A Light Rail Strategy for the UK

UKTram
The voice of light rail

Contents

Executive Summary

Mobility needs are evolving with changing travel habits that demand services that increase convenience, speed and predictability, as well as raising customer expectations.

Eighty three per cent[1] of the England's population live in urban areas. Today, sixty-four per cent of all travel occurs within urban environments, and the total amount of urban miles travelled is expected to increase significantly in future.

Light Rail has the potential to serve as the central artery of urban areas and create a connection between other modes of transport, orbital connectivity between suburbs and radial access from the outskirts to the inner city; however, its success depends very much on its integration into an overall urban development strategy.

In the year before the start of the restrictions brought about by the nations pandemic response, March 2019, 282 million journeys were made on Britain's nine light rail networks. Light rail had supported economic growth in the areas that it serves, promoted social inclusion and led to environmental gain, including a reduction in carbon emissions. It contributes to meeting the Government's "levelling up" agenda and helps meet the need to decarbonise transport. The 'journey' starting point has been reset but growth to pre-pandemic patronage levels can be seen on the horizon.

Benefits the economy

Transport plays a critical role in facilitating competitiveness in post-industrial economies. High quality transport services and infrastructure enhance internal and external connectivity. …. unlocking previously hard to reach sites for development; triggering fresh growth through elimination of significant transport constraints; stimulation of inward investment; extension of labour market catchment areas; reorganisation or rationalisation of production, distribution and land use; and land and property value increase and capture. Urban light rail investment can help regenerate Central Business Districts and boost employment and property prices. Similar rail investments in different locations may not however have the same economic impacts — geography matters. Other conditions in addition to transport investment are required for positive externalities.

Sustainable growth of town and city centres

Key examples; previously hard to reach sites included two of the UK's former Dockland areas: the London Docklands, and Salford Quays, Greater Manchester. During the industrial era, such docklands were poorly connected on their landward side with main road and passenger railway networks. When ports moved downstream to deeper waters, these traditional dock sites became derelict and lacked good land transport connections essential to their redevelopment.

1 https://www.gov.uk/government/publications/trend-deck-2021-urbanisation/trend-deck-2021-urbanisation

For instance, the London Docklands, largely derelict from the mid-1960s, until the 1980s, was described to be "more inaccessible by public transport than any comparable area of London" (Church, 1990). Similarly, a forecast of development in Salford Quays (the area around the former Salford Docks at the head of the Manchester Ship Canal) claimed that "without a significant, reliable and marketable improvement in public transport…, it is highly unlikely either that the official development proposals will be completed or that the public sector investment in the proposed Lowry Centre could be justified and therefore committed" (Roger Tym and Partners Ltd, 1996).

Benefits to Society

Accessible to all, well-marked and presented stops, reliable and predictable arrival times, step free boarding/alighting, spacious interiors, good seating/wheelchair space, smooth & jerk free acceleration/braking, clear and fixed routes, well positioned destination stops all provide social inclusion by supplying attractive connections to job and training opportunities, as well as important public services.

Light Rail assists with a clear and solid urban development strategy in which light rail construction is part of wider urban regeneration that supports housing, jobs and public and private investment not only along the system corridor but includes the wider catchment areas. Light Rail provides support to our urban areas with an infrastructure offering a multi-modal integrated transport solution combining: Cycling/walking, Heavy Rail/Metro, Bus and Road. It offers an attractive urban landscape that keeps the UK on a level footing when competing to attract investment of our global partners. In the right circumstances Light Rail helps 'left behind' towns and local center's bounce back, allowing these town and city centres to grow sustainably and with less congestion by offering a convenient alternative to traditional road traffic.

Benefits the environment

Light Rail vehicles do not pollute along the route helping towns and cities meet their air quality goals. As much renewable energy supplied through the grid can be used and with developments in modern technology vehicles can even reduce the requirement for overhead power supplies and lessens their visual impact. Utilising regenerative braking for battery charging and feeding power supply means that even less energy is required as route frequencies increase.

Modal shift is a real possibility with reliable frequency and evidence suggests that they can pose an attractive alternative to certain car journeys. Whilst car travel will remain an important part of future transport use, by providing competitive light rail and encouraging some users to use alternative means of travel, we can ensure less road congestion, lower carbon emissions and better air quality. It also frees up space for some alternative modes of transport such as walking and cycling.

With governments' support, Britain's light rail systems have continued to operate throughout the pandemic. This has allowed key workers to get to and from their places of work, but more importantly provided a lifeline for those who do not have access to private transport. Not everyone could work from home or find their own way to health care and vaccination centres – light rail played its part in the integrated transport network that provided access to essential services.

Building Back Better

As the economy re-awakens, light rail will continue to provide public connectivity at a rate that fits the scale and nature of a full and complete 'Back to Normal' recovery and beyond. Town and city centres were highly productive and, because of their higher density and better public transport accessibility, are more sustainable than suburban sprawl. Strong and vibrant town and city centres are synonymous with a strong and vibrant day as well as night economies.

Looking beyond the pandemic, the environmental case for light rail is stronger than ever. As described in the Government's Decarbonising Transport strategy, the challenge is to make public transport, cycling and walking the natural first choice for all who can take it[2] and, as society exits the pandemic and impacts on the economy start unwind and public transport demand returns, stabilises and then grows. Light rail can play a key role helping rebalance the economy by supporting and facilitating economic growth in towns and cities across the country. It can contribute to the Government's levelling-up agenda by connecting left behind communities to a greater range of job opportunities, access to gain new skills and qualifications and to essential services; such as health care.

It also offers the flexibility to change to suit different markets. For example, service patterns can be changed to meet leisure market demands (ecommerce pick up points, new attractions and sporting events) as well as cater for traditional commuter and retail markets.

2 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009448/decarbonising-transport-a-better-greener-britain.pdf

Net Zero

The Government's Transport Decarbonisation Plan is clear. Zero emission cars and lorries will not be able to meet all the climate goals or solve all the environmental transport problems. Transport decarbonisation requires a shift in behaviours, with an increase in the share of trips taken by public transport, cycling and walking and for those modes to become the natural first choice for all who can take them.

Light rail networks play a vital role in supporting this shift. They can provide attractive alternatives for transport users and the capacity required for the necessary shift to public transport. Directly serving city centres and providing cross-city connectivity, and through the provision of Park and Ride and interchange with rail and bus, light rail is attractive to those who would otherwise travel by other forms of transport. Light rail, through its ability to attract transport users and support sustainable growth can play a major role in helping Britain's cities and large conurbations reach net zero.

There are also opportunities to further extend existing systems and to introduce new systems in towns and cities that currently do not benefit from light rail. Having seen the benefits that it can bring, places that developed initial phases of light rail (such as Manchester, Tyne and Wear, Sheffield, Nottingham, Blackpool & Birmingham) have extended their networks. Many are pursuing further network expansion. Other towns and cities are developing proposals for new light rail systems, for example, Coventry. However, developing and promoting light rail systems is a time consuming and resource hungry process. UKTram is working closely with the DfT to assist with this process, when the right conditions exist, to give greater confidence for promoters to come forward with proposals for system extensions and for new systems to take these proposals forward to implementation.

Introduction

Light rail has a continuing role shaping the future of our towns and cities. The economic, societal and environmental benefits that light rail delivers will continue and as the industry adapts to new markets and makes best use of new technology to maximise benefits and make light rail even more carbon efficient.

Light rail will continue to help and support post-pandemic economic recovery and shape the recovery from the pandemic so that urban economies follow a more inclusive and more sustainable path. Government financial support enabled light rail to continue to operate throughout the Covid pandemic when passenger capacity was very limited. Although regional concessionary travel arrangements, local parking levies etc. may fluctuate light rail systems can be very close to self-sufficiency in terms of operating costs.

There is a need to maintain the connectivity provided by light rail as the economies of the towns and cities that light rail serves recover from the impacts of the pandemic.

In the right places, where mode modelling and land development opportunities require it Light Rail can be considered a viable alternative to other modes of transport whether that is in terms of reducing the burden of high traffic densities or in Very Light Rail derivative[3], a cheaper but as capacity efficient option of restoring railways to operational use.

Britain's light rail systems have supported economic growth in the areas that they serve, promoted social inclusion and led to environmental gain, including a reduction in carbon emissions.

In the twelve months to March 2019, 282 million journeys were made on Britain's nine light rail networks. Everyone who uses light rail does so because they benefit when compared to travelling by the alternatives, be that travel by bus, by car, making a different journey altogether, or simply not travelling at all. For these people light rail is quicker, more convenient, more accessible, is considered safer, or is a combination of these and other factors. These benefits are not just felt by individuals. Light rail supports and facilitates economic growth. Powered by electricity and an attractive alternative to other forms of transport, light rail is helping meet the country's pressing need to reduce transport's carbon emissions.

