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The case for an integrated new rail network serving the Eastern Leg

A report by Volterra Partners, June 2020

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Report produced in collaboration with:

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1 Executive Summary

This report sets out the necessity of delivering the HS2 Eastern Leg (EL) at the earliest available opportunity and continuing at pace with proposed measures integrating the scheme into local transport networks.

The EL is home to 13m people and around 6m jobs, equating to 20% of the UK and larger than Greater London or the entire economy of Denmark. HS2 will boost both employment and productivity across the EL. The EL authorities of Leeds City Region (LCR), Sheffield City Region (SCR), and the East Midlands Councils outline that the delivery of HS2 and supporting investments would lead to approximately 150,000 additional jobs across these regions alone.

The transport sector remains the largest barrier to the UK's target to be a net-zero emission economy by 2050. Significant modal shift away from car use is required across the EL for the UK to achieve its climate targets – this will not occur without improving transport accessibility across the EL.

The delivery of HS2 and supporting transport infrastructure will provide the step-change in connectivity required for the EL to boost productivity and for the UK to develop internationally competitive infrastructure. In 2019 the EL exported £59 billion, 22% of England's exports. Delivering the HS2 EL and supporting transport investments will contribute to levelling up the UK, and provide better access to international markets for British businesses.

Transport investment across the EL has long lagged behind that of other UK regions. In the last decade alone, the EL has faced a total transport investment deficit of £58 billion when compared to spending levels per person within London. A commitment to delivering the HS2 EL will contribute to the levelling up of the region and provide inclusive growth for some of the most economically deprived areas of the country.

Purpose of this document

1.1 In February 2020 the Government announced plans to proceed with HS2, coupled with plans for drawing up an Integrated Rail Plan for the Midlands and the North. This document aims to collate the available information from across the Eastern Leg (EL) authorities for the case for HS2 in particular, alongside the need for other major rail and wider transport investment, highlighting the importance of the integration of these, along with the integration between transport and other policy areas.

1.2 This report concludes that the case for delivering the HS2 EL remains strong despite the rise in costs forecast within the Oakervee Review. The case is particularly strong when delivered in combination with supporting local and regional transport investments and delivered at the earliest possible opportunity. A national commitment to delivering the scheme at the earliest available opportunity would enable the delivery of significant supporting investment from the public and private sector and underpin the national response to the current economic downturn resulting from the Coronavirus crisis.

Why investing in transport is important for the economy

1.3 Transport connects places, enabling people to travel for commuting, business and leisure purposes. Much research over a sustained period of time has shown that there is a positive relationship between infrastructure investment and economic growth – **put simply infrastructure is a critical factor for the economy to function and grow**.

1.4 There is clear, consistent evidence that the UK has historically underinvested and as a result **the UK's infrastructure falls behind European and global competitors**.

There has been a long term persistent underinvestment in regional transport, which needs to be addressed to deliver a national network for the North

1.5 There are large inequalities in the amount of public money spent on transport infrastructure between different regions.

1.6 Both historical and planned transport expenditure have been significantly lower per head across the North and the Midlands than other areas of the UK. **The EL regions of the North East, East Midlands, and Yorkshire have received just 36% of the spending per capita London levels** over the past decade.

1.7 This underinvestment has been consistently true. If the EL had received the same amount per person as London over the last decade, then £58 billion more would have been spent across the EL on transport than has occurred. Even if the reported **£100bn cost of HS2 is correct, this would still be less than the combined underspend across the EL and WL over the past decade**, putting into context the scale of the imbalance.

1.8 HM Government has made clear the need to rebalance transport investment towards areas of lower productivity and connectivity.

1.9 Even **after accounting for the costs of HS2, NPR and TRU at current estimated costs, each of the regions across the EL would still contain lower transport investment per head than London**.

The Eastern leg is committed to delivering transformational change

1.10 National policy has highlighted the need for a transport strategy to maximise the benefits of HS2 through **integration with local economic, spatial, industrial and transport plans**.

1.11 Significant work has already gone on at the local and regional levels into the planning of how best to maximise the benefits of HS2. A number of transport investments have been proposed that will further connectivity within the area and maximise the benefits of the EL.

1.12 The growth strategies produced by LCR, SCR, and the East Midlands Councils that feed into the objective of integrating HS2 into the existing and future transport network outline that **the delivery of HS2 and supporting investments would lead to approximately 150,000 additional jobs** across these regions alone.

1.13 Alongside HS2, the additional investments of Northern Powerhouse Rail (NPR), Midlands Engine Rail and the TransPennine Route Upgrade (TRU) are needed to unlock additional capacity.

1.14 LCR estimate that the delivery of **HS2 will contribute an additional 40,000 jobs across the region by 2050**. To integrate HS2 into the existing transport network, LCR have created the Leeds Integrated Station Masterplan, maximising local accessibility to the station when operational. LCR estimate that **supporting policy and other transport investments alongside HS2 could result in productivity increases that contribute a further 50,000 jobs** within the region.

1.15 In addition, LCR have ensured that planning policy is prepared to ensure that development contributes to the economic opportunities offered by HS2. The **South Bank growth proposals would see significant regenerative development in** a current relatively deprived area which would experience a large uplift in connectivity. The proposed HS2 Rail Depot to the south of Leeds centre would add further jobs to the economy and be supported by the creation of the Institute for High Speed Rail and System Integration, adjacent to the site and fostering innovation for the transport network.

1.16 **SCR estimate that the delivery of HS2 would contribute 23,800 additional jobs and more than £2.7bn in economic output by 2048**. The region outlines several integration measures in its Transport Strategy, boosting connectivity prior to the delivery of HS2. The region will invest a total of £330 million in transport

research and development with the objective of enabling greater access to public transport through technological solutions.

1.17 SCR has emerging innovation clusters which are a global magnet for people, industry and innovators. They will build upon the region's specialisms in advanced manufacturing and engineering, intelligent mobility, healthcare technology and more. Continued success will be underpinned by great transport infrastructure. The clusters will improve local connectivity with the upcoming HS2 station and enable greater access to the region's advanced manufacturing industrial sites.

1.18 The East Midlands Hub Station at Toton will serve an area of over 3 million people and more than 100,000 businesses. It will transform connectivity between the East Midlands and Birmingham (19 minutes), and Leeds (29 minutes) and release capacity from overcrowded passenger and freight networks, including to **East Midlands Airport, the 2nd largest air freight hub in the UK**.

1.19 The **East Midlands HS2 Growth Strategy published in 2017 sets out proposals to use HS2 connectivity to deliver at least an additional 74,000 jobs** and £4 billion of GVA – shifting the region's growth rate to above the UK average.

1.20 The area adjacent to the East Midlands Hub Station at Toton in Nottinghamshire and Leicestershire represents a major development opportunity. An **Innovation Campus will sit at the heart** of a number of major development opportunities that will include the nearby Chetwynd Barracks 'garden village', the Ratcliffe-on-Soar Power Station site and, in Leicestershire, the area around East Midlands Airport and the new intermodal freight terminal.

1.21 Given the collective scale of these opportunities, the Growth Strategy identified the need for a **powerful local delivery body to be established**. Subsequently, a Summary Business case was submitted to MHCLG to explore the establishment of a new form of 'Locally Led Development Corporation', with the objective of accelerating development and maximising growth potential.

1.22 The prospect of a HS2 connection at Chesterfield Station has led to the establishment by County and Borough councils of a **'Joint Growth Board' which is already driving major regeneration** of the town centre and adjacent commercial areas. The potential benefits of HS2 for the Chesterfield area include: 4,740 new homes and 10,220 new jobs, creating £270m net additional GVA, and establishing a new gateway into the Peak District. A new HS2 Infrastructure Maintenance Depot at Staveley will help generate hundreds of new high quality engineering jobs within some of the most deprived communities in England.

1.23 Tees Valley Combined Authority (TVCA) are seeking to integrate HS2 and NPR with the region's transport network and capitalise on the economic opportunities offered, through the development of the Darlington HS2 Growth Hub at Darlington station and proposed redevelopment of Middlesbrough station.

1.24 It is likely that the economic impacts arising from the Covid-19 pandemic will affect the strategies for growth developed by the EL. The economic uncertainty generated by the crisis is likely to dampen the appetite for business investment and potential economic growth. In the context of the likely significant national recession brought about by the pandemic, it is increasingly important to commit to a public investment programme to ensure that the economy can bounce back from the impacts of the pandemic.

The objectives of a northern transport network:

- Provide a **new national network** to serve population and jobs;
- Facilitate **transformational modal shift** to rail;
- Improve the **reliability,** resilience and use of capacity across the network;
- Accommodate **Rail passenger growth**;
- Deliver **major economic growth**;
- Deliver **inclusive economic growth** and address deprivation and inequalities;
- Contribute positively towards the **climate agenda**.

Providing a new network to serve population and jobs

1.25 **The EL is home to 13m people and around 6m jobs, equating to 20% of the UK.** This is on a par with the combined size of the West Midlands and the North West and **larger than Greater London, or the entire economy of Denmark.**

1.26 Over the past 20 years rail demand across GB has doubled. Rail trips, miles travelled and time spent have all risen whilst the same for car, bus and walking have all fallen.

1.27 **Journeys to work across the EL are still heavily reliant on car travel** however, with 72% of commuting trips by private motor vehicles and 11% by public transport; the polar opposite of just 30% using the car in London.

1.28 Three quarters of Leeds' commuting growth between 2001 and 2011 occurred by rail. In Nottingham, rail commuting more than doubled at the same time that overall commuting actually fell. While there is a small difference between the East and West,with 3.5% of EL commuting by rail compared with 5.3% for the WL, both of these are dwarfed by London where over 40% of commuting trips are by rail.

1.29 Despite the increase in rail trips seen, the transport sector remains the largest barrier to the UK's target to be a net-zero emissions economy by 2050. **Significant modal shift away from car will be needed if the region is going to be able to meet its zero emissions targets.**

The current EL rail infrastructure is unreliable, overcrowded and cannot accommodate the scale of future growth planned

1.30 The East Coast Main Line (ECML) and Midland Mainline (MML) have not benefited from the same level of investment and upgrades as the West Coast Main Line (WCML). The WCML had a recent major upgrade, costing £9bn and completed in 2008. It is estimated that the additional capacity will be filled within the next few years, highlighting that this was only a short term fix and did not deliver the scale of improvements needed.

1.31 This lack of investment is reflected in the reliability statistics. The service operator on the ECML has the 3rd largest proportion of trains cancelled or significantly late of all rail network operators in the UK. **The three worst-performing rail operators on this metric all serve the population of the EL**.

1.32 Leeds has the 4th highest level of overcrowded services of any station in the UK,[1] and remains the busiest station in the North with almost 34 million passengers annually.

1.33 Upgrading the ECML could deliver some of the additional capacity required on rail travel to Leeds. However, **baseline demand growth would fill the additional capacity by the time works are complete even under the lowest growth scenario**. A greater investment into transport capacity into Leeds in particular and across the EL more generally is needed to allow the region to support future economic growth. The new rail track provided by HS2 would enable a step-change in connectivity across the EL's key employment centres and subsequent productivity benefits that cannot be delivered by upgrades to the ECML alone.

Turning the tables: what does a major package of transport investment across the Eastern Leg need to deliver to pay back?

1.34 The **three regions which make up the EL** (Yorkshire, the North East, and the East Midlands) **each have the lowest productivity levels of all regions in England**, over 30% below the London levels.

1 When measured under the passengers in excess of capacity (PiXC) metric reported by the Department for Transport.

1.35 HS2 East estimate that in total the **HS2 EL alone will contribute an additional £4.2bn to the economic output of the EL regions**. This would correspond to a 1.5% increase in total economic output for the North East, Yorkshire and the Humber, and the East Midlands combined.

1.36 The UK target is to increase exports as a share of GDP from 30% to 35%. The EL exported £56bn in 2019; 22% of England's exports. Approximately one year's worth of the EL's exports would therefore cover their proportion of the capital cost of investing in HS2.

1.37 The EL authorities have **aspirations for significant growth: 40k new jobs within LCR almost 24k in SCR and 74k in the East Midlands**.

1.38 On the current funding estimate of £109 billion capital costs (for Phase 1, 2a and 2b), **HS2 would need to deliver 64,000 new jobs in order to 'pay back' its total capital expenditure**. This figure equates to **c. 15% of the estimated new jobs which are targeted around the country as a result of HS2**. If the cities achieve their targets, the BCR (on this metric) would be up to 8.5.

1.39 A lack of capacity within the transport network creates a constraint on growth for economic centres. Were transport investment not contributed to the EL and the region lost only 5% of its anticipated economic growth to 2050 as a result of these constraints, a total of 60,000 additional job opportunities and over £14bn in GVA each year would be lost.

1.40 There is a strong long term relationship between rail passenger journeys rising with employment growth. This has been underpinned by modal shift and sectoral change. There is evidence to suggest that **the EL has a significant way to go with its modal shift if it wants to achieve its emissions targets**.

Tackling inequality and transport poverty

1.41 Inclusive growth aims to maximise the benefits of economic development for society as a whole, ensuring that no individuals or groups are left behind. Existing literature and policy has routinely highlighted the **role played by the transport network in ensuring that all individuals have equal access to social and community facilities and economic opportunities.**

1.42 One of the **key issues preventing households from accessing social and economic opportunity is transport poverty**. The city regions across the **EL suffer from some of the highest levels of transport poverty across the country**.

1.43 Transport poverty is **strongly correlated with social disadvantage**, with low-income households more likely to face economic and social exclusion. There

are **1.3 million working-age individuals, or 14% of the working-age population, living in transport poverty across the EL.**

1.44 The additional connectivity resulting from within-region transport investments has the potential to unlock areas that currently cannot access employment centres and **directly link the benefits of future economic growth to the areas currently facing the largest levels of deprivation**.

1.45 Not only would this direct economic growth to the areas across the EL that need it the most, but also has the potential to boost overall economic growth. The additional workers able to access labour markets as a result of the transport improvements would contribute to the labour supply within key employment centres, providing **not only a greater level of inclusive growth, but a greater level of economic growth overall**.

Conclusions and Recommendations

1.46 The case for transport investment into the EL, including HS2, remains strong. There are of course uncertainties on both costs and benefits of specific schemes, but our work shows that the economic case to deliver a truly transformational new rail network across the EL remains compelling.

1.47 The North collectively has received 2.4 times less investment in transport per resident than London over the past decade. **If the EL had received the same investment in transport per person as London over the last decade, then £58 billion more would have been spent across the EL.** Investment in infrastructure has been repeatedly evidenced to underpin and enable economic growth.

1.48 Even **after accounting for the costs of HS2, NPR and TRU at current estimated costs, each of the regions across the EL would still contain lower transport investment per head than London**.

1.49 HM Government has made clear the need to rebalance transport investment towards areas of lower productivity and connectivity in order to underpin the levelling-up agenda and increase productivity and economic growth.

1.50 Fundamentally, the case for a new rail network serving the EL needs to focus on the transformational economic growth that it could facilitate – this is the very reason for investing in a new national network and so should form a key part of the strategic case for an investment of this type – and how its delivery will be secured.

1.51 The regions making up the EL currently have the lowest productivity levels of all regions in England, but the economic growth planned across the EL is

substantial – with **40k jobs in Leeds City Region, 24k in Sheffield City Region and 74k across East Midlands Councils**.

1.52 The authorities across the EL are **fully committed to delivering transformational change across the region**. This is evidenced by the setting up of a development corporation, the enshrining of objectives within policy and the thought which has gone into the integration of the entire network, both physically but also culturally and demographically.

1.53 As well as the hard economic benefits of growth, an integrated rail network for the North would fundamentally alter **modal choice, enabling the region to deliver it emissions reduction targets, contributing positively to the climate agenda**. The intercity networks would further enable people currently in transport poverty to reach job opportunities, thus **contributing positively to national targets for rebalancing, levelling up and inclusivity**.

2 Introduction

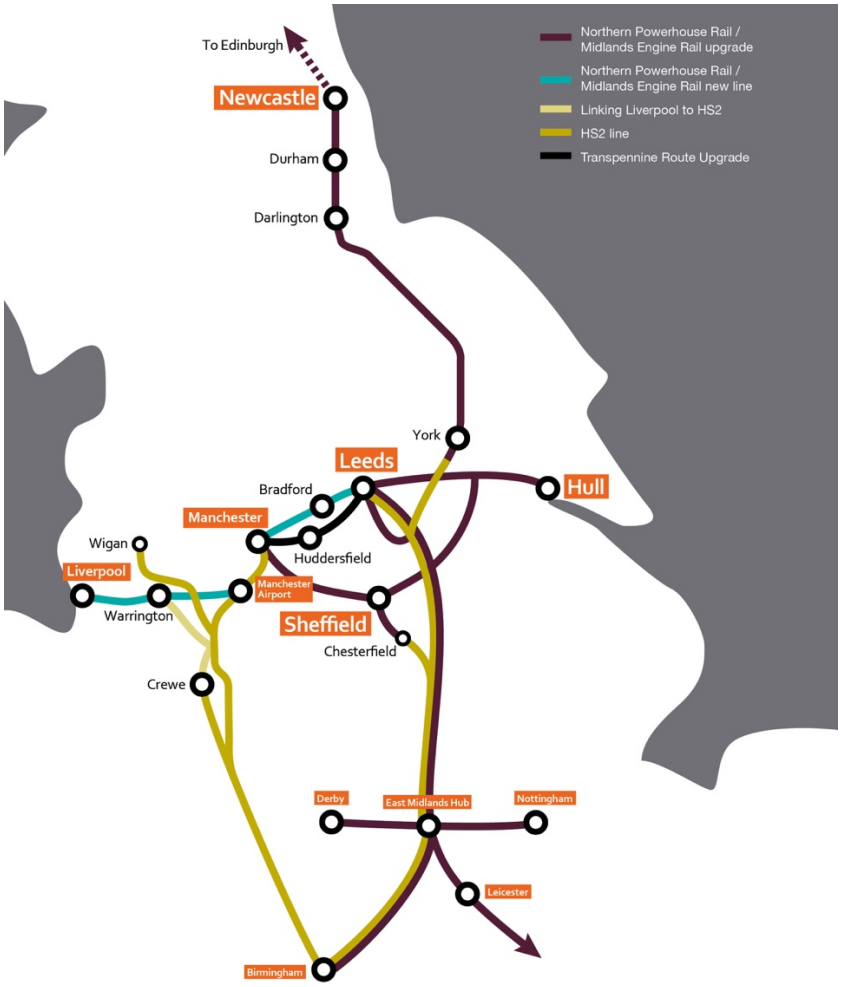
2.1 In February 2020, the Government announced plans to proceed with HS2, with the Y-shaped network as the right strategic choice. However, the review also concluded that Phase 2b needs to be considered as part of an Integrated Rail Plan for the North and Midlands which also includes Northern Powerhouse Rail, Midlands Engine Rail and other major Network Rail schemes to ensure these can be operated as an integrated network. The NIC issued a call for evidence as a first step in building the evidence base for the Integrated Rail Plan.

2.2 This document aims to collate the available information from across the authorities across the Eastern Leg (EL) for the case for HS2 in particular, alongside the need for investment in an integrated rail network serving the region. The importance of integration of rail proposals, along with other policy areas is emphasised, as is the need to consider the objectives of such investment more widely than transport and economic benefits, including distributional impacts and climate change.

2.3 The EL area encompasses the East Midlands, Yorkshire and the Humber and the North East. Figure 1 shows an indicative transport network for the Eastern Leg, combining HS2 with the key strategic priorities of NPR, TRU and Midlands Engine Rail.

2.4 The report does not include any update to the modelling of the benefits of HS2 or other transport investments, but it reviews the cases that have been made to date and provides updated relevant material that supports the case based on currently available information.

Figure 1: Indicative vision for the rail infrastructure network across the North



2.5 This report is structured as follows:

- Chapter 3: the national case for investing in transport
- Chapter 4: the alignment of transport with other policy objectives
- Chapter 5: need to rebalance regional investment in transport
- Chapter 6: integrating HS2 with transport across the Eastern Leg
- Chapter 7: making the case for transport investment in the UK
- Chapter 8: the case for HS2 and the Eastern Leg
- Chapter 9: serving population and jobs and the use of rail
- Chapter 10: reliability of the network
- Chapter 11: providing capacity and rail passenger growth
- Chapter 12: aspirations for transformational change
- Chapter 13: climate impacts of EL investment
- Chapter 14: connectivity and inclusive growth objectives
- Chapter 15: the need for national investment certainty around HS2
- Chapter 16: the impact of Covid-19 upon the case for the EL

3 The national case for investing in transport

Summary

- **Transport connects places**, enabling people to travel for commuting, business and leisure purposes. Much research over a sustained period of time has shown that there is a **positive relationship between infrastructure investment and economic growth** - put simply infrastructure is a critical lynchpin for the economy to function and grow.
- **The UK rail network**, moving both people and goods, was built over many years but **has predominantly been in place for over 150 years**. Since the 1950s the UK has historically underinvested in infrastructure, and now **does not have the capacity and resilience to support the needs of a sustainable UK economy in the future**.
- The PESA statistics show that the UK has spent c. 1.2% of GDP on transport over the past 20 years, rising to c. 1.5% in three of the past four years, equating to c. £30bn each year.
- There is clear, consistent evidence that **the UK has historically underinvested and as a result its infrastructure falls behind global competitors.** By way of example, McKinsey's global comparison found that the UK only spent 2.1% of GDP on economic infrastructure, which is on a par with Italy, France and Germany (2.3%, 2.2% and 2.1% respectively) but considerably lower than Canada (3.4%), Australia (4.4%) and India (5.6%).
- Two marked structural changes have been major drivers in the growth in rail travel – the **decline of car trips, and the sectoral shift towards service and knowledge based industries** which have a greater propensity to use rail as a mode of travel and greater concentration in city centres (which are better connected by rail). These factors further suggest that rail travel will continue to be of vital importance to support economic growth in the UK's core cities.
- The road and **rail connections between English cities are not up to the standards of the best in Europe**, which put them at a competitive disadvantage. Investing in **infrastructure is crucial to the future growth and competitiveness of the UK economy.**

Transport's role in the modern economy

3.1 All economies need transport systems because this enables trade and economic activity, which drives the ability to specialise, to create economies of scale and to innovate.

3.2 A well-developed transport system enables trade networks to be created and maintained; these networks include goods, services, labour markets and innovation.

3.3 In a modern economy, communication is very important. In the future, the intensity of communication is likely to continue to rise, as technology improves and new corporate forms are better able to take advantage of opportunities that will arise from these changes. This will require both face-to-face contact to create ideas and longer range connections to access markets.

3.4 The Covid-19 pandemic situation has forced a step-change in the use of remote working practices and virtual meetings. Whilst this may have an impact upon future rates of travel, it will never fundamentally replace the need for face-to-face communication.

3.5 In economics the importance of face-to-face communication is described as agglomeration. This is the process by which closeness raises productivity. It does this by facilitating knowledge transfer, creating potential niches, fostering innovation and facilitating effective and wide labour markets.

3.6 Therefore, maintaining and enhancing all forms of communication including transport will be of primary importance in a modern economy. Just as in their day motorways offered efficient modern communication, now it is the turn of renewed railway investment to deliver these outcomes.

The drivers of growth in demand for rail travel

3.7 Two marked structural changes have impacted upon the growth in rail travel – a decline in car trips and the sectoral shift towards service and knowledge based industries which have a greater propensity to use rail as a mode of travel and greater concentration in city centres (which are better connected by rail).

3.8 Cities will be crucial in delivering the UK's economic growth in the knowledge intensive and advanced manufacturing sectors. According to the Centre for Cities, while cities form only 9% of the UK's land mass, they account for 54% of its population, 60% of jobs and business starts and 62% of output.[2] Investment in transport infrastructure is a key factor in cities' continued ability to grow and prosper.

3.9 These factors suggest that rail travel will continue to be of vital importance to support economic growth of the UK and its core cities. The growth of knowledge intensive industries across the whole country also further supports other national objectives of levelling up, increasing productivity and lowering the productivity gap. Similarly, the continued push towards modal shift away from cars is absolutely fundamental in delivering the climate agenda. Thus, whilst transport is vital to underpinning economic growth, it is also important in achieving other national objectives.

2 Centre for Cities, 2019, Why Cities Matter.

3.10 Travel demand will rise if growth opportunities in the cities served by HS2 are realised, enabling larger more flexible labour markets. This will require new capacity, as there is only limited opportunity for further expansion of the existing system. HS2 is an effective and efficient way of providing additional capacity between key economic centres across the North and Midlands, as well as with London, avoiding the disruption of increasing capacity on existing main lines.

3.11 The WCML had a major upgrade, costing £9bn and completed in 2008. It is estimated that it will be full again within the next few years, meaning that the upgrade has given it a further 10-15 years rather than providing a solution for the long term.

Britain risks being left behind

3.12 Transport infrastructure is one of the essential underpinning factors of how the economy functions, making significant contributions to almost all activities of the economy. Much research, including most notably Eddington[3], has shown that there is a positive relationship between infrastructure investment and economic growth. However, the UK has historically underinvested in infrastructure:

- According to the OECD,[4] the quality of the UK's infrastructure stock is perceived as poor;
- The UK ranks only 26th in the world for the quality of its roads, and 22nd for the efficiency of its train services[5];
- The UK invests less as a share of GDP than any other G7 country. According to the NIESR, "This persistent underinvestment has an enduring impact on the capital stock with likely knock-on effects on productivity and competitiveness"[6]; and
- The UK only spent 2.1% of GDP on economic infrastructure[7] between 2010 and 2015, less than most other major economies and faces an infrastructure gap of 0.5% of GDP between 2017 and 2035[8].

3.13 According to the Public Expenditure Statistical Analysis (PESA) 2019[9] the Government has spent on average 1.2% of GDP on transport over the past twenty years. This has ranged from a low of 0.8% (in 1998-2000) of GDP to a high of 1.5%. In fact, 1.5% of GDP has been spent in three of the last four years, equating to spending of c.£30bn each year on transport.

3 Eddington, 2006, Eddington Transport Study: The Case for Action.
4 OECD, 2019, Going for Growth.
5 World Economic Forum, 2018, Global Competitiveness Report.
6 National Institute of Economic and Social Research, 2017, Infrastructure in the UK – Time to Rebuild?
7 McKinsey define 'economic infrastructure' as: transport, power, water and telecom. Of economic infrastructure transport accounted for c. 43%
8 McKinsey, 2017, Bridging Infrastructure Gaps: Has the world made progress?
9 HMT Public Expenditure Statistical Analyses, 2019, Chapter 4 tables

3.14 The particular need to invest in rail infrastructure to ensure that British cities are not left behind the rest of Europe and other advanced economies in the world has been highlighted in literature on this subject. Parkinson et al[10] stated "the ability to move between cities on fast and reliable networks is greater in countries like France and Germany than it is in the UK". The plans to develop a network of connected cities, through HS2 and also NPR, must seek to create rail networks that match the best in Europe. The report went on to state that "in many respects the road and rail connections between English cities are not up to the standards of the best in Europe, which put them at a competitive disadvantage". Investing in infrastructure is crucial to the future growth and competitiveness of the UK economy.

