

QUICK WINS FOR THE NORTH'S TRANSPORT NETWORK



Luke Raikes

March 2019

ABOUT IPPR NORTH

IPPR North is the dedicated think tank for the north of England, with bases in Manchester and Newcastle.

IPPR, the Institute for Public Policy Research, is the UK's leading progressive think tank. We are an independent charitable organisation with our main office in London. IPPR Scotland is based in Edinburgh.

IPPR's purpose is to conduct and promote research into, and the education of the public in, the economic, social and political sciences, science and technology, the voluntary sector and social enterprise, public services, and industry and commerce.

20th Floor
City Tower
Piccadilly Plaza
Manchester
M1 4BT

T: +44 (0)161 694 9680
E: north@ippr.org
www.ippr.org/north

Registered charity no: 800065 (England and Wales),
SC046557 (Scotland)

This paper was first published in March 2019. © IPPR 2019

The contents and opinions expressed in this paper are those of the authors only.

The progressive policy think tank

CONTENTS

Summary	3
Introduction	5
1. Context	6
The North	6
Northern transport: A brief history	7
Transport for the North	9
2. Quick wins: Principles	13
3. Six quick wins for the North	14
1. Reopening of the Ashington Blyth and Tyne railway for passenger services	14
2. Leeds Bradford Airport Parkway rail station	17
3. Supporting the development of hydrogen trains.....	19
4. Tees Valley rail interventions	22
5. Integration of traffic management to improve air quality.....	26
6. Tees Crossing.....	29
4. Conclusions and recommendations	31
References	34

ABOUT THE AUTHOR

Luke Raikes is a senior research fellow at IPPR North.

ACKNOWLEDGEMENTS

The author would like to thank the many stakeholders that attended roundtables across the North and contributed to the longlisting and shortlisting process. He would also like to thank the staff of local authorities and combined authorities who contributed supplementary information to these case studies, and in particular Transport for the North for engaging with this project throughout. He would also like to thank IPPR North colleagues: Leah Millward and Marcus Johns for the mapping, director Sarah Longlands for feedback on later drafts, and Ed Cox for chairing the roundtables and feeding in to early drafts of the report.

Supported by:



Download

This document is available to download as a free PDF and in other formats at:

<http://www.ippr.org/research/publications/quick-wins-for-the-north-s-transport-network>

Citation

If you are using this document in your own writing, our preferred citation is:

Raikes L (2019) *Quick wins for the North's transport network*, IPPR North.

<http://www.ippr.org/research/publications/quick-wins-for-the-north-s-transport-network>

Permission to share

This document is published under a creative commons licence:

Attribution-NonCommercial-NoDerivs 2.0 UK

<http://creativecommons.org/licenses/by-nc-nd/2.0/uk/>

For commercial use, please contact info@ippr.org



SUMMARY

The North's transport network is currently in crisis, but there are major opportunities ahead. The chaos faced by passengers in the summer of 2018 revealed long-term structural weaknesses in the network, which have resulted from decades of central government underspending. But in February 2019 a potential future was revealed as Transport for the North (TfN) published their Strategic Transport Plan, an outline business case for Northern Powerhouse Rail and their investment pipeline. This marks the 'end of the beginning' for this organisation, which has the potential to transform the North's transport network and improve the daily lives of people living in the North.

But long-term plans must demonstrate short-term success. Northern Powerhouse Rail will be delivered over 30 years; while it is planned, scoped and developed, the people using the North's roads and railways will still need to see improvements. For this reason, Transport for the North and its constituent transport authorities need some 'quick wins'.

We define 'quick wins' as projects that can deliver real economic, fiscal, social and environmental benefits to passengers – ideally by 2020, and by 2025 at the latest. We worked with a wide range of stakeholders to compile a longlist of projects, and to set out a series of principles for shortlisting these. We looked across all 'types' of intervention and all transport modes, but we prioritised those which cross local transport authority boundaries or have a wider impact on the North.

The 'quick wins' we selected are not the only projects that need to be prioritised – they just represent particularly good examples and strong candidates for prioritisation. And TfN won't work alone in this task – many of these projects are led by local transport authorities, but they have pan-northern importance and TfN should support them in whatever way it can.

The six quick wins that meet our criteria are as follows.

- **Reopening of the Ashington Blyth and Tyne railway for passenger services:** This project would bring many social and economic benefits to the North East, and is a realistic proposal that should be taken forward through the next stages.
- **Leeds Bradford Airport Parkway rail station:** This is an important, strategically-located station, which could serve Yorkshire's internal and international connectivity well.
- **Supporting the development of hydrogen trains:** While electrification is the top priority for the North there are alternatives such as hydrogen and battery power which could also regenerate the Tees Valley and Merseyside areas, and their development should be investigated.
- **Tees Valley rail interventions:** The rail network in this part of the North is vital for the wider region, but can't function properly at the moment due to poor infrastructure. Three interventions would unlock many of these difficulties and improve passenger and freight journeys across the North.
- **Integration of traffic management to improve air quality:** Air quality is a major concern for many parts of the North, but new traffic management technology could be rolled out alongside other interventions to reduce harmful emissions.
- **Tees Crossing:** A new bridge across the Tees would help this small but important economy reach its potential and have a wider impact on the North.

These case studies have also revealed how centralised decision-making is a drag on progress in the North's transport network, and we have learned from Transport for London and Transport Scotland that project development capacity is essential in order to bring projects to a point where they can be funded. We therefore recommend the following.

1. Central government should provide a £400 million project development fund for Transport for the North

- The 2019 spending review should allocate and devolve a £400 million project development fund for Transport for the North (over the whole spending review period) – equating to 15 per cent of the new 'asks' in TfN's investment programme – to be spent in conjunction with constituent transport authorities, and in line with TfN's appraisal methodology.
- This should be a revenue fund to develop projects – not direct capital spending on a transport project itself – and the North should have full discretion over how it is spent. In the immediate future, the capital cost of transport projects would still be met by central government.