Light Rail in the UK

The Office of Road and Rail (ORR) defines light rail as "an urban transportation system that generally uses electrically powered rail guided vehicles along exclusive rights-of-way at ground level, on raised structures, in tunnels, and in streets. To allow greater flexibility in integrating systems into urban environments, light rail systems generally use lighter equipment that operates at slower speeds when compared to mainline or heavy rail metro/urban railways."

Tramways

This is how the ORR defines tramways (a particular form of Light Rail):
"Tramways are a specific type of light rail system that have a significant element of the system operating in a highway environment or other public space. Tramways are typically built at street level, sharing roads with traffic, but most systems feature a variety of operating environments, including private rights of way, segregated, and off-street sections." For example, Manchester and Nottingham.

Light Metro

Is light rail that operates entirely on segregated tracks under signal control, but using lighter weight vehicles than found on the national railway or London Underground networks. Stations can be underground, elevated or at-grade. For example, Tyne and Wear and Docklands.

Tram-train

Is where light rail vehicles can operate on segregated alignments and as a tramway and additionally, on mainline "heavy" railway lines shared with conventional trains. The goal for tram-train is to combine heavy rail's connectivity advantages of providing attractive journey times and capacity over distance with the penetration of town and cities provided by light rail and the added connectivity that this brings. For example, Sheffield.

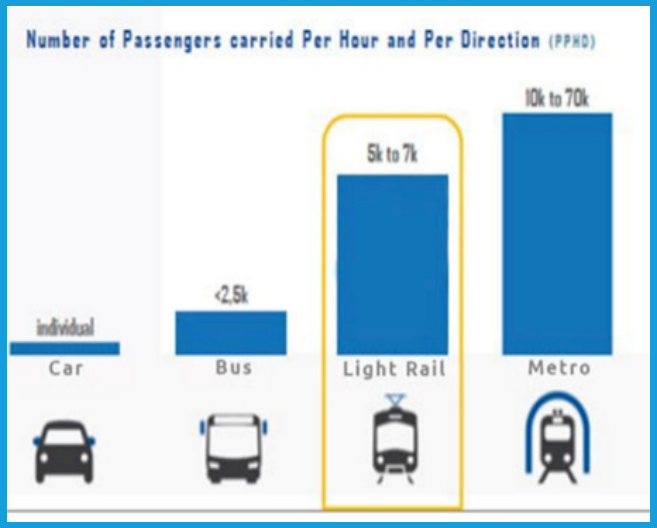
Very Light Rail (VLR)

Is an emerging concept in the UK. Lighter weight versions of light rail have been proposed for routes where the level of patronage is lower than for many urban mass transit systems. Smaller vehicles can be used, which in turn will be lighter and impose lower loads on the track structure than conventional light rail. The goal is for VLR to offer many of the advantages of conventional light rail at a lower unit capital cost, albeit at lower capacity that light rail can offer. For example, Coventry.

3 https://warwick.ac.uk/fac/sci/wmg/research/hvmcatapult/research/rail/vlr/

Light Rail Capacity

A particular feature of light rail systems is the ability to efficiently move large numbers of people in comfort. The capacity of a light rail system is a function of the vehicle capacity and the frequency of service operated. For instance, a light rail vehicle with a capacity of 200 on a route with a 3 minute frequency has a capacity of 4,000 people per direction per hour, around the same as 50 fully laden double decker buses or 2,500 cars. Light rail capacity can be higher than this. In Manchester for instance, some Metrolink services are operated as 'doubles', which is two two-car trams coupled together. Fully segregated light rail systems can operate at frequencies similar to urban metros systems, such as the London Underground.



In summary, light rail is characterised by:

- Steel wheels running on conventional track formations or on rails laid into the highway.
- An ability to operate on alignments with steeper gradients and sharper curves than is possible on the national rail network
- Generally driver operated, but full automation is possible on fully segregated light metro systems
- Speeds of up to 80 kph and rapid, yet comfortable and safe, acceleration and deceleration
- A vehicle length of 20 m to 50 m, width of 2 m to 3 m, with multiple doors and one or two articulated sections, often capable of being coupled into longer formations
- Typically externally electrically powered either through overhead line or by charging batteries, although new emerging power sources such as hydrogen fuel cells are feasible.
- Level boarding for passengers at all stops, either using high-floor vehicles and raised platforms, or low-floor vehicles and platforms almost at street level
- Fares collection not being undertaken by the driver, instead ticket vending machines, contact-less payment points, other 'off system' sales, or conductors
- A centralised control system for operational management with system and security monitoring
- Signalling ranging from line-of-sight to full automation on fully segregated routes
- A dedicated depot and stabling facility

Owners

Outside London, the UK's light rail systems are owned by their respective Local Transport Authorities. In the metropolitan areas, these are the Combined Authorities often acting through an executive agency (e.g. Greater Manchester Combined Authority and Transport for Greater Manchester). In London, Transport for London is an executive agency of the Greater London Authority. Any new light rail system would be promoted by the relevant Local Transport Authority.

As infrastructure owners, the Local Transport Authorities (or equivalents) are responsible for the maintenance and up-keep of their light rail systems, including the infrastructure and the light rail vehicles. Different approaches are taken to operations, with some Local Transport Authorities letting operating concessions while others operate their systems through in-house companies. Where there are concessions, the revenue risk can either rest with the public sector or with the private sector. Each concession has its own arrangements for which party (the authority or the concessionaire) undertakes different maintenance activities and how these are paid for.

In common with all public sector spending programmes, new light rail systems or extensions/ enhancements are subject to a business case, developed following the staged Treasury "Green Book" five case business case model. These business cases set out the strategic rationale for an investment (why it is needed), establish the value for money of the proposal, as well as set out how it will be funded & financed, implemented and how the public sector will oversee the overall process.

Promoters

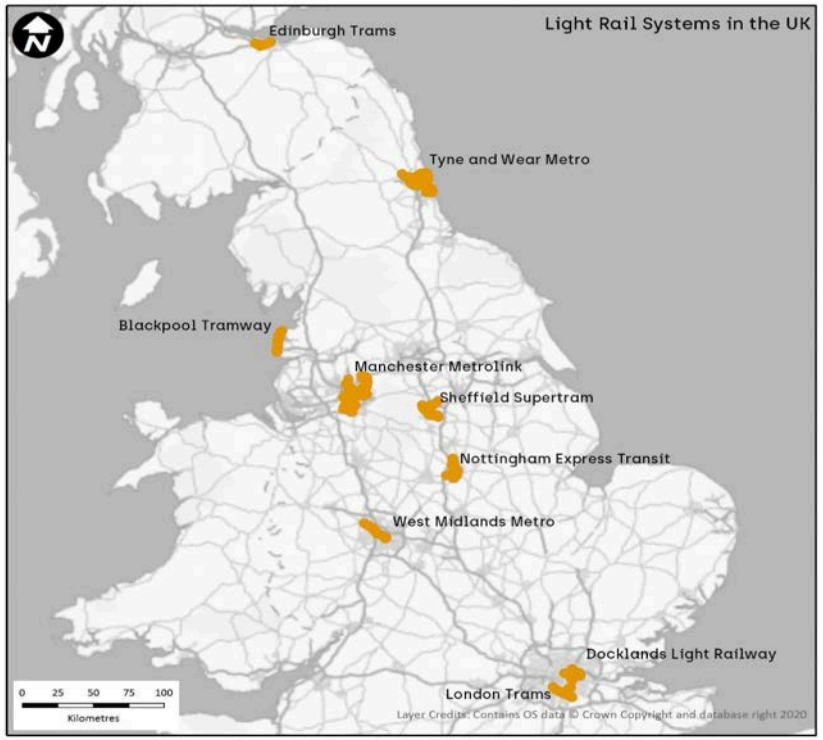
Light rail promoters secure the legal powers to build and operate a light rail system (or modify an existing system) by securing an Order granted by the Secretary of State for Transport using powers granted by the Transport & Works Act (1992). The Transport & Works Act Order (TWAO) process is a powerful one, with the Order giving the promoter wide ranging powers which otherwise would have to be obtained through multiple consenting routes. UKTram's Centre of Excellence forum is actively engaged with the DfT in identifying and publishing tools to help promotors navigate the TWAO process.