10 Parkinson et al., 2006, The State of the English Cities, ODPM

4 Transport's alignment with other national policy objectives

Summary

- **Transport** enables people to travel for commuting, business and leisure purposes, a critical lynchpin for the economy to function and grow. It **also aligns with many other important policy objectives.**
- By connecting businesses and markets, locally through to globally, transport facilitates trade**. The UK target is to increase exports as a share of GDP from 30% to 35%. The EL exported £56bn in 2019, 22% of England's exports and is home to the East Midlands airport, the 2nd largest freight hub in the country**. Increased connectivity between cities, across labour markets and internationally via Heathrow will all impact positively upon the objective to increase trade.
- The climate agenda, to achieve net zero greenhouse gas emissions by 2050, is challenging. **Transport is the largest sector contributing to emissions** and road transport and car journeys are very significant components of this. Considerable mode shift is required if we are to achieve our targets. **If there is no expansion of capacity of public transport, the EL will miss its targets**.
- Addressing the productivity puzzle and levelling up the imbalanced productivity across the country are key national policy objectives. The **UK is the most geographically unequal country in the OECD on this measure, and the EL contains the poorest performing regions across England.** Investing in transport can help to narrow this divide and increase overall productivity**.**
- Policies and enterprise zones such as the **East Midlands Development Corporation, the Derby Growth Zone, SCR's innovation clusters and the Darlington Growth Hub will enhance potential productivity benefits** and ensure deliverability of the transformational targets for growth.
- **Relieving transport poverty, lifting people out of deprivation and ensuring better economic activities** are shared across society are further policy aspirations which transport can play a key role in delivering through better connecting people with opportunities and services, creating larger and more effective labour markets**.**

Policy Topic	National policy priorities	EL focus and the role of transport investment
 Trade	• Grow the UK's exports as a share of GDP from 30% to 35% • Connect UK businesses to overseas buyers, markets and each other • Enhance our global competitiveness by making Britain a more attractive place to trade and invest • Strengthen the links between all areas of the UK and Heathrow Airport, the nation's global hub • Expand the role played by major ports in accessing emerging export markets • Champion innovation and increase exports through the creation and support of freeports	• The EL exported £56bn in 2019, 22% of England's exports. East Midlands airport is the 2nd largest freight hub in the country • Increased connectivity between and within the employment centres of the EL will strengthen local and national supply chains andallow access to global supply chains, thus reducing barriers to exporting • The wider labour pool available as a result of the investments will encourage business investment across the Midlands and the North • The links established by the HS2 EL to Heathrow provide previously unavailable transport access for EL businesses to the UK's hub airport • Connectivity improvements will link supply networks across the Midlands and North to opportunities to export. Enhanced freight access to Teesport and the Port of Grimsby will reduce barriers to exporting
 Climate	• Comply with the terms outlined with the Paris Climate Change Agreement • Move to clean economic growth through low carbon technologies • Net zero greenhouse gas emissions by 2050 • Transport is now the largest sector for UK greenhouse gas emissions (27%), of which road transport accounts for over 90% • Car journeys represent the largest output of greenhouse gas per km of any mode of transport. Passenger cars account for 58% of total emissions within the transport sector in the UK • Lead the world in the development, manufacture and use of low carbon technologies • Road to zero transport greenhouse gas emissions across all modes by 2050	• Across the EL, a total of 80% of all trips over a mile in length were taken by private motor vehicle in 2018 • If no additional policies, such as expanding the capacity of public transport, are put in place the West Yorkshire Combined Authority forecast a 35% reduction in greenhouse gas emissions over the period 2020 to 2038, significantly lower than that required to meet national policy targets • Substantial mode shift away from private motor vehicles and air travel is required • Current DfT policy promotes mode shift away from car transport as the primary means to achieve net zero vehicle emissions – investment into the EL transport network will enable this mode shift • The modernisation of the transport network will reduce its emissions • Transport investment will enable the research into low carbon technologies that will be necessary to meet the net zero emissions targets

Policy Topic	National policy priorities	EL focus and the role of transport investment
 **Productivity**	• Improveg living standards by addressing the productivity puzzle • Build a stronger, more balanced economy by enhancing productivity and responding to local growth priorities • Increase STEM education and skills across the country • Address the long tail of low productivity firms	• Investment into the transport network between the key economic centres of the North and the Midlands enables productivity generating agglomeration benefits • The access to larger labour pools as a result of transport investments within the region would enable better labour market matching, raising productivity levels • The supporting employment and skills measures enacted by local and regional authorities would develop the science and engineering education offering to meet the demand for jobs generated
 **Levelling-up**	• London has productivity 32% above the UK average, with the least productive regions falling up to 17% below average UK levels. Under this measure, the UK is the most geographically unequal country in the OECD • Raise growth in all nations and regions, creating opportunity for everyone • Address regional disparities in economic and social outcomes • Rebalance R&D investment away from the East and South East of England	• The EL regions have the three lowest productivity levels of all regions in England, at 35%, 33%, and 32% below the London level in 2018 • The EL area contains many of the advanced industrial clusters promoted within the levelling up agenda • Investment into the EL transport network would align investment levels across the region with other areas of the country • The increase in connectivity between the key economic centres in the Midlands and the North would develop supply chains and economic opportunities throughout the EL in areas of relatively higher deprivation levels • Policies and enterprise zones such as the East Midlands Development Corporation, the Derby Growth Zone, SCR's innovation clusters, and the Darlington Growth Hub will enhance potential productivity benefits and ensure deliverability • HS2 East estimate that HS2 EL will contribute an additional £4.2bn to economic output of the EL regions, corresponding to a 1.5% increase in total economic output • LCR will establish a world leading high speed rail and systems integration research facility next to the planned HS2 rail depot in Leeds.

Policy Topic	National policy priorities	EL focus and the role of transport investment
 **Transport**	• Become a world leader in shaping the future of mobility • Invest in the priorities of the business community by improving transport networks and connectivity • Create a more reliable, less congested and better connected transport network that works for the users who rely on it • Equal access across the transport system for all individuals by 2030	• The investment into the transport network across the EL would form the basis of the future of mobility across the region and encourage significant mode shift • Capacity on the network would be enhanced, enabling greater reliability and an improved experience for users • The supporting station redevelopments occurring across the EL will ensure that all users have access to the benefits offered by the additional services
 **Wellbeing**	• Ensure that people can enjoy at least 5 extra healthy, independent years of life by 2035 • Narrow the gap in life expectancy between the experience of the richest and poorest • Encourage 1 million more individuals living with a disability into work by 2027	• The economic opportunities afforded by the investment will raise incomes in areas of relatively high deprivation • The additional transport services will enable residents across the Midlands and North better access to social infrastructure, including healthcare, improving physical and mental health outcomes • Supporting local policy will ensure that the economic benefits of transport investment are shared across society
 **Culture, arts and tourism**	• Increase the proportion of UK residents who holiday in the UK • Spread the benefits of the visitor economy across the UK • Increase productivity within the culture, arts and tourism sectors to become one of the top 5 most efficient and competitive visitor economies in the world. • The delivery of 30,000 apprenticeship starts annually within the arts and tourism sectors • Become the most accessible nation in Europe for visitors by 2025	• Investment into the EL transport network will provide connectivity between the cultural and heritage assets offered within the Midlands, Scotland and the North of England • Enhanced connectivity between the EL region and London ensures that visitors can travel and spread economic benefit elsewhere in the UK • The investment provides an opportunity to place accessibility at the forefront of the UK's transport network, encouraging use for disabled passengers

Trade

National policy

4.1 The UK identifies the key role for international trade in providing economic opportunity and contributing to growth across the country. In 2018, HM Government produced the UK's Export Strategy to highlight the key policy objectives for UK international trade.[11] Within the Export Strategy HM Government outline a target to grow the UK's exports as a share of GDP from 30% to 35%, with the aim of strengthening the position of the UK as a major international trading nation.

4.2 To achieve the growth in export volumes targeted within national policy, the Export Strategy outlines the four core functions that government can perform in UK exports: to encourage, inform, connect, and finance. The Export Strategy states that to connect businesses in the UK to one another and international markets, a new commitment to investment in infrastructure must be achieved: "To help businesses connect with buyers, markets, and each other, the UK government is driving strategic investment across transport, telecommunication and digital infrastructure through the Industrial Strategy".

4.3 Within the UK Industrial Strategy, infrastructure is presented as one of the five foundations of productivity for future economic growth. It is acknowledged that "infrastructure is the essential underpinning of our lives and work, and having modern and accessible infrastructure throughout the country is essential to our future growth and prosperity."[12] The Industrial Strategy states as its vision "a major upgrade to the UK's infrastructure".[13]

4.4 A number of national policies and measures have been put into place to ensure that barriers to trade and innovation are minimised. The promotion of Heathrow as a national hub aims to increase access to international destinations and markets and policies such as the development of freeports aim to encourage international investment. HM Government aims to support these key gateways between the UK and international markets by maximising connectivity between them and supply networks across the UK.[14]

The Eastern Leg

4.5 The EL already accounts for significant levels of international trade. Across Yorkshire and the Humber, the North East and the East Midlands, a total value of £56 billion was exported in 2019, accounting for 22% of all England exports.[15]

11 HM Government, 2018, Export Strategy: supporting and connecting businesses to grow on the world stage.
12 HM Government, 2017, Industrial Strategy.
13 Ibid.
14 HM Government, 2020, Freeports Consultation Boosting Trade, Jobs and Investment Across the UK
15 HMRC, 2020, Regional Trade Statistics.

When combined, these three regions account for a greater share of manufacturing exports than all other regions of England.

4.6 Investment into the transport network across the EL, including HS2, Midlands Engine Rail and NPR will provide a step-change in connectivity between the key employment centres, allowing for significant agglomeration and productivity benefits. These benefits are promoted within local policy, such as the establishment of high technology industrial corridors within SCR, or the Derby Growth Zone within Derbyshire.

4.7 To enable an increase in the volume of exports across the UK, the Industrial Strategy aims to remove the current barriers faced by businesses. Access to export markets is a key barrier preventing many businesses in the UK from exporting, with significant costs in delivering services to ports and airports from which they can enter international markets.

4.8 The proposed transport investments of HS2, Midlands Engine Rail, NPR and TRU will enhance connectivity between the core cities of the Midlands and North and locations from which products can be exported. The significant improvements in accessibility between the region and Heathrow Airport, the UK's hub airport, will strengthen access to international markets for businesses across the North and Midlands. In addition, the links generated across the EL to major ports in the Humber, Tees and Tyne will reduce barriers to exporting.

Climate

National policy

4.9 The UK has domestic targets for reducing greenhouse gas emissions under the Climate Change Act 2008 (CCA). The CCA established a long-term legally binding framework to reduce emissions, initially committing the UK to reducing emissions by at least 80% below 1990/95 baselines by 2050. In June 2019, following the IPCC's Special Report on Global Warming of 1.5°C and advice from the Independent Committee on Climate Change, the CCA was amended to commit the UK to achieving a 100% reduction in emissions (net zero) by 2050.

4.10 Although today's new cars are more efficient than those bought in 1990, transport greenhouse emissions have fallen just 2% since 1990.[16] As a result, transport is now the largest sector for UK greenhouse gas emissions (27%), of which road transport accounts for over 90%.[17] Road transport is one of the biggest contributors to poor air quality in some of the UK's towns and cities.

16 Department for Business, Energy and Industrial Strategy, 2018, Final UK greenhouse gas emissions national statistics: 1990 – 2016.
17 Ibid.

4.11 To address the challenge faced across the country in reducing greenhouse gas emissions, the UK has imposed a net zero greenhouse gas emissions target by 2050. Acknowledging the significance of the transport sector in contributing to total emissions, the UK have adopted a further target to achieve net zero greenhouse gas emissions across each type of transport.

4.12 Overall UK greenhouse gas emissions have fallen since 1990, (although not at a rate whereby net zero would be achieved in 2050), however transport emissions have remained stagnant. As clean technologies have enabled the reduction in the emissions of other sectors, transport represents the major challenge in reducing emissions to be overcome in order to achieve the targets.

4.13 Journeys taken by car represent the largest output of greenhouse gas per km of any mode of transport.[18] Currently, passenger cars account for 58% of total emissions within the transport sector in the UK.[19] In England, 87% of car users report that their current lifestyle requires them to own a car.[20]

4.14 Although currently playing a relatively smaller role than car travel, air travel represents an increasing proportion of greenhouse gas emissions within the UK. The anticipated future growth in air travel represents a further challenge to be overcome by the UK in order to achieve emissions targets.

The Eastern Leg

4.15 Across the EL, private vehicle use is the most dominant form of transport accounting for the largest share of trips over a mile in length. Within Yorkshire and the Humber, the North East and the East Midlands, a total of 80% of all trips over a mile in length were taken by private motor vehicle in 2018, above the UK average of 77%.[21]

4.16 The West Yorkshire Combined Authority's North & West Yorkshire Emissions Reduction Pathways (2020) states that currently within West Yorkshire road traffic accounts for 40% of all emissions within the county. By 2040, this is anticipated to increase to 42% of total emissions, despite anticipated efficiency improvements within motor vehicles resulting in lower emissions per km. Were no additional policies, such as expanding the capacity of public transport put in place, the report estimates that the West Yorkshire Combined Authority would see a 35% reduction in greenhouse gas emissions over the period 2020 to 2038, significantly lower than that required to meet national policy targets. This is indicative of the scale of the challenge faced across the EL.

18 Department for Business, Energy & Industrial Strategy, 2019, Greenhouse Gas Conversion Factors.
19 DfT, 2019, Sustainable Travel Towns: evaluation of the longer-term impacts.
20 DfT, 2018, Transport and Technology Public Attitudes Tracker – Waves 1 and 2.
21 DfT, 2019, National Travel Survey Tables: NTS9903.

4.17 The pathways outlined for carbon emissions across West Yorkshire Combined Authority are emblematic of the issues faced across the whole of the EL. Although specific forecasts for future emissions levels across other EL authorities are not currently available, many have committed to the goal of achieving net zero carbon emissions by 2038. The transport sector remains the largest barrier to achieving this target, primarily as a result of private vehicle use.

4.18 In order to meet the net zero emissions targets enacted by the HM Government, the UK will be required to achieve substantial mode shift away from private motor vehicles. Even after accounting for potential efficiency improvements in vehicle travel, the Emissions Reduction Pathways proposed by the West Yorkshire Combined Authority show that, in the absence of additional policy, net zero emissions in transport will not be achieved by 2050. To encourage public transport as a viable alternative to private motor vehicle use, a step change in public transport connectivity is required. Additionally, it is likely to be required well in advance of the 2050 target deadline. The targets imposed by many authorities along the EL to achieve net zero emissions by 2038 are likely to require significant behavioural change, above that required to meet the national target.

4.19 The transport investments proposed through HS2, NPR, Midlands Engine Rail and supporting local integration measures will enable the transformation of connectivity and accessibility by public transport across the EL (and wider North) in such a way as to facilitate these targets.

Productivity

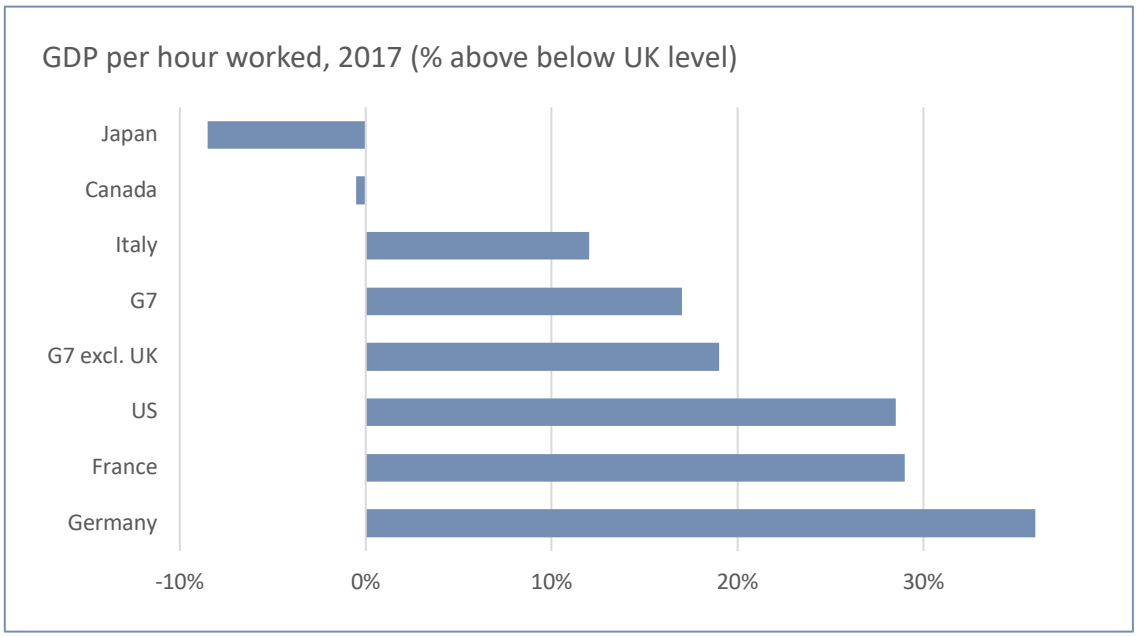
National policy

4.20 The UK's recent performance with relation to productivity growth has been poor. Since the 2008/09 financial crisis, productivity in the UK has been growing, but at a rate significantly lower than its pre-crisis trend rate. Although this growth slowdown has been experienced by other advanced economies, it appears to be more accentuated in the UK.[22]

4.21 Currently, the UK's productivity level is significantly below that of most comparable economies (see Figure 2). This fact is acknowledged within the UK's industrial strategy, which refers to a 'long tail' of business productivity underperformance in which a large number of business are lagging behind overall UK productivity growth.

22 Bank of England, 2017, The Fall in Productivity Growth: Causes and Implications.

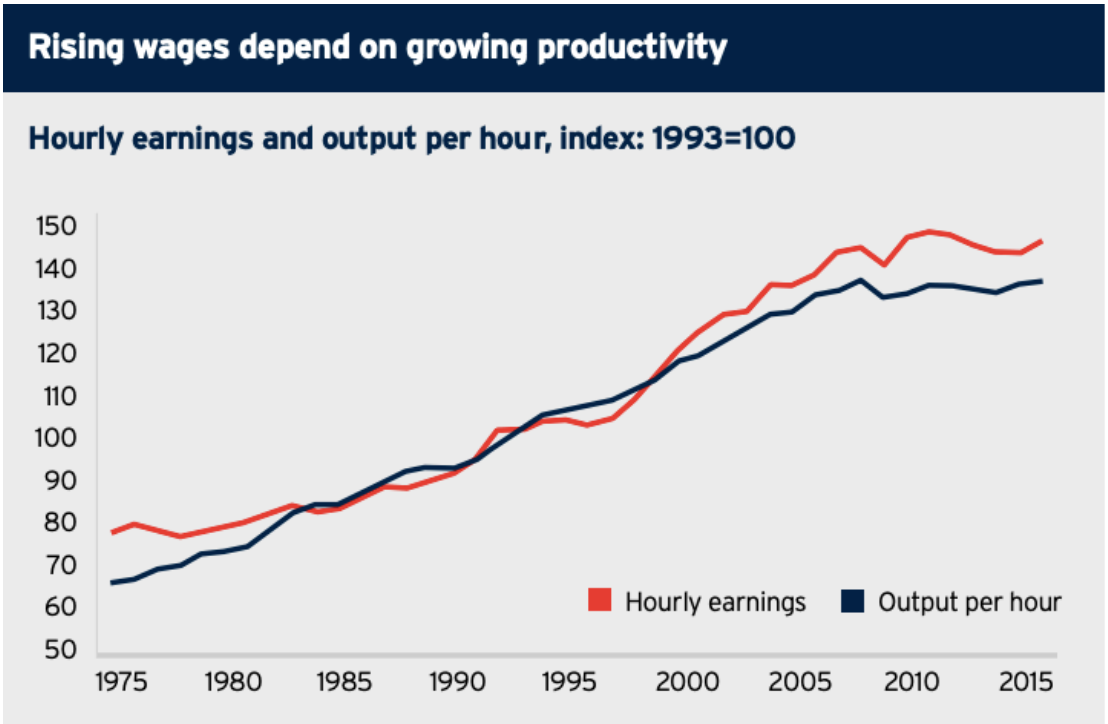
Figure 2: UK productivity compared to G7, 2017



Source: ONS, 2018, International comparisons of UK productivity.

4.22 The 'productivity puzzle', as the low growth in productivity within the UK has been named, is critical to raising living standards, as over the long-term increases in productivity are the sole manner through which to achieve sustained economic growth. To demonstrate the importance to the country of achieving greater productivity growth, the UK Industrial Strategy (2017) presents Figure 3, which shows that in the UK incomes are highly related to productivity.

Figure 3: UK hourly earnings and productivity, 1973 to 2015 (1993 = 100)



Source: HM Government, 2017, Industrial Strategy.

4.23 HM Government has placed improving productivity levels as a key focus of national policy. The UK Industrial Strategy (2017) outlines the role of government in improving productivity levels, identifying five policy foundations targeted for increasing productivity, these are: people, ideas, infrastructure, business environment and places. Each of these foundations will be positively impacted by increasing investment into transport infrastructure.

4.24 The most obvious impact resulting from infrastructure investment on these foundations is upon the infrastructure foundation. Without increased investment in transport infrastructure, it is clear that the UK is not going to achieve the 'major upgrade to the UK's infrastructure' targeted within this foundation. However, it is also likely that transport investment will contribute to the remaining foundations as well.

The Eastern Leg

4.25 By providing a step-change in the level of connectivity in cities across the North and the Midlands, investment into the EL transport network will enable significant agglomeration and labour market benefits for knowledge intensive employment sectors located within key economic centres within the region. This will directly increase innovation levels throughout the region, contributing jobs for local residents, deepening supply networks and developing communities.

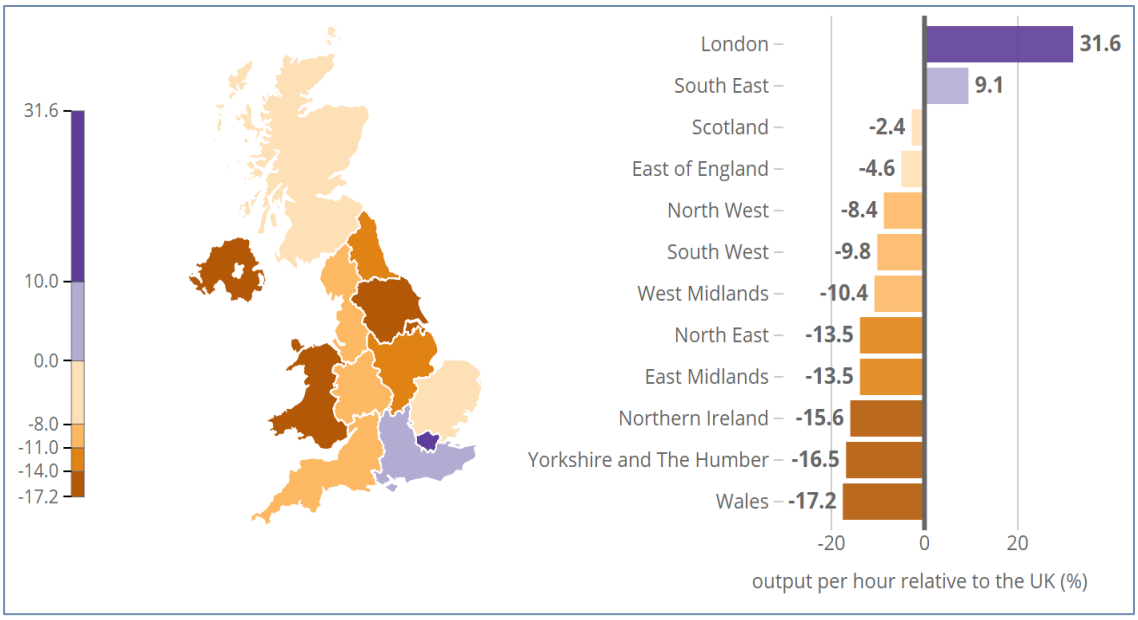
Levelling up

National policy

4.26 The 2020 Budget restated HM Government's commitment to levelling up all regions across the UK by raising productivity and growth in all regions, creating opportunities for everyone and addressing disparities in economic and social outcomes. Outside London, a number of the UK's largest cities underperform economically against the national average; a trend counter to that of other developed countries.[23]

4.27 Not only does the UK's productivity fall below internationally comparable rivals, but the UK faces one of the most severe geographical inequalities in productivity levels throughout the developed world. Currently, the most productive region of the UK (London), has productivity 32% above the UK average, with the least productive regions falling up to 17% below average UK levels (see Figure 4). Under this measure, the UK is the most geographically unequal country in terms of productivity in the OECD.[24]

Figure 4: Output per hour by NUTS 1 region relative to UK, 2018



Source: ONS, 2020, Regional labour productivity, including industry by region, UK: 2018

4.28 The regions encompassing the EL (Yorkshire and the Humber, the East Midlands, and the North East) currently have the three lowest productivity levels of any region in England. Respectively their productivity levels were 35%, 33%, and 32% below the London level in 2018.[25]

23 Productivity Insights Network, 2019, Real Journey Time, Real City Size, and the disappearing productivity puzzle.
24 McCan, 2019, Perceptions of regional inequality and the geography of discontent: insights from the UK.
25 ONS, 2020, Regional labour productivity, including industry by region, UK: 2018.

4.29 Nationally it is understood that this level of regional inequality is an issue for the UK economy and has been routinely linked to the low productivity growth witnessed across the UK in recent years.[26] The levelling up agenda aims to address the regional inequality issues faced across the country, raising the prosperity of the country's poorest regions. HM Government highlights the need to rebalance investments towards less economically successful areas of the country, with the Industrial Strategy stating "Our investment decisions need to be more geographically balanced and include more local voices."[27]

4.30 As discussed within the context of productivity objectives, the investment in infrastructure and particularly transport infrastructure, is key to providing the connectivity that economic centres of the UK need to boost productivity. Over recent years, the areas of the country with the lowest productivity levels have also experienced significantly lower levels of investment into their transport networks and this will need to be addressed before regional inequalities are reduced.

The Eastern Leg

4.31 Investment into the EL transport network provides an opportunity to boost the productivity of the areas in England currently experiencing their lowest levels. HS2 East estimate that the HS2 EL alone will contribute, in total, an additional £4.2bn to economic output of the EL regions.[28] This would correspond to a 1.5% increase in total economic output for the North East, Yorkshire and the Humber and the East Midlands combined.[29]

4.32 In addition to this there are many interventions proposed by authorities along the EL to maximise the productivity benefits of the HS2 EL and other large transport investments. Policies and enterprise zones such as the East Midlands Development Corporation, the Derby Growth Zone, SCR's innovation clusters, and the Darlington Growth Hub will enhance potential productivity benefits associated with supply chain integration and agglomeration.

4.33 Both the gap in transport investment and productivity gap between the most economically developed and most deprived regions of the UK has been growing in recent years. Investment into the transport network across the EL would address both issues, provided it brings the step-change in connectivity and accessibility at least comparable to current proposals for HS2, NPR, Midlands Engine Rai, and supporting integration policies.

26 See, for example, Mckinsey, 2018, Solving the United Kingdom's productivity puzzle in a digital age.
27 HM Government, 2017, Industrial Strategy.
28 HS2 East, 2017, HS2 East Economic Benefits Study.
29 Volterra calculations using ONS, 2019, Regional economic activity by gross value added (balanced), UK: 1998 to 2017.

