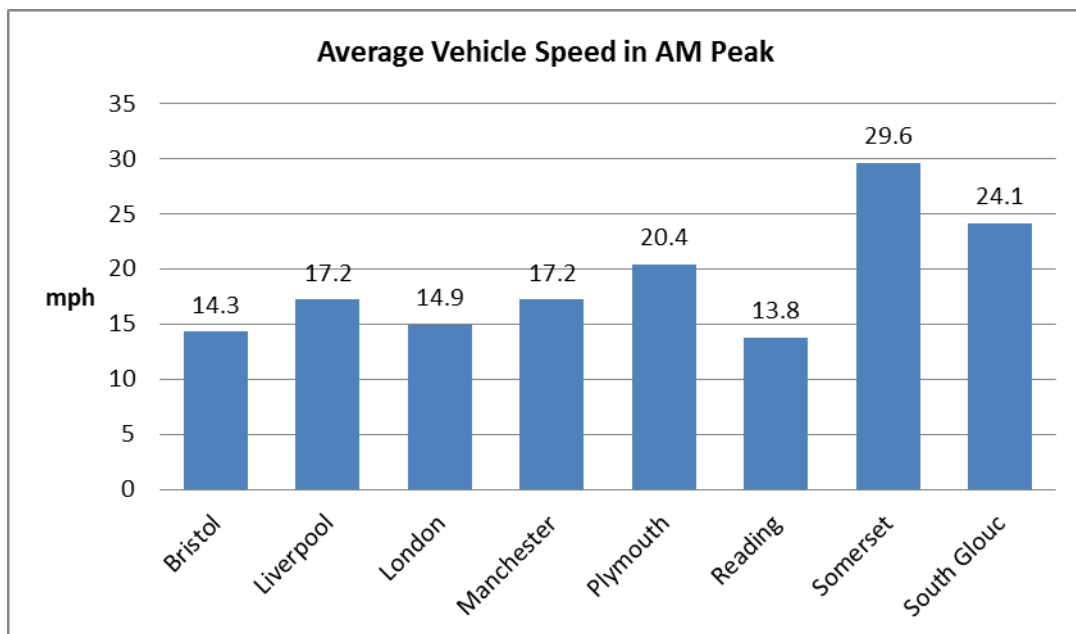
- Over 120 new buses
- Nearly 1,000 improved bus stops - new shelters, new information panels, level access
- More than 300 new real time information displays
- New bus priority signals at junctions that turn green when buses approach helping them stay on time
- Bus priority lanes allowing buses to bypass general traffic
- Road widening in key traffic hot spots

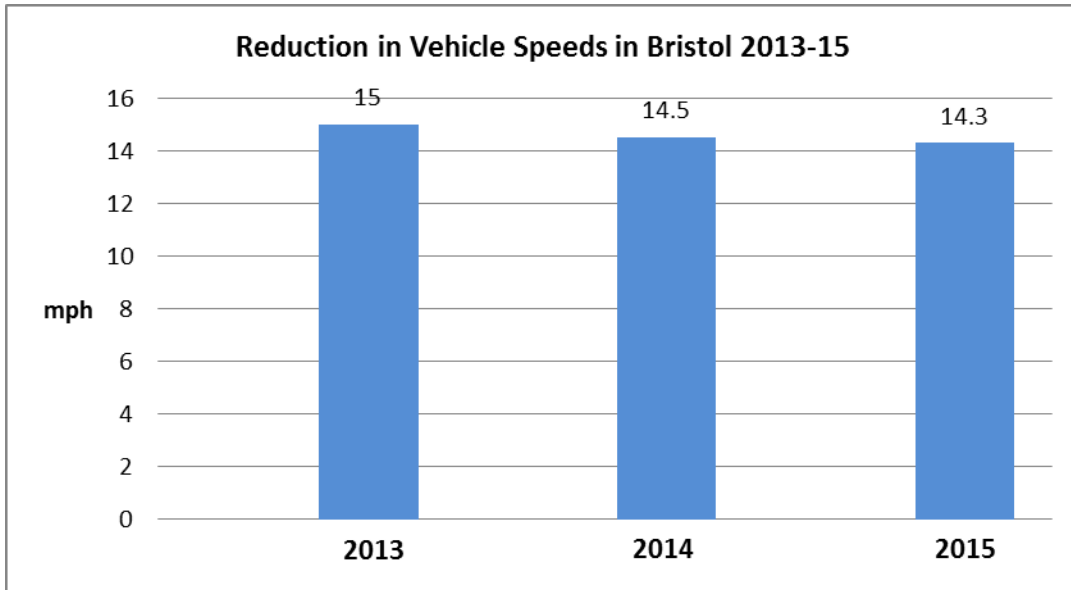
In 2017, the long gestation of the Metrobus project – high priority and high speed bus services connecting several parts of Bristol and will link in with existing bus and rail services - will become operational in 2017 when 20,000 services a day are expected to run on it. It will be operated with modern, low-emission vehicles which will run on segregated bus ways and bus lanes which have right of way over traffic on sections of the route. Bus stops will provide electronic, real-time information displays with fast-boarding and smartcard ticketing.

In 2015, the bus company carried 54 million passengers in the West of England, a 20 per cent increase from two years ago.

Despite active promotion, and an increase in use, of public and active transport in the city as well as representing the European Green Capital in 2015, Bristol has a very severe

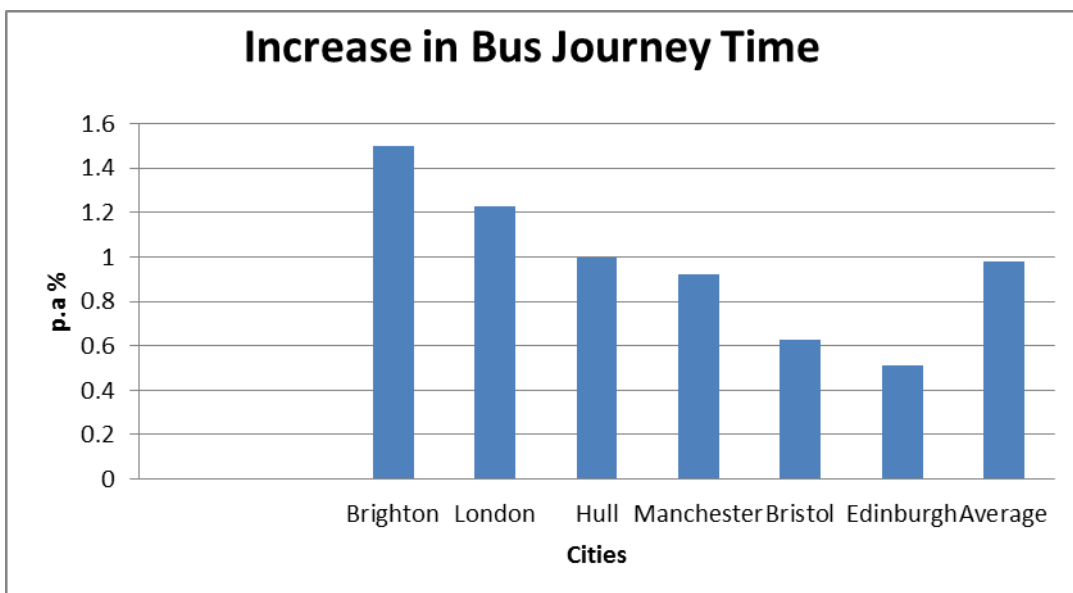
congestion problem with regular grid-locks an all-too-familiar feature of local life. The Department for Transport's figures show that Bristol is in fact the most congested city in the country and that traffic moves slower during peak times than any other city, including London. On A roads in peak times, the average speed of vehicles in Bristol is 14.3 mph (compared to London's average of 14.9mph). The city's latest average represents a drop from 14.5mph in June 2014 and 15mph the year before.