Financing

The principal source of capital funding is Exchequer grant or Government approved borrowing. Government expects Local Transport Authorities to contribute capital costs and to use local sources to re-pay borrowings. The Government's contribution is justified by a value for money assessment, including a cost benefit analysis in which the benefits to the national economy are compared with the whole life costs of the proposal. In some areas, complex arrangements combining Government grant, local contributions and expected operating surpluses have been put in place to fund light rail expansion, with the Government's contribution part-justified by the expected boost to the local economy and what this is expected to mean for Exchequer tax revenues.

UK Light Rail Systems

There are nine light rail systems currently operating in the UK Blackpool Tramway, Docklands Light Railway, Edinburgh Trams, London Trams, Manchester Metrolink, Nottingham Express Transit, Sheffield Supertram, Tyne and Wear Metro and West Midlands Metro. Their locations are shown below.



There are six light rail systems in England outside London. The Tyne & Wear Metro, which is the light rail network that provides local rail services in the North East conurbation, opened in stages from 1980. The first phase of the Manchester Metrolink, a tram-based light rail network, commenced operation in 1992 and has been extended in phases since then. Modern tram systems have also been introduced in Sheffield, West Midlands and Nottingham, each using former rail alignments for part of their route. The Blackpool tramway is the only 'first generation' tram system to survive the post Second World War closures. It has been substantially upgraded and now has the characteristics of a modern tramway, as well as operating tourist-focussed heritage services.

In London, the Docklands Light Railway (DLR) is a fully-segregated automated light railway. The first part of the system opened in 1987 and there have been several extensions. The DLR network now serves south of the Thames and London City Airport, as well as a large part of east London. London Trams operates on a mixture of former railways and on street, with the network focussed on Croydon. Both DLR and London Trams are operated by concessions awarded by Transport for London (TfL).

Edinburgh Trams is Scotland's sole light rail scheme. Opened in 2014, Edinburgh Trams links Edinburgh Airport with the city centre using a mixture of tramway and segregated alignment. The system is currently being extended to Newhaven via Leith.

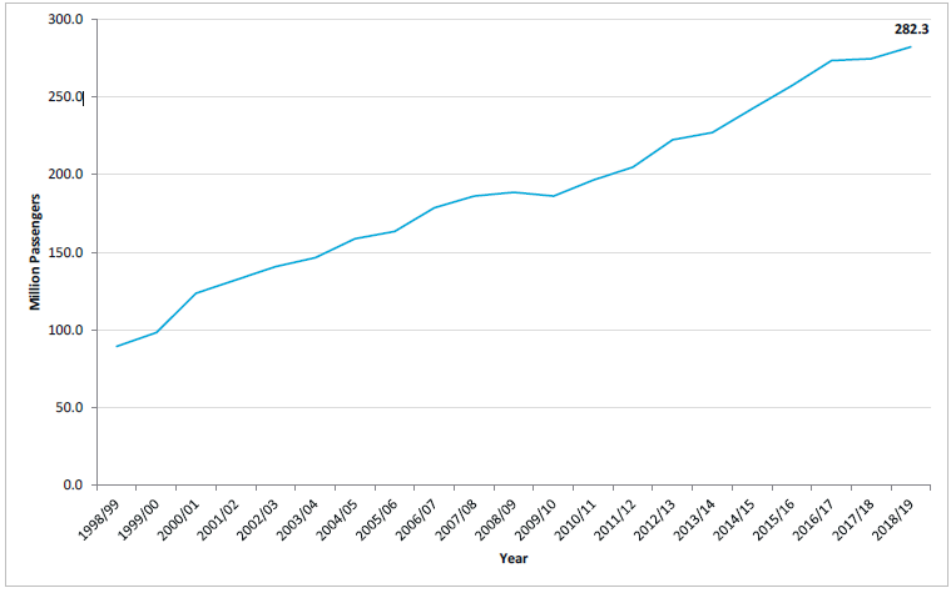
Whilst the arrangements are unique for each system, reflecting the economic and wider benefits that they bring, the capital costs of each light rail system have been substantially funded through Exchequer contributions. The way each system is operated is also unique, but reflecting Government capital funding conditions.
Key characteristics of the nine light rail systems are set out in the following Table which also sets out how each system is operated and where revenue risk lies.

Network	Passengers (million)	Revenue (£m)	Length (kilometres)	Fleet (trams/LRVs)	Description	Operation and revenue risk
Blackpool Trams	5.2	£7.0m	18	18[7]	Follows coast between Blackpool and Fleetwood. Significant seasonal traffic	Direct award to council owned bus company which takes revenue risk
Docklands Light Railway	121.8	£171.6	38	149	Six-line network linking Lewisham in the south, Stratford and Stratford International in the north, Beckton and Woolwich Arsenal in the east, and Central London to the west	TfL concession operated by Keolis Amey Docklands Ltd. Revenue risk rests with Transport for London
Edinburgh Trams	7.5	£15.7	14	15[8]	Single line network linking Edinburgh Airport with Edinburgh city centre (York Place)	Operated by Edinburgh Trams Limited, which in turn is owned by City of Edinburgh Council
London Tramlink	28.7	£23.5	28	35	Three-line network focussed on Croydon and serving Wimbledon, New Addington and Beckenham Junction	TfL concession operated by First Group. Revenue risk rests with Transport for London
Manchester Metrolink	43.7	£82.1m	103	120[9]	Seven lines radiating out from city, mixture of new alignments, on-street and heavy rail conversion	Seven-year concession to KeolisAmey until 2024. TfGM takes revenue risk
Nottingham Express Transit	18.8	£20.6m	32	37	Cross city tram spine with routes to the North, South and West of city	A DBOM concession granted to the Tramlink Nottingham consortium which takes revenue risk
Sheffield Supertram	11.9	£14.0m	34	32[10]	On street or new build lines to north west, north east and south east of city. The link with Rotherham is the UK's only tram-train	Operated by Stagecoach who hold the concession until March 2024. Stagecoach takes revenue risk
Tyne & Wear Metro	36.4	£51.9m	78	89	Combines heavy rail conversions with tunnel section under Newcastle	In house operation with LTA taking revenue risk
West Midlands Metro	8.3	£10.7m	22	21	Largely follows former rail alignment between Wolverhampton and Birmingham. On street sections in both centres. Extensions under construction	In house operation with LTA taking revenue risk

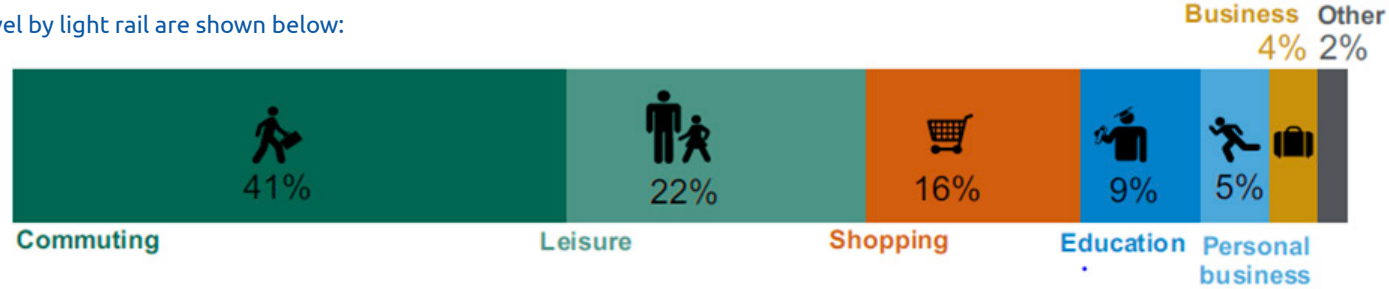
7 Excludes historic and B series trams. 8 Total fleet is 27 vehicles, which will support future services that will operate once the route is extended to Newhaven. The extension is under construction and due to open in 2023. 9 131 trams as at October 2021, to be 147 trams by late 2022

Customers

In the year before the start of the restrictions brought about by the nation's pandemic response, in the 12 months to 31st March 2019, 282 million journeys were made by light rail. As shown in chart below, use of light rail had been increasing over the last twenty years reflecting: the expansion of these networks which has made them a viable travel option for a greater number of people; the growth in employment and economic activity in the city centres that they serve; that light rail is an attractive alternative to other forms of transport, especially for medium-distance journeys within conurbations. The latest data statistics released by DfT show that journey levels, as with all other modes of transport, were comparable to those of 1997 eighty two million journeys[4]. There is no evidence to suggest that passenger journeys will not again increase to pre-pandemic levels as urban centers revibrate.