2. TfN should prioritise 'quick wins' alongside long-term investment plans

- TfN should prioritise 'quick wins' including but not limited to:
 - reopening the Ashington Blyth and Tyne railway for passenger services
 - Leeds Bradford Parkway rail station
 - supporting the development of hydrogen trains
 - Tees Valley rail interventions
 - integration of traffic management to improve air quality
 - Tees Crossing.
- TfN should develop a set of criteria for selecting 'quick win' priorities going forward, starting with the eight principles we have outlined as criteria for shortlisting in this paper. They should then use their institutional capacity to provide the necessary support for these projects, and progress them through the relevant processes as quickly as possible.

3. TfN should develop its own approach to project appraisal and increase its positive impact on social and environmental outcomes

- TfN should develop a new appraisal methodology tailored to the North's economic geography and directed towards economic, social and environmental outcomes such as reductions in unemployment, better paid jobs, improved health outcomes and reduced emissions.
- This methodology should be used to prioritise TfN's own sequencing and priority-setting – deciding which projects to develop to the stage where funding is requested – but if TfN takes on its own capital budget, then this methodology would be used to approve their own capital spending.
- TfN should also develop a social value policy, which would mean the contracts they tender would have to comply. This could then help support, for example, local employment outcomes when such schemes are delivered.

INTRODUCTION

This is a significant moment for the north of England. Challenges remain, such as low productivity, unemployment, climate change, globalisation and technology. But there are major opportunities ahead: the region stands on the cusp of the fourth industrial revolution, and ready to lead the world in modern industries like health innovation, digital, advanced manufacturing and energy. The Northern Powerhouse agenda tapped into the North's latent potential and galvanised stakeholders across its diverse geography. The government's industrial strategy now looks set to deliver on its promise.

It is in this context that Transport for the North (TfN) has developed its long-term plans. Its vision reaches forward to 2050, and it builds on an economic analysis of the North's economic strengths and its infrastructure needs (SQW and TfN 2016). The recently-published Strategic Transport Plan provides an opportunity to drive major improvements in strategic connectivity throughout the North, taking a pan-northern view for the first time (TfN 2019).

IPPR North has undertaken this project, which focuses on the short-term 'quick wins', to support TfN's long-term ambitions. The North does need big projects and packages of investment, like Northern Powerhouse Rail. But there is significant value in smaller projects too. They can often have a big impact on the North's transport network, and thereby improve the performance of its economy, the inclusivity of its society and the sustainability of its environment.

We have worked openly and inclusively with TfN and a wide group of stakeholders across all three northern regions. We held roundtables in the North East, North West and Yorkshire and the Humber, and undertook a series of in-depth interviews. This resulted in a shortlist of projects that meet the long-term objectives of TfN, but could be implemented in a relatively short timescale. This report briefly summarises the economic and policy context in which these 'quick wins' should be taken forward, before setting out our criteria for shortlisting these projects, the details of the projects themselves, and finally our recommendations.

1. CONTEXT

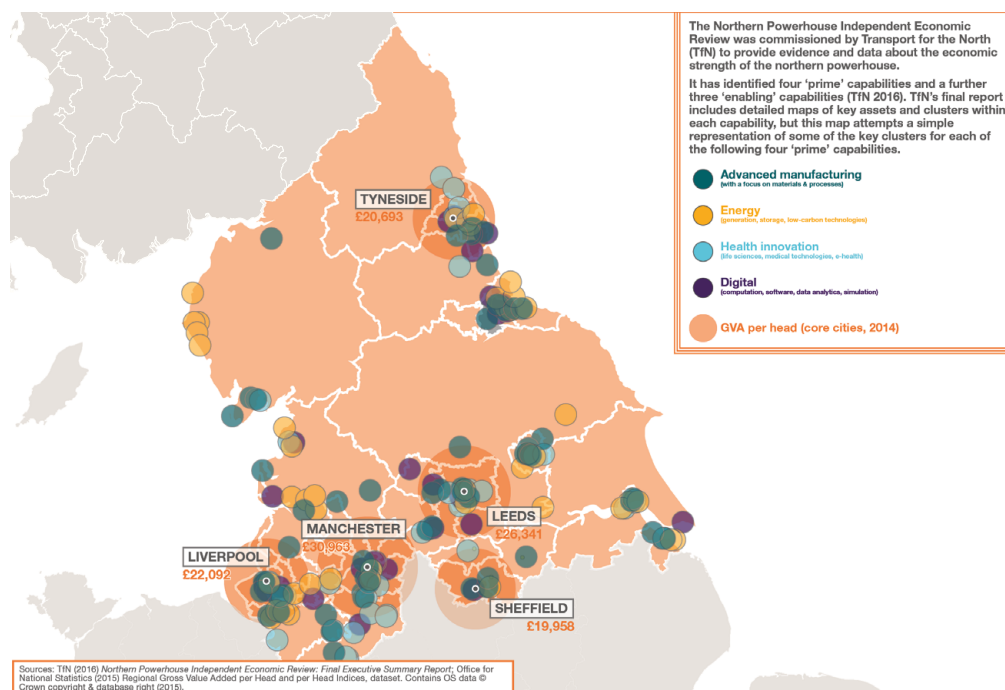
THE NORTH

The North has significant latent economic potential that is now finally being realised. As a region, it is of substantial scale and has many assets in its cities and its towns: 15 million people power a £344 billion economy that is bigger than those of all the devolved nations combined and most EU countries' economies (ONS 2018a). The North is home to 29 universities; eight major ports; five major cities; 265 towns; five national parks; and, in Manchester Airport, the largest airport outside of the South East (Raikes et al 2018).

Innovative, frontier industries thrive in the North. The North specialises in energy, digital, health innovation and advanced manufacturing sectors – these are spread out across the North's diverse geography, as figure 1.1 shows (SQW and TfN 2016). The North harnesses its geographical advantages: its two energy coasts and biomass power plants help it to produce one-third (31.3 per cent) of the UK's renewable energy (BEIS 2018a). The government's industrial strategy acknowledges the importance of these sectors and the value of the North's regional strengths, encapsulated in the language of Northern Powerhouse (BEIS 2017).