Bristol is a busy city and the urban hub of the West of England sub-region with half a million car users travelling in to the city each day. A historic deficit in transport infrastructure, with lower than average public transport for a city of its size, high levels of car ownership (during the period 2012-2015 the DVLA recorded an additional 18% of vehicles registered in the West of England partnership area), a rapidly rising population (+12,000 a year in the city alone) as well as increasing prosperity has seen traffic levels and congestion at breaking point during peak times which has had a seriously adverse impact on bus journey times and reliability.

The reality is that Bristol's new directly elected Mayor, Marvin Rees, will have no choice but to tackle the problem head on and follow in the vein of his pro-bus and pro-public and active transport predecessor, George Ferguson.



Edinburgh

Edinburgh's Greenways

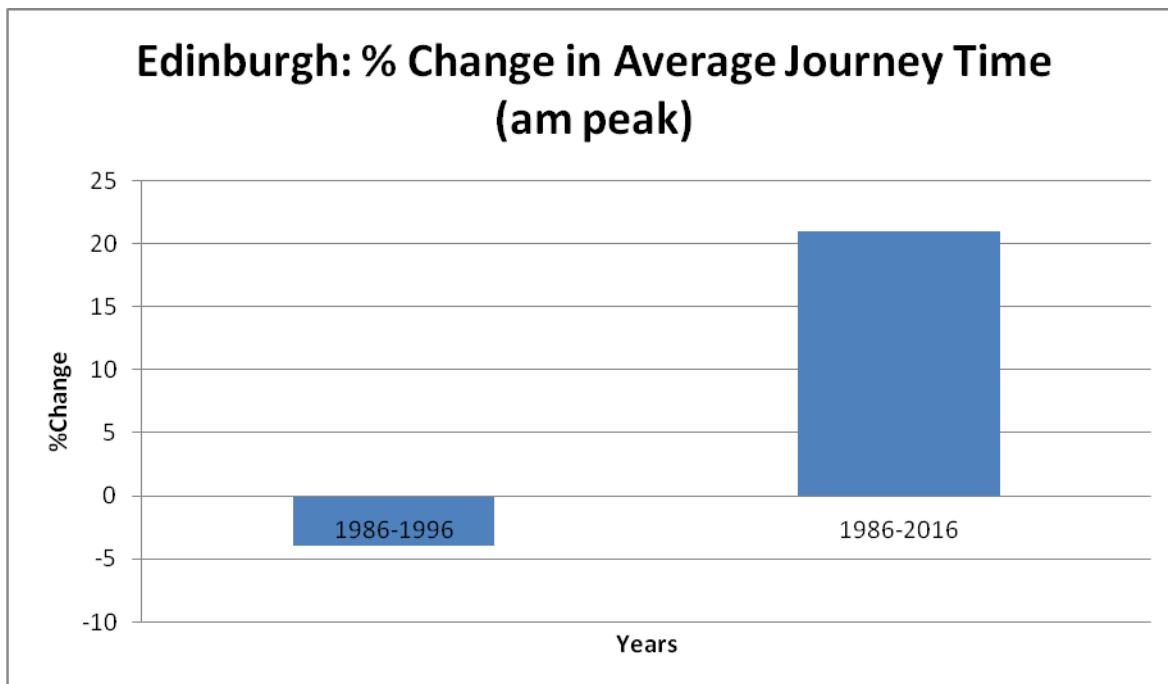
This year marks the 20th anniversary of Edinburgh's radical Greenways bus priority scheme. It has won many plaudits from transport professionals and central government: "Edinburgh Greenways scheme is successful (DfT: 2010. "Bus Priority – The Way Ahead") and "Edinburgh's Greenways have proved to be a high profile and effective form of bus priority which substantially insulates the buses using them from the worst effects of congestion"(The Scottish Executive Central Research Unit 2000) I need to declare an interest as I was the politician responsible for Greenways. While it's reassuring to receive plaudits from fellow transport professionals I still, 20 years later, get stuck when I return to my native city!



Look how green the bus lanes are! They look nothing like this now as they don't get much paint!

You were 15 times more likely to be caught by a traffic warden for illegally encroaching on a Greenways bus priority. Compared with a conventional bus lane.

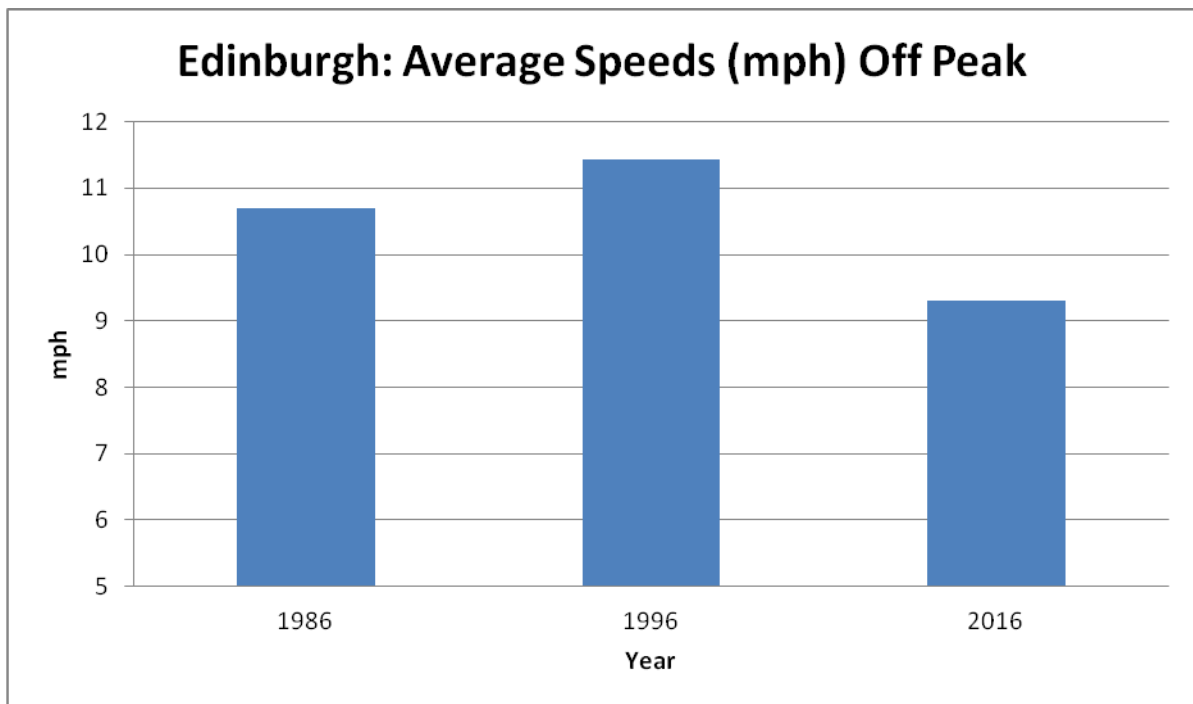
What is startling about the bus journey time data from Edinburgh is that from 1986 to 1996 all day average bus speeds – as a result of good conventional bus priority followed by Greenways – bucked the UK trend and actually improved by over 5%. It's the only conurbation wide example in the UK. were bus journey times have actually improved over a prolonged period. From 1996 to 2016 journey times in Edinburgh revert to the UK wide trend and declined by 20%.



The City of Edinburgh Council needs to stand firm against those who want to dilute Greenways enforcement and point to the fact that bus speeds are now falling by 10% every decade.