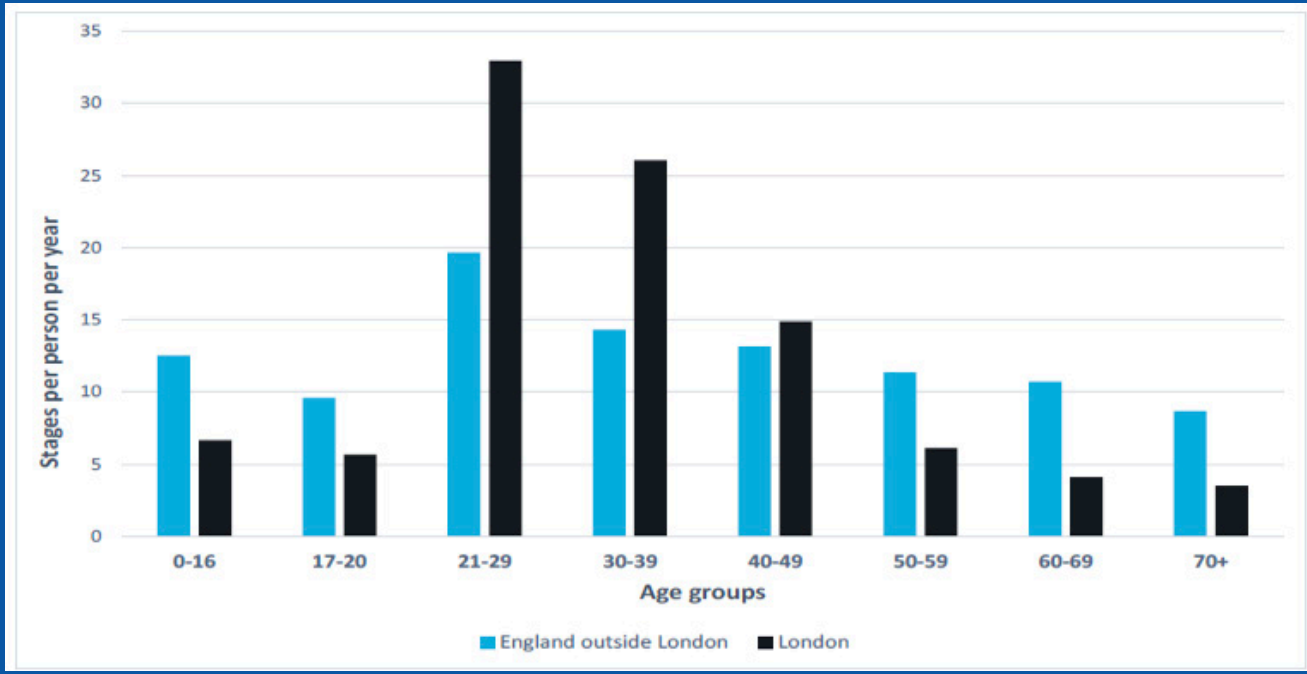


The reasons why people travel by light rail are shown below:



Together, commuting to work and journeys to education account for around 50% of all light rail journeys. This reflects that light rail networks are focused on the centres of the conurbations that they serve, which are the largest centres of employment and largest centres for retail and the leisure industry in their areas.

4 https://www.gov.uk/government/statistical-data-sets/light-rail-and-tram-statistics-lrt#passenger-journeys-vehicle-miles-vehicle-kilometres-and-occupancy-lrt01



The figure above shows the age demographic of customers using light rail in London and outside London.

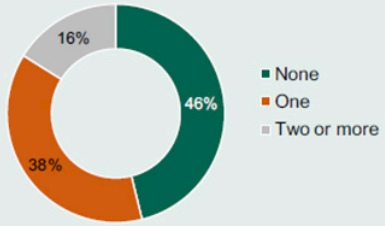
The snap shots below show that customers without a private car access and those in higher income groups take greater light rail trips. It is city centre markets that light rail serves well – city centres have the highest concentration of better paid knowledge intensive jobs.

Passengers

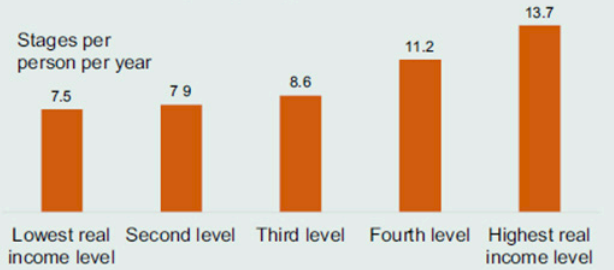
Households without access to a car account for a larger share of trips by light rail.

Higher income households tend to make more trips by light rail.

Journey stages by household car access



Journey stages by household income



See page 7 for the definition of a stage

Source: National Travel Survey

Overall, men make 54% of light rail journeys and women 46%.

Passenger satisfaction

87-97% of passengers are satisfied with their overall journey

59-91% of fare paying passengers are satisfied with the value for money for their journey

85-93% of passengers are satisfied with the punctuality of the tram

68-89% of passengers are satisfied with the availability of seating or space to stand

Blackpool Tramway (2018), Midland Metro (2018), Manchester Metrolink (2019), Sheffield Supertram (2019)

Source: Transport Focus

Why Light Rail

Light rail is a convenient, attractive and sustainable transport option used by millions of people every year. Light rail delivers substantial and widespread benefits to its users and to non-users alike. In turn, these lead to benefits to the economy, environment and social makeup of the areas which light rail serves.

Everyone who uses light rail does so because they benefit when compared to the alternatives, be that travel by bus, by car, walking or cycling, making a different journey altogether, or simply not travelling at all. For these people light rail is quicker, more punctual, more convenient, accessible and is considered safer. Or a combination of these along with other more intangible factors that make light rail attractive to its users.

As well as making life better for the people that use it, either directly or indirectly, these individual benefits felt by users translate to benefits to the national economy and these impacts are recognised and incorporated in the cost benefit analysis that is integral to the business cases that underpinned each of the UK's nine light rail systems.

The benefits of light rail, however, are not limited to benefits felt by its users. There are wider societal benefits too. Indeed, it is these wider benefits that promoters of light rail systems are looking to realise when they bring forward their proposals. These benefits include :

- Supporting the sustainable growth of town and city centres – allowing them to grow with less congestion by offering a convenient alternative to road traffic.
- Supporting specific site location redevelopment and regeneration – increasing the scale of new housing and new employment.
- Helping 'left behind' towns and local centres bounce back – Promoting social inclusion by providing attractive connections to job and training opportunities, as well as important public services.
- Encouraging more sustainable and healthier lifestyles.
- Zero emission at the point of use and can be powered by green electricity (which in turn can be an efficient way of supporting the transition to net zero), as well as helping towns and cities meet their air quality goals.
- Light rail can help enhance the urban realm.

Modal Shift

As set out in the Government's Transport Decarbonising Plan, modal shift is an important tool in securing the decarbonisation of transport, and it goes further to say that we cannot rely on the electrification of road transport, or believe that zero emission cars and lorries will solve all the decarbonisation issues, particularly for meeting the medium-term carbon reduction targets to 2035.

Not one solution fits all but when put in the right place and best suited to the transport needs of the community Light Rail has demonstrated that it can shape travel patterns.

Example 1

Research undertaken[5] as part of the 2017 evaluation of Nottingham Express Transit which found:

- 30% of passengers using the Phase Two network extensions had previously used the car for their main mode of travel prior to the introduction of new services or had transferred from other park and ride sites to those on the Phase Two network (Clifton South and Toton Lane).
- Over 50% of passengers who had changed travel mode to Line One of NET previously used car as their main mode of travel.

A key feature of the NET system is its park and ride. The five park and ride sites on Line One have an occupancy rate of over 85%, which effectively means they are considered 'full'. The evaluation report suggests demand of around 800-900 cars using Totton Lane each weekday and 300-400 at Clifton South. As these sites are not yet operating at capacity, there is potential for further growth.

This has contributed to growth in public transport use in the city of nearly 25% between 2004 and 2019 which in turn has led to Nottingham being one of the few cities outside London to see a reduction in car usage.

5 rep.ntu.ac.uk/id/eprint/28095/1/PubSub5644_Rossiter_v2.pdf

Example 2

Surveys undertaken[6] in October and November 2018 on Manchester Metrolink found that:

- Network-wide, 48% of all passengers reported that they had a car or van available for the journey they were making when surveyed. On the East Didsbury line this figure increases to 58%, while on the Eccles line it is 39%, which reflects both the characteristics of the journeys made on these two lines and the socio-demographic characteristics of the areas served.

- When asked "if Metrolink was not available for the journey you are describing, what would you have done instead", network-wide 29% said that they would travel by car, either as a driver or as a passenger.