FIGURE 1.1: THE NORTH HAS MANY ASSETS AND SPECIALISMS THAT CONTRIBUTE TO NATIONAL ECONOMIC GROWTH

Northern prime capabilities



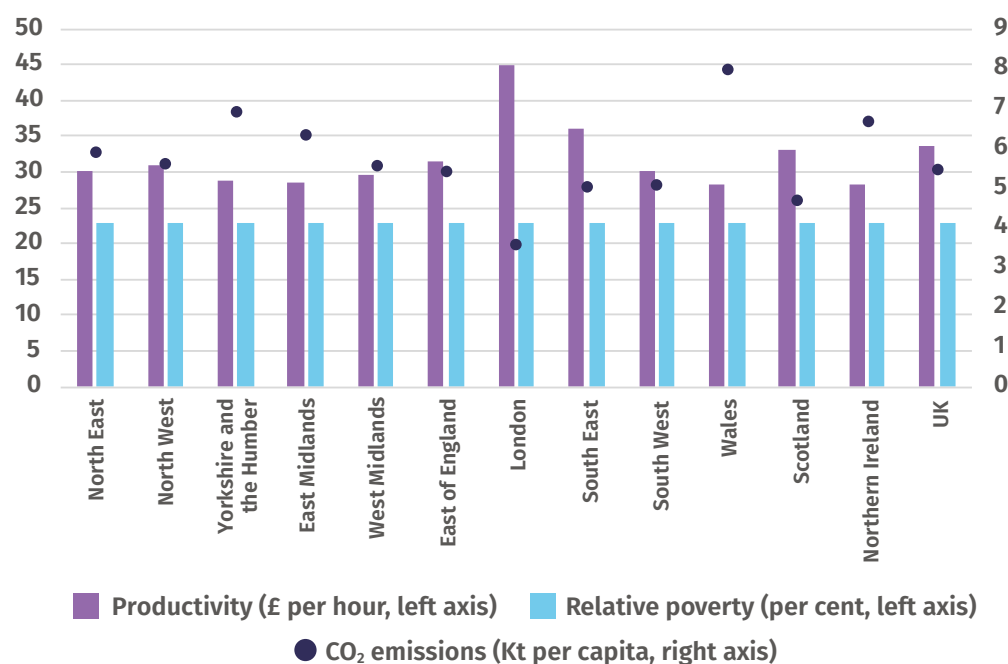
Source: IPPR North analysis of SQW and TfN 2016

But the north of England continues to face challenges. Like most of the country outside London, the North is less productive than it should be: productivity is £30 per hour compared with £34 per hour nationally, and £45 per hour in London (ONS 2019). The North should be on a par with modern developed regions such as North-Rhine Westphalia and the Randstad, but instead it has rates of productivity which are lower even than East Germany (Raikes et al 2018).

This has a profound consequence for the people of the North. As figure 1.2 shows, 2 million working-age northerners live below the poverty line, and average healthy life expectancy is below the state pension age in all northern regions (Raikes et al 2018). The North’s CO₂ emissions have reduced sharply over the last decade, but they remain very high, and levels of air pollution in cities like Manchester are now above the safe legal limit with consequences for public health and economic productivity (Raikes et al 2018; Cox and Goggins 2018).

FIGURE 1.2: THE NORTH’S ECONOMY HAS A COMBINATION OF LOW PRODUCTIVITY, HIGH POVERTY AND HIGH CO₂ EMISSIONS

Percentage of population below the poverty line (after housing costs), productivity (£ per hour), and CO₂ emissions per capita



Source: DWP 2018; ONS 2019; BEIS 2018b

NORTHERN TRANSPORT: A BRIEF HISTORY

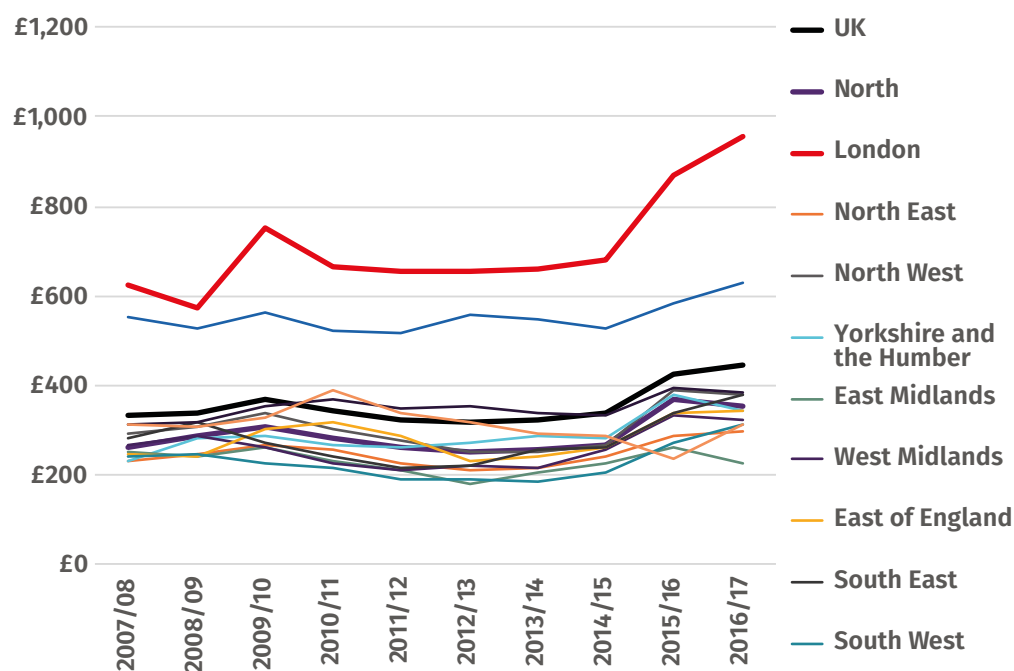
An effective and coordinated network of transport infrastructure is a prerequisite for future northern prosperity. It is true to say that transport isn’t the only thing holding the North back – the potential of the North can only be realised when there is also investment in education and skills, health, trade and investment and business support (Raikes et al 2018). It is also fair to say that evaluations of transport have shown mixed results (WWCLEG 2015). But the right investment can enable significant economic, social and environmental benefits (Laird and Mackie 2010; Frontier Economics 2016). This is especially needed in the North – where cities, towns and economic assets are distributed across its diverse geography, but are poorly connected with one another (TFN 2019).