Transport

4.34 The national policy objectives for transport are intrinsically linked to the productivity and levelling up agenda set out in previous sections. In addition to these, the UK has outlined its Transport Investment Strategy (2017), specifically detailing the case for further transport investment and the goals of this investment. The Transport Investment Strategy outlines four key objectives to be achieved through investment into the transport network, these are to:

> *Create a more reliable, less congested, and better connected transport network that works for the users who rely on it;*
>
> *Build a stronger, more balanced economy by enhancing productivity and responding to local growth priorities;*
>
> *Enhance our global competitiveness by making Britain a more attractive place to trade and invest; and*
>
> *Support the creation of new housing.*[30]

4.35 Not only would investment in HS2 EL encourage productivity gains through connecting key economic centres better, improving infrastructure will directly enhance the UK's global competitiveness. The UK has experienced one of the highest levels of foreign direct investment of any country worldwide and the infrastructure network is key to making sure this continues.[31] The UK Industrial Strategy outlines the key role that foreign investment has played in reigniting the UK's vehicle manufacturing industries. Areas across the EL such as Sunderland and Derby have gained globally competitive clusters of automotive manufacturing as a result of foreign investment.

4.36 In recent years, however, the UK's expenditure on transport investment has fallen significantly behind that of international competitors in relative terms. The UK now ranks 22nd globally for the connectivity, reliability and quality of its rail network.[32] To promote the UK as a globally competitive country for multinational businesses, connecting areas of the country to enable easy access to skilled workers and to support supply chain development is crucial. The HS2 EL and supporting transport interventions will provide that connectivity to the core economic centres of the UK that are currently relatively less accessible. Addressing this deficit will help to tackle transport poverty as well as creating a requirement for skilled workers across more than one generation to build and maintain the new infrastructure.

30 DfT, 2017, Transport Investment Strategy.
31 HM Government, 2018, Export Strategy.
32 World Economic Forum (2018), Global Competitiveness Report

4.37 To encourage the development of additional housing to meet the demands of a growing population, further investment in transport networks will be required. To meet current transport climate targets, the UK will be required to undertake significant modal shift away from private car use and towards public transport.

4.38 For many locations across the UK and particularly across the EL, this is not possible currently because public transport simply is not a viable option. Many of the 1.3 million residents across the EL currently living in an area of transport poverty are likely to not have access to public transport as a means to travel to employment or use community services (see section 16 for further discussion of transport poverty across the EL).

4.39 Large-scale investments in transport connectivity are necessary in order to bring the UK's transport network into the 21st century and provide a sustainable platform for future economic growth. However, these investments will need to be integrated into local transport systems to ensure that all households can choose to travel via alternative means than private cars. This is why the local interventions proposed by authorities along the EL and presented within section 6 of this report are vital to ensuring that the transport system can sustainably provide for additional future demand.

Wellbeing

4.40 Alongside the economic benefits of raising productivity and levelling up areas of the UK, transport forms the foundation of the way in which people connect to one another. In spite of the increasing accessibility of digital interactions, there remains an economic and social need for individuals and households to interact with each other. Not only does the UK suffer from large economic inequality between its regions, but also experiences large social and health inequalities.

4.41 In England, the range in life expectancy at birth between the least and most deprived deciles was 9.3 years for males and 7.5 years for females in 2015 to 2017.[33] In addition, many vulnerable groups within the UK face social and economic exclusion as a result of poor access to economic opportunities.

4.42 Across the EL, average life expectancy at birth in 2017 stood at 78.7 years for males and 82.4 years for females. The North East records the lowest life expectancy of all UK regions (77.9 years for males and 81.6 years for females).[34]

33 ONS, 2020, Health state life expectancies by national deprivation deciles, England and Wales: 2015 to 2017.
34 ONS, 2020, Health state life expectancies, UK: 2015 to 2017.

Four of the top ten most deprived local authorities, as measured through the Index of Multiple Deprivation (2019) rankings, are along the EL.[35]

4.43 One of the key barriers resulting in social deprivation and exclusion is an inability to access social and economic opportunities and resources. The transport network plays a significant social role in connecting individuals to these opportunities and resources. By developing the transport links to socially disadvantaged areas, of which there are a high density across the EL, the improved accessibility will widen the range of economic opportunities and social services, such as healthcare and community facilities, that can be accessed by residents. This will enable growth in the living standards of a number of areas struggling with social deprivation across the EL and reduce the socio-economic inequalities currently seen across the country.

Culture, arts and tourism

4.44 The UK Government Culture White Paper (2016) outlines that the UK government has a role in promoting and supporting the cultural sectors across the UK and in promoting them abroad to attract tourism.

4.45 The culture, arts and tourism sectors are highly interconnected and vital to the UK's economy. The tourism sector alone is one of the fastest growing sectors in the UK and when combined, the culture, arts and tourism sector is in the top five largest sectors of the UK's economy.[36]

4.46 The fact that the UK's culture is seen so positively around the world increases its contribution to the economy beyond its direct impact. The Culture White Paper (2019) highlights the key role that culture and the arts plays in generating tourism. Research by the British Council shows that cultural attractions are the most commonly mentioned factor in terms of what makes the UK an attractive place to visi,t while the arts was the third most commonly mentioned reason.[37]

4.47 To ensure that the UK is best placed to benefit from the growth in the arts, culture and tourism sectors targeted by HM Government, the Government has outlined a commitment to investing in skills, aiming for the delivery of 30,000 new apprenticeship starts each year by the end of 2020.[38]

4.48 Currently 42% of all international visitor nights spent in the UK are stayed in London.[39] The UK aim to maximise the economic benefit that is generated by

35 These are Kingston-upon-Hull, Middlesbrough, Hartlepool, and Nottingham. Of the remaining six, five are within the North West and one is in the West Midlands.
36 HM Government, 2011, UK Tourism Strategy. NB: Here largest corresponds to the total number of individuals employed in the sector.
37 HM Government, 2019, Culture White Paper.
38 HM Government, 2011, UK Tourism Strategy.
39 ONS, 2019, International Passenger Survey.

the culture, arts and tourism sectors, and spread these benefits around the UK. The Tourism Sector Deal (2019) outlines the UK Government's commitment to ensuring a growth in international visitor numbers outside of London. To meet the forthcoming demand generated from international visitors, HM Government have set a target to build 130,000 additional hotel bedrooms over the period 2019 – 2025, with the majority of these outside London.[40]

4.49 The delivery of the HS2 EL and supporting transport investment will provide a step change in the connectivity offered between the cities and regions across the EL, linking some of the UK's most well-known international cultural destinations. This will encourage additional visitor nights across the area, and ensure the large international pull of visitors offered by London is connected to other significant cultural and heritage attractions in the Midlands and North of England and Scotland.

4.50 HM Government aim to ensure that particular attention is paid to the accessibility of the UK as a tourism destination. A target is outlined within the Tourism Sector Deal for the UK to become the most accessible tourism destination in Europe by 2025, increasing the number of international disabled visitors by a third.[41] The investment into transport infrastructure across the EL provides an opportunity to place accessibility at the heart of the transport network, enabling the international reputation for accessibility for all needed to meet this goal.

40 HM Government, 2019, Tourism Sector Deal.
41 Ibid.

5 The need to rebalance regional investment in transport

Summary

- As detailed previously, the connectivity gained through investment into the transport network enables economic growth.
- However, **there are large inequalities** in the amount of public money spent on transport infrastructure between different regions.
- Both historical and planned transport expenditure have been significantly lower per head across the North and the Midlands than other areas of the UK. **The Eastern Leg has received just 36% of the spending per capita London levels.**
- **Over the last decade, the North collectively has received 2.4 times less investment in transport per resident than London**.
- This underinvestment has been consistently true. **If the EL had received the same amount per person as London over the last decade, then £58 billion more would have been spent across the EL.**
- Even if the reported £100bn cost of HS2 is correct, this would still be less than the combined underspend across the EL and WL over the past decade, putting into context the scale of the imbalance.
- **HM Government has made clear the need to rebalance transport investment towards areas of lower productivity and connectivity.**
- Ignoring the historic underspend and starting on an equal footing now, **if the per capita spend is set equally across the country, this would result in an annual transport budget of £5.5bn for the North East, Yorkshire and the Humber and the East Midlands.** Over the lifetime of delivery of HS2 Phase 2b, **this figure would be sufficient to also entirely include the costs of NPR, Midlands Engine Rail, and the TransPennine Rail Upgrade.**
- Even after accounting for the estimated costs of these major rail priorities, each of **the regions across the EL would still contain lower transport investment per head than London in the current pipeline.**

The Eastern Leg has seen limited transport investment

5.1 As discussed in section 3, the connectivity gained through investment into the transport network enables economic growth. Compared to other developed economies, the UK has relatively under-invested in its transport network, spending a significantly lower proportion of its income on investment into infrastructure such as transport than comparably developed economies. Furthermore, within the UK, there are large inequalities in the amount of public money spent on transport infrastructure between different regions.

5.2 IPPR North (2019) provides insight into the amount of historical and planned transport infrastructure investment occurring within each of the regions of the UK. The report found that over the decade 2008/09 to 2017/18 public expenditure on transport per person was significantly lower in the North and Midlands of the UK than other regions, notably London and the East of England.[42] IPPR found that for each resident within the North a total of £305 was spent on transport infrastructure over this period, compared to £739 in London.

5.3 There are potential reasons why transport spending per person may differ between regions, such as that a region might receive net inflows of commuters, which would place a greater burden on the region's transport infrastructure.[43] However, given the potential for transport investment to drive future economic growth, a disparity of investment on this scale can be quite reasonably linked to the historical differences in growth rates that have been witnessed between the UK's regions.

5.4 To counteract the economic inequalities that have occurred between the regions of the UK, which are by some measures the largest in the OECD,[44] the Government is promoting a levelling up agenda. The ultimate aim of the policy being to reduce the disparities in productivity and earnings across the UK. To achieve that goal, the HM Treasury Budget 2020 promotes public expenditure on infrastructure, including strategic transport projects and local transport projects, to bring growth to left behind regions.[45]

5.5 The table below sets out the amount spent on average per capita over the past decade across the UK's regions, and then calculating the total extra that would have been spent in the given regions over the past decade has spending levels been all consistently set at the per capita rate spent in London. These numbers have been recalculated by Volterra based on the PESA 2019 data and mid-year population estimates, so differ very slightly to the reported IPPR North figures.

5.6 This shows that if the EL regions had received the same per capita expenditure as London, then the area would have benefited from an additional £58bn in spending on transport over the last decade. It stands to reason that the historic underinvestment is intrinsically linked to the weakness and scarcity of good quality transport links across the north and specifically the EL.

42 IPPR North, 2019, Transport Investment in the Northern Powerhouse
43 House of Commons, 2013, Scrutiny Unit Note – Regional Transport Spending
44 McCan, 2019, Perceptions of regional inequality and the geography of discontent: insights from the UK
45 HM Treasury, 2020, Budget 2020: Delivering on our Promises to the British People

Table 1: Expenditure per capita levels by region, and gap in spending over the pastdecade

Region	Historic spend per capita 2009-2018	Additional spend needed to match London levels
North East	£256	£12bn
North West	£325	£28bn
Yorkshire and The Humber	£291	£23bn
East Midlands	£223	£23bn
West Midlands	£268	£26bn
East	£287	£26bn
London	£716	-
South East	£275	£39bn
South West	£226	£27bn
England	£343	£203bn
Eastern Leg	£259	£58bn
Western Leg	£300	£54bn
North	£301	£63bn

Source: Volterra estimates using PESA 2019 data.

5.7 This historic discrepancy between per capita spending regionally is generally accepted and the Government's policy position is one of moving towards the need for greater equality.

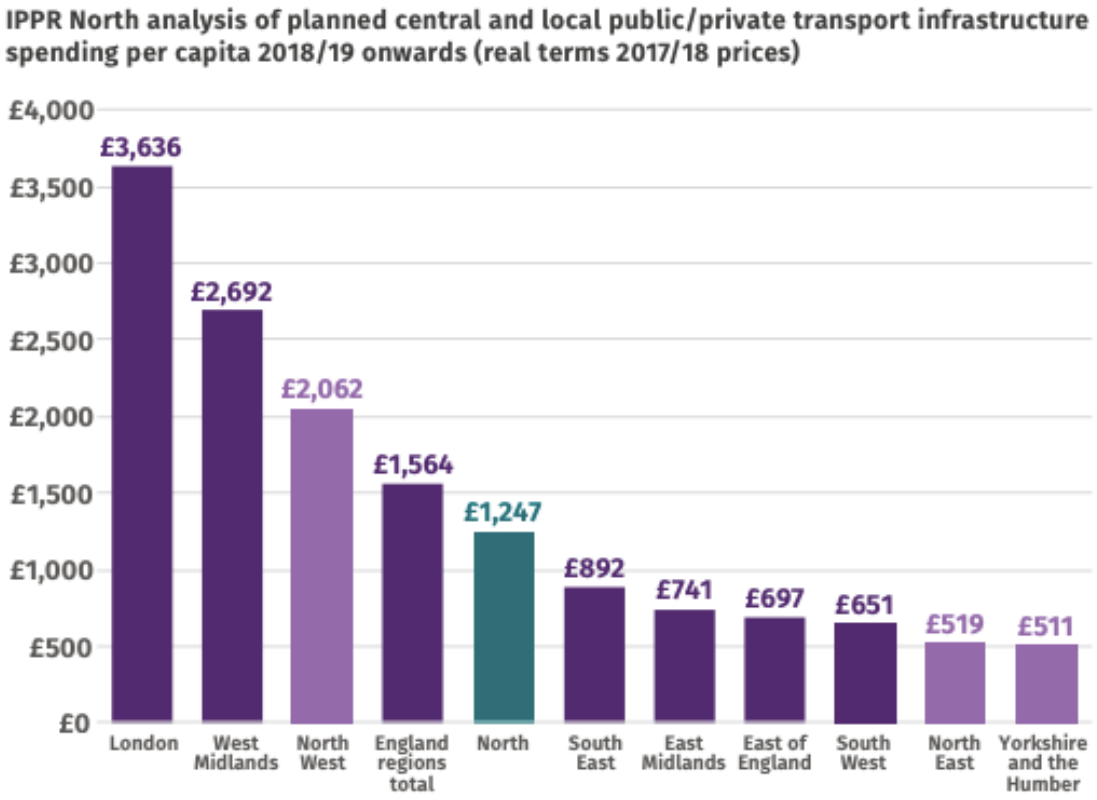
5.8 IPPR also presents (see Figure 5) analysis of the future pipeline of infrastructure and assigns it all to the different regions. On their method, IPPR conclude that despite the increasing focus on rebalancing infrastructure investment towards the UK's left behind regions, the current pipeline of transport projects is actually set to invest more than seven times as much per resident in London than it is across Yorkshire and the Humber and more than five times more than it is across the East Midlands.[46] Per resident, planned transport expenditure in Yorkshire and the Humber stood at £511 in August 2019 and £741 in the East Midlands, which compares to a figure of £3,636 across London. There is disagreement between government and the IPPR on the suitability of analysing the pipeline of investments in this way.

5.9 These figures do include some expenditure on HS2, although they don't consider some interventions currently at an early stage of development but with general government support, such as Northern Powerhouse Rail, Midlands Engine Rail, the TransPennine Route Upgrade and a number of additional

46 IPPR North, 2019, Transport Investment in the Northern Powerhouse

supporting schemes aimed at integrating HS2 into local transport networks. This analysis would suggest that the EL regions are set to face a further considerable deficit in transport expenditure levels compared to London or the England average level in the future.

Figure 5: Pipeline transport investment per resident within UK regions, 2019



Source: IPPR North, 2019, Transport Investment in the Northern Powerhouse.

5.10 Taking a levelling up approach to potential future spending on transport would result in an alternative approach to the distribution of that spending, and support a wider range of Government policy objectives. Earlier in section 3 it was found that over the past four years, the Government has spent c. 1.5% of GDP in three of the past four years (and 1.4% in the other year), equating to c. £30bn each year, on transport. If we hold constant in today's prices and based on today's GDP levels (i.e. not trying to account for inflation or future economic implications of Covid-19), we might simplistically begin with a starting point of a pot of £30bn to spend each year on transport. Removing 20% for spending in Wales, Scotland and Northern Ireland,[47] and allocating the remainder on an equal per capita basis would give spending of £425 per capita per annum. Grossing up for the population of the EL would give a transport budget of

[47] The average of the total spent in these regions historically was 21-22%

£5.5bn each year for the North East, Yorkshire and the Humber and the East Midlands. Over the lifetime of delivery of HS2 Phase 2b, this figure would be sufficient to also entirely include the costs of NPR, Midlands Engine Rail and the TransPennine Rail Upgrade, as well as a number of supporting local transport measures to integrate these schemes into local transport networks.

5.11 The capital investment would be a one-off investment, with the total cost of this investment in all schemes falling below existing levels of UK spending in transport infrastructure. Additional supporting investment would be required to ensure that these schemes are continually integrated into regional and local transport networks. Should expenditure on transport infrastructure be equalised on a per capita basis between all the regions in the UK, the transport budget for the UK would not only be sufficient to cover the capital costs of the headline investments, but also provide a significant budget to cover the cost of integrating these schemes into the transport network.

5.12 The investment into the transport network across the EL would enable the generation of well paid jobs with relatively higher levels of productivity, encouraging the development of supply chains. Not only would this contribute to narrowing the UK's regional inequality – the largest in the developed world – but would aid in addressing the 'long-tail' of low productivity firms frequently highlighted as a key factor behind the UK's nationwide productivity puzzle.

6 Integrating HS2 with transport across the eastern leg

Summary

- National policy has highlighted the role for transport strategy to **maximise the benefits of HS2 through integration with other transport projects as well as local economic, spatial and industrial policy**.
- Significant work has already gone on at the local and regional levels into the planning of how best to maximise the benefits of HS2. A **number of transport investments have been proposed that will further enhance connectivity within the area** and maximise the benefits across the EL. Currently **fewer than 10,000 people in the North can access four or more of the North's largest economic centres within an hour. This would rise to 1.3 million** once NPR is delivered.
- The complementary **additional investments of Northern Powerhouse Rail (NPR) and the TransPennine Route Upgrade (TRU) will also unlock additional capacity for local services and freight**.
- **NPR is currently estimated to cost £39 billion if completed by 2040, but would support the delivery of 35,000 additional jobs** within city centres across the North and 35,000 more seats in trains to six core cities each hour.
- The links between HS2 and NPR are clear, current proposals are for the investments to share much of the same infrastructure. NPR has been designed to integrate with the agreed HS2 design. Overall, **HS2 will add around 150km of new rail infrastructure for the North, NPR will use at least 80km of the planned HS2 network**, as well as the considerable investment in new station capacity. Without HS2, this would mean significant additional cost for the NPR programme to achieve an equivalent economic benefit.
- LCR transport policy demonstrates that the **current transport system does not have the capacity to meet forecast future demand** resulting from the development of key employment centres across the region.
- In combination with the West Yorkshire Combined Authority, **LCR have developed a HS2 Growth Strategy**, outlining the policies through which the authorities aim to maximise the economic benefits of HS2. This includes the **transformation of the area next to Leeds Station, known as South Bank, which is planned to deliver over 35,000 new jobs in addition to the 40,000 jobs directly created across LCR by HS2**.
- The **York Central Enterprise Zone**, outlined within the York Economic Strategy will enable the connectivity offered by HS2 and supporting transport investments to **catalyse development in an area of high connectivity and generate knowledge intensive jobs**.
- SCR aim to encourage the transport and enabling development across its innovation clusters, providing connectivity and boosting the size of labour markets for the region's advanced manufacturing clusters. **SCR estimate that the combined delivery of NPR and the HS2 EL would contribute 23,800**

additional full-time equivalent employment positions and a total of £2.7bn more in economic output.

- The **East Midlands Hub Station at Toton** will **serve an area of over 3 million people and more than 100,000 businesses**. It will transform connectivity between the East Midlands and Birmingham (19 minutes), and Leeds (29 minutes) and release capacity from overcrowded passenger and freight networks.
- The **East Midlands HS2 Growth Strategy** published in 2017 sets out proposals to use HS2 connectivity to **deliver at least an additional 74,000 jobs and 4 billion of GVA** – shifting the growth rate to above the UK average.
- The area adjacent to the East Midlands Hub Station at Toton represents a major development opportunity. **An Innovation Campus will sit at the heart of a number of major development opportunities.** A Summary Business case was submitted to MHCLG to explore the establishment of a new form of **'Locally Led Development Corporation'**, with the objective of accelerating development and maximising growth potential.
- The prospect of a HS2 connection at **Chesterfield Station** has led to the establishment of a 'Joint Growth Board' which is already driving **major regeneration of the town centre and adjacent commercial areas**. The potential benefits of HS2 for the Chesterfield area include: 4,740 new homes and 10,220 new jobs, creating £270m net additional GVA and establishing a new gateway into the Peak District. A new HS2 Infrastructure Maintenance Depot at Staveley will help generate hundreds of new high quality engineering jobs within some of the most deprived communities in England.
- To ensure that the economic opportunities of HS2 are maximised for residents within the region, TVCA have proposed the development of the **Darlington HS2 Growth Hub**, focused around a redeveloped Darlington station. Incorporating the wider economic impacts of the scheme, the Outline Business Case for the Darlington station redevelopment presents an overall BCR of 3.9.
- The North East Authorities have identified priority corridors for transport investment, aiming to **increase accessibility between the most deprived communities across the region, the economic opportunities** anticipated as a result of HS2 and supporting transport infrastructure.
- HS2 will also link the Eastern Leg to Scotland. **HS2 is expected to benefit the Scottish economy by over £5bn**. It will join up the economic powerhouses of Glasgow and Edinburgh with fast, reliable train travel to other major cities in the UK. **HS2 will emit 17 times less carbon than the equivalent domestic flight**, further reinforcing the emissions basis for this investment through enabling modal shift.

The need for integration to maximise benefits

6.1 The Oakervee Review concluded that alongside a commitment to ensuring that both the Eastern Leg and Western Leg of HS2 are delivered, government should also ensure that a strategy is put in place to ensure that HS2 is integrated into the wider transport network. [ref Oak Rev] The review acknowledges that the scheme is likely to deliver significant economic benefits along its route, but that significant transformational economic change can only occur where properly integrated alongside the existing and proposed intra-city and inter-regional transport networks.

6.2 The importance of integration of HS2 with the wider transport network is clearly recognised by the Oakervee Review, in particular to maximise the economic benefits from strategic investment. The HS2 Plus (2014) report also highlights the need to integrate HS2 Phase 2b with the wider rail and other transport networks is particularly strong for stations across the North of England and will broaden the impact of inter-city connectivity benefits offered by the scheme.[48]

6.3 To ensure that the economic benefits of HS2 are realised, it remains equally important to ensure that stations within key economic centres are as easily accessible for the surrounding populations as it is for HS2 to reduce journey time between these centres. Following completion of Phase 2b, were the stations to be inaccessible to much of the population of the North and the Midlands, any benefit associated with providing connectivity between the key economic centres would be far below its potential.

6.4 Although the economic case for HS2 assesses the impact of the scheme in isolation, in reality presenting the investment alongside a package of supporting policy measures is necessary to ensure the largest level of economic growth and that this growth is shared equally. Supporting policy measures to ensure the benefits of HS2 are maximised include transport integration measures, but also a range of supporting social and economic policies to promote the economic benefit.

6.5 Much work at the local and regional level has already gone into the planning of how best to maximise the benefits of HS2. A full list of these measures would go beyond the scope of this report, butthe following sections outline the key policies currently proposed for the regional economic areas along the EL.

48 DfT, 2014, HS2 Plus.

Integration between HS2 and NPR

6.6 The Northern Powerhouse Independent Economic Review sets out how connectivity improvements combined with significant other investment in skills, innovation, inward investment and public and private services could lead to a transformation of the northern economy, with productivity 4% higher and 850,000 additional jobs by 2050 than would otherwise be the case. [49] HS2 and Northern Powerhouse Rail are key requirements for this transformation to occur and Transport for the North has considered four potential scenarios for increased demand for rail travel. [50]

6.7 The links between HS2 and NPR are clear; current proposals are for the investments to share much of the same infrastructure. NPR has been designed to integrate with the agreed HS2 design. Overall, HS2 will add around 150km of new rail infrastructure for the North, of which the EL accounts for 58km and Western Leg 94km. NPR will use at least 80km of the planned HS2 network, as well as the considerable investment in new station capacity.[51] Without HS2, this would mean significant additional cost for the NPR programme to achieve an equivalent economic benefit. Transport for the North have estimated that cancelling of the EL would add several billions to the bill for NPR.

6.8 A junction at Clayton has already been included in the scope of HS2 Phase 2b to enable future Northern Powerhouse Rail and HS2 services at Sheffield Midland station to connect onto HS2 to travel towards Leeds (on 32km of shared running), the North East and Scotland (using 15km of shared running between Garforth and Ulleskelf). The inclusion of the Sheffield Spur, the Midland Mainline upgrade/electrification, Sheffield Midland Station upgrade and Northern Loop will support HS2 and Northern Powerhouse Rail services. This infrastructure will not only support Sheffield – Leeds/Newcastle services, but also interact with Sheffield-Manchester and Sheffield-Hull Northern Powerhouse Rail services, further demonstrating the synergies between the two programmes.

6.9 Where opportunities are available to unlock the early delivery of the potential benefits of HS2 and the EL, these need to be taken. The economic and climate case for acting as soon as is feasible is clear. This includes the potential for a phased construction programme. A phased program would further enable efficiencies during construction, but most importantly ensure a sequence that provides the maximum benefits for the project, at the earliest opportunity.

49 https://transportforthenorth.com/wp-content/uploads/NPIER-Core-Messages.pdf
50 Transport for the North, 2018, Future Transport Demand Statemtn.
51 Transport for the North, 2019, Letter to Doug Oakervee.

6.10 To deliver the transport objectives across the EL, a single strategic programme of investment in rail covering the next 30 years is needed. The single programme must include:

- A phased programme of interventions at Leeds station which includes improving both pedestrian and operational capacity.
- Construction of TRU by 2026, including electrification between Huddersfield and York and Selby.
- Early delivery of the Garforth HS2 touchpoint as a later phase of TRU improvements to speed up services to the North East and Scotland.
- Completion of HS2 Phase 2b between the Midlands and Leeds which includes the HS2 station in Leeds delivered as early as possible, alongside a link south to Clayton North to enable early introduction of NPR services to Sheffield.
- The provision of a touchpoint on HS2 between Leeds and Sheffield onto the classic rail network remains a requirement of the Leeds City Region to allow services from the South utilising HS2 infrastructure to travel beyond Leeds. A touchpoint at Stourton does not offer the right solution in this respect and further detailed work is required to understand the infrastructure requirements to provide better links from Bradford, Halifax and Huddersfield to South Yorkshire and beyond.
- Delivery of the Northern Powerhouse Rail (NPR) network including a new station in the centre of Bradford incorporating both NPR and Calder Valley services and early delivery of a new line between Leeds and Bradford.
- A rolling programme of electrification to create an electrified city region metro rail network that supports the Government's wider plans to decarbonise the economy, starting with the Calder Valley line.