Example 3

Work by Nexus[7] that explored the hypothetical question of what would happen if the Tyne and Wear Metro was closed identified that there would be significant shift to private cars

- As much as 42% of Metro passengers in North Tyneside would switch to car or taxi.

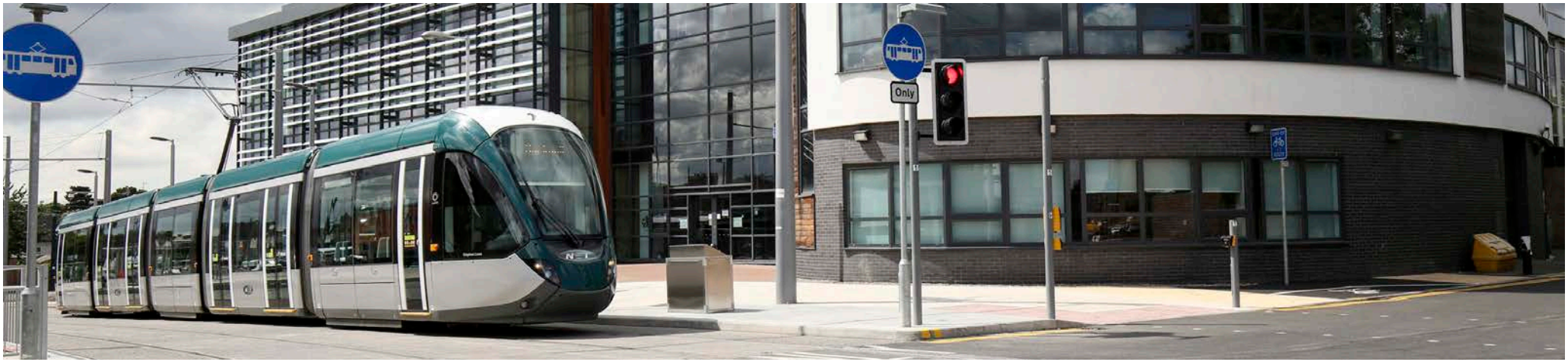
Example 4

Tram-trains entered operation in South Yorkshire on 25 October 2018, providing 100 services per day between Sheffield Cathedral tram stop and Rotherham Parkgate station. The line to Parkgate is the first extension to the South Yorkshire Supertram network since it opened in 1994.

During the development of the Tram-train concept it soon became evident that the final preferred location of the Tram-train terminus at Parkgate (chosen primarily as the most appropriate place to turnaround trams) would be an attractive location for potential 'Park & Ride' (P&R) users.

Working closely with Parkgate Shopping (owner of adjacent retail park) SYPTE were able to secure 31 dedicated P&R spaces within the existing privately owned retail car park for Tram-train customers for the launch of the service in October 2018. Not surprisingly the service proved very popular and demand for P&R soon exceeded supply, resulting in customer complaints to SYPTE and parking control problems for the retail park. A short-term temporary solution was found by extending the area for parking into adjacent under utilised land owned by Parkgate Shopping increasing the number of P&R spaces from 31 to 90, initial uptake, pre Covid was very encouraging.

Recognising the popularity of the Tram-train service, demand for P&R in the locality and seeking to ensure that the service reaches its full potential, in November 2019 SYPTE as part of its Transforming Cities Funding (TCF) bid submitted proposals for a permanent 200 space P&R site on land close to the existing Tram Train stop. The TCF bid was subsequently approved and plans are currently been drawn up for construction to commence summer (2022) subject to approvals.



6 ssets.ctfassets.net/nv7y93idf4jq/6Tk9r9ATVS8zTQfyi4vFD2/f67f3087b19d46fb8d4f2c290ec2fef0/Metrolink_Phase_3_evaluation_second_report.pdf

7 urbantransportgroup.org – What Light Rail can do for City Regions

Economic Development and Regeneration

When put in the right place and best suited to the transport needs of the community, there is evidence from across the UK's light rail systems that when light rail is implemented alongside coordinated and integrated land use planning, there can be new development and regeneration which would otherwise not have happened. These can range from large area wide impacts where the provision of light rail is integral to the transformational development that has occurred to smaller scale more local impacts. Examples include:

Case Study 1[8]

Salford Quays is a former dockyard area, lying 5 km west of Manchester City Centre. The dockyard closed in 1982 and the redevelopment was built around the extension of Manchester Metrolink, which opened in 2000 and provides direct connections to Manchester city centre and Manchester Piccadilly, which is Manchester's principal railway station, as well as connections to the rest of the Metrolink network. Before Metrolink, the area was poorly served by public transport. Part of Salford Quays is the flagship 'MediaCityUK' site, which is home to around 250 businesses employing around 7,000 people including one in seven BBC employees. Integral to the MediaCity development is a 360 m spur from the Metrolink line through the Quays and this opened in 2010. A further 1,000 business are in the wider Salford Quays area, employing 27,500 people.

Case Study 2

A new £21 million interchange at South Shields on the Tyne and Wear Metro forms part of a wider £100 million regeneration of the town centre ("South Shields 365") which includes renewing town centre retail and the market square, new commercial and housing developments as well as the new National Centre for the Written Word.

Case Study 3

Recent extensions to NET are helping unlock a number of significant development sites in the area, including the Southern Gateway, NG2 business park, Queens Medical Centre and Beeston town centre.

Case Study 4

Interview evidence[9] from key developers has shown that Edinburgh Tram played a role in their decision to invest and in their marketing of developments to potential buyers and occupiers. The same research suggests that as a result of the light rail line, a number of businesses have been able to open new market sectors or increase their resilience and ability to deal with increased growth. Evidence from stakeholder interviews shows that offices located along the light rail line were generally more profitable and attractive for staff and new recruits.

Case Study 5[10]

Light rail can also support residential developments. Opened in 2007, Langdon Park station is on the Stratford-Lewisham line of the Docklands Light Railway. The opening of the station generated a step change in local development activity, resulting in around twice as many residential units coming forward than an equivalent nearby area without a new station. By 2013, around 700 to 1,700 net additional homes had been delivered compared to other control areas.

8 Case study provided by TfGM
9 Edinburgh Tram Evaluation Report, City of Edinburgh Council (unpublished)
10 Arquati D (2013), No Train, No Gain: The Local Economic Impact of Langdon Park DLR Station, Report provided by TfL

Case Study 6[11]

Supertram connects the Lower Don Valley with Sheffield city centre and the city's main railway station, as well as residential communities south and west of the city centre. Following the introduction of Tram-train services connectivity is now extended to the centre of Rotherham and the Parkgate shopping complex. This and future enhancements to park and ride facilities at Parkgate and Tinsley will further improve connectivity.

The Lower Don Valley was a key industrial area of Sheffield that has experienced deindustrialisation and by the late 1980s there was approximately 1000 acres of redundant land and industrial buildings. 31 Throughout the 1990s the Lower Don Valley was redeveloped with one of the first major developments being Meadowhall, alongside venues such as the DSA Sheffield Arena. These were all connected via the Supertram system. There was also the development of the Valley Centertainment Leisure complex which saw the development of a new Supertram stop. This site includes a 20 screen multiplex cinema and other food and beverage outlets. It also provides Park and Ride facilities for journeys into Sheffield City centre.

Meadow hall Shopping centre is one of Britain's six super regional shopping centres, employing up to 8,500 people in both full and part-time jobs. In 2018, British Land secured planning approval for a new Leisure Hall, to diversify the centre away from pure retail. In 2020, the plan was revised and an outline planning application submitted for a revised Leisure Hall and wider Masterplan. Supertram is key to the Leisure Hall development and so the shopping centre's future. A Section 106 Agreement was entered into to improve one of the key Supertram stops serving the new Leisure Hall. Collectively these plans have the potential to deliver over 6,000 new jobs[12] and help sustain thousands more. The Olympic Legacy Park is a £100m development across 30 hectares expected to create 3,500 jobs.[13] It is set to become an internationally recognised Innovation District for health and wellbeing research and learning, plus the location for offices, laboratories, leisure retail and residential spaces. The site is home to the Sheffield Hallam University Advanced Wellbeing Research Centre, University Technical College, Community Stadium and Community Arena alongside established venues such as Ice Sheffield, Sheffield Arena and the English Institute of Sport. The Arena/Olympic Legacy Park Supertram stop serves the site directly, providing access for those who don't have a car as well as an attractive alternative way of travelling for those who do.

Highway constraints in the Lower Don Valley and around Junction 34 of the M1 mean that further developments in the area need the connectivity that Supertram provides, and this is integrated into development planning and planning applications for the area.