This poor connectivity is rooted in a long history of underinvestment. Many of the North’s vital connections were severed in the 1960s, which further accelerated the downward spiral of areas that were already struggling (Gibbons et al 2017). But successive governments have also underinvested, as figure 1.3 shows.

- Over the last 10 years, the North received £289 per head on transport, while London received £708 per head on average.
- If the North had received the same amount per head public spending on transport as London for the last 10 years, it would have had an additional investment of £63 billion.
- Central government spend in London has more than doubled since 2012/13 in real terms, rising more than in any other region, and at more than double the rate of increase in the North.¹

FIGURE 1.3: LONDON HAS RECEIVED TWICE AS MUCH TRANSPORT SPENDING PER CAPITA THAN THE UK AVERAGE OR THE NORTH OVER THE PAST TEN YEARS

Historic transport spending per capita in UK nations and regions, current prices



Source: IPPR North analysis of ONS 2018b

The government’s pipeline indicates that this picture is set to worsen in future. The government sets out its long-term transport plans in the National Infrastructure and Construction Pipeline (HM Treasury and the IPA 2017). The government produces its own analysis of this pipeline which excludes spending beyond 2021 and spending technically undertaken by Transport for London (ibid). Given that the purpose of the pipeline is to set out a long-term plan, and given Transport for London is funded by a business rate retention deal signed with the Transport Secretary, IPPR North analysis includes all spending in the pipeline for which the government is responsible (Raikes 2018). The December 2017 pipeline indicated that planned spending in London was 2.6 times more per person than in the North.

¹ IPPR North analysis of ONS 2018b.

There are several reasons why the North has seen such underinvestment.

Institutional capacity

Transport projects need to be actively developed and brought forward, which often takes many years. Transport for London is a powerful body with significant institutional capacity and undertakes this important task on behalf of the capital. Elsewhere there are only much smaller, under-resourced and far less powerful transport authorities that cover city regions (such as Transport for Greater Manchester (TfGM) and MerseyTravel). The vital regional tier has only recently evolved into something of substance (see section on 'Transport for the North'). This means that there simply aren't many projects in the pipeline. Scotland also appears to benefit from its institutional capacity, with a level of transport spending per person second only to that of London's, and has some important lessons for the north of England (Cox and Raikes 2015).

Transport appraisal methodologies

Value-for-money assessments are an important part of decision-making in transport policy. These form the core of HM Treasury's five-part business case for investment, contained within the Green Book (see HM Treasury 2018). These value-for-money assessments are underpinned by benefit-cost ratios (BCRs) which have historically placed great emphasis on the journey-time savings of high-income individuals or land value increases. As a result, projects in London tend to have favourable ratios, as there are more people within a small area, and these people also tend to have higher incomes (Blakeley 2017, Metro Dynamics 2018). The importance of appraisal methodologies can however be overstated: these calculations were never intended to be the sole factor in such decision-making and the decision about what money to invest in which scheme is ultimately a political one. The government has also produced a 'rebalancing toolkit', which aims to improve this regional spending disparities by providing supplementary guidance. However, this does not change the core calculations that HM Treasury will undertake as part of its value for money estimates.

Political pressure and influence

The political dimension to transport decision-making is extremely important, but difficult to demonstrate. It is perhaps best defined by observing which projects have already been developed and appraised but for some unknown reason have not received the investment they need, and comparing these with projects for which there is a weak economic case which have gone ahead (Coyle and Sensier 2018; Forth 2017). This is, of course, a result of our centralised politics, which results from centralised decision-making – it should be no surprise that political decisions made in London tend to favour the capital over other regions.

However, there has been some progress towards the devolution of transport funding. Central government has started to provide non-ring-fenced integrated transport funds to combined authorities, and the £1.7 billion Transforming Cities Fund has benefited Liverpool City Region, Tees Valley and Greater Manchester. Devolution of power and funding to the North's combined authorities is an important change that complements the development of Transport for the North.

TRANSPORT FOR THE NORTH

Underinvestment in northern transport clearly requires a response above and beyond a minor technical changes to appraisal methodologies. An institutional and political solution is clearly required in order to address the three factors which lead to underinvestment in the North (Cox and Raikes 2015). TfN is that solution. This organisation has developed at pace in recent years, but has its roots in pan-northern cooperation that go back more than 10 years.