6.11 NPR will provide faster East-West connectivity across the North, while HS2 will provide fast long-distance connections from the Midlands and the North to London, Scotland, and the remainder of Great Britain. These improvements will be felt beyond the immediate cities and intermediate markets directly served by NPR and HS2. It reinforces the message that to maximise the impact of NPR, HS2 and other supporting transport investments, schemes must be designed and delivered as a unified programme to maximise the benefit to passengers.

Leeds City Region

6.12 In combination with the West Yorkshire Combined Authority, LCR have developed a HS2 Growth Strategy, outlining the policies through which the authorities aim to maximise the economic benefits of HS2. Within this strategy, it is estimated that HS2 would contribute 50,000 additional jobs within the region by 2050.

6.13 LCR transport policy demonstrates that the current transport system does not have the capacity to meet the forecasted future demand increase resulting from the development of key employment centre across the region. The LCR HS2 Connectivity Strategy states that to meet expected demand in 2033, an additional 25,000 trips into the centre of Leeds during the AM peak will need to be accounted for. Unless additional connectivity measures are put in place alongside HS2, these employment opportunities will not be accessible to many residents within the region as a result of transport overcrowding.

6.14 In order to enable greater capacity into the centre of Leeds and build upon the connectivity provided by the EL connection to Leeds station, the additional investments of Northern Powerhouse Rail (NPR) and the TransPennine Route Upgrade (TRU) will unlock additional capacity. NPR seeks to provide additional connectivity between the key economic centres in the North, providing a new rail line between Liverpool, Manchester, Bradford and Leeds. The HS2 Connectivity Strategy presents evidence of the fundamental connectivity benefits of the scheme, stating:

> *"Currently fewer than 10,000 people in the North can access four or more of the North's largest economic centres within an hour. This would rise to 1.3 million once NPR is delivered."*[52]

6.15 The scheme has currently been estimated to cost £39 billion if completed by 2040, but would enable the delivery of 35,000 additional jobs within city centres and 35,000 more seats in trains to six core cities each hour.[53]

6.16 Additionally, the proposed TRU would provide further capacity for public transport journeys into Huddersfield and Leeds city centre and contribute to boosting connectivity both within LCR and between the employment centres of LCR and Greater Manchester. The scheme would invest in electrifying existing rail lines to improve reliability and increase network capacity, both for passenger and freight transport. The initial phase of TRU has been estimated to cost in the region of £3 billion and a refreshed Outline Business Case has been submitted to the Government with a decision expected sometime in the summer.

6.17 LCR identify that HS2 will bring significant development opportunities for Leeds City Centre and along the HS2 route. A key planning intervention aimed at unlocking the opportunities afforded by HS2 is significant development of the South Bank and Holbeck areas to the south of the proposed Leeds HS2 terminal. This is a current area of relatively high deprivation, but the intervention will aim to spread the employment growth located at the direct city centre to the area.

52 Leeds City Region, 2019, HS2 Connectivity Strategy.
53 Transport for the North, 2019, The Potential of Northern Powerhouse Rail.

6.18 The planned rolling stock depot located to the south of Leeds station would further act as a catalyst for prosperity and productivity on the enterprise zone site and will attract new investment for the region. This depot will be directly linked to the South Bank and Holbeck areas of regeneration, enabling high levels of accessibility to the economic opportunities located at the site.

6.19 In the city centre, LCR concentrates on the need for increasing commercial space to enable the additional opportunities afforded by the HS2. The Leeds 2019 Core Strategy makes provision for 655,000sqm of additional office floorspace, 31,000sqm of additional retail floorspace, and 10,200 dwellings to meet anticipated demand over the plan period. Much of this additional demand is attributed to the completion of the HS2 terminal in the city centre.

6.20 LCR aim to position Leeds as a UK centre for high speed rail engineering through connections to existing higher education institutions in the region specialising in high speed rail. These include the University of Leeds' Institute for High Speed Rail and System Integration, and the University of Huddersfield's Institute of Railway Research. The High Speed Rail and System Integration research centre will be located on a site adjacent to the planned HS2 rolling stock depot in Leeds, to enable integration between the centre and the depot, enabling connectivity between the centre and the operation of HS2 and maximising the potential for further innovation.

6.21 These research links will contribute to ensuring LCR residents have access to employment opportunities enabled by HS2 and spread out benefits. An additional technology park with a priority on high speed rail engineering will be created in conjunction with the Institute for High Speed Rail and System Integration, to create a legacy of engineering knowledge for local residents.

6.22 Another measure to spread out benefits through the region is West Yorkshire Combined Authority's promotion of priority corridors. These are strategic areas linking employment centre that are themselves relatively deprived. These corridors will see significant investment into sustainable transport connectivity, with improvements to bike routes, bus services and severance reduction schemes.

York

6.23 York will benefit from an increase in connectivity to the other EL centres through the HS2 connection to the ECML. Within the LCR HS2 Growth Strategy, it is estimated that the economic uplift of York Central is estimated to be around £1.6bn, generating up to almost 7,000 additional jobs. The economic uplift of

HS2 would therefore correspond to an uplift equivalent to 6.5% of the current employment levels within York.

6.24 The City of York has a well-educated population, with over 40% educated to degree standard, and residents would be well-placed to benefit from the increase in knowledge-intensive jobs likely to occur as a result of HS2 and other transport investments. The York Economic Strategy 2016-2020 emphasises the role that knowledge-intensive and high-value added jobs will play in promoting economic growth. The Economic Strategy outlines a target for growth in high value added sectors of 20% above baseline forecasts.

6.25 York has a strategic advantage of expertise within the railway engineering industry, which places it in a prime position to contribute to and benefit from the economic opportunities offered by HS2. As stated within the LCR HS2 Growth Strategy, the promotion of York's Railway Engineering Expertise will contribute to the city's strategic advantage, enabling the development of a high value added industrial cluster.

6.26 The recently-approved York Central Masterplan will unlock the potential of one of the country's largest brownfield sites, providing up to 2,500 new homes, 90,000m^2 of high quality commercial space, new public space and a £50m expansion of the National Railway Museum. Situated in an area of high connectivity, this development will grow York's economy by 20% and create 6,500 jobs.

6.27 To ensure local transport accessibility is maximised, York Council is already planning for an increased demand in rail services, earmarking £15m to redevelop the railway station square with new bus and cycling provision promoting multi-modal interchange. The York Station Front project will transform the station frontage, creating a world-class gateway to York in keeping with the city's unique heritage and create new public spaces and a more pedestrian-friendly experience.

6.28 With 9,000 businesses, 110,000 employed in the City and a population of 209,900, two leading universities, an output of £7 billion, and a cultural and heritage offer that attracts 8.4m visitors a year, contributing £765m to the local economy and supporting 24,000 jobs. Crucially, 39% of all visitors come to York by train. It is second in popularity only to London as a UK tourist destination. The connectivity benefits offered by HS2 and supporting transport investments will unlock York as a visitor destination, spreading the benefits enabled by the visitor economy across York and the wider region.

Sheffield City Region

6.29 Evidence produced by Sheffield City Council suggests that whilst the SCR economy has been growing strongly in recent years, the gap between SCR and national economic performance levels is not expected to close over the next 30 years, with the productivity gap (output per FTE worker) expected to widen. HS2 has the potential to provide a significant boost to the SCR economy, equivalent to a 28% increase in employment and 10.5% increase in GVA per annum by 2048.

6.30 Sheffield City Council is currently preparing a new Local Plan for Sheffield and SCR has completed work on a HS2 Growth Strategy, which will inform much of the related planning and development policy for the region. This work included a Development Framework for Sheffield Midland Station and the Sheaf Valley to ensure the area maximises the benefits of HS2 and NPR arriving, which includes significant new commercial and residential development as well as connectivity and public realm improvements. As within LCR, the SCR will benefit from transport investments complementary to HS2 with the NPR developing improved links between Sheffield city centre and Manchester, as well as Leeds and Hull.

6.31 The connectivity challenges faced by SCR are different to those of LCR. Although LCR faces significant long distance commuting flows between employment centres, commuters in SCR travel relatively shorter distances, with more than a third of commuters travelling less than 5km. Alongside measures encouraging cross-commuting between employment centre within the region, SCR have also set a target to increase the two-way commuting between the region and the cities of Manchester and Leeds.

6.32 SCR will benefit substantially from the connectivity improvements offered by NPR, lowering journey times and improving reliability on the rail link between Sheffield and Manchester. SCR estimate that the combined delivery of NPR and the HS2 EL would contribute 23,800 additional full-time equivalent employment positions and a total of £2.7bn more in economic output when compared to a 'business as usual' scenario.

6.33 The SCR Transport Strategy and Integrated Rail Plan outline several measures for the development of public transport connectivity within the region. The strategy commits to an investment of £330 million into transport-focussed research and development within the city region. This R&D investment aims to contribute to a step change in the way in which people travel within the region, developing sustainable forms of travel and improvements to the way in which people access the public transport network, such as MaaS (Mobility as a Service).

6.34 SCR identify additional intra-regional transport investments aimed at improving the delivery, quality, and reliability of local services. SCR demonstrate within

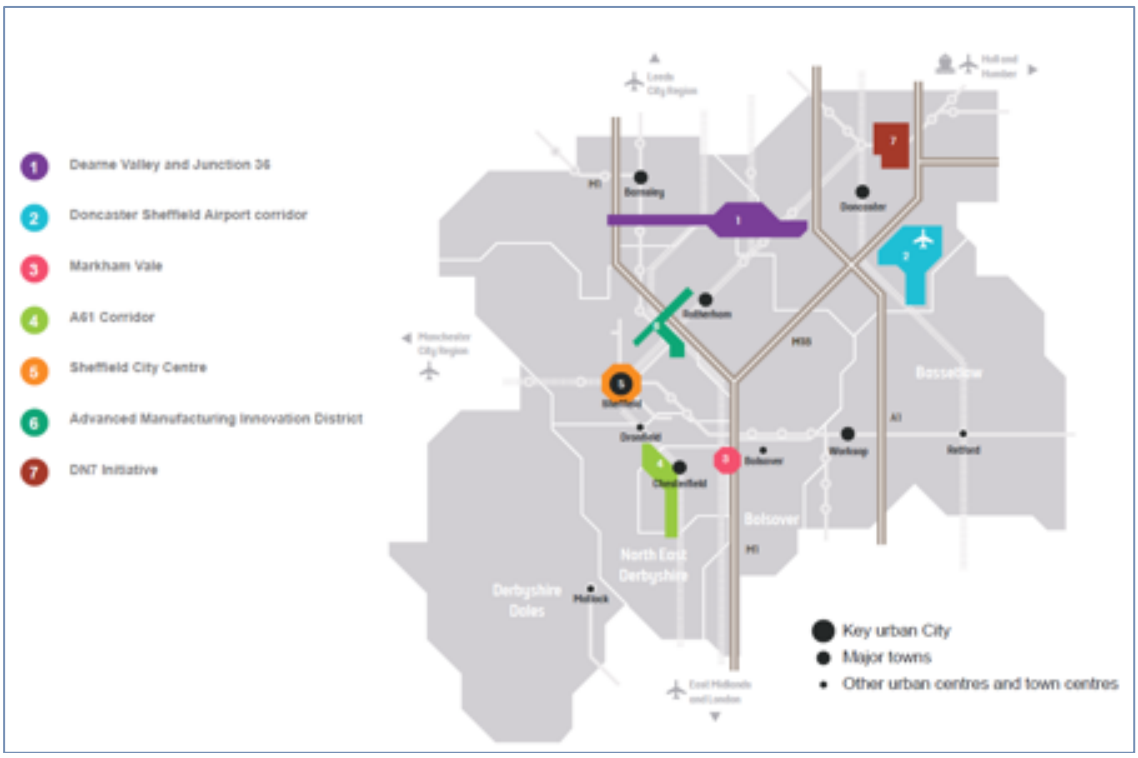
the SCR Transport Strategy that they will provide additional investment into the existing tram network around SCR, and will contribute additional investment to reduce delays to transport journeys. The latter intervention is estimated to increase productivity by £500 million.

6.35 Alongside the development of supporting transport investments spreading the benefits throughout the region, SCR has identified priority areas for growth, with its Integrated Infrastructure Plan identifying the infrastructure challenges and opportunities which could act to constrain or support target levels of growth. A total investment of £300m is being used to alleviate these challenges and ensure the opportunities are maximised. The growth areas are closely aligned with the HS2 and NPR station locations, where growth is expected to be clustered, and will form innovation clusters, stretching from Chesterfield in the south up to Leeds in the north.

6.36 In addition, the Transforming Cities Fund interventions within SCR aim to maximise the economic opportunity offered by HS2 and encourage sustainable land-use change. The Transforming Cities Fund will generate investment into high technology manufacturing industries along three corridors within the region. These are the River Don, the Dearne Valley and the Urban Centres of the City Region corridors.

6.37 This funding aims to generate an Advanced Manufacturing Innovation District encompassing the employment centres of Barnsley, Doncaster, Rotherham, Sheffield, Bolsover, Chesterfield and Worksop. To do so, public transport connectivity between these locations will be improved, creating a large labour market encompassing much of SCR. The interventions will focus residential development within these corridors, with 70,000 dwellings planned for areas within these corridors with the greatest public transport access.

Figure 6: SCR priority growth corridors



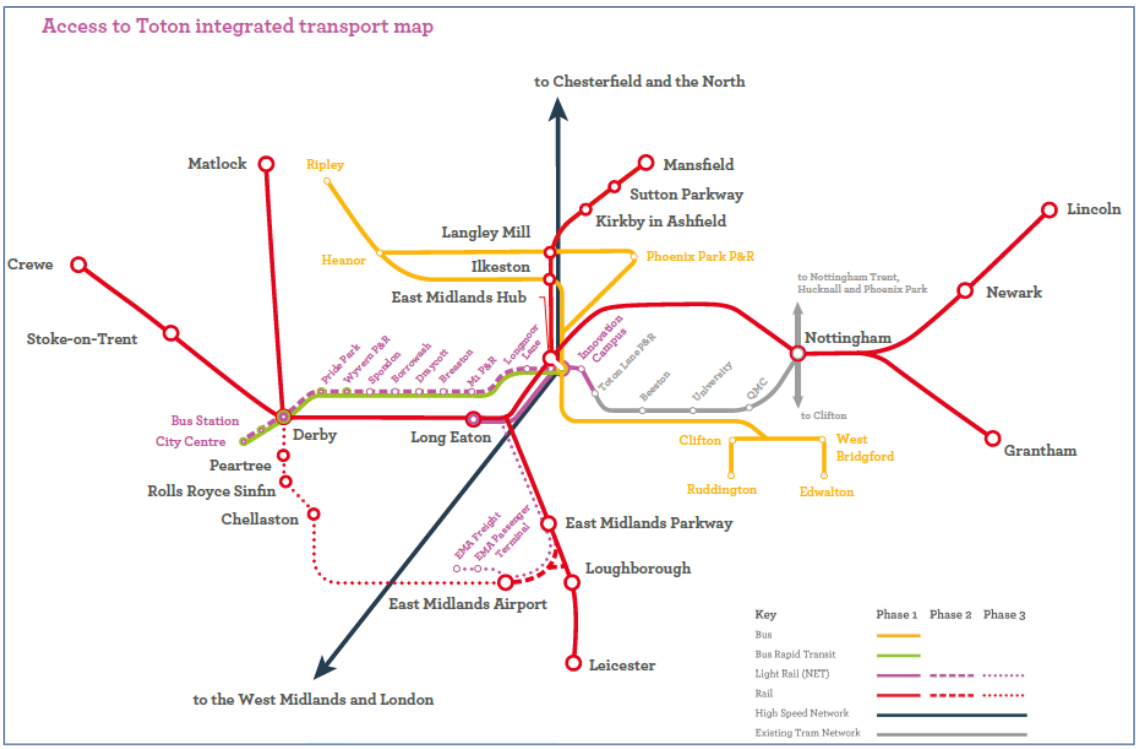
East Midlands Hub Station at Toton

6.38 The East Midlands Hub Station at Toton will serve an area of over 3 million people and more than 100,000 businesses. It will transform connectivity between the East Midlands and Birmingham (19 minutes), Leeds (29 minutes) and London (52 minutes) and release capacity from overcrowded passenger and freight networks, including to East Midlands Airport, the 2nd largest air freight hub in the the country.

6.39 Toton will also have conventional platforms which will give direct conventional rail connectivity into Derby, Leicester, Nottingham and Loughborough. Midlands Connect has also identified a strong business case for additional classic compatible HS2 services to run via the Hub Station between Bedford, Leicester and Leeds, and between Birmingham Curzon Street and Nottingham. These services will require full electrification of the Midland Main Line.

6.40 Local partners have also been working with Midlands Engine Rail to identify local connectivity improvements to spread the benefits of HS2 across the wider region, including by conventional rail, light rail (tram), bus and bus rapid transit. The Phase 1 package of interventions has a conventional transport business case of more than 4 to 1 and could be delivered within the next 10 years in advance of HS2.

Figure 7: Access to Toton integrated transport map



6.41 Alongside the flagship Midlands Engine Rail proposals, the East Midlands HS2 Growth Strategy sets out transport interventions to maximise connectivity between the key employment centres within the East Midlands and the East Midlands HS2 station. The recently introduced Nottingham Express Transit tram service will be extended to the HS2 hub, to provide maximum two-way access for residents around Nottinghamshire and the East Midlands Growth Hub. This would be in addition to local train services running directly from the Growth Hub to Nottingham, Derby, and Birmingham.

6.42 The HS2 Growth Strategy recognises the importance of improving the connectivity to the HS2 Growth Hub across the region. Another significant transport intervention aimed at improving that connectivity for the whole of the region to the Growth Hub is the development of several HS2 park and ride centres. The current issues of congestion around the existing transport network in the vicinity of the Growth Hub are likely to be exacerbated following its completion and the development of park and ride centre seeks to provide a solution to these issues.

6.43 The East Midlands HS2 Growth Strategy published in 2017 sets out proposals to use HS2 connectivity to deliver at least an additional 74,000 jobs and 4 billion of GVA – shifting the region's growth rate to above the UK average. The area adjacent to the East Midlands Hub Station at Toton in Nottinghamshire and

Leicestershire represents a once in a lifetime development opportunity. To capitalise on the location's super-connectivity and unique potential local partners have exciting proposals for a high quality 'Innovation Campus' linked to the region's powerful university sector. The development principles underpinning the proposal have been incorporated into statutory planning policy, and the relevant parties are now working together on a detailed masterplan to provide a framework for investment.

6.44 The Innovation Campus will sit at the heart of a number of major development opportunities that will include the nearby Chetwynd Barracks 'garden village'; the Ratcliffe-on-Soar Power Station site and, in Leicestershire, the area around East Midlands Airport and the new intermodal freight terminal.

6.45 Given the collective scale of these opportunities, the Growth Strategy identified the need for a powerful local delivery body to be established. Subsequently, the Government made available funding via the Midlands Engine to explore the establishment of a new form of 'Locally Led Development Corporation', with the objective of accelerating development and maximising growth potential. A Summary Business case was submitted to MHCLG in March 2020.

Chesterfield and Staveley

6.46 HS2 classic compatible trains serving Sheffield will also stop at the existing Chesterfield Station. Currently, just one of the two trains per hour serving Sheffield will also call at Chesterfield. However, there is evidence of a strong local economic case for two services per hour and for additional Cross-Country services. This may require some additional infrastructure enhancements, including the provision of a fourth platform. An updated infrastructure assessment is nearing completion and will be submitted to the NIC by Chesterfield BC.

6.47 A proposal was recently made to the Government's 'Restoring your Railway Fund' to reopen the Barrow Hill Line between Chesterfield and Sheffield for local passenger services, This was announced as one of the ten successful bids by the Transport Secretary on 23rd May and received funding to proceed to the next stage. This would further upgrade the current freight line and re-open local stations in a number of communities in areas of deprivation which currently lack public transport, connecting them to HS2.

6.48 The prospect of a HS2 connection at Chesterfield Station has led to the establishment by County and Borough councils of a 'Joint Growth Board' which is already driving major regeneration of the town centre and adjacent

commercial areas. The potential benefits of HS2 for the Chesterfield area include:

- Better connectivity for the one million people already living within 30 minutes of the station;
- 4,740 new homes and 10,220 new jobs;
- £270m net additional GVA; and 176 ha of brownfield land brought back into use; and
- Establishing an international gateway into the Peak District National Park.

6.49 The Chesterfield HS2 station master plan has been developed to provide a framework for public and private investment. The D2N2 Local Enterprise Partnership has already agreed investment of £2.4m towards the development of a new office facility and master planning works within Chesterfield station area. A further £3.8 million has recently been agreed which will support the creation of a new link road from the south of the town to the station and unlock 1.26Ha of new commercial floorspace generating around £95m GVA over a 30 year period.

6.50 A new HS2 Infrastructure Maintenance Depot at Staveley will help generate new high quality engineering jobs within some of the most deprived communities in England. In the short-term, the Depot could also provide a construction base for HS2 to align with the current plans to make the nearby Barrow Hill Roundhouse a rail industry 'centre of excellence' linked to the High Speed Rail College and the research and development capabilities of the Universities of Newcastle and Derby.

6.51 The prospect of HS2 co-investing in Staveley is already helping to energise landowners to bring forward a 150ha brownfield site, with planning applications submitted for a new mixed-use housing and employment zone comprising around 1,500 homes and new leisure and commercial development around a revitalised Chesterfield canal.

Tees Valley Combined Authority

6.52 In similarity with the other EL authorities, the Tees Valley Combined Authority (TVCA) will benefit from improved connectivity with significant economic centres in the north of England through NPR, enabling the development of freight and supply chain links for the manufacturing industrial cluster located within the region.

6.53 To ensure that the economic opportunities of HS2 are maximised for residents within the region, TVCA have proposed the development of the Darlington HS2 Growth Hub, focused around a redeveloped Darlington station. Incorporating the wider economic impacts of the scheme, the Outline Business Case for the

Darlington station redevelopment presents an overall BCR of 3.9, with a total cost of £80 million in present value terms, representing high value for money in isolation of the complementary HS2 and NPR transport investments. TVCA estimate that in combination with these schemes, an additional 16,500 jobs will be generated between 2019 and 2029 as a result of investments outlined within the TVCA Investment Plan.

6.54 Building upon the connectivity benefits associated with HS2 and NPR for freight transport, TVCA and Network Rail are investigating the possibility for an upgrade of the rail link between Northallerton and Teesport, the large port located in Middlesbrough that provides access to international trade for the region and large parts of the North of England.

6.55 TVCA is also developing plans for a major upgrade of Middlesbrough Station, another key strategic rail hub, and also for a wider programme of investment in the wider Tees Valley rail network in order to help ensure that full connectivity with the likes of HS2 and NPR is achieved.

North East Authorities

6.56 The proposed HS2 connection between Darlington and Newcastle-upon-Tyne will build upon the existing rail network to provide connectivity for the wider North East. The key economic centres of Newcastle, Sunderlandand Durham have significant industrial strengths in advanced manufacturing, including the automotive industry. Furthermore,improved connectivity will drive benefits to the area.

6.57 The North East Authorities (consisting of the North East Combined Authority and the North of Tyne Combined Authority) aim to support the connection from HS2 to the North East, and enable further future investment to improve links to Scotland. To ensure that the benefits of HS2 are maximised for the North East Authorities, the authorities aim to make key gateways 'HS2-ready', providing the local supporting transport infrastructure needed to enable local accessibility onto the network and allowing local residents access to anticipated economic opportunities.

6.58 The North East Authorities aim to provide further local investment, supporting the link to HS2 through the Transforming Cities Fund. The North East Authorities have identified corridors where current North-to-South transport links across the area are limited. Investment in the transport network focused on these corridors will enable some of the most deprived communities across whole of the North East to access to the opportunities afforded by HS2.

Scotland

6.59 HS2 will help build a fairer, more balanced Britain. It will join up the economic powerhouses of Glasgow and Edinburgh with fast, reliable train travel to other big cities in the UK.

6.60 By freeing up space on existing lines, for new local train services, passengers and freight, HS2 will help to ease congestion and overcrowding. Travelling by train becomes a more convenient and enjoyable option for everybody, regardless of how far they're going.

6.61 HS2 will help take hundreds of long haul lorries off the roads every day, as more freight can move to rail. This will improve air quality and help reduce carbon emissions. The investment will help reduce the need for short-haul air travel between Scotland, London and other major English cities to help fight climate change and keep the country green. HS2 will emit 17 times less carbon than the equivalent domestic flight.

6.62 HS2 is expected to benefit the Scottish economy by over £5bn. It will join up the economic powerhouses of Glasgow and Edinburgh with fast, reliable train travel to other major cities in the UK.

6.63 The role of the Eastern Leg in linking into an integrated rail plan for the North of England brings consequent benefit for growth in Scotland, paving the way for much closer commercial links between Scotland's major cities to English cities such as Leeds and Newcastle and will support ambitions around the Borderlands growth plans. Stronger HS2 links on both the west and east side of England into the proposed integrated rail network for the north of England will also serve to strengthening transport options into and through the border lands.

7 Making the case for transport investment in the UK

Summary

- The case for **transport investment in the UK is informed by applying WebTAG, which attempts to value and compare the costs and benefits** of proposals.
- The real costs are difficult to estimate due to major uncertainties about physical technicalities, and the method of **estimating the benefits relies upon assumed passenger numbers going from A to B, based upon planned future levels of employment and population growth and the values to those users of various factors including time savings, reliability, congestion and safety.**
- The inclusion of **Wider Economic Benefits improved this process by allowing estimation of productivity benefits** resulting from freeing up capacity to productive locations, thus enabling clustering, better job matching and spillovers.
- However, **WebTAG is simply not fit for purpose for major new transport infrastructure**. It's not about time savings. **The current approach underestimates the benefits of rebalancing and non-economic factors.**
- Major new transport investment across the EL is proposed with the objective of all the things this report has already touched upon – **transformational levels of economic growth, rebalancing and distribution of such growth, all delivered alongside reducing our impact on the environment and maximising individuals' wellbeing;** All the things which either don't appear or can't be changed in WebTAG compliant models, or upon which a value cannot readily be placed.
- An alternative approach to considering whether transport investment should go ahead would be to **clearly set out the objectives a specific scheme is seeking to achieve and then consider the likelihood of delivering those outcomes.**
- It cannot be known with certainty whether transport will ultimately lead to the achievement of those objectives, but by **considering scenarios, along with their likelihood, an evidence-based and risk-based judgment can be reached.**

WebTAG

7.1 For UK transport schemes, including HS2, the Department for Transport's WebTAG guidance is used to produce the economic appraisal.

7.2 The benefits and costs are valued over an agreed appraisal period, usually 60 years for a major piece of infrastructure such as HS2 and a discount rate is

applied so that the values over the appraisal period can be expressed as a Present Value. The benefits and costs are then compared in order to produce a Benefit/Cost Ratio (BCR), which provides an indication of the value for money of the scheme. The BCR usually needs to be greater than 2, which is considered to represent high value for money, in order to be considered for funding.

7.3 The benefits included in WebTAG include 'conventional' benefits associated with transport use and 'wider economic benefits' (WEBs) which reflect impacts on productivity. The types of benefit included under each of these groups are briefly summarised below.