Whilst the Greenways in Edinburgh were a bold and strategic way forward for the mass movement of people in the 1990's their effectiveness has declined over the last 20 years. There are a number of measures the City of Edinburgh Council can take to reverse the upward trend in bus journey times:

- review traffic signal timings. Best practice would indicate that this should be done every three years.
- Embrace new technology by to improve traffic signal intelligence. . A bus with two passengers gets the same priority as a full bus with 88 passengers. Technology exists today where this could be avoided. Likewise, more use could be used of pre-emptive signalling.
- Don't become too reliant on camera enforcement of bus priority lanes. With only 9 road side camera's to enforce over 60 km of bus lanes there are too many unauthorised vehicles using them.
- Properly maintain Greenway's. They no longer green!
- The 9 month trial they have embarked upon to remove bus priority during the off-peak should not be made permanent.



The data from Lothian Buses shows that bus speeds have declined by 19% over the last 20 years even during the so called off-peak! This evidence should persuade the City Council that the trial should not be made permanent

Greater Manchester

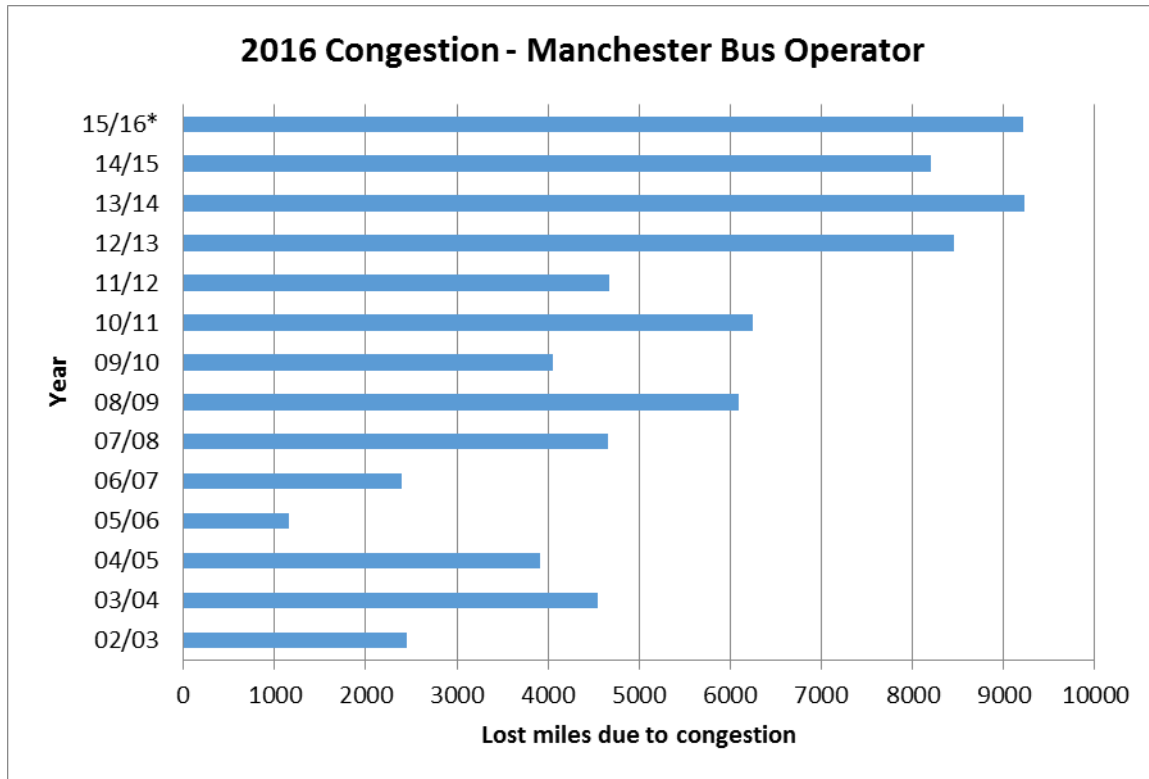
TfGM is delivering the largest contemporary urban public transport investment programme outside London, working closely with district authorities in order to create a world class public transport network in order to achieve world class city status for the city of Manchester. The aims of its public transport network are to increase sustainable travel and reduce car travel, cut congestion, improve the environment and allow communities to flourish. Critically, its public transport system is designed to provide access to jobs and strengthen the Greater Manchester economy – the largest regional economy outside London

Data relating to travel demands to the city centre during the AM Peak period (0730-0930) show that the number of inbound movements that cross the cordon using a car has reduced by 22% (-7,123) over the period between 2006 and 2014 as investments in public transport attracts increasingly greater proportions of commuters.

Its impressive investment programme includes the expansion of Metrolink, major transport interchange facilities and extensive bus priority and busway schemes, investment to boost rail travel, significant cycling, town centre and highways improvements, and evolving integrated travel information systems.

However, traffic congestion on the region's highways has reached such a level that it has begun to seriously affect ridership on non-congesting forms of travel, most critically the bus. Ironically much of the congestion has been caused by disruption from the construction and development of public transport infrastructure designed to strengthen bus operations (and other public transport), which

have temporarily reduced or eliminated highway capacity. Coupled with traffic growth of 4% per annum, emergency highways repairs and population (city centre residents grew 177% between 2001 and 2011) and employment growth (district of Manchester, at has seen a 31% increase in residents of working age between 2010 and 2014), congestion has increased to unprecedented levels. This has produced extremely challenging conditions for bus companies.



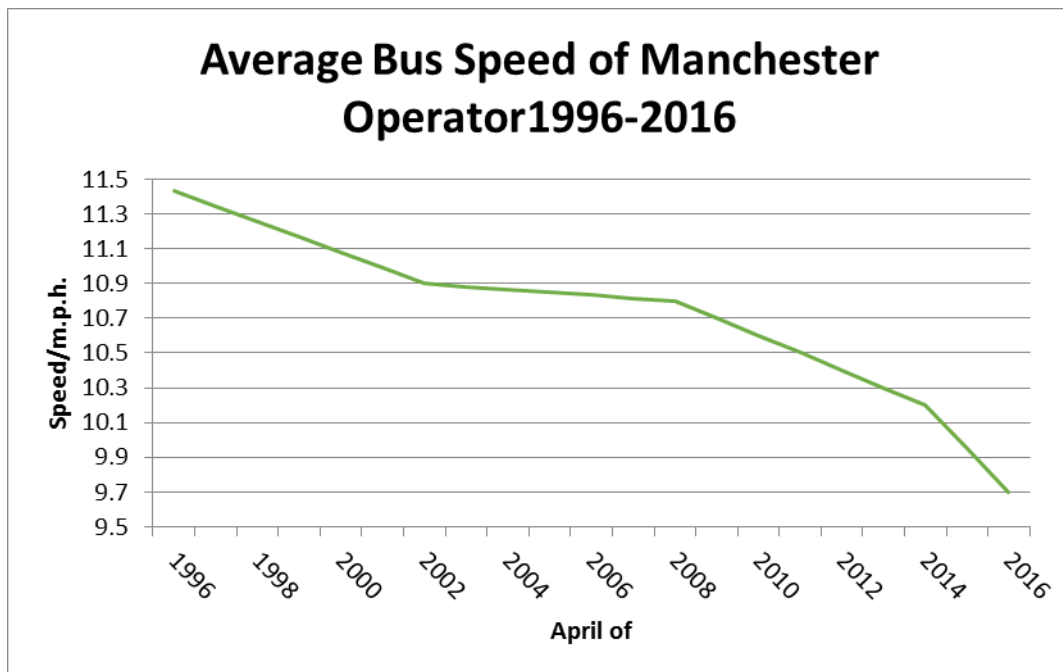
*based on first 11 periods grossed up

Data from Stagecoach West. The graph shows a selected number of key services around the area. Each of these show scheduled running times for various years between 1990 and 2016, change in PVR to maintain the same frequency and estimated additional cost due to congestion (this assumes no change to frequency, although many of these services have in fact had frequency increases since 1990).