FIGURE 1.4: THE NORTH'S PRIME CAPABILITIES NEED IMPROVEMENTS IN TRANSPORT INFRASTRUCTURE

The North's current rail networks



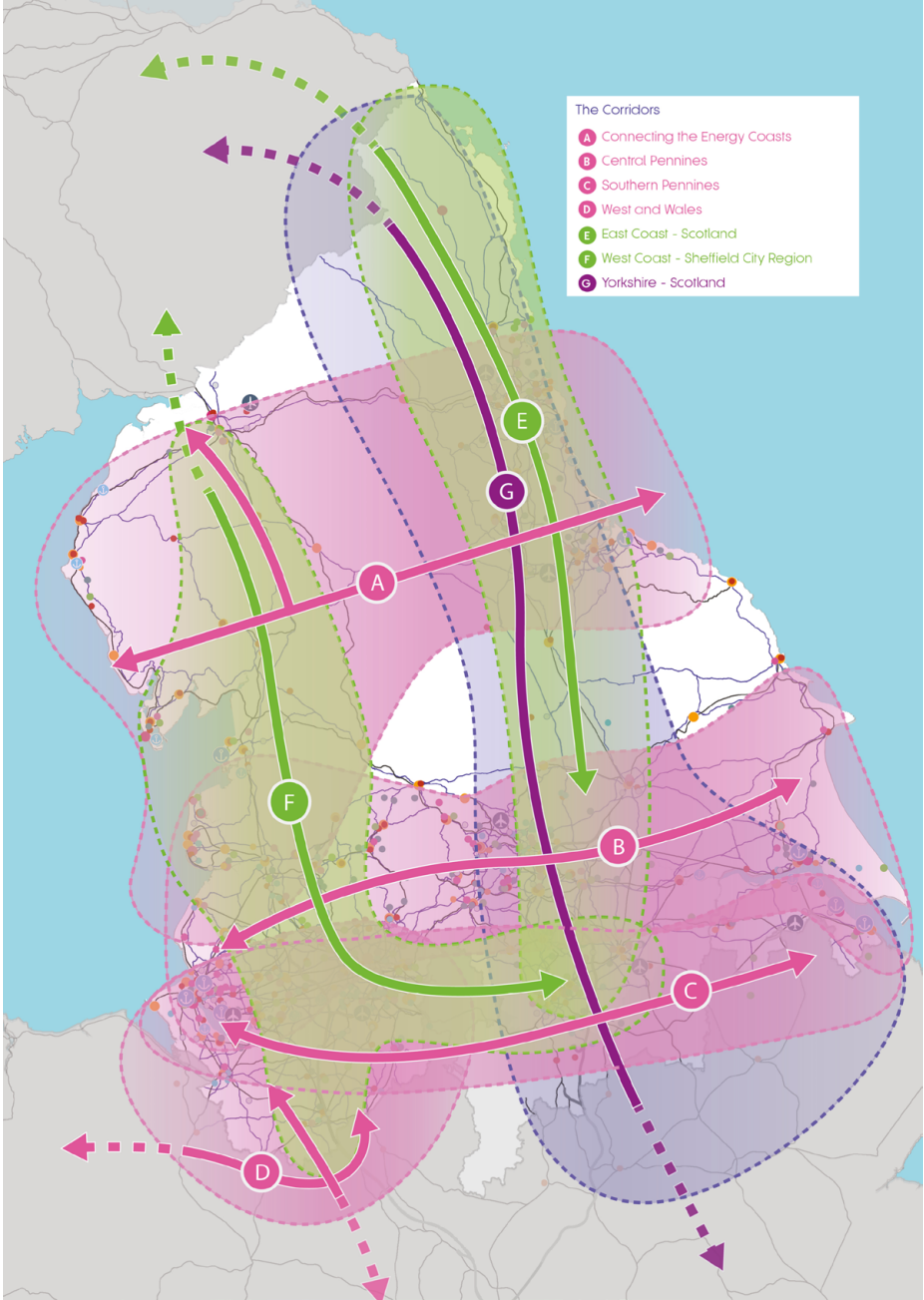
Source: Transport for the North 2019

- The Northern Way Transport Compact laid the foundations for Transport for the North. This was formed in 2004 from the three northern government office regions. It was a major driving force behind the Northern Hub infrastructure package which is still being implemented in the North (GMPTE 2010).
- Rail North became a legal entity in 2014. It is accountable to northern transport authorities and helped to shape the two rail franchises in the North in collaboration with DfT. It now co-manages these franchises, and while it predates TfN, it now acts on its behalf as TfN Strategic Rail.
- Transport for the North was formed in 2014. It has quickly grown into an organisation capable of drawing up plans for infrastructure investment across the North. Crucially, it published the Northern Powerhouse Independent Economic Review (IER) – an economic evidence base which underpins the transport proposals (SQW and TFN 2016). This set out the four prime and three enabling capabilities of the North, which are shown in figure 1.1. In May 2018, TfN became the country's first sub-national transport body, and has recently published its strategic transport plan (STP), investment plan and the business case for Northern Powerhouse Rail – which will connect the North's major economic centres.

TfN has gone from strength to strength, and is now finalising its proposals for investment in northern transport. In February 2019, the STP set out a 2050 vision for transport in the North. Crucially, it is driven by outcomes and informed by economic analysis (the IER). It aims to enhance not only economic growth, but also wages, health and wellbeing and quality of life (TFN 2019). It will do so by developing seven 'corridors of opportunity' (see figure 1.5). This long-term plan, and these strategic development corridors (SDCs), provide the framework for the 'quick wins' that we propose be brought forward in the near future.

FIGURE 1.5.: TRANSPORT FOR THE NORTH'S PLANS ARE MULTI-MODAL AND STRETCH ACROSS THE NORTH'S DIVERSE GEOGRAPHY

TfN's seven corridors of opportunity



Source: Transport for the North 2019

2.

QUICK WINS: PRINCIPLES

Now is a time of great change for transport in the north of England. In order to capitalise on this opportunity, IPPR North has consulted with Transport for the North and a wide range of stakeholders to develop a series of 'quick wins'.

Transport networks take a long time to develop – the economic transformation that this can enable takes generations. Transport for the North is rightly focusing on setting out a long-term package of investment. But significant changes can be made relatively quickly and easily, and long-term plans benefit from demonstrating early success.

Below we set out the framework of principles – developed in consultation with northern transport stakeholders – which guided our selection of 'quick win' case studies which are presented in full in the following section. These formed the basis of our three roundtable discussions with stakeholders across the North, and our shortlisting process with Transport for the North and Rail North.

Principle 1: Case studies must be able to deliver and demonstrate real-time economic, fiscal, social or environmental benefits for passengers and/or businesses – ideally by 2020, and by 2025 at the latest.

Principle 2: Case studies will exemplify different 'types' of opportunity (such as infrastructure, customer experience, freight, skills, rolling stock, policy innovation, planning or financing) and ideally they will be considered innovative. They might involve 'unlocking' something which has stalled or is not yet at the decision-making stage. They must however involve something tangible, and cannot be 'pure policy' even if they have strong policy dimensions.

Principle 3: Case studies will involve different transport modes and ideally multi-modal opportunities delivering 'end-to-end' benefits.

Principle 4: Case studies will cover diverse spatial scales with a preference for projects that either physically cross LTA/LEP boundaries or bring obvious wider regional benefits. We will avoid simply local schemes unless they have far-reaching benefits or have clear policy implications or set useful precedents.

Principle 5: Case studies will demonstrate long-term social and environmental benefits, ideally demonstrating 'net environmental gain' rather than simply protection and demand reduction on the most polluting forms of transport.

Principle 6: Finance and funding issues will be considered for all case studies, in order to demonstrate their financial benefits and sustainability with an emphasis on innovative funding models and spend-to-save approaches.