Conventional benefits

7.4 These are benefits that the user of the transport system is estimated to get as a result of the transport investment. Through research which enables us to place a value on these impacts, they are quantified to result in transport user benefits, which accrue to the user due to shorter journey times, more reliable, frequent, safe or comfortable trips. Each of the components which are included in this element of a transport appraisal are briefly summarised below.

- Time savings associated with quicker journeys, shorter waiting times or easier connections: WebTAG says that people place a value on being able to travel more quickly and provides monetary values of time based on well-established empirical research undertaken over an extensive period. For instance, the 2019 value of time for a rail passenger making a business trip is £32.36 per hour, so a ten minute time saving would be valued as a benefit of £5.39 per person.
- Reliability improvements: as well as valuing quicker journeys, people value certainty – so it is beneficial if average lateness is reduced, and this can also be assigned a monetary value.
- Congestion relief: a reduction to crowding (whether more capacity on trains, fewer vehicles on the road etc) is beneficial as it can make journeys quicker and more pleasant.
- Changes to vehicle operating costs: an increase or decrease in vehicle trips leads to an increase or decrease in the costs of running a vehicle – both fuel costs and non-fuel costs (such as vehicle maintenance), which needs to be accounted for.
- Emissions: a change of mode, or a change to the number of trips, has an effect on emissions. For instance, mode shift from car to rail leads to fewer total emissions, and WebTAG provides values that can be used to convert this into a monetary impact for inclusion within the BCR.
- Safety: mode shift also impacts on the number of accidents, and WebTAG provides values for these impacts.

Wider economic benefits

7.5 These are the wider economic benefits that are estimated to result from the transport investment. Evidence tells us that transport is a critical factor in underpinning a productive economy. These benefits arise due to individuals being better connected to jobs where they can be most productive, enabling more competitive markets, better matching of people to jobs and overall spillovers on productivity. Each of the components which are included in this element of a transport appraisal are briefly summarised below.

- Agglomeration: there is a positive relationship between density and productivity; transport schemes that improve connectivity lead to an increase in 'effective density' and hence boost productivity in particular sectors of the economy, which leads to an increase in output.
- Imperfect competition: markets that operate under imperfect competition keep output below its optimal level; if a new transport scheme reduces firms' transport costs they will expand output, which represents a benefit.
- Labour force participation: if transport costs reduce this leads to an increase in 'effective wages' and hence some additional people are induced to enter the labour market. This leads to an increase in output.

Costs

7.6 With regards to costs, a WebTAG economic appraisal will include:

- Capital costs: usually with optimism bias (OB) applied. The inclusion of OB reflects previous research that suggested that capital costs are often underestimated at the outset of a project;
- Operating and maintenance costs: i.e. ongoing costs over the course of the appraisal period;
- Revenues: the net change to public transport revenues is netted against the costs in order to estimate the net cost to the transport budget.

Other benefits

7.7 Crucially, WebTAG does not allow for land use changes in the benefits. Despite evidence on the impact that transport can have on development, the WebTAG approach applies an assumption of fixed land use, with the distribution of population and employment left unchanged. Land use changes are only allowed to be included if a Land Use Transport Interaction model is used and even then only as a sensitivity test.

7.8 This is a particularly important omission for a transformational project such as a whole net national network where growth plans have been developed for all of the main locations, to ensure that the impacts of the investment are maximised. Although there is a value associated with time savings, the key benefit of HS2 is not about making journeys faster; instead it is about growing the UK economy by connecting major cities, adding rail capacity and supporting jobs growth.

Alternative methods

7.9 Before we move on to the specifics of the case for HS2 made to date, it is worth setting out briefly what an alternative, more pragmatic approach to considering the case for specific transport investments might be.

7.10 WebTAG is not fit for purpose for considering major new transport infrastructure. It's not about time savings. The current approach underestimates the benefits of rebalancing and non-economic factors.

7.11 Investing in major new infrastructure is done with the objective of achieving the very things which cannot be changed within webTAG compliant models. The many complex objectives this report has already touched upon – transformational levels of economic growth, rebalancing of such growth and economic growth for all, all delivered alongside reducing our impact on the environment and maximising individuals' wellbeing.

7.12 It is worth at this stage reminding ourselves of the goals set out in the UK's Transport Investment Strategy (2017). The Transport Investment Strategy outlines four key objectives to be achieved through investment into the transport network, these are to:

- Create a more reliable, less congested, better connected transport network;
- Build a stronger, more balanced, economy which responds to local growth priorities;
- Enhance global competitiveness through making places more attractive to trade and invest; and
- Support the creation of new housing.

7.13 An alternative approach to considering whether transport investment should go ahead would be to clearly set out the objectives a specific scheme is seeking to achieve, and then considering the likelihood of achieving those objectives.

7.14 It cannot be known with certainty whether transport will ultimately lead to the achievement of those objectives, but by considering scenarios, along with their likelihood, a risk-based approach can be taken.

7.15 Nonetheless, even without land use changes or wider considerations included in the economic appraisal, the BCR for HS2 has historically continued to broadly stack up over time. The next chapter looks briefly at the case for the EL via the conventional method, how this has changed over time, with reference to the BCR of the scheme, estimated using the approach outlined above. It then outlines what are the real objectives of HS2 and how we might consider the likelihood of achieving them, along with some high level calculations and rules of thumb to assist with this.

8 The case for HS2 and the Eastern Leg

Summary

- The **HS2 EL has consistently had a stronger economic case than the western branch**, dating back to 2010, when a BCR of 5.6 was reported for the Leeds branch, compared with 2.6 for the Manchester branch.
- Various sensitivities were tested for the full HS2 network in the most recent (2020) report, with the **BCRs ranging from 1.1 to 2.1.**
- The full HS2 network incorporating phase 2b always has a greater BCR than either phase 1 in isolation or a combination of phase 1 and phase 2a.
- However, despite these positive BCRs, we do not believe that this approach should be the only way of assessing whether HS2 EL is good value for money, and that the Government should take into account a wider range of policy objectives and impacts not included in those calculations.
- The objectives of HS2 EL are set out in more detail in the following chapters, but in summary the key factors supporting the case for investing in HS2 are as follows:
  - Provide a **new national network to serve population and jobs;**
  - Facilitate **transformational modal shift to rail;**
  - Improve the **reliability**, resilience and use of capacity across of the network;
  - Accommodate **Rail passenger growth;**
  - Deliver **major economic growth;**
  - Deliver **inclusive economic growth** and address deprivation and inequalities;
  - Contribute positively towards the **climate agenda.**
- It is on its ability to deliver against these wider range of objectives that the case for HS2 EL should be considered and, the long term strategic transformation it will have on the UK economy and the Levelling Up agenda.

8.1 The table below summarises the BCRs put forward in the various business cases for HS2 which have been produced over the past decade. The most recent publication dramatically reduces the BCR, predominantly due to a very large increase in the estimated cost.

8.2 The table breaks down the different parts of the network, where they are available. The HS2 EL has consistently had a stronger economic case than the western branch. This dates back to 2010, when an HS2 report estimated a BCR of 5.6 for the Leeds branch, compared with 2.6 for the Manchester branch.[54]

[54] High Speed 2 ltd., 2010, High Speed Rail London to the West Midlands and Beyond. HS2 Demand Model Analysis.

8.3 Since then, the EL has not been separated out in the analysis, because Phase 2b includes not only Birmingham to Leeds, but also Crewe to Manchester. Nonetheless, the 2016 HS2 Strategic Outline Business Case[55] had a BCR of 3.1 for Phase 2b, compared with 2.7 for the full network, suggesting a stronger case for the eastern branch. When this was updated in both 2017 and 2020, the combined scheme with Phase 2b had a higher BCR than a scheme consisting solely of Phase 1 and Phase 2a. This information is summarised in Table 2.

Table 2: Summary of HS2 BCRs over time

2010: High Speed Rail London to the West Midlands and Beyond. HS2 Demand Model Analysis
HS2 Western Leg had BCR of 2.6 HS2 Eastern Leg had BCR of 5.6
2016: HS2 Phase 2b Strategic Outline Business Case – economic case
Full network had a BCR of 2.7 Phase 2b had a BCR of 3.1
2017: HS2 Phase 2 – Economic Case
Phase 2a has a BCR of 1.9 Phase 2b has a BCR of 2.6
2020: HS2 Phase 1 Full Business Case
Phase 1 and Phase 2a combined BCR of 1.2 Full network BCR of 1.5 (including Phase 2b)

8.4 Table 3 summarises various sensitivity tests for the full HS2 network, including Phase 2b in the most recent report, with the BCRs ranging from 1.1 to 2.1. Under every assessment scenario, the scheme with Phase 2b has a greater BCR than either Phase one in isolation or a combination of Phase 1 and Phase 2a.

[55] Department for Transport, 2016, High Speed Two Phase 2b Strategic Outline Business Case.

Table 3: BCR for HS2 Phases, various sensitivity tests

Test	Phase 1 BCR	Including Phase 2a BCR	Including phase 2b BCR
Central assessment	**1.2**	**1.2**	**1.5**
Higher cost – 50% optimism bias	1.0	1.0	1.3
16% greater demand	1.6	1.5	2.1
16% reduced demand	0.9	0.9	1.1
No reliability benefits included in BCR	0.9	0.9	1.1
100 year appraisal window	1.8	1.7	2.1

Source: HS2 economic case (2017)

8.5 The estimated costs associated with the full delivery of the scheme have risen since the initial assessment presented, in which the EL had a BCR of 5.6 and the Western Leg 2.6 respectively. This has resulted in the reduction of BCR levels for each phase, however, the full network including Phase 2b still provides the largest BCR of the HS2 phases.

8.6 Despite the cost increases, the fundamentals underpinning the positive case for the eastern branch remain very strong.

8.7 As discussed in the previous section, WebTAG is not fit for purpose for assessing the economic implications of and case for HS2. The objectives of HS2 EL are set out in more detail in the following chapters, but in summary the key factors supporting the case for investing in HS2 are as follows:

- Provide a new national network to serve population and jobs;
- Facilitate transformational modal shift to rail;
- Improve the reliability, resilience and use of capacity across of the network;
- Accommodate Rail passenger growth;
- Deliver major economic growth;
- Deliver inclusive economic growth and address deprivation and inequalities;
- Contribute positively towards the climate agenda.

8.8 The following sections consider each of these factors in turn, wherever possible presenting helpful statistics on benchmarks for what constitutes a reasonable pay back for the scale of investment.

9 Serving population and jobs, and the use of rail

Summary

- The EL is home to **13m people and 5.5m jobs, equating to 20% of the UK**
- This is on a par with the combined size of the West Midlands and the North and larger than Greater London, or the entire economy of Denmark
- Over the **past 20 years rail demand across GB has doubled**
- **Rail trips, miles travelled and time spent have all risen** whilst the same for car, bus and walking have all fallen
- The EL still relies heavily on car travel however, **with 72% of commuting trips by private motor vehicles and 11% by public transport**, the polar opposite of just 30% using the car in London
- Three quarters of Leeds commuting growth between 2001 and 2011 occurred by rail, which has contributed towards the trebling of passenger use at Leeds station over the past 20 years.
- **In Nottingham, rail commuting more than doubled**, at the same time that overall commuting actually fell
- However, a disparity exists between the East and West – with only **3.5% of EL commuting by rail and 5.3% of WL.** Both of these are dwarfed however by London where over 40% of commuting trips are by rail.
- Despite the increase in rail trips seen, **significant modal shift away from car will be needed** if the region is going to be able to meet its zero emissions targets.

Serving population and jobs

9.1 The fundamentals underpinning the core underlying need for transport, are about where people live and work, and how they get between those places.

9.2 The EL will serve several major UK cities and hence connect a significant number of people and jobs. Table 4 shows the level of population and employment a) for city regions and primary urban areas (i.e. selections of local authorities that form part of the city's economic area)[56] along the eastern and western branch, and b) for the entire set of regions that would be served by each branch.

[56] The local authorities included within each of these geographies are as follows:
Leeds: Barnsley, Bradford, Calderdale, Craven, Harrogate, Kirklees, Leeds, Selby, Wakefield and York (as per Leeds City Region)
Sheffield: Doncaster, Rotherham, Barnsley, Bassetlaw, Bolsover, Chesterfield, North East Derbyshire, Derbyshire Dales and Sheffield (as per Sheffield City Region)
Nottingham: Broxtowe, Erewash, Gedling and Nottingham (the ONS definition of the Nottingham Primary Urban Area)
Derby: Derby (the ONS definition of the Derby Primary Urban Area)
Leicester: Blaby, Leicester, Oadby & Wigston (the ONS definition of the Leicester Primary Urban Area)
Birmingham: Birmingham, Dudley, Sandwell, Solihull, Walsall, Wolverhampton (the ONS definition of the Birmingham Primary Urban Area)
Liverpool: Halton, Knowsley, Liverpool, Sefton, St Helens, Wirral (as per Liverpool City Region)
Greater Manchester: Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford, Wigan

9.3 Table 4 shows that LCR, SCR, Nottingham, Derby and Leicester PUAs combined account for around 9% of total population and employment in Great Britain. Widening this to include all of the East Midlands, Yorkshire & Humber and the North East, the proportion increases to around 20% of the UK's population and jobs. In absolute terms, the eastern route would serve an estimated population of 13m people and 6m jobs, which is a very similar size to the West Midlands and North West combined.

Table 4: Population and employment for selected areas

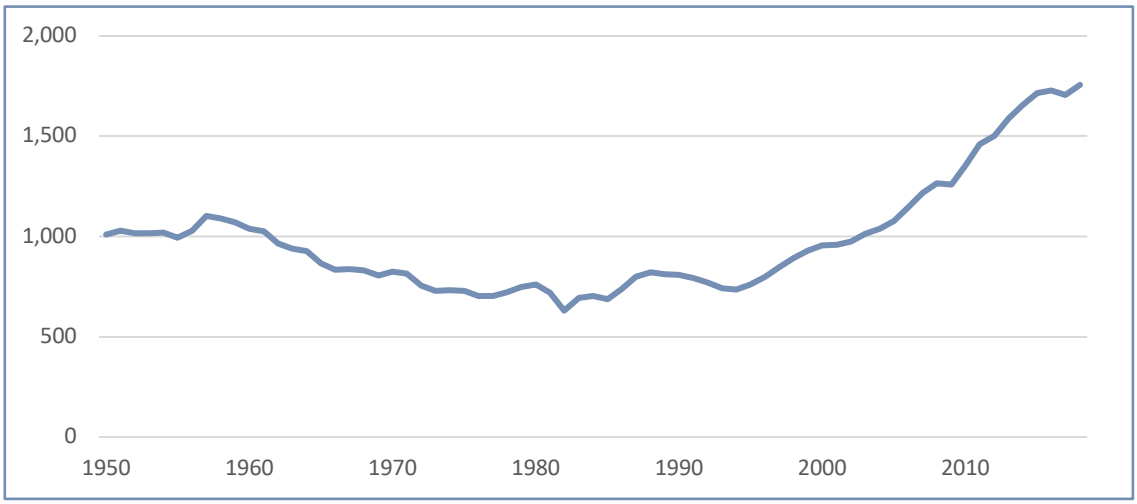
	Population	Employment
City regions		
Leeds City Region	3,082,000	1,400,000
Sheffield City Region	1,158,000	481,000
Nottingham PUA	678,000	303,000
Derby PUA	257,000	137,000
Leicester PUA	513,000	244,000
Tees Valley	674,000	258,000
Tyne and Wear PUA	1,457,000	627,000
Birmingham City Region	2,550,000	1,085,000
Liverpool	1,551,000	632,000
Greater Manchester	2,813,000	1,332,000
Regional comparators		
East Midlands, Yorkshire & North East	12,942,000	5,524,000
West Midlands & North West	13,193,000	5,890,000
Greater London	8,908,000	5,163,000
National Comparisons		
Scotland	5,438,000	2,509,000
Great Britain	64,554,000	29,758,000

Source: ONS , 2019, Population Estimates and Business Register and Employment Survey.

Travelling by rail

9.4 Figure 8 shows that over the past 20 years rail demand across Great Britain has more than doubled. Whilst journey numbers hovered around the 1bn mark for 50 years from 1950-2000, for the past twenty years there has been a marked rise in demand.

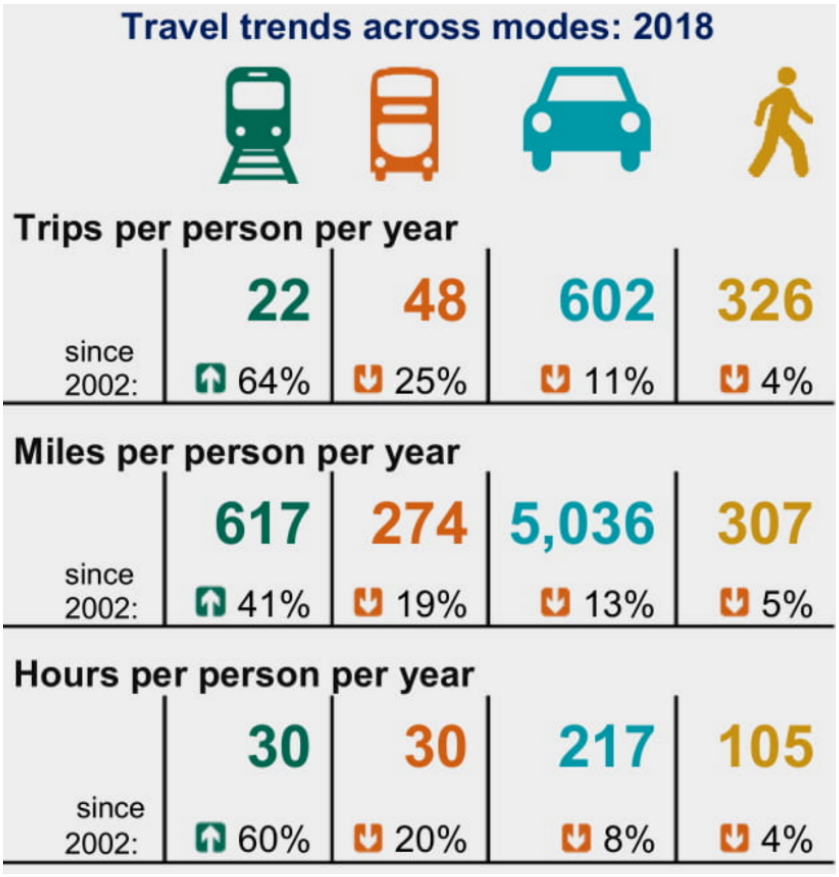
Figure 8: Rail passenger journeys (billions) in Great Britain 1950-2018



Source: DfT, 2019, Passenger Journeys by Year.

9.5 Reinforcing this, Figure 9 shows that trips, miles and hours spent travelling per person per year by rail in England have risen by 64%, 41% and 60% respectively, in contrast to road and bus which have seen declines. This reflects a myriad of factors including: the increasing importance of cities, the crowding on the roads, and the shift towards more sustainable modes of transport.

Figure 9: Changes in trips, miles & hours per person by mode, England 2002-2018



Source: DfT, 2019, Rail Factsheet

9.6 Across the EL, private vehicle use is the dominant mode of transport. Table 5 shows the commuting mode share of each form of transport within the areas of the EL. The commuting mode share of public transport ranges from 9% in the Tees Valley Combined Authority to 21% in the North East Authorities. Overall, across the East Midlands, North East, and Yorkshire and the Humber, only 11% of all commuter journeys are taken by public transport, with 72% of commuting done within private motor vehicles. Public transport across the EL has a significantly lower mode share and car transport a significantly higher mode share than the England average.

Table 5: Commuting mode share to each region, 2011 (% of commuter trips)

	Train	Bus	Car	Other motor vehicle	Bicycle	Foot
Leeds City Region	4%	10%	70%	1%	2%	13%
Sheffield City Region	3%	10%	73%	1%	2%	12%
Nottingham PUA	2%	14%	67%	1%	3%	12%
Derby PUA	1%	7%	76%	2%	3%	12%
Leicester PUA	1%	9%	73%	1%	4%	13%
Tees Valley	1%	8%	76%	1%	2%	12%
Tyne and Wear PUA	7%	14%	66%	1%	2%	10%
North East, East Midlands, and Yorkshire	2%	9%	72%	1%	3%	12%
West Midlands Combined Authority	5%	13%	70%	1%	2%	9%
Greater Manchester	5%	12%	69%	1%	2%	11%
West Midlands and North West	3%	9%	73%	1%	2%	11%
London	42%	13%	30%	1%	2%	11%
England	10%	8%	65%	1%	4%	9%

Source: ONS, 2011, National Census. NB: Figures may not sum due to rounding.

9.7 Rail is an increasingly important mode for commuting journeys. Table 6 shows the number of commuters to city regions and primary urban areas along the eastern and western leg and how this changed between 2001 and 2011.

9.8 The table shows that although rail has a relatively low share of total commuting trips, it saw significant growth between 2001 and 2011 for each of the areas of the EL.

9.9 There are several areas for which absolute total levels of commuting fell over the ten years period, but commuting by rail still rose. This is true for: Nottingham, where overall commuting levels fell by 4% but rail commuting rose by 118%; the West Midlands, where overall commuting fell 3% but rail commuting rose 55%; and similarly for London, where overall commuting fell 2% but rail commuting rose 21%.

9.10 Perhaps most stark is the comparison of rail's mode share – which is notably lower for the Eastern leg areas than the western ones. Across the Eastern Leg, rail accounts for just 3.5% of commuting trips, in comparison to 5.3% across the western leg. Both of these are however dwarfed by the comparison to London, where over 40% of commuting trips are by rail.

9.11 The highest growth in rail trips was in Nottingham in percentage terms (+118%), followed by Leeds (+72%). In absolute levels, Leeds had the highest increase in rail commute trips across the Eastern Leg, second only narrowly behind the West Midlands more generally across the areas considered (excluding London). Almost three quarters of the total growth in commuting to Leeds occurred by rail.

Table 6: Commuting to each region by rail and metro, 2001 and 2011

	2001	2011	Change 01-11	% change
Leeds City Region	23,900	41,100	17,200	72%
Sheffield City Region	11,200	16,000	4,800	43%
Nottingham PUA	3,400	7,400	4,000	118%
Derby PUA	1,100	1,500	400	36%
Leicester PUA	2,200	2,700	500	23%
Tees Valley	1,500	2,100	600	40%
Tyne and Wear PUA	23,700	32,000	8,300	35%
West Midlands Combined Authority	31,400	48,800	17,400	55%
Liverpool City Region	23,600	32,800	9,200	39%
Greater Manchester	36,900	51,200	14,300	39%
London	1,301,000	1,573,000	272,000	21%

Source: ONS, National Census 2001 and 2011

Table 7: Commuting to each city region all modes, 2001 and 2011

	2001	2011	Change 01-11	% change
Leeds City Region	1,128,500	1,152,000	23,500	2%
Sheffield City Region	414,100	421,700	7,600	2%
Nottingham PUA	261,300	250,200	-11,100	-4%
Derby PUA	104,500	109,300	4,800	5%
Leicester PUA	200,000	206,800	6,800	3%
Tees Valley	238,900	242,100	3,200	1%
Tyne and Wear PUA	459,300	557,700	98,400	21%
West Midlands Combined Authority	927,000	901,100	-25,900	-3%
Liverpool City Region	526,600	539,500	12,900	2%
Greater Manchester	1,029,000	1,059,700	30,500	3%
London	3,807,000	3,721,000	-86,000	-2%

Source: ONS, National Census 2001 and 2011

10 Reliability of the network

Summary

- The **WCML had a major upgrade, costing £9bn** and completed in 2008. It is estimated that it will be full with the next few years, highlighting that this **was only a short term fix** and did not deliver the scale of improvements needed.
- While the ECML and MML serve some parts of the EL, they have not benefited from the same level of investment and upgrades as the WCML.
- This lack of investment is reflected in the reliability statistics. On average across the whole train network 4.9% of trains are cancelled or significantly late (CaSL). Services on the ECML are currently operated by the Government owned London North Eastern Railway (LNER), which is **the 3rd worst performing TOC with 8.1% of its trains CaSL**. It only comes behind TransPennine Express and Hull Trains (11% and 10.9% respectively).

10.1 Parts of the EL are served by the East Coast Mainline (ECML) and Midland Mainline (MML) routes. However, the existing transport network does not connect the main economic hubs and centres of population together in the same way that the EL would achieve. The station currently serving the largest town or city population on the ECML between Leeds and London is Doncaster, which in itself contains only a fifth of the residents of the city of Sheffield (served by the MML).

10.2 Also, it has not benefited from the same levels of investment as the West Coast Mainline (WCML). The WCML had a major upgrade, costing £9bn and completed in 2008, which saw a modernisation of the 400 mile route between London and Glasgow via Birmingham, Liverpool and Manchester.

10.3 This is reflected in reliability statistics. On average across the whole train network 4.9% of trains are cancelled or significantly late (CaSL).[57] Table 5 shows the worst five train operating companies (TOCs) in terms of CaSL, out of 22 in total. Services on the ECML are currently operated by the Governmentowned London North Eastern Railway (LNER), which is the 3rd worst performing TOC with 8.1% of its trains CaSL. It only comes behind TransPennine Express and Hull Trains (11% and 10.9% respectively) and is around three percentage points worse than WCML. Of the three least reliable train operators, each moves its greatest number of passengers within one of the three regions served by the EL.

57 Based on a moving annual average from Office of Rail and Road data, 2018-19 Q4.

Table 8: Five worst performing train operating companies, 2018-19

Train operating company	% of trains cancelled or significantly late
TransPennine Express	11.0%
Hull Trains	10.9%
London North Eastern Railway	8.1%
Grand Central	7.9%
Caledonian Sleeper	7.3%

Source: Office of Rail and Road, 2019, Rail Statistics Compendium.

10.4 Reliability is crucial for modern infrastructure to act as a catalyst for economic growth and encourage global competitiveness for the UK as a whole. The low levels of reliability on the ECML and more widely on the whole of the EL transport network when compared to the other areas of the UK deters industrial growth and development. The EL stands to benefit significantly as a result of the proposed HS2 EL and supporting transport investments, which would not only provide connectivity between each of the core cities, but encourage the reliability necessary for development.

11 Providing capacity & rail passenger growth

Summary

- **Leeds has the 4th highest level of passenger overcrowding.**[58]
- Leeds was the station with the 12th highest number of entries and exits in the UK in 2018/19, and **third busiest station outside London after Birmingham New Street and Glasgow Central**. With almost 31 million entry and exits and over 3 million passengers interchanging, its throughput is similar in size to several major London stations (e.g. Charing Cross).
- **Sheffield and York stations each serve almost 10 million people and have also seen considerable growth in passenger numbers.**
- Over the past twenty years **entries and exits at Leeds and Sheffield have risen by 188% and 169% respectively,** which compares to an average across the whole of the country of 117%.
- Upgrades to the existing network would deliver some of the additional capacity required on rail travel. The **proposed EMCL upgrade** would meet some of the need for additional capacity required across the EL area (specifically into Leeds station), but it **would not provide the step-change in connectivity across the EL** and productivity offered by HS2, NPR, and supporting investments.
- To put the proposals in context, **baseline demand growth to Leeds station would fill this additional capacity by the time works are complete even under the lowest growth scenario**. A greater investment into transport capacity into Leeds is needed to allow the city to sustain future economic growth.
- Additional investment into the ECML may enable the route to serve some of the forecast growth in rail demand for Leeds, however, it cannot be seen as an alternative to HS2 and NPR investment across the EL. **Without HS2's investment in new rail track, the connectivity between key employment centres will stay at current levels and thus will undermine the deliverability of the 150,000 jobs** planned across the LCR, SCR and the East Midlands Authorities alone.