According to bus operators, this has resulted in average bus service punctuality over the last two years being reduced by 10 per cent. On the poorest performing days, this can reach 50 or 60 per cent below the regulatory target.

Bus operator data shows that this reduction in punctuality has led to longer journey times (up to 100% longer in the evening peak on cross-city routes and also longer in the mid and late evenings); gaps in service as controllers attempt to re-schedule and re-allocate resources; increased regulatory risk (3 DVSA investigations over reduced punctuality ongoing); doubling of lost mileage; a 10% increase in customer complaints; an increase in staff overtime payments (up 400% in the last quarter of 2015); and, critically, plans for permanent reductions in peak period service levels.

The same data shows additional vehicles have been deployed daily since November 2014, from at least 2 to a peak of 17 between October and December 2015. It is currently 5. Average journey speed has fallen from 11.2 mph in 1996 to 10.2 mph in 2014, and then to 9.7 mph in February 2016.

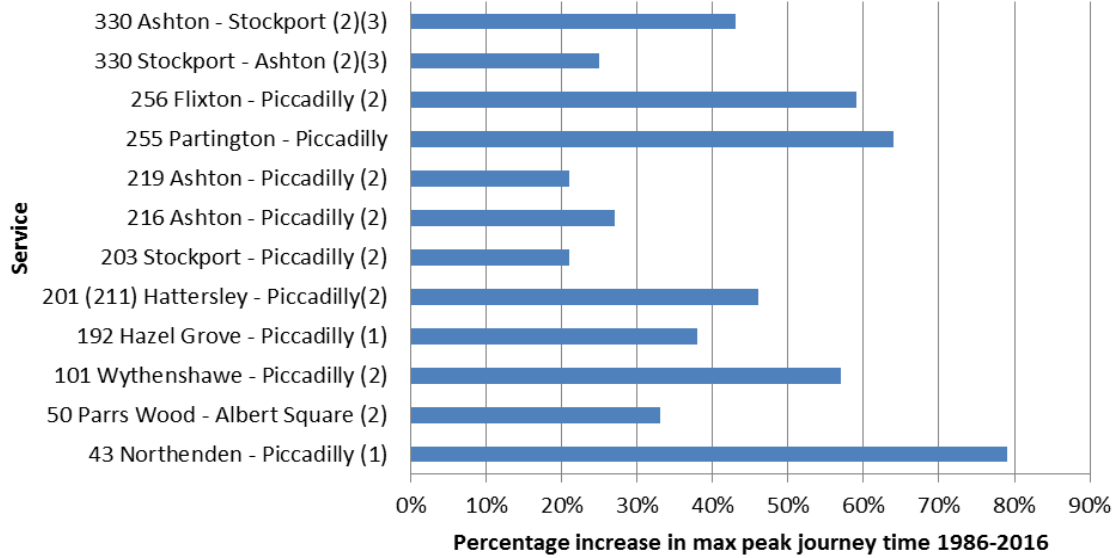


Several services have observed average peak journey time increases of between 40 and 60 per cent and from January 2016, peak period headways have been widened on several services. 89 timetables have been adjusted for headway or journey time since May 2015.

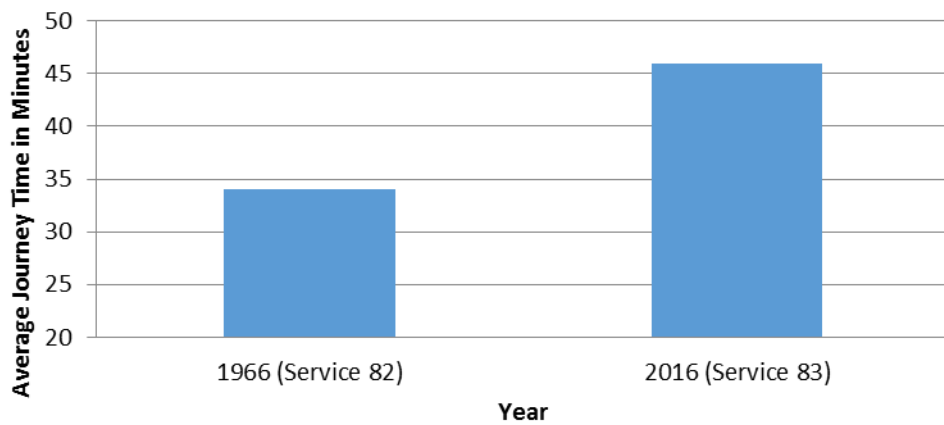
For the services in South Manchester below, Stagecoach have added 42% more PVR's since 1986 due to impact of congestion on running time. Overall 125% more PVR's due to also increasing frequencies.

Average mileage is down by 3% year on year (4.5% after allowing for a service enhancement) and critically, passenger numbers are down by 2.4% on year (after allowing for service enhancements). These figures are despite operating hours being up by 0.4% on the year.

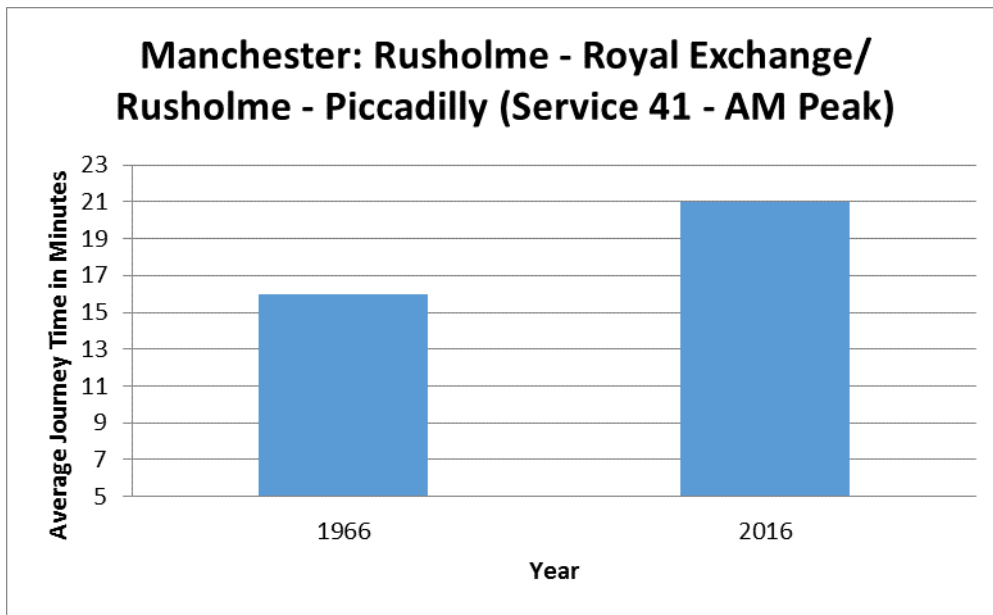
Manchester Max Peak Speed



Manchester: Oldham Market Place to Piccadilly/ Oldham Bus Station to Piccadilly (AM Peak)



35% increase in journey time. 0.7% p.a.