These principles enabled us to draw up a longlist of potential 'quick wins' which we then narrowed down in consultation with TfN, local authorities and local campaigners. The six quick wins below are examples of the kinds of projects that TfN and local transport authorities should prioritise. These are not the only potential quick wins, but they are all strong candidates that meet the above criteria and show what the North can do to improve its transport network in the near future. These are not presented in priority order.

3. SIX QUICK WINS FOR THE NORTH

1. REOPENING OF THE ASHINGTON BLYTH AND TYNE RAILWAY FOR PASSENGER SERVICES

Context

North of Newcastle, and along the North East coast, there is an area with great potential but numerous challenges. This area contains several small and medium-sized towns: Blyth (population 37,000) and Ashington (population 28,000) are the largest (Centre for Towns 2017). The public sector dominates in terms of employment (education, health and public administration provide one-quarter of jobs), and the areas' private sector is largely in the 'everyday economy' of retail (5,900 jobs) and food and beverage services (4,130 jobs) (ONS 2018c). The Port of Blyth handles 2 million tonnes of freight each year, and there are some significant development sites for renewable energy in the area (Port of Blyth 2018).

The history of the area is a vital consideration for its transport infrastructure. The area boomed during the industrial revolution as coal mining and port towns grew – Ashington was once considered the world's largest coal-mining village (Whitfield 2018). The Ashington-Blyth and Tyne railway line once connected a number of Northumberland settlements between Ashington and Newcastle – it was not a single route, but a small network, built in 1840 to link the collieries to the River Tyne, and was opened up to passengers in 1841 (NCC 2015). But in 1964, passenger services were withdrawn under the 'Beeching Axe',² although it has remained open for freight.

The intervention

The South East Northumberland Rail User Group (SENUG) has campaigned since 2004 for the re-introduction of passenger services. In 2009, the Association of Train Operating Companies (ATOC, now the Rail Delivery Group) published a £34 million proposal to reopen the line (ATOC 2009). The route is presented in figure 3.1, alongside local settlements and economic development plans.

The Ashington Blyth and Tyne line (now referred to as the Northumberland line) is currently operational to freight, thus minimising the need for additional work. The reopening of the line would see passenger services running from Newcastle to Ashington with intermediate stations in between the two. It would have the following features:

- stations at Manors, Northumberland Park (Metro connection), Seaton Delaval, Newsham for Blyth, Bebside, and Bedlington
- a potential interchange with Tyne and Wear Metro at Northumberland park, Manors and Newcastle Central station
- an interchange with Metro at Northumberland Park

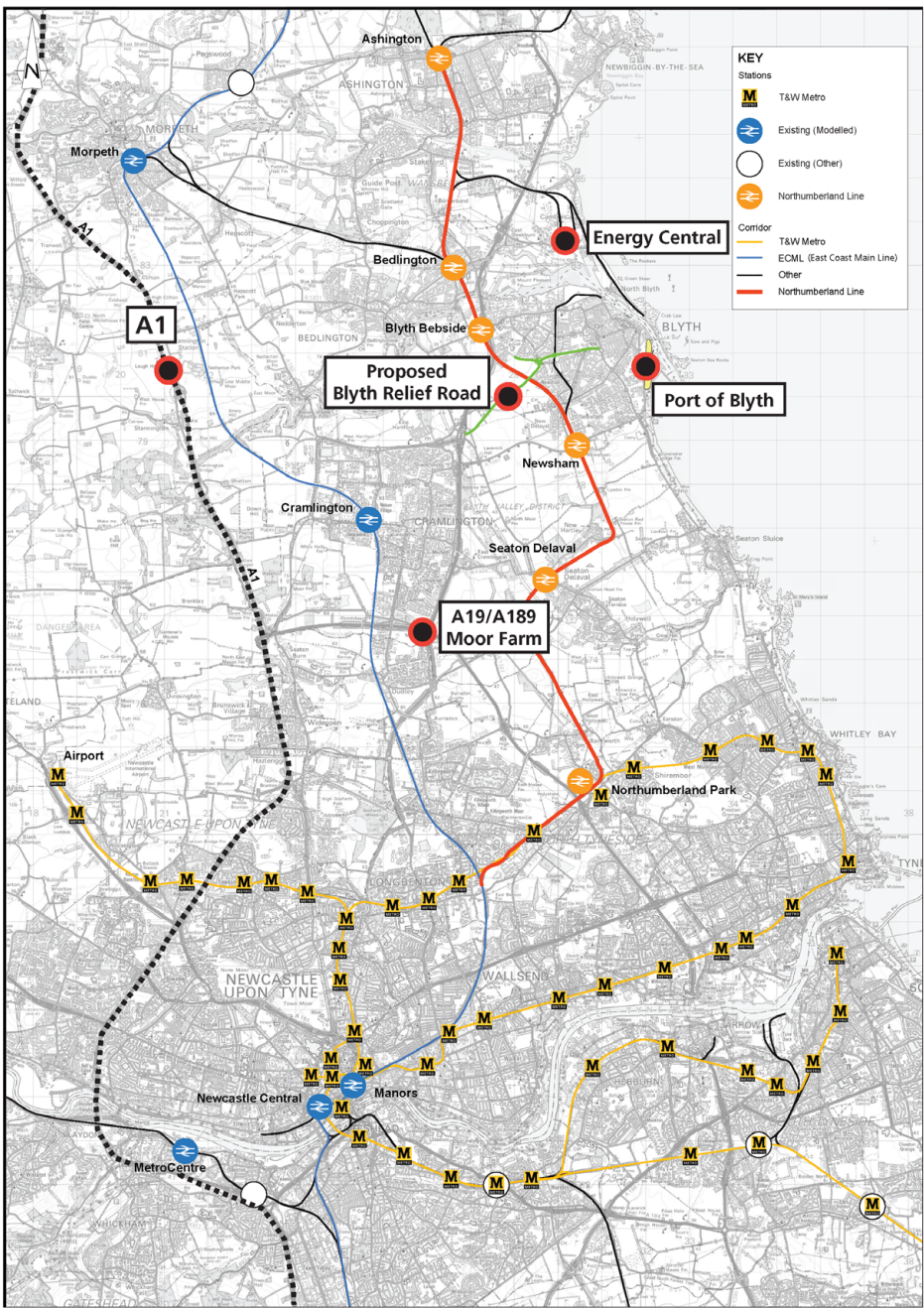
² This refers to the major railway line closures that followed the Beeching Report, *The Reshaping of British Railways*, published in 1973.