11 Information provided by South Yorkshire Passenger Transport Executive
12 Sheffield City Story, LSE Housing and Communities, Centre for Analysis of Social Exclusion, May 2016
13 https://sheffieldolympiclegacypark.co.uk/

Supporting Local Employment

Building and then operating light rail systems directly supports local employment.

Example 1

Light rail construction involves a range of skills and trades, offering employment opportunities to people who are highly trained and experienced, as well as those who are entering or re-entering the labour market or who have low skills. An evaluation of the Nottingham Express Transit Phase Two found that:

- Over 40% of construction staff were from the Greater Nottingham area
- Around 2,900 years of employment in the local economy and a further 1,600 years of employment the regional economy were created and this generated around £108m and £61m of Gross Value Added respectively
- Supply chain expenditures generated £140m of activity in the local economy and a further £77m in the regional economy

Example 2

In operation, light rail systems also provide good local jobs directly and support many more in their supply chains. They also invest in skills through supporting apprenticeships. For instance, the Tyne and Wear Metro, employs more than 800 people, Manchester Metrolink around 900 and South Yorkshire Supertram in the region of 350.

Example 3

NET Phase Two provided significant training for people before and during employment, and work experience for young people. Examples include:

- Delivering pre-employment training and targeted recruitment for local candidates claiming Jobseekers' Allowance, via: Five Sector Based Work Academies for the NET Phase Two Works - these resulted in 80 candidates completing their course and attaining NVQ Level 1 and a CSCS Card Construction Skills Certification Scheme), with around 50 candidates being employed on the project.
- New College Nottingham's 'work like' training experience configured to help to improve the 'work readiness' of potential recruits, helped to establish the profile of NCN's Civil Engineering Academy which has since hosted a number of construction courses for other projects and employers.
- Various apprenticeship courses, including: Stephenson College and Taylor Woodrow Alstom (TWA the design and construction Joint Venture) - two-year Level 2 Apprenticeship courses in Construction Operations (5 apprentices).
- New College Nottingham - Level 3 Apprenticeships (3 apprentices).
- West Notts College and Nottingham Tram Ltd (6 apprentices).
- New College Nottingham also led a consortium of colleges in delivering a training programme to over 100 Alstom staff, including a mix of NVQ Level 1, 2 and 3 qualifications.
- National Citizenship Scheme initiative held at the University of Nottingham during the summer holidays providing work experience courses involving over 700 young people. The Princes Trust also ran three 'get into construction' courses with TWA.

Levelling Up

The specific issue of 'left behind' town and local centres is a particular focus of the Government's 'levelling up' agenda and it is worth giving consideration to definitions of 'levelling up' and of the objectives behind the agenda.

The Government's March 2021 Levelling Up Fund prospectus states that: "Investment in local transport networks can revitalise local economies by boosting growth, improving connectivity and making places healthier, greener and more attractive places to live and work"

The development of an index of priority places for the Levelling Up Fund, combined data sources which showed the need for:

- Economic Recovery and Growth – Based on productivity; unemployment; and skill levels
- Improved Transport Connectivity – Based on average journey times to employment centres by car, public transport and bike
- Regeneration – Based on commercial and dwelling vacancy rates

The City Region Sustainable Transport Scheme guidance for Mayoral Combined Authorities sets out the assessment criteria for the scheme, which include levelling up – considered in terms of "where improvements to intra-city transport will deliver the best returns in improving growth, productivity and quality of life"

Investment in Light Rail can and has delivered against these criteria in terms of their beneficial impacts in levels of employment. However, the challenge remains that light rail investment must be shown to represent value for money, including in terms of being the most cost-effective (or only) way to deliver these benefits.

The World Bank defines social inclusion as "the process of improving the terms on which individuals and groups take part in society". In the UK context, the primary designation of populations in need of support are the national indices of multiple deprivation.

Taking England as an example, the seven underlying deprivation domains are: Income, Employment, Education, Skills and Training, Health and Disability, Crime, Barriers to Housing Services & Living Environment.

Improving transport connectivity to employment opportunities, education and training, and other facilities can bring substantial benefits, where such opportunities are sufficiently viable to allow participation – that is: within reasonable commute/journey time; at affordable travel cost; dependable; and available at suitable times (for example arriving in time for shift start/returning not too long after shift-end).

Public transport plays a particularly important role in promoting social inclusion; research for the Government's Foresight Future of Mobility project reported that lowest income households have higher-levels of non-car ownership and that there are considerable affordability issues with car ownership for many low-income households. Where car ownership levels are low, public transport can provide the only connection between areas of social need and opportunities to participate.

Example[14]

West Midlands Metro has played a critical role in the Covid crisis in the West Midlands. It has kept Key Workers working, allowing the West Midlands to continue as a functioning society. This exemplifies the role the light rail line has had over the last twenty years: getting workers to work and students to skills in one of the UK's most deprived urban corridors. It has done this in a way which is pollution-free and without adding traffic pressures on the West Midlands' congested highway network. It has done this in an almost totally carbon-free way.

It has helped the economic vitality of Wolverhampton, West Bromwich and Birmingham strategic centres and helped them attract investment in jobs, shops and services. Metro Line One has increased land values in its corridor, showing its powerful regeneration effect.

Eight million passengers a year used Metro Line One in 2019/20, a significant increase from the five million in 2015/16, before the extension to Birmingham Grand Central/New Street station opened. This shows the importance of tramways which are highly visible in city centres, and which provide key connections for customers such as between edge of centre areas and the heart of the city centre and links between central rail stations like Snow Hill and New Street.

Metro Line One serves one of the most deprived urban corridors in the UK. It provides a fast, high capacity, high frequency light rail link serving three strategic centres (Wolverhampton, West Bromwich and Birmingham) and the towns and communities of Bilston, Wednesbury, Winson Green and Handsworth. Before the Covid pandemic, commuting to work or education accounted for 62% of Metro use (Metro User Profile, TfWM, 2017) and 26% of Metro users in 2017 were from DE socio-economic group and 20% from the C2 group. Metro users were more ethnically diverse than the West Midlands population as a whole with 23% of Metro users Asian, and 11% Black. Metro has helped promote inclusive economic growth, which is fundamental to the whole development strategy of West Midlands Combined Authority.

Light Rail systems provide an additional advantage over most other public transport services, in terms of providing equal access for disabled people, and for those travelling with shopping, luggage, children, etc. Light rail allows dependable independent level access to services, often from near-ground level, and vehicle layouts which readily accommodate mobility scooters, wheelchairs and pushchairs. Light Rail provides a dependable and understandable service, allowing for clear at-stop and on-board visual, audio and tactile information provision.

Across the UK, Light Rail services enable trips by passengers – and therefore fuller participation in society – that cannot otherwise be made by public transport.

Light rail can support the transition to net zero carbon

The imperative to reduce carbon and the Government's commitment to achieve net zero by 2050 is the singular greatest policy challenge facing the UK. Transport is the largest contributor to UK domestic greenhouse gas (GHG) emissions, accounting for 27% in 2019.[15] Reducing transport emissions will be fundamental to addressing climate change and to meeting the Government's legally binding commitments.