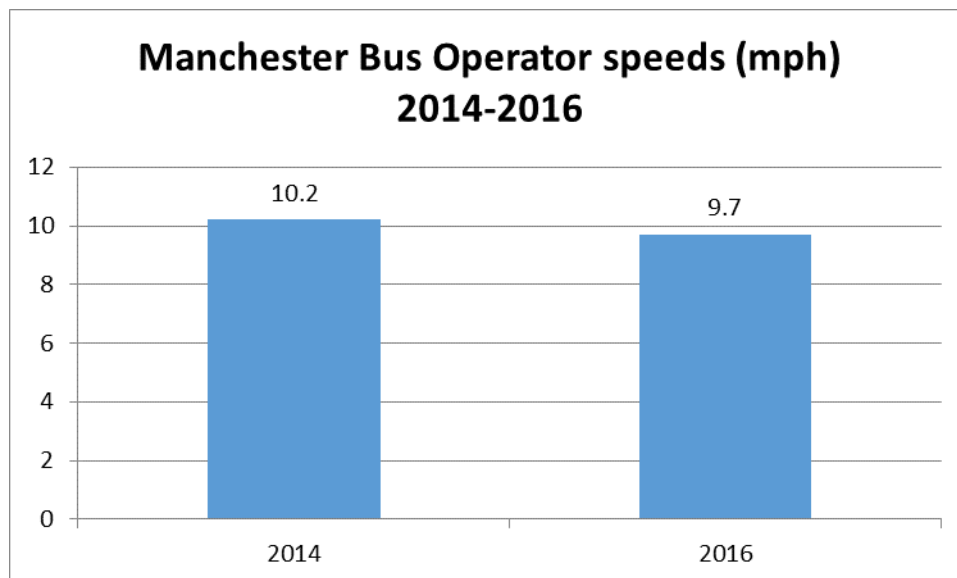


31% increase in journey time 0.62% p.a.

The long term data shows a decline in bus journey times of between 0.6 and 0.7% per annum from 1966, on the two sections of route above, that I was able to compare current timetables with historic.

This compares favourably with the UK trend which is nearer 1% per annum decline.

However, it is the dramatic increase in journey times over the last few years which are much more worrying. Data shows how Stagecoach's average bus speeds decreased by 4.9% between 2014 and 2016, way above the average trend of 1% per annum for the six most congested conurbations.



TfGM publicly recognises that traffic congestion on its highways is a real challenge and is undertaking a broad programme of activity that recognises the role and further potential that buses have in helping meet the challenge of congestion and equally, the effect congestion that has on bus operations across Greater Manchester. In particular, it is recognised that there is limited resilience on key parts of the highway network, and that relatively small increases in demand can cause

significant levels of congestion. Hence there is a key role for bus, functioning efficiently within a more integrated public transport network, to attract as much demand as possible thereby helping reduce highway congestion in aggregate.

Based on the success of its £88m Quality Bus Corridors implemented between 1998 and 2008, TfGM showed its continued commitment to bus priority by implementing its £122m Bus Priority Package from 2008 to date. Patronage on its QBC routes had increased by 7.9m journeys (18.6%) between March '04 and July '08 and the "gap" between car and bus journey times reduced, increasing bus competitiveness. Safety also improved in the location of major QBC schemes with an average reduction in all accidents of 19%; and average bus speed in bus lanes was 25kph, 38% faster than the average speed of 15kph where bus lanes were not provided. The study also showed marginally improved average journey times for general traffic.

These achievements led it to embark on its £122m Bus Priority Package which is one of the largest investments in Greater Manchester's bus network for decades, with over 25 miles of the network being either created or improved. The investment will allow cross city bus services to run directly through the heart of Manchester city centre so passengers won't need to change buses. It will also improve accessibility and connectivity between areas in the north and west of Greater Manchester to the Regional Centre and Oxford Road. This includes the North West's first guided busway which opened in April 2016.

In the short term, some disruption during construction phases is inevitable, but close liaison between TfGM with all agencies including bus operators and careful forward planning will hopefully help mitigate the effects. And in the longer term, investments such as the Cross City bus priority schemes confer significant operational and efficiency advantages for bus operations.

Looking ahead, as part of the 2040 Greater Manchester Transport Strategy, assessment is underway of key locations causing bus delays. A long term strategy for bus priority investment is in development, an integral part of the Highway Strategy for Greater Manchester

Hull

Through a Quality Bus Partnership approach between Hull City Council and the two main bus operators, Stagecoach in Hull and East Yorkshire Motor Services, bus patronage has grown by 30% since 2002/3 with around 26 million bus journeys being taken on the city's combined bus network each year. This represents twice the rate of growth achieved throughout the country during the same time period. This is also the equivalent of cutting more than 3.5m car trips from the city's roads.

Such impressive growth has been the result of improved fares structures; Park and Ride schemes; extensive bus priority; a major new transport interchange; award winning marketing campaigns and the bus lane enforcement scheme.

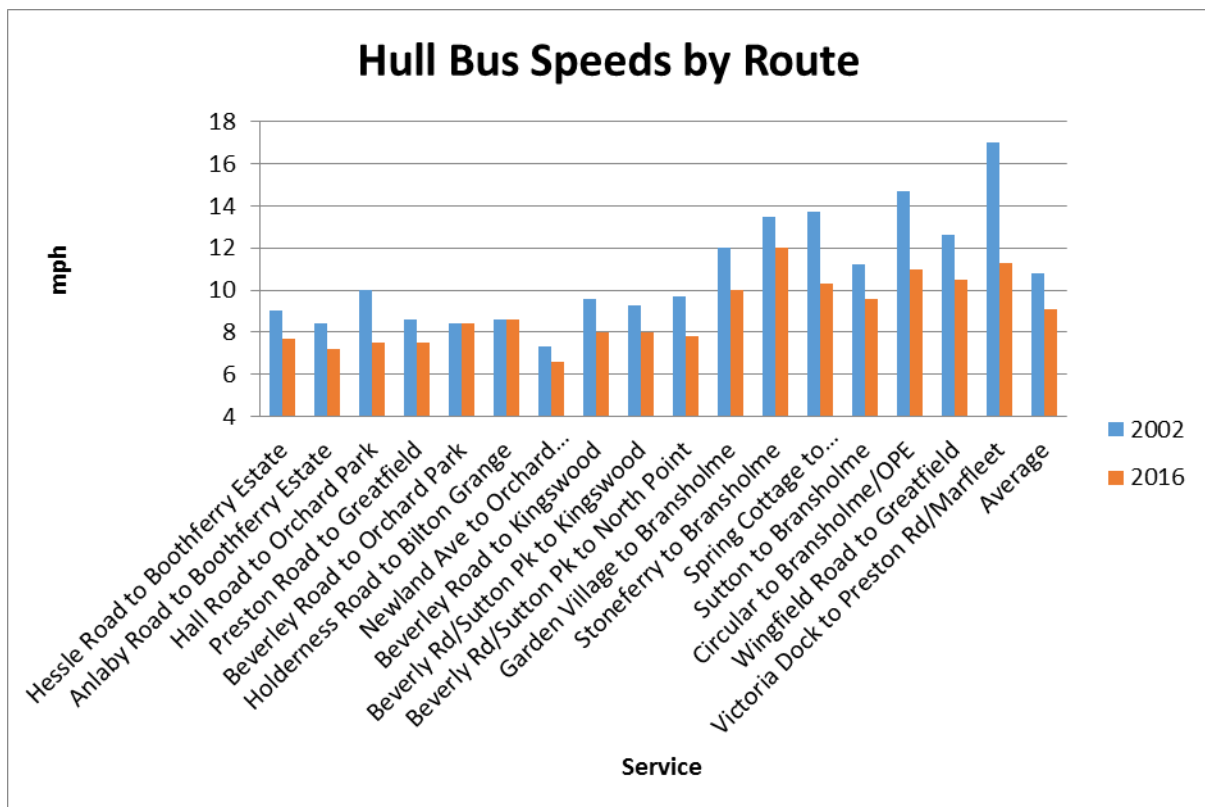
Despite such a success story, congestion in Hull is a major issue and which is impacting significantly on the city's radial routes and the A63 Trunk Road Corridor. The latest research by 'Tom Tom' identifies that Hull is the sixth most congested city in the UK. There are a number of factors behind the severity of congestion levels. Car ownership and car use in Hull is growing. The city's role as a strategic port and a 'gateway to Europe' creates additional traffic which has to pass through the city centre to access and depart from the docks on the eastern side of the city making the A63 trunk road

the most congested part of the local road network. The reduction in Humber Bridge tolls led to a 25% increase in traffic with most vehicles going in to Hull on the A63.