- shared technology with Metro, such as CCTV, info systems and ticketing
- refurbished or new stations, with safe, secure, high quality passenger facilities (NCC 2015).

Network Rail initially estimated that this would cost £191 million – far more than the £34 million estimated in 2009 – but subsequent cost challenge exercises are looking to reduce this cost significantly.

FIGURE 3.1: THE PROPOSED ROUTE WOULD JOIN UP A NUMBER OF POPULATION CENTRES AND LINKS IN TO WIDER DEVELOPMENTS

Proposed Ashington Blyth and Tyne route



Source: NCC 2019

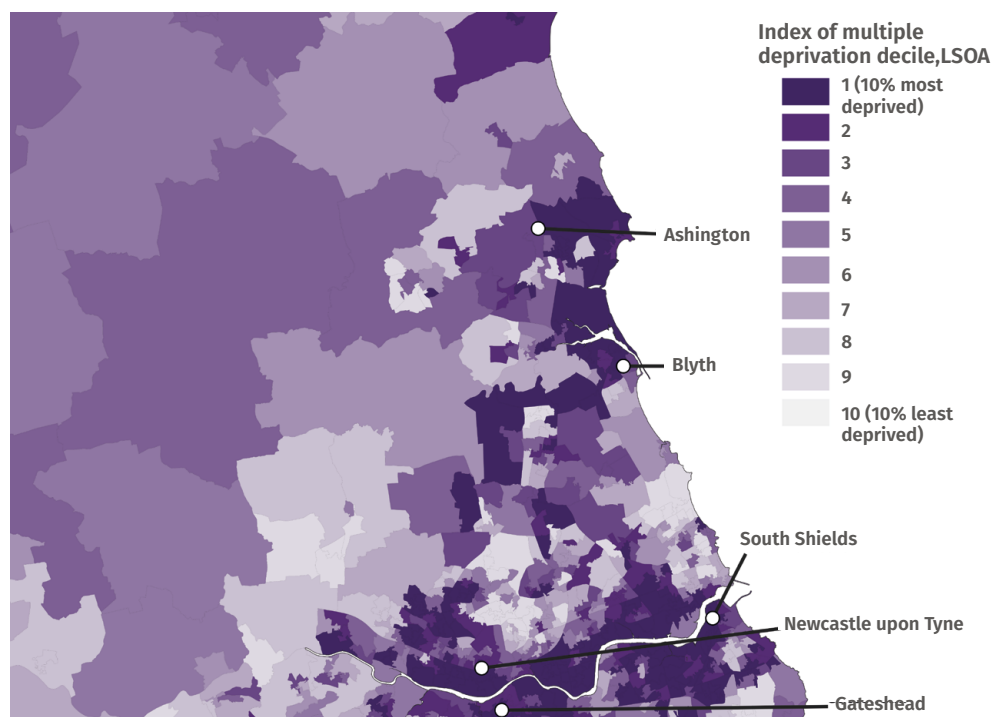
Rationale and wider impact

There are likely to be significant wider benefits to re-opening this line. Northumberland Council has estimated that it would boost the economy by £70 million a year, and carry in excess of 800,000 annual return journeys by 2038. It could also improve job and educational opportunities in both directions – many neighbourhoods along or near the line experience severe deprivation, as figure 3.2 shows. This new line could help to connect these people with job opportunities and public services in the wider region – especially in Newcastle. But it could also boost tourism as people travel outward from the city, and it could form part of a longer alternative freight route from Benton Junction to Butterwell Junction, thereby providing the opportunity to increase freight capacity between Teesside, Tyneside and Scotland (SENUG 2018).

This intervention also sits within the geography of two of Transport for the North's SDCs and could potentially support their broader objectives. First, it could complement the 'East Coast to Scotland' SDC by enabling this cluster of towns – currently quite deprived and disconnected even from Newcastle – to have access to a far broader geography for work and leisure. Second, it could support the 'Connecting the North's energy coasts' SDC, because, by connecting the local area's economy together more efficiently, it could help already-thriving and emerging energy industries around the Port of Blyth to thrive.

More generally, it also aligns closely with Transport for the North's stated desire to drive 'inclusive' growth, given the socio-economic characteristics of the area.

FIGURE 3.2: SOUTH-EAST NORTHUMBERLAND HAS MANY AREAS OF HIGH DEPRIVATION
Index of multiple deprivation (IMD) by lower layer super output area (2015)



Source: DCLG 2015; Contains National Statistics data © Crown copyright and database right 2016. Contains OS data © Crown copyright and database right 2016.

Current status, obstacles and constraints

This scheme is under consideration and has drawn support from many quarters. Northumberland County Council is promoting the scheme and are moving it through Network Rail's processes. The transport secretary Chris Grayling has supported the re-opening of the line and it features in the government's rail strategy as worth further consideration (DfT 2017).

Network Rail has reportedly been a drag on progress with this scheme. They have included in the cost calculations upgrades that they would have to make anyway, and the delay has meant costs have spiralled. This has prompted a discussion of other options, such as 'open access' whereby train operators take on responsibility for the infrastructure on the line; the government is considering whether train operators could have a role in managing the infrastructure in place of Network Rail (Walker 2017).

Northumberland County Council are currently driving this scheme forward via the 'governance for railway investment projects' (GRIP) process and RNEP (Rail Network Enhancements Pipeline). It is currently at GRIP 3 – this means that options are being developed, before being selected at GRIP 4, designed during GRIP 5 and constructed, tested and commissioned at GRIP 6.³ The intention is to have the line reopened by 2022.

2. LEEDS BRADFORD AIRPORT PARKWAY RAIL STATION

Context

Leeds City Region is the largest of the North's local enterprise partnership (LEP) areas. It is home to 3 million people and has an economy worth £68.5 billion (4 per cent of the total UK economy) (ONS 2018a). It is a diverse and thriving city region that sits geographically toward the centre of the North, and is an important centre for professional services, medtech and digital (Cox et al 2016).