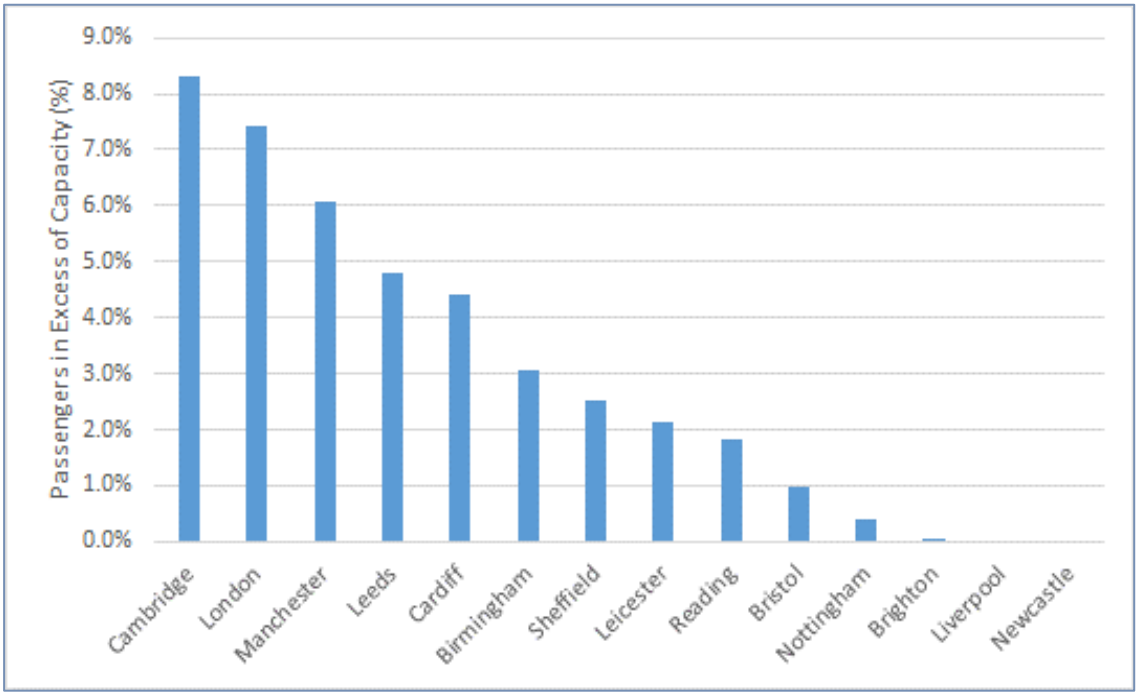
Providing capacity to meet passenger growth

11.1 Chapter 9 showed that rail commuting across the EL has increased significantly between 2001 and 2011. Rail growth to the city centres of Leeds and Nottingham has been particularly strong. As shown in Figure 9, Leeds is the station with the 4th highest level of 'passengers in excess of capacity' (PIXC) out of the cities covered by DfT PIXC data.

58 When measured under the passengers in excess of capacity (PiXC) metric reported by the Department for Transport.

11.2 PIXC is a measure showing how many passengers are on a train, over and above its level of capacity, at its busiest point. The capacity has an allowance for standing, so if there are any PIXC then there are even more people standing than would usually be allowed for, suggesting that the train is crowded and uncomfortable for passengers.

Figure 10: Passengers in excess of capacity, arrivals during AM peak hour, 2017



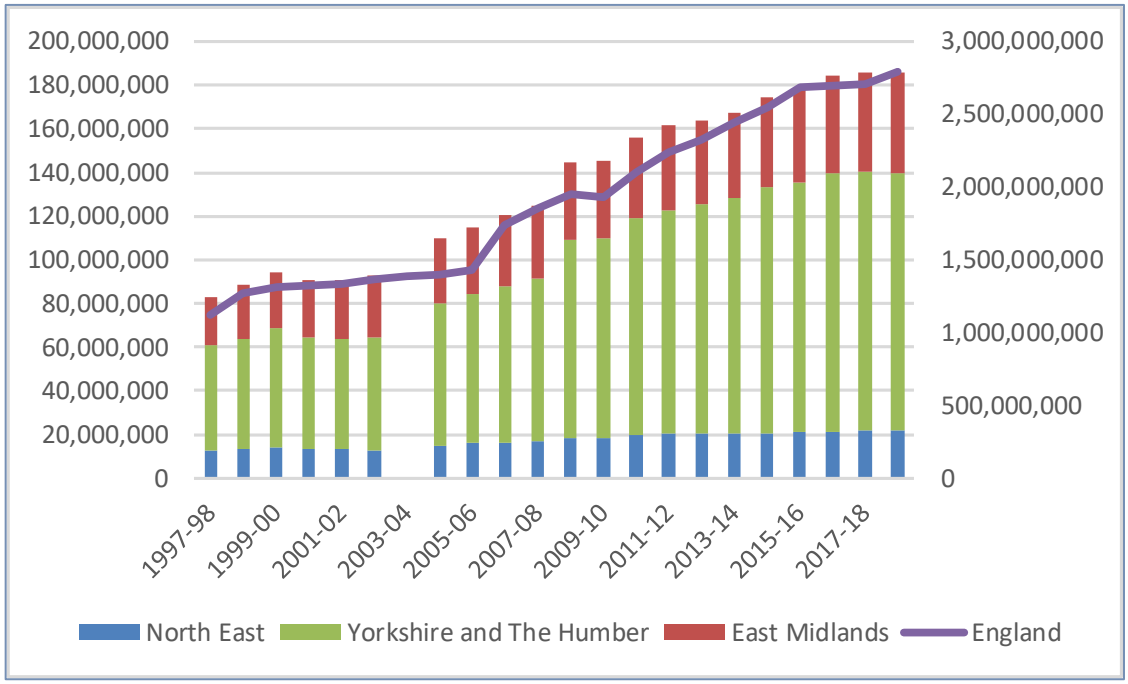
Source: DfT, 2019, Rail passenger numbers and crowding on weekdays.

11.3 Evidence suggests that crowding is likely to worsen if nothing is done to address it. Of all stations in the UK, Leeds was the station with the 12th highest number of entries and exits in 2018/19. With almost 31 million entries and exits, its throughput is similar in size to several London stations (e.g. Charing Cross). On top of this, Leeds station serves an additional 3 million interchanging passengers each year. Excluding London stations, Leeds is the 3rd busiest station after Birmingham New Street and Glasgow Central in the UK, and is the busiest in the North. Over the past twenty years entries and exits at Leeds have risen by 188%, which compares to an average across the whole of the country of 117%. Similarly, Sheffield and York stations each serve almost 10 million passengers and have both seen considerable growth in passenger numbers, with growth over the past 20 years of 169% at Sheffield station.

11.4 Figure 11 charts the numbers of passengers using stations in the three regions of the EL, showing that numbers have increased significantly over the past 20 years.

11.5 Each of the train stations serving the centres of the key cities across the EL has seen demand increase by a larger proportion than the overall England average between 1997 and 2018. For Leeds particularly, but also more widely in the largest employment centres within the EL, available public transport capacity will be an issue looking into the future.

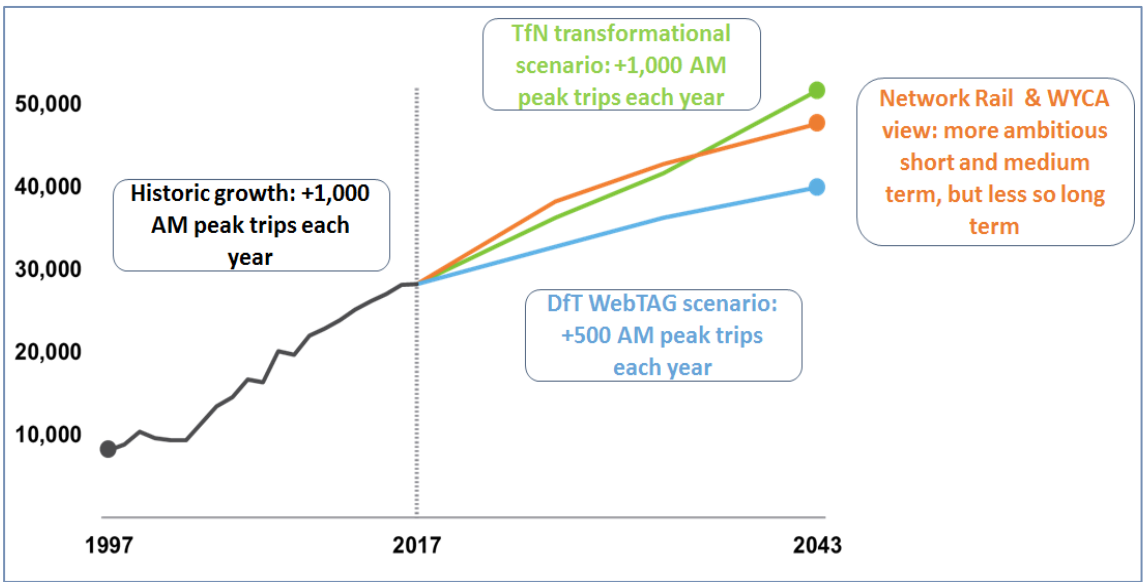
Figure 11: Annual passengers at stations serving the EL, 1997 – 2018, compared to the total across England



Source: Office of Rail and Road, 2019, Rail Statistics Compendium.

11.6 This strong growth rate is expected to continue because the underlying factors continue to influence the demand for travel. Figure 11 shows past vs future growth at Leeds station under three different forecast scenarios. Even the DfT's WebTAG scenario sees AM peak arrivals rising to 40,000 over the next 25 years (from a current level of around 30,000), but more aspirational, regionally evidenced, targets would see this rising to c. 50,000 trips. This very clearly and simply makes the case for increased capacity – there is already crowding on services to Leeds now and this will increase without the provision of any additional capacity.

Figure 12: Current rail growth forecasts for Leeds - AM 3 hour peak arrivals



Source: WYCA, 2019, 2050 vision for Leeds – the case for growth in Leeds.

Could an upgrade to existing rail lines deliver this capacity?

11.7 In order to meet the growing demand for rail passenger travel across the EL, and in particular for the city centres of Leeds and Nottingham, it is clear that additional investment is needed. The current proposal for upgrades to the ECML will see additional capacity provided across the EL, meeting some of the forecast growth in demand and ensuring greater reliability. However, with a maximum addition of two trains per hour on the network and a total of up to 1,000 additional passengers per hour, baseline demand growth would fill this additional capacity during peak hours by the time works are complete even under the lowest growth scenario.

11.8 Additional investment into the ECML may enable the route to serve some of the forecast growth in rail demand for Leeds, however if undertaken alone it will leave many of the other key employment centres across the EL with unreliable and inaccessible rail links. Even if it were possible to meet the growth in demand anticipated within Leeds through large additional upgrades to the ECML, the upgrades would not enable any of the more than 100,000 jobs anticipated to result from connectivity improvements associated with HS2 in SCR and the East Midlands Authorities alone.

11.9 Upgrades to the ECML will provide capacity and reliability benefits for the areas surrounding its existing stations. However, this cannot be seen as an alternative to HS2 and NPR investment into new and upgrade rail lines across the EL. Without HS2's investment in new rail track, the connectivity between key employment centres will stay at current levels, which have contributed to low

productivity levels. The DfT (2017) East Coast Main Line Route Study states the ECML upgrade would enable a sorely needed increase in capacity for the number of journey into Leeds, however also highlights that "these are journeys where HS2 is not expected to have an impact on demand."[59] Any further investment into the ECML should then be seen as complementary to HS2 and supporting investments, providing greater reliability and connectivity to central locations currently connected as opposed to the new connectivity benefit offered by HS2.

59 DfT, 2017, East Coast Main Line Route Study.

12 Importance of transformational change

Summary

- **The three regions which make up the EL have the lowest productivity levels, all over 30% below the London levels.**
- HS2 East estimates that in total, the **HS2 EL alone will contribute an additional £4.2bn to the economic output of the EL regions.**[60] This would correspond to a 1.5% increase in total economic output for the North East, Yorkshire and the Humber and the East Midlands combined.
- The EL authorities have **plans for significant growth as a result of HS2: 40k new jobs across LCR, c.24k in Sheffield, and 74k in the East Midlands**.
- On the current funding envelope of £109 billion capital costs (for Phase 1, 2a and 2b), **HS2 would need to deliver 64,000 new jobs in order to 'pay back' its total capital expenditures**. This figure equates to c. 15% of the estimated new jobs which are targeted around the country as a result of HS2. If the cities achieve their targets, the BCR (on this metric) would be up to 8.5.
- As well as growth specifically related to HS2, the EL will experience some background 'business as usual' growth. If it continued to grow at the historic rates, it might be expected to create between 1.1m and over 1.4m new jobs by 2050.
- A key question therefore is: **how much of this background growth can be reasonably expected to be achieved without additional investment in the transport network**? This historic growth has not occurred without investment, there has been ongoing investment in infrastructure historically – that is to say, we cannot take the 'business as usual' growth for granted.
- There is a strong long term relationship between rail passenger journeys rising with employment growth. This has been underpinned by modal shift and sectoral change. There is evidence to suggest that the EL has a significant way to go with its modal shift if it wants to achieve its emissions targets.
- For every job **in London there are 290 entries and exits across London stations each year.**[61] This metric is **considerably lower for the EL regions, with rates of just 49 entries and exits per job in Yorkshire, 22 in the East Midlands and 21 in the North East.** This highlights the scale of the challenge to get these commuters out of their cars and onto rail. In order to be incentivised to do so the **quality, reliability and resilience of the public transport network has to be sufficiently attractive, which will require a stepchange.**

60 HS2 East, 2017, HS2 East Economic Benefits Study.
61 Including underground and light rail modes.

Levelling up

12.1 As mentioned within the discussion of national policy, one of the key objectives within recent government policy is the levelling up of regions currently performing less well economically than others. Since the 2008/09 financial crisis, the UK's performance with relation to productivity growth has been poor, and this is driven by the 'long-tail' of firms with low productivity, concentrated in less well performing regions of the country.

12.2 The UK faces one of the most severe geographical inequalities in productivity levels throughout the developed world. Currently, the most productive region of the UK (London), has productivity 32% above the UK average, with the least productive regions falling up to 17% below average UK levels.[62] Under this measure, the UK is the most geographically unequal country in terms of productivity in the OECD.[63]

12.3 The large inequality in productivity levels between regions of the UK presents an opportunity for future growth. Through better connectivity of areas of relatively lower productivity, both within regions and between high productivity and low productivity regions, the resulting levelling up of lower productivity areas could be achieved.

12.4 The regions encompassing the EL (Yorkshire and the Humber, the East Midlands and the North East) currently face the three lowest productivity levels of any region in England. Respectively their productivity levels were 35%, 33%, and 32% below the London level in 2018.[64]

12.5 Investment into the EL transport network provides an opportunity to boost the productivity of the areas in England currently experiencing its lowest levels. HS2 East estimate that in total, the HS2 EL alone will contribute an additional £4.2bn to economic output of the EL regions.[65] This would correspond to a 1.5% increase in total economic output for the North East, Yorkshire and the Humber and the East Midlands combined.[66]

Land use change

12.6 As noted earlier, a key omission from WebTAG, and therefore the appraisal and reported BCRs for HS2, is the impact that it will have on land use change and employment. All of the cities that HS2 would connect have aligned spatial and

62 ONS, 2020, Regional labour productivity, including industry by region, UK: 2018.
63 McCan, 2019, Perceptions of regional inequality and the geography of discontent: insights from the UK.
64 ONS, 2020, Regional labour productivity, including industry by region, UK: 2018.
65 HS2 East, 2017, HS2 East Economic Benefits Study.
66 Volterra calculations using ONS, 2019, Regional economic activity by gross value added (balanced), UK: 1998 to 2017.

economic growth plans, summarised in Figure 13 which shows the impact that is currently anticipated by each local organisation. In the Leeds City Region, it is envisaged that HS2 could support 40,000 new jobs by 2050, with additional productivity increases resulting from HS2 and supporting transport investments potentially increasing this by a further 50,000 jobs.

12.7 Sheffield City Council estimate that the combined delivery of NPR and the HS2 EL would contribute 23,800 additional full-time equivalent employment positions and a total of £2.7bn more in economic output across the SCR when compared to a 'business as usual' scenario.

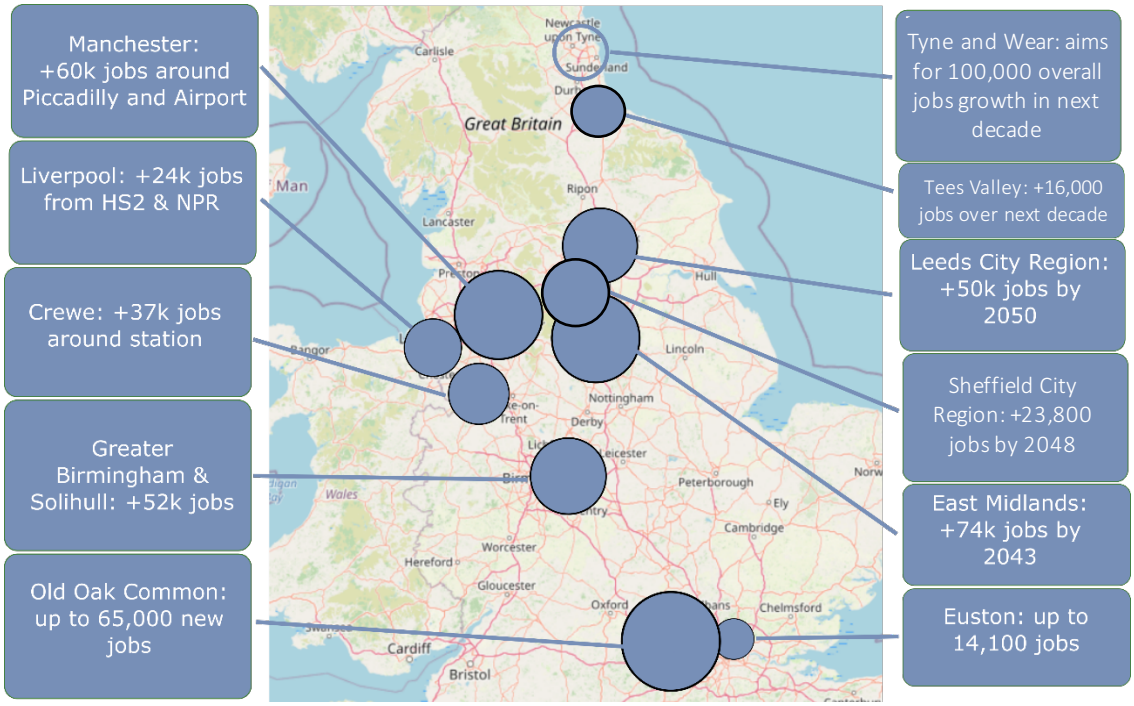
12.8 The growth around Toton is envisaged to accommodate 74,000 new jobs, which will be delivered by the creation of a development corporation. Tees Valley Combined Authority estimate that the delivery of their Investment Plan, including HS2 and supporting transport infrastructure, could contribute an additional 16,475 jobs over the period 2019 to 2029.

12.9 Whilst specific geographical remits and modelling approaches vary, across the core cities around 400k new jobs are predicted. This demonstrates how transformational the economic impacts of HS2 could be. The underlying reason for investing in HS2 is to encourage greater and more valuable economic growth – more people, more jobs, and all being more productive. The plans for HS2 will be crucial for supporting and facilitating this growth.

12.10 One job of average productivity in the UK is 'worth' c. £60k each year[67]. The 60 year PV of this one job is therefore c. £1.7m. On the current funding envelope of £109 billion capital costs (for Phase 1, 2a and 2b), HS2 would therefore need to deliver 64,000 new jobs in order to 'pay back' it's total capital expenditures. This figure equates to c. 15% of the estimated new jobs which are targeted around the country as a result of HS2. Therefore, if the cities achieve their targets, the BCR (on this metric) would be up to 8.5.

67 WebTAG Wider Impacts Dataset, value for 2019, uplifted from 2010 to 2015 prices using Bank of England inflation calculator.

Figure 13: Growth objectives across the North



12.11 These jobs estimates represent additional employment that could be enabled by HS2, and specifically aspirational employment targets around HS2 stations. However, this does not consider the counterfactual – that is, what would happen without HS2?

Business as Usual growth

12.12 All parts of the UK will have a 'business as usual' level of economic growth – i.e. background employment growth that is assumed to be realised with or without HS2. Table 9 shows employment levels across the key employment centres in the EL in 2018, and historic annual growth rates achieved over different periods of time, ranging from the last decade to the past 30 years. This shows that nationally, the annual employment growth rate has fluctuated over this period – 1.7% over the whole 30 year history, falling to 1.0% per annum growth over the last 20 years. The last decade has seen a compound annual growth rate of 1.0% across England.

12.13 A consideration of the regional picture highlights that the region driving this growth to the largest extent is London, which accounted for more than a quarter of the jobs employment growth across the entire of England over the last 30 years. Across the time period the EL regions of the North East, Yorkshire and the Humber and the East Midlands have seen employment growth consistently below the overall England level.

Table 9: Employment by region, and historic growth rates

	Base	Annual Jobs growth rate (CAGR) from the previous…		
	2018 (000s)	10 years	20 years	30 years
Leeds City Region	1,450	1.2%	1.0%	1.1%
Sheffield City Region	815	1.0%	0.9%	0.9%
Nottingham PUA	410	0.9%	0.6%	0.8%
Derby PUA	225	1.3%	0.7%	0.9%
Leicester PUA	405	1.2%	0.8%	0.9%
Tees Valley	265	0.1%	0.4%	0.5%
Tyne and Wear PUA	530	0.7%	0.9%	0.7%
North East, Yorkshire, and East Midlands	5,525	0.8%	0.6%	0.8%
West Midlands Combined Authority	1,270	0.8%	0.5%	0.5%
Greater Manchester	1,365	1.6%	1.2%	0.9%
North West and West Midlands	5,890	1.1%	0.6%	0.8%
London	5,165	1.8%	1.3%	1.5%
England	25,980	1.2%	0.8%	1.1%

Source: ONS, 2019, Business Register and Employment Survey

12.14 Whilst not perfect, past performance is a helpful benchmark for future performance. The next table projects forward the historic growth rates from these various periods in order to arrive at future potential jobs estimates. This shows that over the past three decades, the EL regions have created 1.3m new jobs. If it continues to grow at the historic rates, it might be expected to create between 1.2m and over 1.6m new jobs by 2050.

Table 10: Indicative ranges for employment growth by region

	Base	Additional jobs (000s) to 2050 based on persistence of growth rate from past…		
	2018 (000s)	10 years	20 years	30 years
Leeds City Region	1,450	690	575	610
Sheffield City Region	815	290	260	275
Nottingham PUA	410	135	90	125
Derby PUA	225	115	60	70
Leicester PUA	405	190	115	130
Tees Valley	265	5	35	50
Tyne and Wear PUA	530	125	185	140
North East, Yorkshire, and East Midlands	5,525	1,645	1,270	1,645
West Midlands Combined Authority	1,270	370	215	225
Greater Manchester	1,365	920	640	480
North West and West Midlands	5,890	2,470	1,295	1,725
London	5,165	4,080	2,550	3,150
England	25,980	11,985	7,665	10,685

Source: ONS, 2019, Business Register and Employment Survey

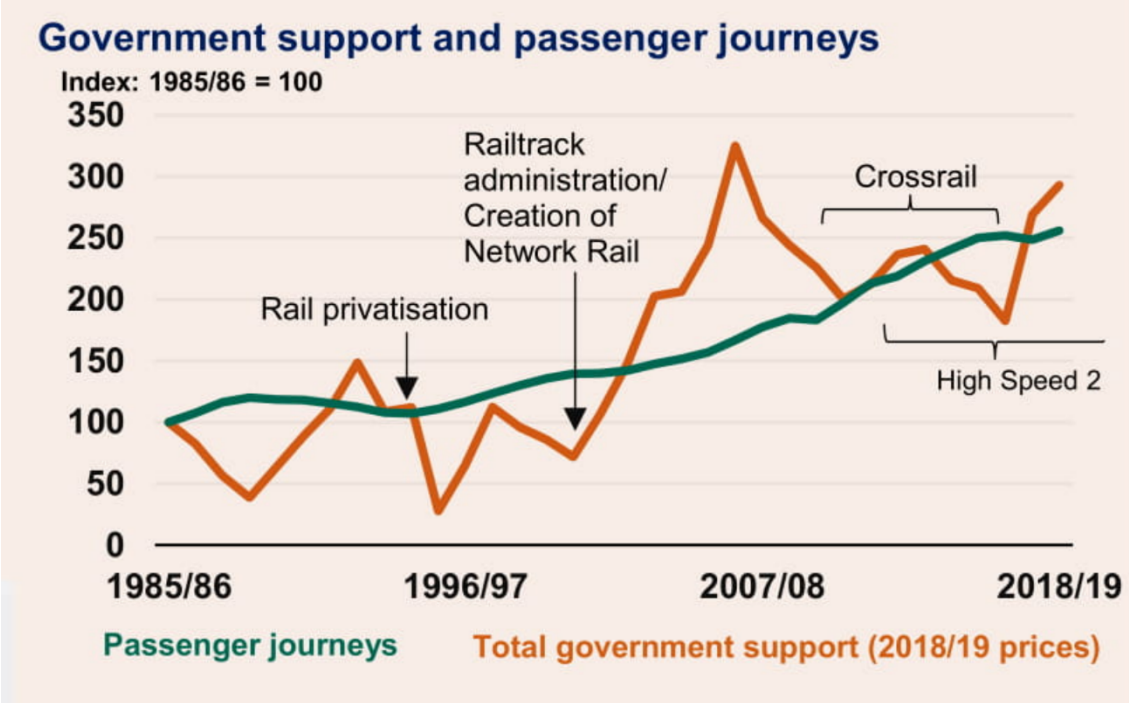
12.15 By comparison, the Northern Powerhouse Independent Economic Review suggested that the North would add 650,000 jobs by 2050 under a 'business as usual' scenario, or 1.5m jobs in a 'transformational' scenario with substantial improvements in the skills base, innovation and transport connectivity. [68]

Interdependency between employment growth and transport

12.16 A key question therefore is how much of this background growth can be reasonably expected to be achieved without additional investment in the transport network. What we sometimes forget when going about our 'business as usual' forecasting is that this historic growth has not occurred without investment,.There has been ongoing investment in infrastructure historically – that is to say, we cannot take the 'business as usual' growth for granted, it too has been underpinned by a level of transport investment. Figure 14 shows the Government's support to rail since the mid-1990s which shows that it has increased in line with passenger journeys.

68 SQW et al (2016), The Northern Powerhouse Independent Economic Review

Figure 14: Government support and passenger journeys



Source: DfT, 2019, Rail Factsheet.