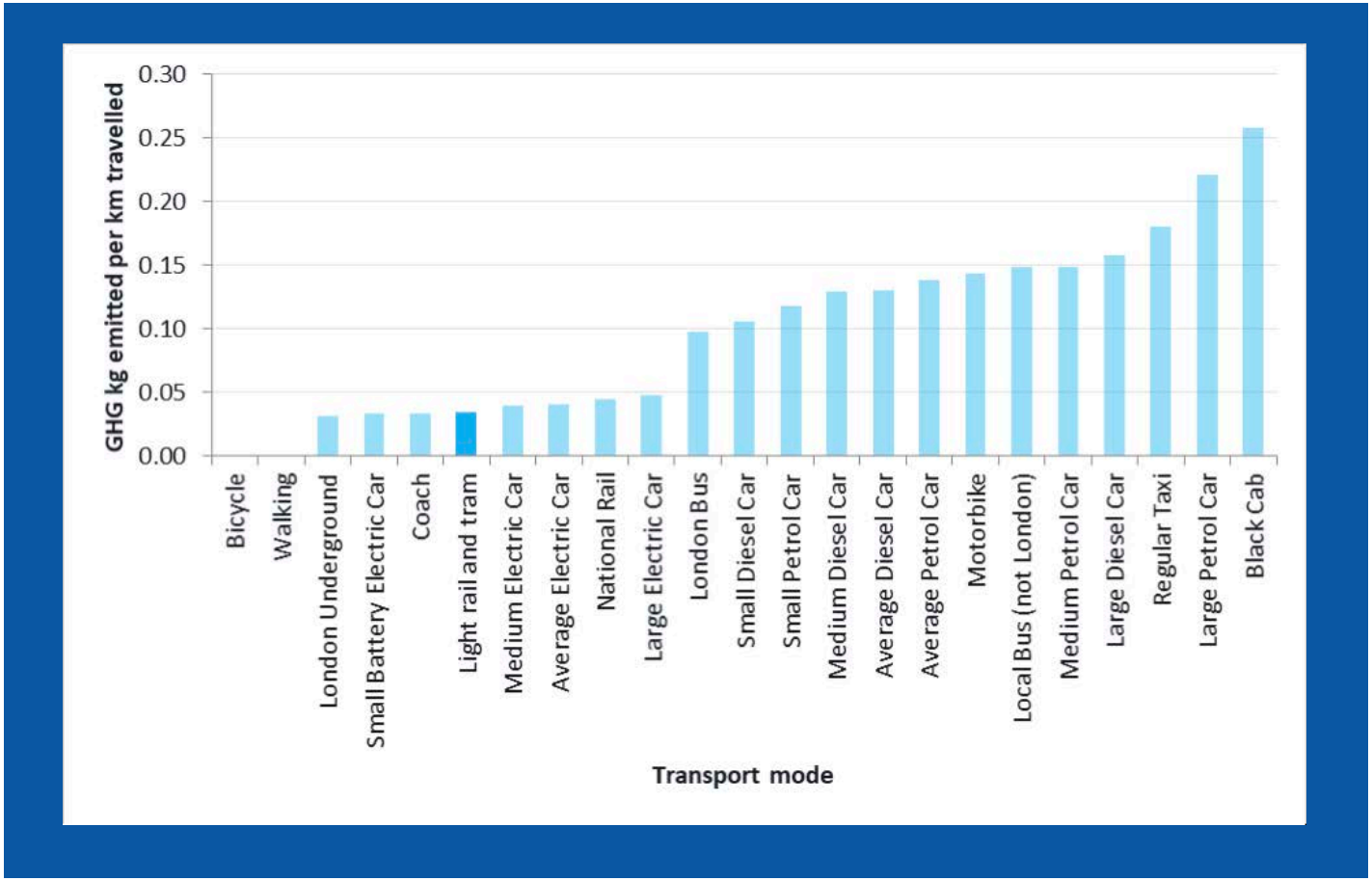
In addition, there is increased recognition of the importance of air quality and physical activity in supporting health outcomes, and the importance of 'place' and enhancing the physical environment in supporting communities, society and economic regeneration.

14 Information provided by Transport for West Midlands
15 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/984685/transport-and-environment-statistics-2021.pdf

The potential role of light rail will therefore be increasingly important if it can help address these policy challenges. City region combined authorities and local authorities have responded to climate change by making commitments to climate reduction targets and, in many cases, setting out targets for the share of sustainable modes (public transport, walk and cycle) that is necessary to help achieve this target. These targets are more stretching than the Government's national target and if the national target is to be met, reflecting that some parts of the economy are harder to decarbonise than others, it will be necessary for other sectors to decarbonise faster.

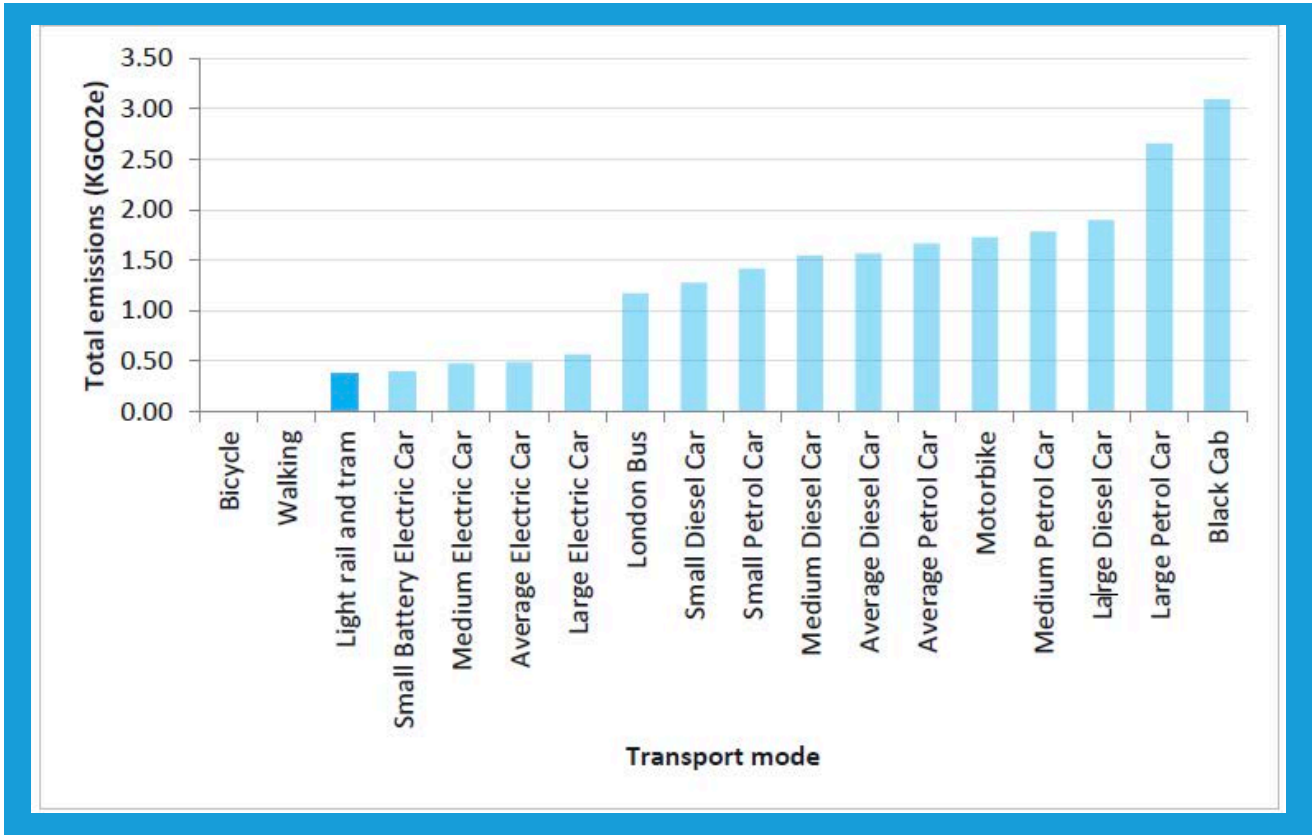
These benefits can be increased by utilising clean energy. Attracting passengers from private car can reduce car kilometres and associated carbon emissions.

A comparison of the emissions from transport modes in 2020 is presented in the graph below[16] shows the amount of Green House Gas kilograms emitted per passenger kilometre travelled by each mode. The chart suggests that light rail is one of the least polluting transport modes.



16 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1046069/env0701.ods

While the graph above is based on emissions per passenger km at a national level (an average of all trip movements and distances), the DfT also publishes a subset of the data which compares emissions from transport modes for a number of journey pairs. These include journeys from Croydon to Wimbledon, which allows for a more direct comparison of emissions by mode for a journey for which light rail is an option and therefore enables a more 'like for like' comparison of light rail and other modes, over a representative urban geography and distance than the national dataset allows. The total emissions, measured in kgCO2e, for a journey from Croydon to Wimbledon, are presented in the graph below:[17]



The chart shows that a journey on light rail between Croydon and Wimbledon emits the least amount of GHGs of all vehicular modes, including electric cars of all size. This suggests that, for typical light rail journeys, light rail is likely to be more carbon efficient than available alternatives.

Over time advances in light rail technology will result in vehicles and systems become more energy efficient. For instance, the new fleet that is currently being introduced on Tyne & Wear Metro will be 30% more energy efficient, increasing Metro's advantage over other modes further. Across all systems, as light rail vehicles are renewed and replaced over time, it is anticipated that further improvement in energy efficiency will reduce carbon emissions per passenger.

17 ttps://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/984685/transport-and-environment-statistics-2021.pdf

The proportion of electric vehicles in the private car fleet will also increase and they too will become more efficient (although these gains may be reduced by consumers purchasing more powerful vehicles)[18]. The carbon footprint of the UK generation sector will also reduce as the renewables share grows. Similarly, electric buses will become more commonplace and hydrogen fuel cell powered buses may become mainstream. However, and as the Department for Transport's Transport Decarbonisation Strategy sets out, the rate that these changes are expected to happen is insufficient to allow the trajectory to net zero to be met by 2050 without accelerating modal shift to public and active transport, including light rail.