According to the Tom Tom study, journey times on Hull’s roads are on average 33% slower than they would be in free flowing traffic. According to the Department for Transport’s Average Delay on Local A Roads 2014, Hull experienced an average delay of between 60 to 90 seconds per vehicle mile which it categorizes as high levels of delay. DfT statistics show that between December 2014 and December 2015, the average speed on local roads during the weekday AM peak fell from 16.7 mph to 16.1 mph. It also shows that during the last quarter of 2015 alone, speeds fell by 1.3%.

Inevitably, Hull’s congestion problem has had an adverse impact on buses. Additional buses have been added to the network simply to increase bus running times to reflect lower traffic speeds and the effect of traffic congestion. Bus operator data has quantified the effect of increased congestion by recreating and comparing the resources that would have been required to run today’s service levels using 2002/3 bus running times and schedules. Bus speeds have slowed from 10.8 mph to 9.1mph and the current network could be operated with 15% less buses in the traffic conditions experienced in 2002/3.

The city council and in particular Councillor Martin Mancey, has continued to be supportive of pro bus measures and public transport in general which it has voiced as being the only solution to reducing some of the congestion in the city and regularly encourages people to switch from using their cars on to non-congesting modes. However, budget cuts are now biting with the council unable to afford to submit the planning application for a new additional park and ride. Given the city’s strategic role as an international trading route, a continued rise in congestion is not only going to continue to negatively impact local bus services but on both the local and national economies.



London

In London bus speeds have been declining faster than anywhere in the UK over the last few years. This comes after decades of relative success in protecting bus passengers from traffic congestion through effective bus priority measures, such as red routes and other initiatives, and the central congestion charging zone introduced in 2003. If the average urban bus speed in the UK has historically been decreasing by almost 1% p.a., then for one-third of London bus routes the decline has been more than five times this average over the past year. This has become a crisis for the capital and something the new mayor must prioritise. London, which for more than a decade has been the UK's bus success story, with passenger numbers doubling since the formation of TfL in 2000, is now facing the fastest decline in bus use anywhere in the UK.

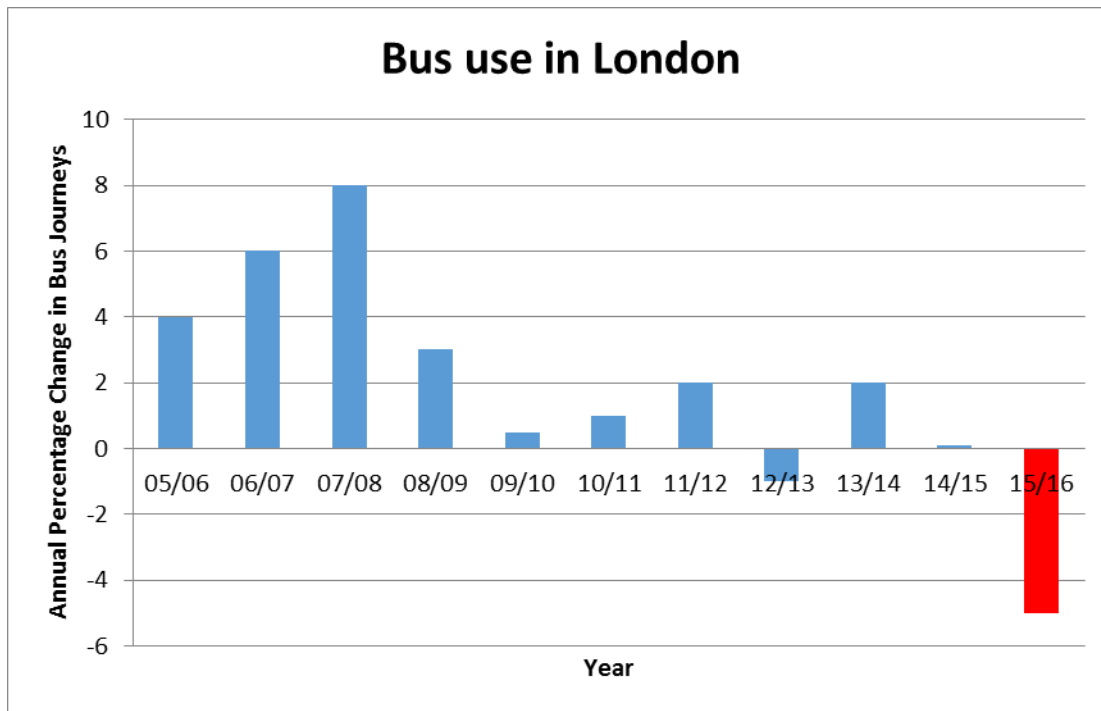
There is a key lesson we can learn from this. You can get all the other ingredients right: modern bus fleet, cashless buses with the most advanced smartcard ticketing system in the world, a level of integration which is the envy of other UK cities, state-of-the-art passenger information at the bus stop and on mobile devices. Add to this population and employment growth and you should have a recipe for the London bus success story continuing. But all these laudable ingredients cannot offset the rapid deterioration in bus journey times.

Boris Johnson was right to warn that his successor will have to use tougher congestion charging measures to tackle London's growth in congestion, but it's a pity he did not take action on his watch. He exacerbated the problem by removing the western extension of the congestion zone and by reducing road capacity in central London by 25% through the introduction of cycle superhighways – without taking action to curtail traffic in central London. Both decisions were taken against the advice of TfL.

London Buses have undoubtedly been one of the Capital's success stories, however, recent growth in traffic and congestion over the last few years have undermined bus speeds and reliability to the degree that buses are now facing a crisis.

The historic pattern of slowly declining patronage was dramatically reversed in the late 1990s to one of strong growth. Over the 13 years from 2000/01 to 2013/14, the number of bus journey stages in London increased by 59.9 per cent, and passenger-kilometres grew by 73.8 per cent. More than half of all bus journeys taken in England are made in London.