12.17 So the final piece of the jigsaw is to consider the extent to which rail passenger journeys have risen with employment growth. It makes logical sense that they would do, but proving the point is helpful. In fact, it is useful here to refer to DfT's guidance for franchise arrangements, which includes an assumption (in the context of London) that for every 1% growth in jobs, commuting trips will rise by 1.25%. This relationship has broadly been true over a long period of time and statistical analysis finds it to be a causal relationship too. More detailed analysis finds that it is not stable over shorter timeframes, but broadly over the long historic period available, the two series are related.

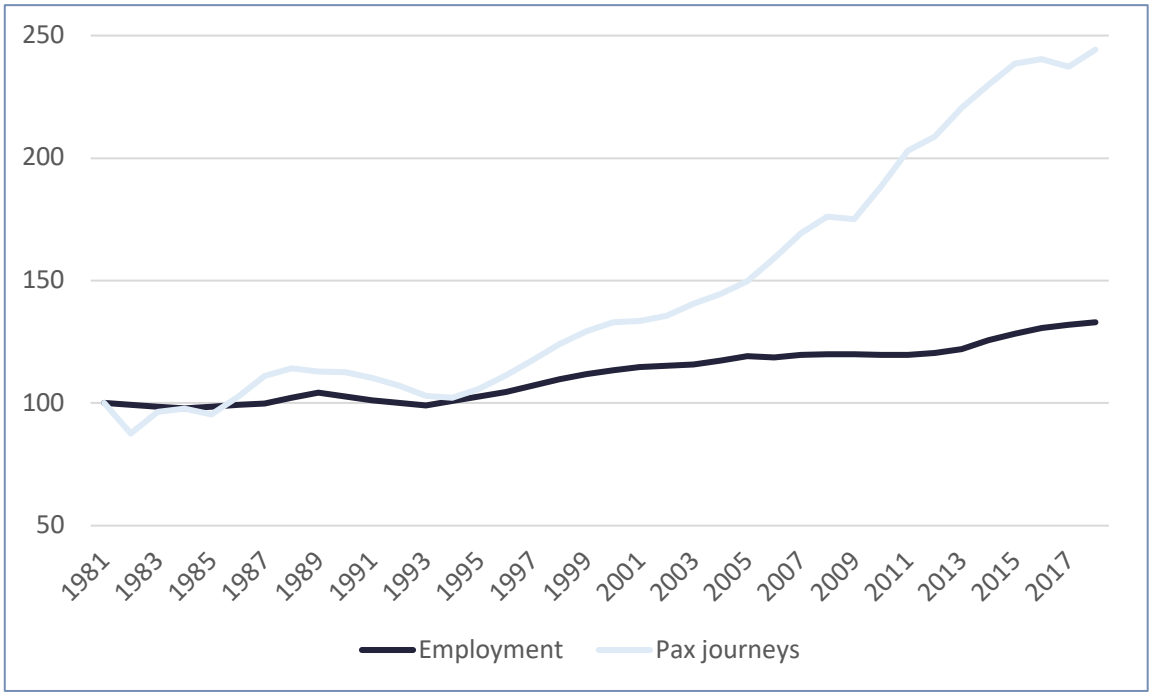
12.18 Various propositions have been put forward to support a position that this relationship may not continue in London – due to flexible working, the fact a large modal shift occurred over the historic period and the vast majority of London commuters already now travel by public transport rather than the car. This latter point is potentially particularly interesting for regions outside of London. The commuting data presented in Section 8 showed that rail commuting to Leeds City Region only represented 3.5% of all commuting trips in 2011, the equivalent statistic for SCR is 2.7%, 2.5% for Nottingham and as low as 1.0-1.1% for Derby and Leicester. This compared to 42% in London. For all non-London regions, the growth in rail passenger growth accounted for the

majority of all increases in commuter traffic and in some cases growth in these was actually offset to some extent by falls in users of other modes (i.e. the car).

12.19 This suggests that the rest of the country is behind London in the modal shift away from car to public transport. This is unsurprising given the lack of a comprehensive public transport network across the North in contrast to the London public transport network.

12.20 Looking at passenger journeys and employment, at the national levels, we find that passenger journeys have indeed risen, but they have done so at a considerably faster rate than employment – over the period that employment has grown by 32%, passenger growth has risen by 144%. This too, supports the proposition that historically there have been increased rail trips over and above the increased levels of employment, which have been underpinned by a wider economic shift towards sectors more based in cities, whose workforces are more likely to commute by rail, plus a wider modal shift in general.

Figure 15: Employment and pax journeys, 1981-2018 (index 1981=100)



Source: Office for Road and Rail, 2019, Number of Franchised Paw Journeys; ONS, 2019, Business Register and Employment Survey.

12.21 Table 11 shows how this relationship varies by region and over time, highlighting that the number of entries and exits has increased across the whole country, with at least doubling occurring across the majority of regions. All regions also show that the growth in passengers has been much slower over the past decade than the one before that.

Table 11: Growth in combined entries and exits by region

	Entries & Exits (millions) per annum			Growth (%)	
Region	1998-99	2008-09	2018-19	Decade	20yr
North East	13.4	18.4	22.1	20%	65%
North West	81.6	186	234	26%	187%
Yorkshire and The Humber	50.6	91.0	117	29%	132%
East Midlands	24.2	35.3	46.4	31%	92%
West Midlands	48.0	97.7	167	71%	249%
East	116	172	229	33%	97%
London	681	958	1,499	57%	120%
South East	222	333	400	20%	80%
South West	34.9	57.9	78.5	36%	125%
Wales - Cymru	24.8	42.7	57.5	35%	131%
Scotland	98.6	154	194	26%	97%
England	1,273	1,949	2,793	43%	119%
Great Britain	1,396	2,146	3,045	42%	118%
North East, Yorkshire, and East Midlands	88.2	145	186	28%	111%

Source: Office for Road and Rail, 2019, Number of Entries & Exists by Region

12.22 Table 12 looks at a metric of entries and exits per job in each region. This shows the same trends over time, but very different absolute levels – for every job in London there are 290 entries and exits on rail per annum. If we think about the working year, there are typically 220 working days. Each commuter using rail would both enter and exit each day, so the 290 entries and exits might at a high level be thought approximately equivalent to 145 commuter trips per annum per London worker by rail.[69]

12.23 This metric is considerably lower for every other region across the country. The next highest regions are the South East and East, followed by Scotland and the North West. It is noticeable that the Eastern Leg regions are considerably below with rates of just 49 entries and exits per job in Yorkshire, 22 in the East

69 It is noted that this metric abstracts from a number of factors across the transport network such as increased interchanging as a result of the tube network and relatively different leisure uses of the network between regions. However, it is thought that this approach remains applicable in this context as a result of the high significance of commuter journeys across transport networks across all regions.

Midlands and 21 in the North East. This highlights the scale of the challenge to get these commuters out of their cars and onto public transport. This would have not only economic and health benefits, but would assist in tackling the climate emergency.

12.24 The fact that these regions started from a low base but have still seen a similar drop off in rail use relative to employment growth would seem to suggest that the EL does not have a sufficiently strong rail transport network to underpin transformational modal shift.

Table 12: Entries and exists per job

	Entries & Exits per job per annum			Growth (%)	
Region	1998-99	2008-09	2018-19	Decade	20yr
North East	14	18	21	19%	49%
North West	29	61	70	15%	142%
Yorkshire and The Humber	25	40	49	21%	100%
East Midlands	14	19	22	21%	64%
West Midlands	21	41	65	59%	214%
East	53	71	82	15%	56%
London	180	228	290	27%	61%
South East	65	88	96	9%	49%
South West	18	26	32	24%	79%
Wales - Cymru	24	36	45	26%	90%
Scotland	45	63	77	22%	71%
England	60	84	108	28%	80%
Great Britain	57	80	102	28%	80%
North East, Yorkshire and East Midlands	18	28	34	21%	83%

Source: Office for Road and Rail, 2019, Number of Entries & Exists by Region; ONS, 2019, Business Register and Employment Survey.

12.25 Table 10 presented the business as usual employment growth that would occur if previous growth trends continue. It was concluded that the EL regions of the North East, Yorkshire and the East Midlands would experience growth of between 1.2m and 1.6m jobs between 2018 and 2050 were previous growth trends to continue. If this were the case, this would generate approximately

55m additional entries and exits each year at the midpoint of this forecast growth and current regional entry and exit levels outlined in Table 12. Although this measure excludes other reasons for transport, this remains a conservative estimate of the number of additional entries and exits anticipated as it does not account for the growth in rail travel experienced over the past 20 years. Should this mode shift continue, as is currently targeted within national and local policy, it is likely that the rail network could experience a still greater demand.

The risk to growth from not meeting demand

12.26 The current transport network across the EL does not have the capacity to meet these additional journeys. The current proposed ECML upgrade is estimated to boost capacity on the ECML, up to a maximum capacity of 10,000 journeys per day. This expansion would meet up to only 20% of the estimated 55m additional exits and entries forecast to occur as a result of employment growth. Or equivalently, business as usual employment growth would meet this capacity by 2024.

12.27 This section has sought to consider the relationship between rail capacity and connectivity, the usage of this mode of transport relative to the total workforce, investment in transport and the scale of future growth.

12.28 Earlier in this report, the various potential constraints such as poor rail reliability and insufficient city centre transport capacity across the EL were highlighted. If those issues are not addressed (which will require investment), then it is unlikely that background employment growth will reach its potential, let alone the additional growth envisaged as part of the various HS2 growth strategies.

12.29 It is not possible to know exactly how much of the stated employment growth would occur in the absence of transport investment. However, if the trends of increasing passenger demand, reduced capacity, reducing reliability, and deterioration of the track were to continue it is likely that as a minimum this would limit the future growth potential of the core cities and at worst result in economic stagnation, leaving behind the very regions the Government is aiming to level up.

12.30 Even if 95% of the background growth assumed in Table 10 could be achieved, that would imply that by 2050 there would be a total of 60,000 additional jobs that would have been lost by the region as a result of the constraints on the transport system. This loss would be on top of the other HS2 job estimates outlined earlier in this chapter anticipated by the EL authorities and would cost the region approximately £3.3bn in lost economic output each year. Were the growth constrained to 80% of previous trend growth as a result of constraints

on the transport network across the EL, the region would have lost more than 250,000 jobs, worth over £14bn each year.

12.31 Over a 30 year period, a loss of £3.3bn each year would equate to £70bn in present value terms, accounting for more than the total cost of the HS2 EL. A loss of £12bn annually would correspond to approximately £250bn in present value terms over a 30 year period, more than double the total UK pipeline rail investment of £89bn as last published in Autumn 2018.[70]

70 Infrastructure and Ports Authority, 2019, National Infrastructure and Construction Pipeline 2018.

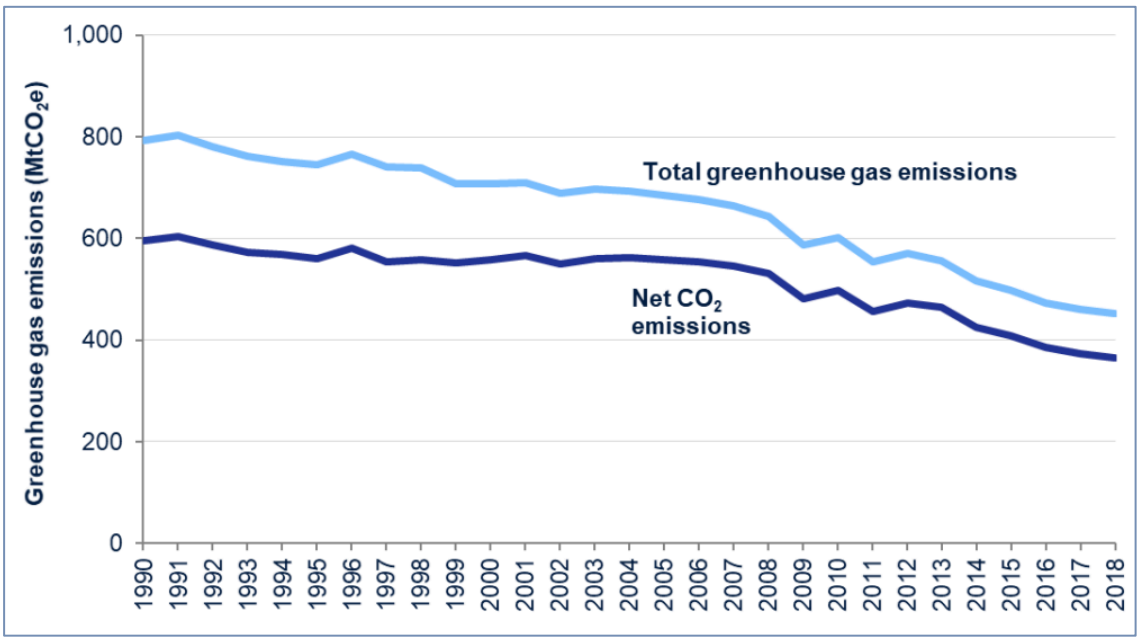
13 Climate Impact of EL Investment

13.1 As outlined within the national policy review, national policy objectives surrounding the climate agenda and net zero emissions targets are ambitious and will require a significant change in individual and societal behaviours to have any realistic prospect of being met. In the medium term, the biggest two challenges outlined within policy are:

> *The achievement of net zero green gas emissions emitted across the country by 2050; and*
>
> *The achievement of net zero green gas emissions across all modes of transport by 2050.*

13.2 Over the last 30 years, the UK has steadily reduced its total output of the seven greenhouse gases outlined within the Kyoto Protocol. Between 1990 and 2018, the UK has reduced total emissions by an average of 11 million tonnes of carbon dioxide equivalent (MtCO2e) each year.[71] This has occurred primarily through improvements in clean energy technology and the movement away from coal and gas power generating stations.[72] If this rate were to continue, a feat that would remain a difficult challenge in itself, the UK would miss its net zero carbon target by 10 years.

Figure 16: Total UK greenhouse gas emissions, 1990-2018 (MtCO2e)



71 Department for Business, Energy & Industrial Strategy, 2019, 2018 UK Greenhouse Gas Emissions, Final figures.
72 Ibid.

Source: Department for Business, Energy & Industrial Strategy, 2019, 2018 UK Greenhouse Gas Emissions, Final figures

13.3 The transport sector currently emits the largest volume of any industrial sector in the UK. Although overall greenhouse gas emissions have been reduced since 1990, emissions from the transport sector have remained at approximately the same level. In 1990, emissions from the transport sector accounted for 16% of all UK greenhouse gas emissions, however following declines in emissions in other figures, in 2018 this figure stood at 28%.[73] Addressing this issue is one of the main challenges for achieving the climate goals set out within national policy.

13.4 Overall emissions have been reduced substantially since 1990, (although not at a rate whereby net zero would be achieved in 2050) however transport emissions have remained stagnant. As clean technologies have enabled the reduction in the emissions of other sectors, transport represents the major challenge in reducing emissions to be overcome in order to achieve the targets.

13.5 Journeys taken by car represent the largest output of greenhouse gas per km of any mode of transport.[74] Currently, passenger cars account for 58% of total emissions within the transport sector.[75] Any strategy that aims to result in net zero emissions in the transport sector should place the reduction of emissions within passenger car travel at the forefront. In England, 87% of car users report that their current lifestyle requires them to own a car.[76]

13.6 Across the EL, the contribution of the transport sector to total greenhouse gas emissions is likely to be even higher as a result of high levels of car use. The West Yorkshire Combined Authorities North & West Yorkshire Emissions Reduction Pathways (2020) states that currently within West Yorkshire road traffic accounts for 40% of all emissions within the county. By 2040, this is anticipated to increase to 42% of total emissions, despite anticipated efficiency improvements within motor vehicles resulting in lower emissions per km. Were no additional policies, such as expanding the capacity of public transport put in place, the report estimates that the West Yorkshire Combined Authority would see a 35% reduction in greenhouse gas emissions over the period 2020 to 2038, significantly lower than that required to meet national policy targets. This is indicative of the scale of the challenge faced across the EL.

13.7 HM Government's Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy (2018) presents the target of achieving net

73 Ibid.
74 Department for Business, Energy & Industrial Strategy, 2019, Greenhouse Gas Conversion Factors.
75 DfT, 2019, Sustainable Travel Towns: evaluation of the longer-term impacts.
76 DfT, 2018, Transport and Technology Public Attitudes Tracker – Waves 1 and 2.

zero emissions from road vehicles by 2050 and sets out a roadmap for how this can be achieved. The key driver of change outlined within the report is that of mode shift, ensuring that trips currently undertaken by motorised vehicles will by 2050 predominantly be undertaken through other methods.[77]

13.8 To encourage mode shift, HM Government outline the steps taken to encourage walking and cycling to replace existing motorised vehicle journeys. However, there is common agreement that this needs to be supported by policies encouraging mode switch for longer distance trips – for many trips walking and cycling is not an option. To encourage mode switch for the 75% of trips taken that are further than two miles in distance, a step-change in public transport accessibility and connectivity is required.

13.9 The HS2 EL and large supporting transport investments such as NPR and Midlands Engine Rail will generate the connectivity between key economic centres required to encourage the 72% of commuters across the route that currently commute by car to switch on to sustainable modes of transport.[78] The integration of local supporting schemes into the transport network will ensure that the number of individuals that can access public transport as a viable alternative to private motor vehicles is increased.

13.10 Within the HS2 Economic Case (2013), the latest report for which estimates are available, the full HS2 network was estimated to divert a total of approximately 800,000 trips each year from vehicle journeys, and a further 200,000 annually from plane trips.[79] Comparatively, one trip on an electric train service such as HS2 or NPR incurs carbon emissions of 8g per person per km, which is 7 times lower than car vehicle travel and 17 times lower than air travel. The electric trains operated within HS2 and NPR would provide significant mode shift between cities and therefore a significant saving of emissions.

13.11 The local transport investments proposed by authorities across the EL would enhance the accessibility of the large economic centres, enabling many more residents the ability to use public transport as an alternative means to private vehicle journeys. Without these investments expanding the connectivity and accessibility of public transport and barring sudden technological change, the reduction in greenhouse gas emissions in the transport sector targeted within national policy would not be achievable by 2050.

14 Connectivity and Inclusive Growth Objectives

Summary

77 HM Government, 2018, Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy.
78 ONS, 2019, Commuting to work by gender, UK country and region.
79 DfT, 2013, The Economic Case for HS2.

- Inclusive growth aims to **maximise the benefits of growth and development for society as a whole**, ensuring that no individuals or groups are left behind
- Existing literature and policy has routinely highlighted **the role played by the transport in ensuring that all individuals have equal access** to social and community facilities, and economic opportunities.
- One of the key issues preventing households from accessing social and economic opportunity is **transport poverty.**
- Transport poverty is a combination of a lack of public transport availability, lack of access to a personal motor vehicle and **reduced labour market outcomes as a result of these factors.**
- The **city regions across the EL suffer from some of the highest levels of transport poverty** across the country.
- Transport poverty across the EL is **primarily an urban phenomenon (with high rates concentrated around EL rail stations**), unlike the West Midlands and Greater Manchester where is it more dispersed.
- **Transport poverty is strongly correlated with social disadvantage, with low-income households more likely to face economic and social exclusion.**
- There are **1.3 million working-age individuals, or 14% of the working-age population, living in transport poverty across the EL.**
- The additional connectivity resulting from within-region transport investments has the **potential to unlock areas that currently cannot access employment centres** and directly link the benefits of future economic growth to the areas currently facing the largest levels of deprivation.
- Not only would this direct economic growth to the areas across the EL that need it the most, but also has the **potential to boost overall economic growth**. The additional workers able to access labour markets as a result of the transport improvements would contribute to the labour supply within key employment centres, providing not only a greater level of inclusive growth, but a greater level of economic growth overall.

Transport Poverty across the EL

14.1 Inclusive growth aims to ensure that the benefits of growth and development are shared across society as a whole and that no individuals or groups are left behind. Existing literature and policy has routinely highlighted the role played by the transport network in enabling everyone to have equal access to social and economic opportunities.

14.2 Without sufficient connectivity between households and the services they require, a large number of people will be cut off from labour markets, and won't have access to healthcare and other social services. Alongside simply generating additional employment and boosting productivity levels of existing

jobs, the transport network enables the opportunities of economic development to be shared consistently within regions and at the national level.

14.3 One of the key issues preventing households from accessing social and economic opportunity is transport poverty. With up to half of British households potentially struggling with the cost of car ownership, the presence of widespread transport poverty prevents individuals from accessing opportunities and disconnects existing communities.[80]

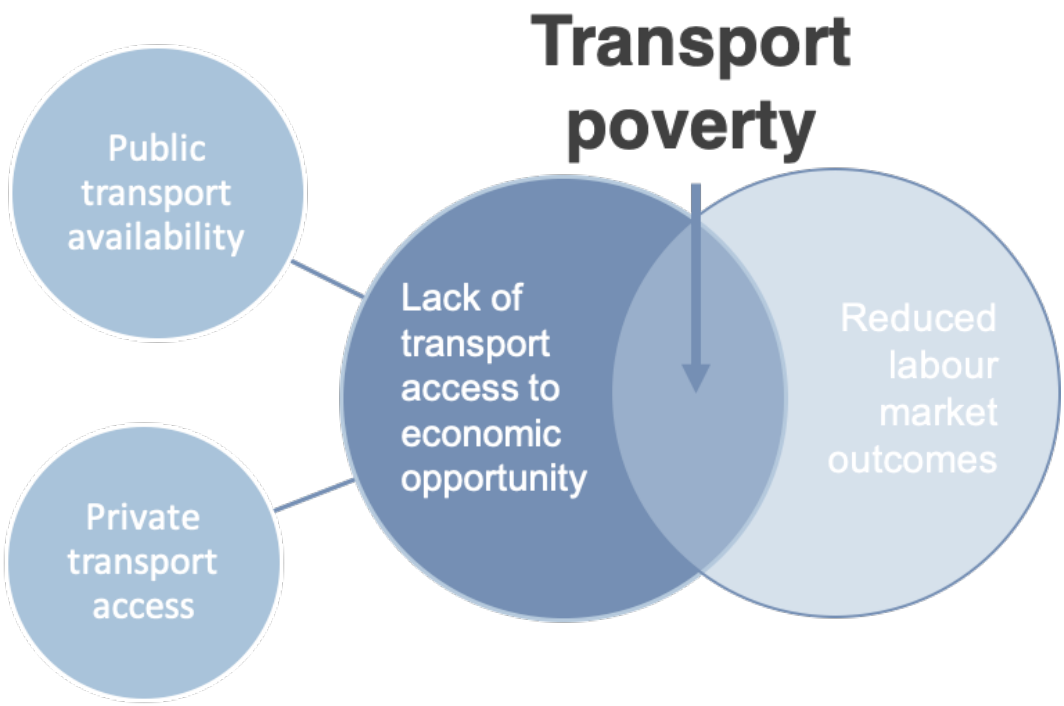
Defining Transport Poverty

14.4 Although transport poverty is a routinely discussed concept in policymaking, there are no universally accepted factors that can be said to result in transport poverty. This research takes the concept of transport poverty as a lack of transport access to economic opportunities, which subsequently results in a constraint on economic outcomes. This definition follows the concept outlined within research for the Government Office for Science (2019).[81] A household is considered to experience transport poverty where the lack of affordable transport access is a limiting factor for the household's economic outcomes.

14.5 In order to capture this phenomenon in the data, Volterra have employed a methodology that relies upon three factors, which each consider a number of indicators, that when combined correspond to a lack of transport access providing a limiting factor for economic growth. These factors are public transport access, private transport access, and labour market outcomes. Further detail is provided on the indices that constitute these factors in **Appendix A**.

80 Sustrans, 2012, Transport Poverty in England.
81 Government Office for Science, 2019, Inequalities in Mobility and Access in the UK Transport System.

Figure 17: Factors influencing transport poverty



Transport poverty along the EL

14.6 Across the UK there are geographical concentrations of transport poverty, affecting some regions to a greater extent than others. The uneven distribution of access to transportation results in households suffering unequal access to economic opportunities and social infrastructure and is strongly associated with the inequality in the levels of economic development across the country.

14.7 Transport poverty is widespread across the EL, with the city regions across the EL suffering some of the highest levels of transport poverty across the country. This is driven by the relatively lower access to transport in the region's cities, and the relatively reduced labour market outcomes experienced by residents in combination. Figure 18 shows the areas experiencing transport poverty across the north of England. As shown in Figure 17, many of the areas surrounding the proposed HS2 EL stations experience widespread transport poverty, (York railway station being the only exception).

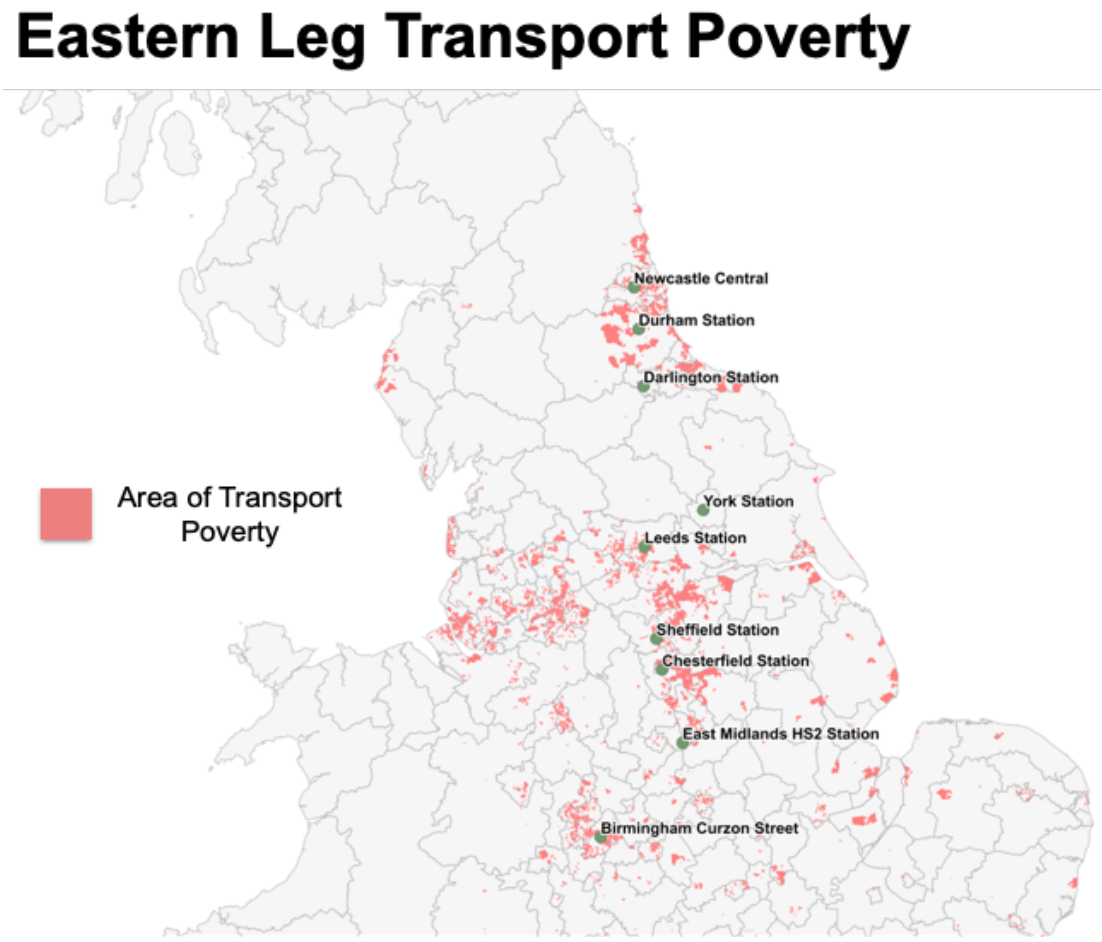
14.8 Additionally, as noted within the Government Office for Science (2019) report, transport poverty across the EL is primarily an urban phenomenon, unlike some other areas of the country. The report states that:

> *"In the West Midlands and Greater Manchester, transport poverty is widely dispersed across the whole region but is more concentrated in urban peripheral areas, whereas in West Yorkshire it is highly concentrated in Bradford,*

Wakefield, Calderdale and other smaller urban centres. Even Leeds city centre demonstrates quite high incidences of transport poverty."[82]

14.9 It can be seen that this prevalence of transport poverty within urban areas is not restricted to West Yorkshire alone, but occurs across the EL with significant pockets in urban areas within SCR and more widely within TVCA and TWCA.