Already, light rail is a carbon efficient mode. The more people who use the UK's existing light rail systems the more carbon efficient it becomes. Growing patronage on existing systems is a carbon benefit that can be had quickly.
Together Manchester Metrolink's Phase Three extensions (lines to Rochdale via Oldham, Ashton-under-Lyne, East Didsbury and Manchester Airport) remove around 39 million[19] car kilometres from Greater Manchester's roads per year. In 2019/20 this helped to save 6,700 tonnes of CO2. SYPTE estimate[20] that Sheffield Supertram helps save over 2,000 tonnes of CO2 per annum. Expanding light rail provision creates the opportunity to induce the types of behavioural change that are needed if the UK is to reach net zero by 2050.

Additionally, light rail promoters are increasingly seeking to ensure that the source power supply is based on renewable energy, for instance the power supply to Manchester Metrolink trams and stops is 100% from renewable sources. Similarly, in the West Midlands, Metro uses renewable source-generated electricity in a green energy supply contract. Commitment such as this from public sector large-scale consumers of electricity help support the further growth of renewable generation, which in turn has a wider benefit as the nation looks to decarbonise electricity generation as part of its net zero commitment.

18 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/914111/driving-and-accelerating-the-adoption-of-electric-vehicles-in-the-uk.pdf
19 Metrolink Phase 3 Monitoring and Evaluation Second Report
20 Information provided by South Yorkshire Passenger Transport Executive

According to Public Health England[21], up to 36,000 deaths a year are attributable to human made air pollution. Traffic-related pollution is one of the most significant sources of poor air quality in urban areas. This air quality is not just brought about by the use of fossil fuels, brake and rubber particulates also contribute to poor air quality.

Reducing traffic flows through encouraging greater use of public transport and active modes, as well as land use policies that minimise vehicular traffic is one way that local authorities can combat poor air quality. The direction of policy across major UK cities is to enhance and promote the 'place' function of urban areas – encouraging activity, while mitigating or ameliorating the adverse air quality and health impacts associated with vehicular traffic.

Light rail is zero-emission at the point of use and therefore provides a significant benefit compared to petrol/diesel vehicles. This advantage of light rail would persist through a transition stage towards the electrification of cars and buses over time. While the sale of new fossil fueled cars will end by 2030, predictions indicate that by 2040[22] a third of car vehicle-kilometres and over 10% of van vehicle-kilometres will still be made by electric vehicles. This reflects the anticipated rate of 'churn' of the UK's car and van fleet.

The capacity and connectivity that light rail offers can be a fundamental enabler of major traffic reduction in central areas, and therefore an integral component to the viability, acceptability, and success of policies such as the development of Clean Air Zones and Low Emission Zones, which can include physical or regulatory restrictions on city centre traffic movements as part of town/city centre movement strategies, as well as fiscal (charging) measures to discourage polluting traffic. Public transport provides an alternative to car travel and for many journeys, light rail is the best way of providing this.

Pandemic Recovery

The pandemic has led to a step-change in the number of people working from home, either some of the time or all of the time. A feature of the pandemic has been the increase in e-commerce and having these goods or services delivered. Pre-pandemic, around 1 in 6 light rail trips were for shopping. The pandemic has also affected how and where people socialise, and therefore how they travel.

Not everyone can work from home. People in office-based jobs in the so-called 'knowledge economy' have the greatest ability to work from home. Data from the Office for National Statistics[23] shows that during the first lockdown in April 2020 no more than 60% of those in professional occupations were working from home and these people accounted for around 60% of the workforce. This means that around a third of the workforce was working from home during the first lockdown.

21 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938623/Review_of_interventions_to_improve_air_quality_March-2019-2018572.pdf
22 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005301/transitioning-to-zero-emission-cars-vans-2035-delivery-plan.pdf
23 https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/adhocs/13755coronavirusandthesocialimpactsongreatbritainworkingathomeandlocationofwork

Before the pandemic the number of people who worked from home either all or some of the time was growing. In response, public transport operators (not just light rail) would have changed, with different service patterns, operating hours, fares and ticketing products all to best serve changing markets. These changes would have been gradual.

While post-pandemic public transport patronage will be a function of the size and nature of the post-pandemic economy, the post pandemic economy will also be influenced by the transport connectivity that is provided. Because of agglomeration, town and city centres are already highly productive and because of scale, they are more sustainable than suburban sprawl. Strong and vibrant town and city centres are synonymous with a strong and vibrant economy. The Government's Transport Decarbonisation Plan calls for a modal shift to public transport and strong and vibrant city centres are a key driver of public transport patronage. Maintaining public transport connectivity is integral to helping town and city centres recover and in the conurbations that they serve, light rail is integral to this connectivity.

The Future

Evidence tells us is that light rail is making substantial and worthwhile contributions to national and local policy goals. This is not to say that each of the country's light rail systems contributes to each policy goal equally. Rather, each system makes a unique contribution that is a function of the connectivity it provides (routes, journey time, service frequency, etc.) and the characteristics of the areas that it serves.

Light rail's contribution to each of the policy themes is maximised by light rail carrying in comfort and with safety the greatest number of passengers possible whilst occupying less road space than need by other forms of public and private transport.

Light rail is integral to the public transport connectivity provided in the towns and cities that it serves. In these towns and cities, light rail connectivity will help shape post-pandemic recovery. However, it will take time for travel patterns to settle for a look at a 'new normal' and respective growth opportunities. If services are not maintained to an attractive or desired standard or level or fares are increased disproportionately, economic, societal and environmental benefits may be lost.

There is agreement within national and local government that light rail has an important role to play to secure economic, societal and environmental benefits when put in the right places.

Government has previously funded some major maintenance and renewal projects. In Blackpool, system renewal and a new tram fleet introduced in 2011 led to patronage growth. There has been infrastructure renewal of the Tyne & Wear Metro and a new fleet is being introduced.

Light rail has much more to offer. Recent changes to the Treasury's business case guidance stress that weight should be given to the strategic case for investment, including how light rail affects different places and supports meeting societal objectives alongside environmental ones.

Fast boarding and alighting coupled with 'Smart ticketing' arrangements make Light Rail attractive to people who would otherwise use cars, but don't consider bus a viable alternative.

Fast and easy payment for passengers, eliminating the need to queue for a paper ticket or to 'top-up' smart tickets. Have already been demonstrated. The Transport Focus survey found that of customers using contactless payments in general retail, 84 per cent cited 'speed' and 79 per cent cited 'ease' as reasons for use[24]. Smart ticketing also benefits industry with increased journey volumes (from simplified ticket purchasing) leading to revenue increases, increase speed of customer throughput and operational cost savings from speed and reduction in ticket management[25].

Multi-Mode Travel products that include Light Rail are complex, there are different regional back office approaches evolving, with no overarching national back office plan or approach to standardisation, all of which are needed to help with mode interoperability. UKTram are offering support and assistance in this area and welcome any request to help further promote 'Smart ticketing' initiatives.

Light Rail is guided with direction controlled by rails which overcomes one of the barriers in the goal to transform highways into safer autonomous vehicle operation that other modes would have to overcome in this quest. Light Rail is highly efficient at absorbing high capacity demands when moving large numbers of people in urban areas, especially for medium distance trips that are not best served by other modes.

24 https://d3cez36w5wymxj.cloudfront.net/wp-content/uploads/2016/10/25115623/TF-Smart-Travel-Contactless-Oct16-web-FINAL.pdf
25 https://www.ukfinance.org.uk/system/files/Contactless%20Transit_v4_FINAL.pdf

Autonomous operation would also enable a frequent "turn up and go" metro-style service, which is most attractive to the public in terms of flexibility and modal shift away from private motoring.

Whilst frequencies on Light Rail systems are nearing 'turn up and go' levels UKTram is working with its European partners to explore the future of autonomous trams in urban transport.

Rail is one of the most carbon efficient ways of moving goods emitting only a quarter of the CO2e emissions of HGVs per tonne km travelled. In 2019/20, the rail freight industry resulted in 6.8 million fewer lorry journeys. The Government continues to encourage and incentivise modal shift from road to rail through the Mode Shift Revenue Support Scheme (MSRS), which financially supports the carriage of freight by rail and water on routes where road haulage has a financial advantage.

There is space in the ecommerce debate to included thought for utilizing Light Rail to connect ecommerce distribution centers with 'collection hubs' to reduce emissions and highway capacity on local delivery networks.

Light Rail systems are perceived as a permanent commitment to improving an area's public transport, economy and environment and these perceptions are integral to customer and investor confidence.