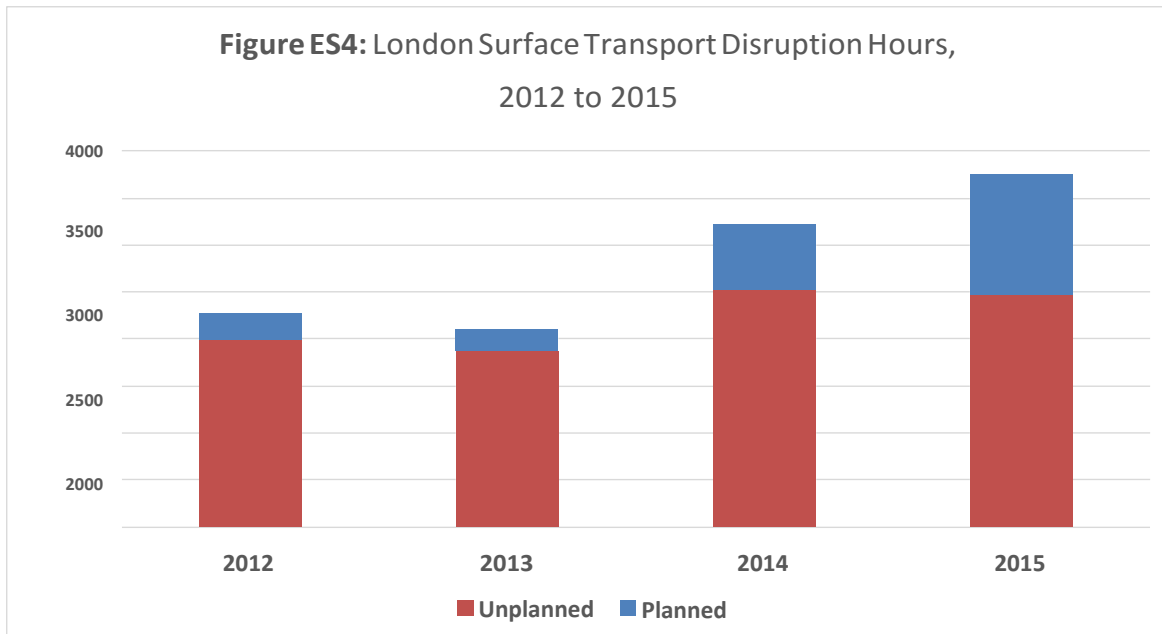
However, this upward trend in bus patronage levelled off in recent years and over the period between 2014/15 and 2015/16, patronage actually declined by 71 million journeys which represent a decline of 3% year on year.



The primary cause of this significant decline in patronage is the increased road congestion caused by London's population growth and the construction of major highway and urban improvement schemes which has led to severe pressure on the road network. This has caused such a deterioration in traffic speeds and bus network reliability that frustrated passengers have stopped using the bus as much as they would have previously.

While levels of road traffic had been falling for much of the last decade, they have increased for the last few years. Car driver trips increased by 1.2 per cent in 2014, the first increase since 2009. During 2014, traffic volumes started to increase in all parts of London – by 3.4 per cent in central London, 1.4 per cent in inner London, and 1.9 per cent in outer London (1.8 per cent at the Greater London level), relative to 2013.

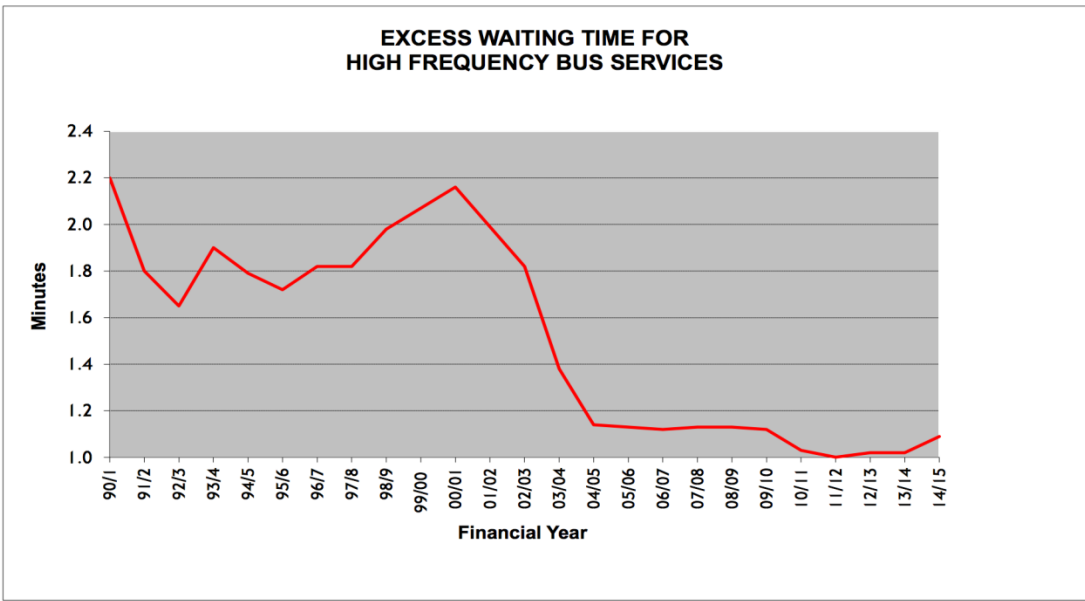
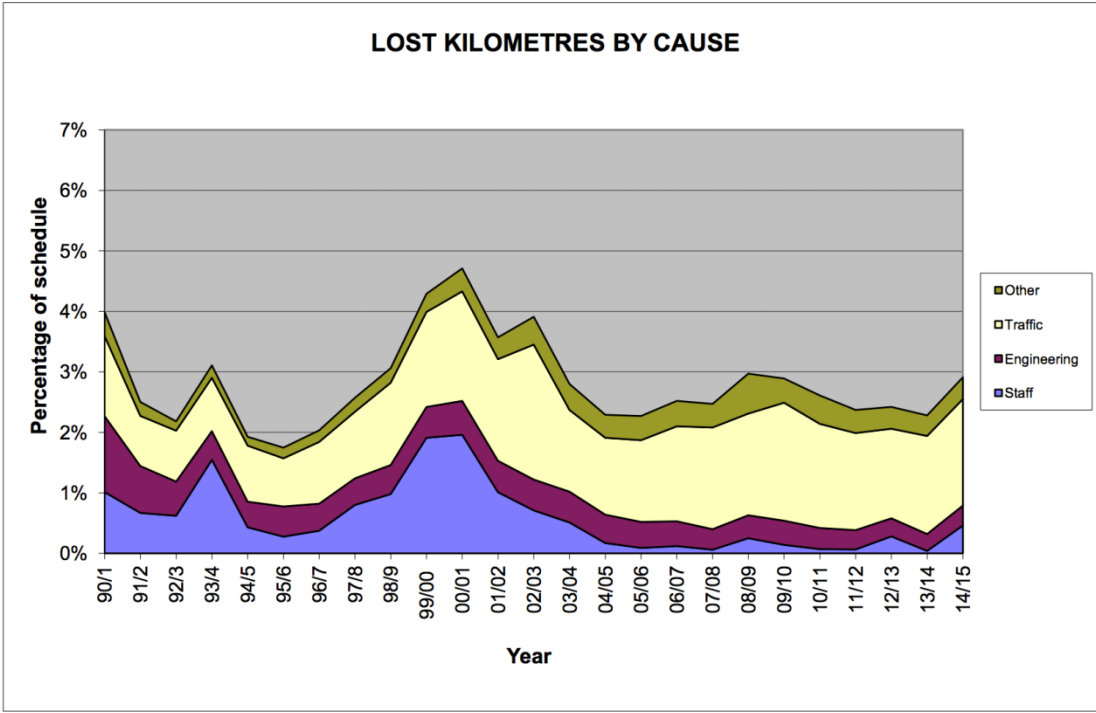
Congestion, as always, is caused by demand exceeding supply. What is interesting about the recent sharp rise in congestion in central London – increasing by 12% per annum since 2012 (Inrix London congestion trends May 2016), is that it mainly a supply side problem. Demand for road space has remained relatively flat, with the growth in LGV's and private hire being largely offset by a decline in car traffic. It is the substantial reduction in road space, with planned roadworks increasing by 362% over the last 3 years, which has led to significant increases in congestion. It is to be hoped that many of the road closures are temporary with major capital works such as Crossrail and Cycle Superhighways reducing available road space.



Hours

ref: Inrix London Congestion trends May 2016.