Figure 18: Transport Poverty Across the EL



Source: Volterra calculations.

14.10 The Government Office for Science (2019) report identifies that transport poverty is strongly correlated with social disadvantage. This remains true within the definition adopted for this research, with the transport deprivation score highly correlated with the level of overall deprivation calculated under the Index of Multiple Deprivation 2019.[83] Households with the lowest income levels are the least likely to have access to a private motor vehicle and therefore are likely to be more reliant on available public transport. As a result of this,

82 Government Office for Science, 2019, Inequalities in Mobility and Access in the UK Transport System.
83 MHCLG, 2019, Index of Multiple Deprivation.

transport poverty results in areas within which low-income households are more likely to face economic and social exclusion.

14.11 The maps presented within Figure 19 show that for each of the city regions across the EL, the areas experiencing the highest levels of transport poverty are strongly correlated with areas of social deprivation. Over the whole of the East Midlands, Yorkshire and the North East there are 1.3 million working-age individuals living in areas of transport poverty (see Table 8). Up to 1.3 million people across the EL thereby face the potential for exclusion from labour markets and social services as a result of transport poverty and this figure could be reduced by improving public transport accessibility across the region.

Table 8: Working-Age Individuals Living within Areas of Transport Poverty

	Working-age individuals living within an area of transport poverty	Proportion of working-age population (%)
City regions		
Leeds City Region	320,000	15%
Sheffield City Region	190,000	15%
Nottingham PUA	80,000	12%
Derby PUA	23,000	6.6%
Leicester PUA	64,000	10%
Tees Valley	99,000	20%
Tyne and Wear PUA	160,000	20%
Birmingham City Region	400,000	19%
Liverpool City Region	210,000	20%
Greater Manchester	350,000	17%
Regional/National comparators		
East Midlands, Yorkshire & North East	1,300,000	14%
West Midlands & North West	1,400,000	14%
Greater London	640,000	9.8%
England	3,900,000	9.6%

Source: Volterra calculations; Department for Transport, 2020, Journey Time Statistics; ONS, 2011, National Census – Census Table KS404EW; MHCLG, 2019, Index of Multiple Deprivation.

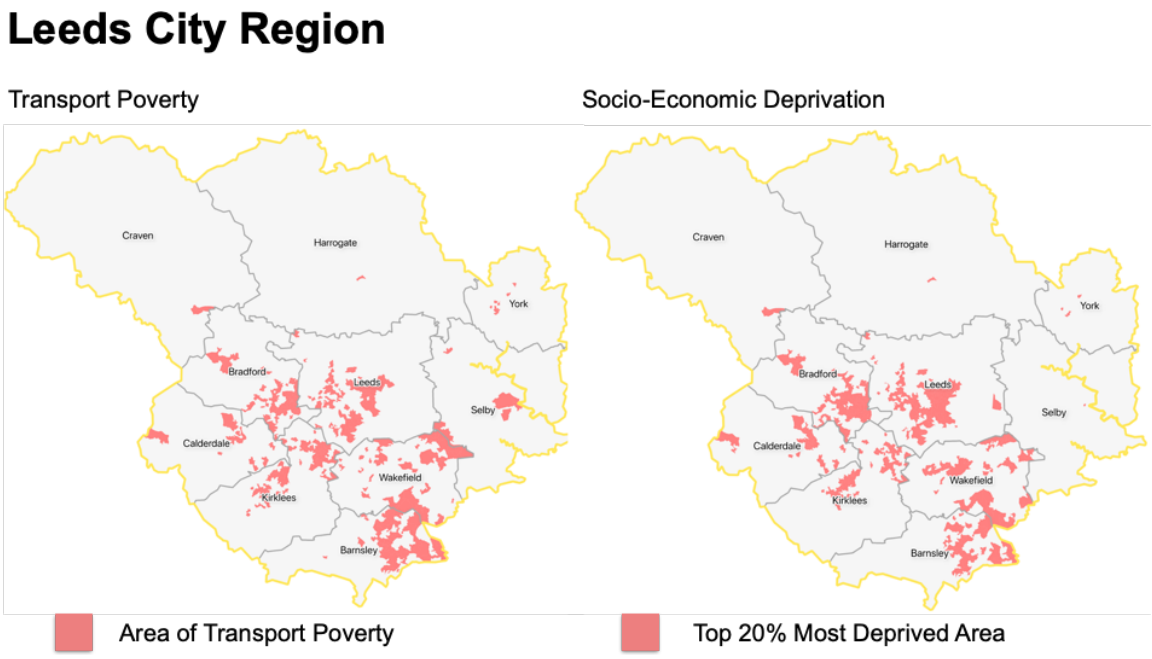
14.12 The transport improvements put forward across the EL region will address the underlying issue within transport poverty of households not having access to social and economic opportunities. As previously outlined within this report, the national investment schemes of HS2 and NPR will contribute many additional employment opportunities across the EL and more widely across the Midlands and North of England. These opportunities will assist in levelling up

economic development in these regions, in line with national policy targets. However, these opportunities will only provide inclusive growth where individuals have physical access to them.

14.13 The improvements in connectivity offered by the within-region transport investments will benefit the households and areas currently experiencing the greatest levels of socio-economic deprivation. The additional connectivity has the potential to unlock areas that currently cannot access employment centres and directly link the benefits of future economic growth to the areas currently facing the largest levels of deprivation.

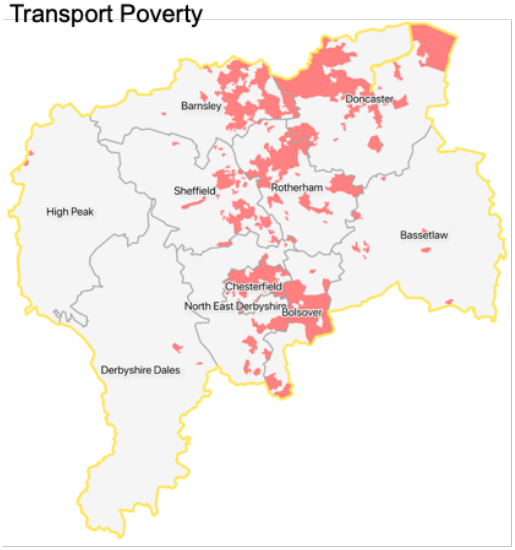
14.14 Not only would this direct economic growth to the areas across the EL that need it the most - some of the most deprived areas within the region facing some of the highest average levels of deprivation and lowest average income levels in the country – but has the potential to boost overall economic growth. The additional workers able to access labour markets as a result of the transport improvements would contribute to the labour supply within key employment centres, providing not only a greater level of inclusive growth, but a greater level of economic growth overall.

Figure 19: Transport Poverty and Deprivation within the EL's Key Urban Areas



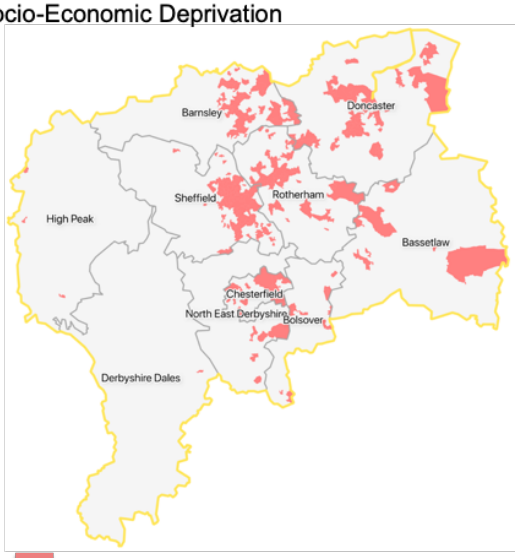
Sheffield City Region

Transport Poverty



Area of Transport Poverty

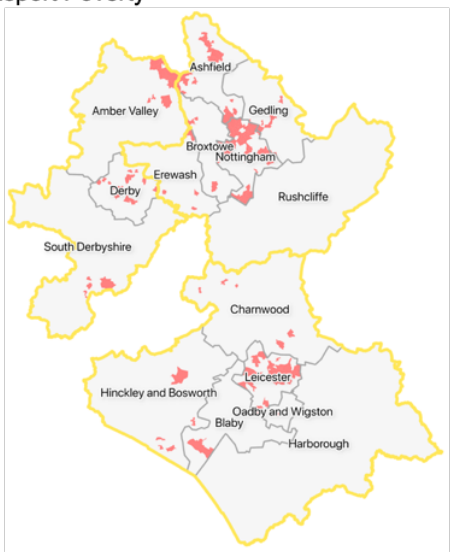
Socio-Economic Deprivation



Top 20% Most Deprived Area

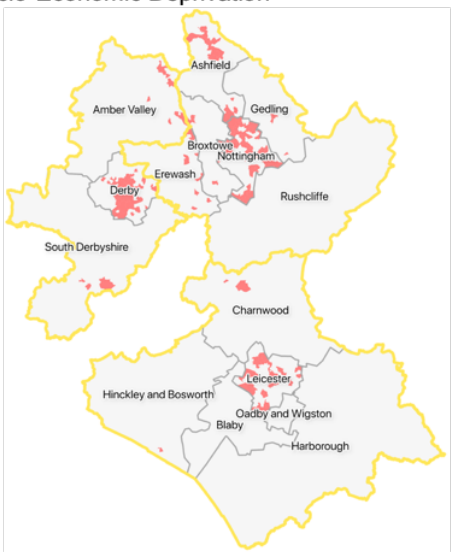
Derby, Leicester and Nottingham Primary Urban Areas

Transport Poverty



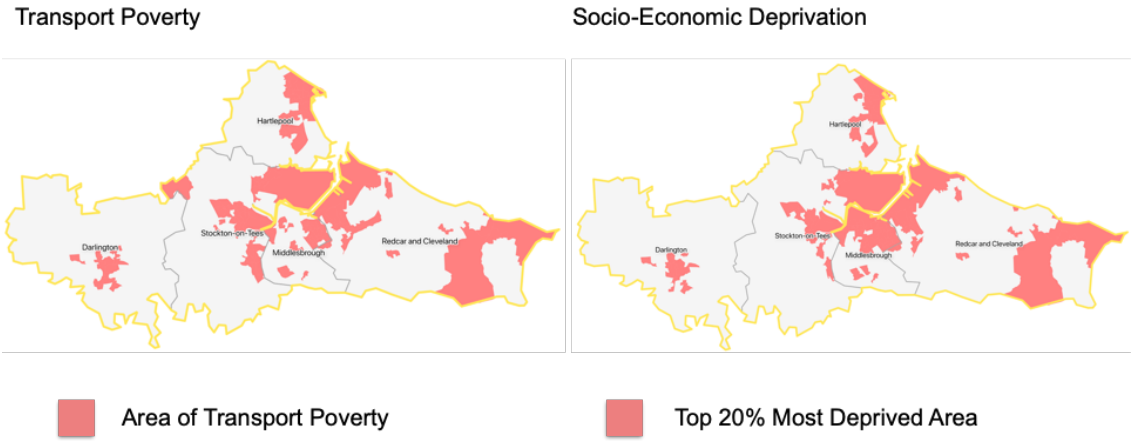
Area of Transport Poverty

Socio-Economic Deprivation



Top 20% Most Deprived Area

Tees Valley Combined Authority



Source: Volterra calculations; Department for Transport, 2020, Journey Time Statistics; ONS, 2011, National Census – Census Table KS404EW; MHCLG, 2019, Index of Multiple Deprivation.

15 The need for certainty around national investment in HS2

15.1 Authorities throughout the EL have been working closely with HS2 Ltd and the Government for over 10 years to ensure that the benefits of investment in HS2 are realised to the maximum extent. Although the full benefits of HS2 will not be realized until at least 2033, evidence from Birmingham and the West Midlands, shows that certainty around the project will deliver investment well in advance of the date when HS2 services would commence.

15.2 The need to address current capacity and resilience issues in the UK's ageing rail infrastructure is clear and the plans for HS2 will help to tackle these in time for when they are urgently needed, while at the same time facilitating the scope for alternatives choices for passengers and freight that will support policies aiming at reducing carbon impacts. Therefore, it is vital that government continue to promote the full network for HS2 and deliver it as soon as possible.

15.3 The North of England needs HS2 and NPR delivered as soon as possible to realise the economic transformation needed to rebalance the economy, improve productivity and ensure a sustainable economic future. Delaying HS2 will impact severely on achieving these important goals and will not help the UK make the shift to zero carbon by 2050. It is on Phase 2b, particularly the Eastern Leg, where the most transformational benefits will be achieved, not just in links to London but critically between the main Core Cities in England.

15.4 The Government is well advanced in its plans for delivering HS2. Phase 1 between London and Birmingham has received Royal Assent, and the Parliamentary Bill for Phase 2a is progressing through Parliament. For Phase 2b, HS2 has undertaken substantial planning, preliminary design and consultation in preparation for a Parliamentary Bill, which has support from Leeds City Region and other authorities in the North.

15.5 The certainty of investment surrounding HS2 Phase 1 has already contributed to securing investment for Birmingham and the West Midlands. As acknowledged within the Oakervee Review, certainty of the future investment in HS2 enables certainty for the supply chain, crowding-in private investment. Investment into the transport network alters the patterns of private investment and commitment to this investment at the earliest stage, brings forward the economic benefits contributed by the private sector.[84]

15.6 Leeds and Sheffield city regions have also been working with Transport for the North and HS2 to understand how the plans for HS2 can also help to deliver parts of the NPR proposals, making the most efficient use of significant capital

84 See, for example, Venables et al., 2014, Transport investment and economic performance: Implications for project appraisal, for a discussion of how commitment to public rail infrastructure investment enables an immediate crowding-in of private sector investment.

expenditure by government on major transport infrastructure. However, this needs government to approve the overall HS2 plan and then we can work together in partnership to think how it is best programmed and constructed in the North.

15.7 Rather than pause plans for HS2, it is recommended that the Government commits to delivering the planned new network but, in line with the Terms of Reference of the review, the Leeds City Region and its partners would work with Government to examine in more detail the specification, programme, mechanisms and governance for delivering HS2, to ensure better cost control, quicker implementation and greater transparency.

15.8 There are also major risks if HS2 Phase 2b is reprogrammed in terms of Hybrid Bill submission in particular significant delay for delivering this vital infrastructure. De-mobilisation and remobilisation of HS2, consultancy and contractor teams arising from this delay could increase costs further, hinder growth plans and adversely impact on the Government Industrial Strategy to upskill the workforce.

15.9 It has always been the position that Leeds City Region would support a simultaneous start to the Phase 2b programme for both and East and West legs. Starting from the North could include provision of the Leeds HS2 station to increase investor confidence, and also be linked to the proposals for NPR Leeds-Sheffield leg, which promote an efficient integrated rail network in the future.

15.10 A number of proposals have been put forward to modify the design specification in particular the speed of the system, to reduce construction costs and, potentially, land requirements. Currently, it is not thought that these would create barriers to the construction of the EL. Consultation between the EL authorities, HS2 and DfT has identified a number of technical solutions that would reduce the cost and improve the delivery programme across the EL.

15.11 However, the overnment must commit to the principles of a new line. It should be recognised that building a new line will enable a consistent set of design standards for the system, and will avoid major long term disruption to existing services during construction, as experienced during the West Coast Main Line upgrade.

15.12 Therefore, due to the wide and transformational nature of the HS2 project, this approach only makes sense if the Government remains committed to the full HS2 network. However, where opportunities are available to unlock the early delivery of the potential benefits of HS2 and the EL, these need to be taken. The economic and climate case for acting as soon as is feasible is clear. This includes the potential for a phased construction programme or the construction of elements of the scheme in parallel with each other. This would further enable

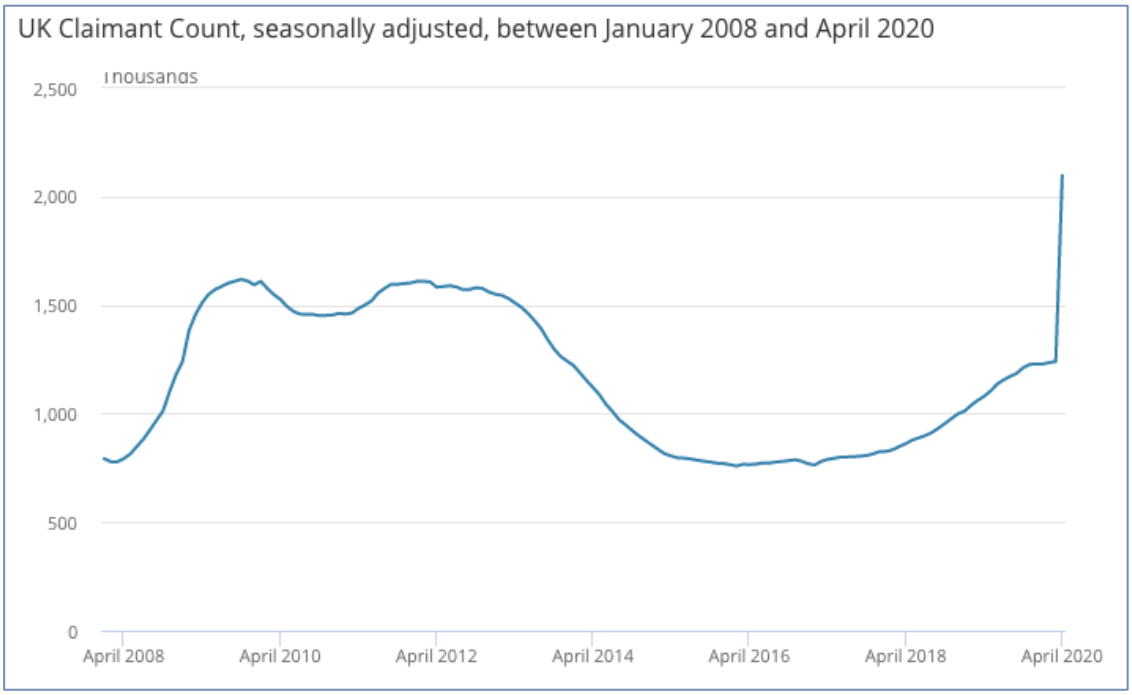
efficiencies during construction, but most importantly ensure a sequence that provides the maximum benefits for the project, at the earliest opportunity.

16 The impact of Covid-19 upon the Case for the EL

Impacts on the delivery of investments

16.1 The speed, scale, and significance of the Covid-19 health crisis has resulted in large socio-economic impacts in the short-term. The Government policy response of lockdown necessary for health reasons has resulted in one of the most rapid falls in consumption demand in recorded history. The short-term result of this has been the most significant reduction in economic growth seen in any single quarter since records began and high unemployment levels, with the number claiming unemployment benefits in the UK increasing by 70% in April 2020 alone.[85]

Figure 20: Total UK Claimant Count



Source: ONS, 2020, Employment in the UK: May 2020

16.2 The response by governments to the Covid-19 crisis has necessarily impacted our way of life and that of our local, regional and global transportation systems. The speed with which these impacts have been felt is significant as national railways and local transport systems experience have free-fall declines in customers.

85 ONS, 2020, Employment in the UK: May 2020.

16.3 The immediate economic impact of the Covid-19 crisis has resulted in large financial constraints on many of the UK's transport networks. This can be seen most recently in London with the near bankruptcy of Transport of London resulting from the collapse in fare revenues. The impact of the constraints on finances is likely to have knock on impacts for the delivery of planned transport investments going forward and the ability to successfully integrate the HS2 EL and NPR into local transport systems.

Persistent impacts on the case for additional transport investment

16.4 In addition to its short-term impacts, the severity of the health crisis has the potential to result in further changes in individual behaviour impacting upon the case for transport investment.

16.5 Changes in behaviour brought about by the policy measures to the crisis have the potential to become permanent shifts in behaviour once the worst impacts of the crisis have tailed off. The potential for video conferencing facilities to replace many of the existing trips for commuting and meeting for work has been recognised for some time, and the enforced lockdown may trigger lasting behavioural change away from travelling to and from work. Within the Travel During Covid-19 Survey, 39% of working-age individuals stated that in future they expect to work from home more often.[86]

16.6 As a result of the potential impact of being in proximity with others on public transport, many individuals also state that they will switch away from journeys taken on public transport in favor of private car use where journeys are necessary. The Travel During Covid-19 Survey reports that 57% of people report an intention to drive more rather than use public transport.[87] If the behaviour changes temporarily forced on individuals for health reasons transfer into long term behavioural change following the recovery from the crisis, demand for public transport following the recovery from the crisis may be lower than that previously anticipated. At present, the extent for behavioural change regarding the use of public transport to occur is unknown, however the fundamental arguments for increased investment in the EL will remain even where this is likely to occur.

16.7 The severity of social and economic impacts brought about by the Covid-19 crisis offer an opportunity to rethink the design of how the economy should perform for the country. Changes at this national scale create new openings for managing systemic challenges and ways to build back better.

86 Transport Focus, 2020, Travel During Covid-19 Survey.
87 Ibid.

16.8 In the climate of heightened economic uncertainty that has arisen as a result of the Covid-19 crisis, it is more important than ever for HM Government to commit to delivering investment in infrastructure. A commitment to investment now, at a time where the UK economy has significant spare capacity, will provide the investment and the certainty required to bounce back from the crisis.

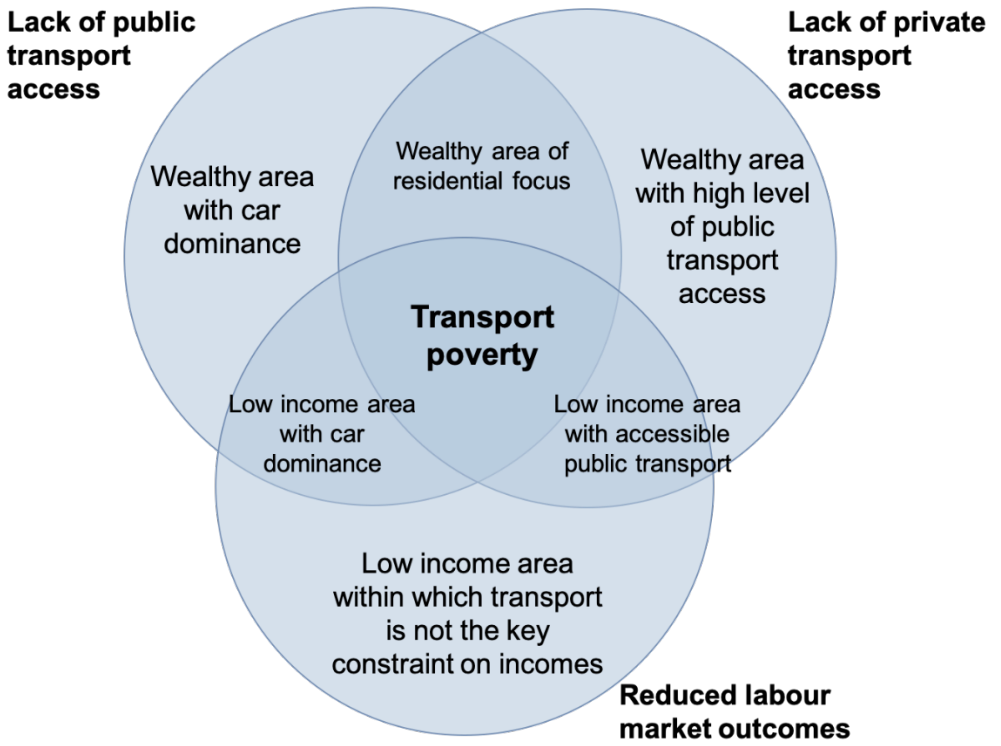
16.9 The pandemic provides an opportunity to revisit the provision of transport networks to ensure the sector meets the needs of a population and workforce into the second half of the 21st century. This will involve meets the increasing demands for urban connectivity and accessibility into key employment centres, and doing so in a way that the UK can meet its climate targets. HS2, NPR, Midlands Engine Rail and the supporting local interventions put forward will create the modern transport system required to level up the Midlands and the North, raise productivity and enable public transport to play the role of a genuine alternative to private vehicle travel.

17 Appendix A: Transport Poverty Methodology

17.1 In order to capture the concept of transport poverty within available data, this research employs a methodology that relies upon three factors, which each consider a number of indicators. When combined, the three factors correspond to a lack of transport access providing a limiting factor for economic growth. These factors are public transport access, private transport access and labour market outcomes.

17.2 The presence of each one of these factors is required for transport poverty to be present. For example, as shown in Figure 21, an area lacking public and private transport access but facing strong labour market outcomes, is likely a wealthy residential-focused area within which an increase in transport access would not contribute to reducing poverty.

Figure 21: Determinants of transport poverty



17.3 To define these three factors using statistical data a variety of data indicators have been used, each presenting data at the Lower Super Output Area (LSOA) level within England. Each indicator used comes from a dataset produced by the Department for Transport, the Office for National Statistics, or the Ministry of Housing, Communities and Local Government.

17.4 To define the lack of access to public transport indicator, data have been gathered from the Department for Transport's 2019 Journey Time Data Tables. This data presents the average time taken by households within an LSOA to reach large employment centres by public transport and via car. Volterra built a predictive model, forecasting the public transport travel time taken to reach the nearest employment centre via public transport, given the total distance between the areas and the average travel time taken via private vehicle travel. The lack of public transport access metric then considers the difference between the travel time via public transport to the nearest employment centres expected and the actual 2019 public transport travel time within the data.

17.5 The lack of private transport access metric considers the availability and affordability of private transport for households within each LSOA. Using the proportion of households with access to a vehicle recorded within the 2011 Census, and accounting for the national changes in car ownership levels over the period 2011 to 2018 using the Department for Transport's 2019 Travel by vehicle availability dataset, the proportion of households to which private transport is an accessible option is estimated for each LSOA.

17.6 The statistical definition of the reduced labour market outcomes factor considers indicators detailing the proportion of households receiving in and out-of-work benefits in 2019 within each LSOA. These measures when combined correspond to an effective proportion of households within an LSOA currently unemployed, under an insecure working contract, or employed at a wage level under which they qualify for in-work benefits.

17.7 A single quantitative value is calculated for each of these factors within each LSOA in England. A simple arithmetic formula is applied, weighting each of these factors equally to calculate an overall index of transport poverty within each LSOA in England. The top 20% most deprived areas under this metric are defined as experiencing transport poverty. Under this definition, transport poverty occurs in areas which experience the greatest level of the three factors identified in combination.

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