The knock on effect for buses in London is that bus speeds have declined faster than anywhere in the UK over the last few years. This comes on the back of decades of relative success in protecting bus passengers from traffic congestion through effective bus priority, such as red routes and other initiatives, and the central Congestion Charging Zone (CCZ) in 2003. Speeds increased by 14.6% (comparing speeds 3 months before to 3 months after) in the CCZ following the introduction of the charge, however, since 2004 bus speeds in London have been gradually decreasing to below pre congestion-charging levels. Bus operations have suffered as a result. Bus kms lost for traffic reasons rose from 1.8% in 2012/2013 to 2% in 2014/15 and average excess waiting time (mins) on high frequency services rose from 1.02mins to 1.09mins.



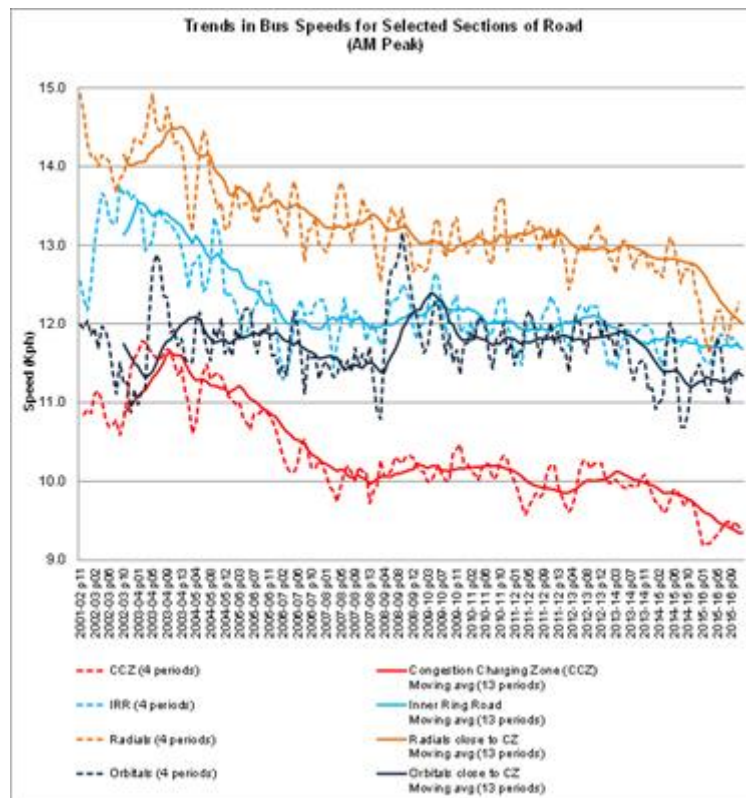
The greatest decline in speeds was noticed in Tower Hamlets and Lewisham with reductions in excess of 3% per annum, with the south-east the worst-affected region. Route level data reflects this picture, with 474 routes out of 528 considered showing a decline in speed in 2015/16, 158 of which declined by more than 5% (routes with low levels of service operated were discounted). TfL has closely monitored bus speeds in London since shortly before the introduction of the congestion charge in February 2003.

Bus speeds in Central London have declined by around 7% in the last 8 years (see graph below). If we work on the basis that average urban bus speeds in the UK have historically

been decreasing by around 1% per annum, then for one third of London bus routes they have been decreasing in speed by more than five times higher than this average over the past year. The current speed of the Route 11 bus which is averaging 4mph in the peak, epitomises the level of crisis that this has become for the capital and something the new Mayor, Sadiq Khan, must prioritise.

TfL are facing swinging cuts to their revenue budget. Public transport is expected to operate without any revenue subsidy by 2019- the only city in the world that will achieve this target, with the exception of Hong Kong. The new Mayor has committed to a fares freeze which raises the question who is going to pay for bus services in London if it is not coming from the taxpayer and passengers will not make up the difference in higher fares. The solution is to operate buses more efficiently by improving their speed. If London is to eliminate the £400 million per annum subsidy to its bus network then bus speeds would have to improve by 24%.

The rise in congestion is reducing TfL's potential bus revenue and is not being fully offset with patronage gained from elsewhere on the public transport network. TfL is working to reverse the loss of bus revenue and patronage through a combination of special route reliability measures, improving the flow of traffic through new bus priority initiatives and through greater incentivisation of performance in outer London.

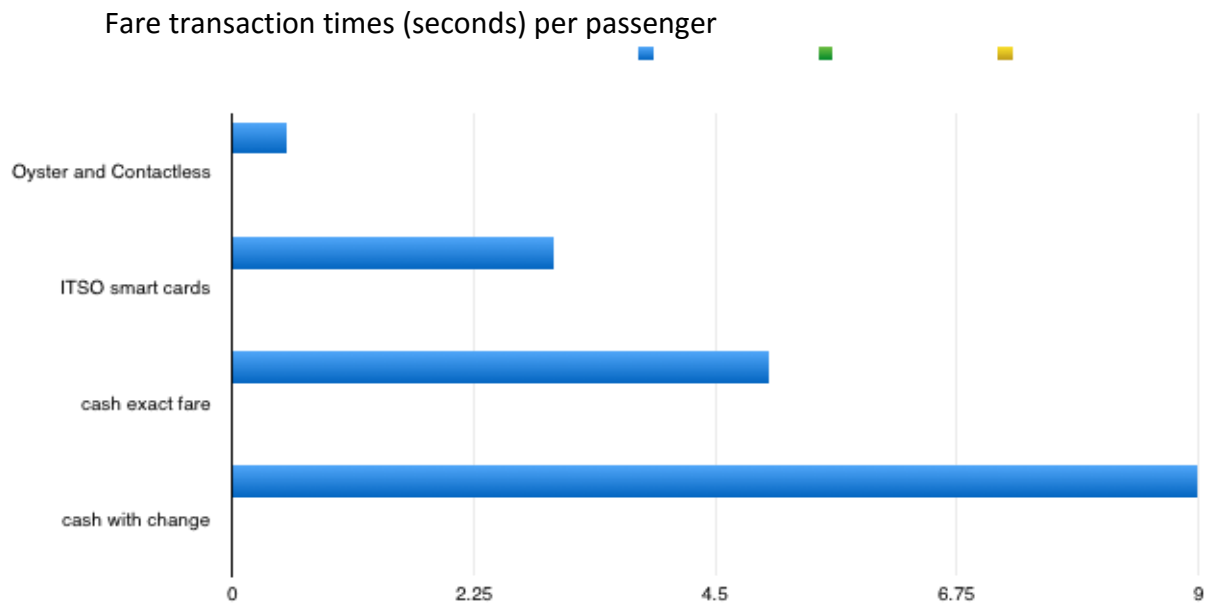


London Buses have already become the butt of media jokes in the media with speeds being compared unfavourably with a donkey (ref Sun) and a chicken (ref Hackney Advertiser).

Some of these media comparisons on journey times in London are worst case scenarios and made in a jovial manner. While bus speeds in London have fallen dramatically in recent years to the bottom of the UK league table they provide an insight into where the trends are taking us in the rest of the country unless radical action is taken especially given that congestion in inner London is projected to rise by 25% and in outer London by 15% by 2031.



While this report has focused on the impact rising traffic congestion has on bus journey times, in urban environments between 25% and 33% of journey time is spent picking up and dropping off passengers (dwell time).



Time in seconds.

London has led the world on cashless buses, which have had a dramatic impact on reducing dwell time at bus stops. The 0.5 seconds per transaction on London buses is unrivalled anywhere in the world. Dwell time has been cut by at least half. Transport for London believes that the total run time of buses has been reduced by about 7-10%.

Most of the operating cost of buses is directly driven by run time, so that translates into a straight saving of some £120-180m annually. This dwarfs the one-off cost of introducing Oyster (£50m) and contactless (£68m).

If we could extend London-style cashless buses and contactless payments to the rest of the UK we could improve bus journey times by up to 10% by halving dwell time at bus stops.