Leeds Bradford airport is a relatively small airport serving 4 million passengers per year (LBA 2018). It has direct services to destinations such as New York, and connects via hub airports such as Heathrow and Schiphol to a wider range of destinations. It has an estimated total 'net economic footprint' of £107 million of GVA in the Leeds City Region, and £200 million through increased productivity associated with business connectivity (York Aviation 2015). It is also more geographically-focused than Manchester Airport – two-thirds of passengers are from the Leeds City Region area, and it only captures 32 per cent of Yorkshire and the Humber's short-haul passengers, and 4 per cent of long-haul passengers (LBA 2017).

Surface access is one of the airport's key priorities, and access via sustainable transport modes is particularly important (LBA 2017). The airport has the second highest share of people using private car of any major airport, at 62.6 per cent (CAA 2017). There is no direct access to the airport by rail and only 3.1 per cent of people use rail to access the airport (ibid).

The intervention

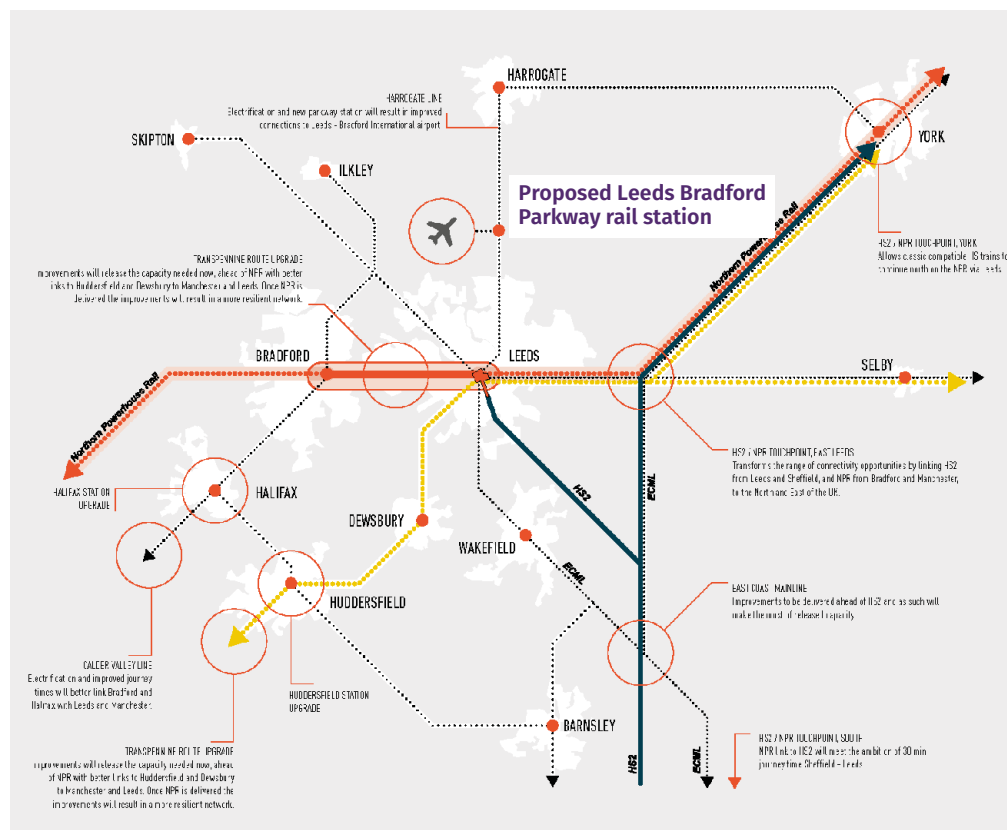
The Department for Transport has granted Leeds City Council and West Yorkshire Combined Authority (WYCA) £173.5 million to improve the local transport network, and Leeds Bradford Parkway train station is one of the investments they propose. This is a proposed train station near Leeds Bradford airport which would connect via a shuttle bus to the airport itself, and would act as a park-and-ride facility in both directions to other destinations on the railway line. Figure 3.3 shows the

3 GRIP 7 and GRIP 8 see the project 'handed back' and 'closed out'.

location of the proposed development: on the Harrogate Line, a 1.3 kilometre drive from the airport, between Horsforth rail station and Bramhope Tunnel southern portal (WYCA 2017). This proposal is included in the airport’s development plans as a medium-term priority (before 2024), and was included in the independent report produced by Transport for the North on airport connectivity (LBA 2017; IIC 2017).

FIGURE 3.3: THE PROPOSED STATION IS STRATEGICALLY LOCATED IN THE CURRENT AND FUTURE NORTHERN TRANSPORT NETWORK

West Yorkshire Combined Authority’s public transport priorities



Source: Leeds City Council 2017

Rationale and wider impact

Other options have been investigated, but the WYCA supports this particular scheme for several reasons:

1. low cost: at £23 million, this option is considerably cheaper than alternatives, and its farebox contribution to net costs is much better than alternatives
2. operationally efficient: it integrates with current rail and bus services
3. faster journey times: alternative modes are slower
4. wider regional connectivity and economic impact: it will connect the airport to many of the conurbations within Leeds City Region and beyond, and integrate well with HS2 serving an estimated 800,000 people – twice as many passengers as the airport alone (Leving and Dunsby 2017; Blake et al 2017).

Other options, such as a new tram-train or a new railway station at the airport, were rejected because they were found to be too expensive or complex, and could take up to 10 years (Blake et al 2017).

Geographically, this intervention sits within Transport for the North's 'Central Pennines' strategic development corridor. A rail link could connect the airport to passengers and businesses in Leeds and Hull to the east, and Warrington and Blackpool to the west.

Current status, obstacles and constraints

Stakeholder involvement has reportedly been very positive. Local stakeholders have been involved throughout the development of the project, including Leeds City Council, Leeds Bradford Airport, Northern, and Rail North. There has also been liaison with North Yorkshire County Council and Harrogate Borough Council. Network Rail has reportedly been engaging positively with the process.

Design options are currently being developed in partnership by the WYCA and Leeds City Council working in partnership with AMP (Blake et al 2017). They are progressing through outline design and working towards outline business case approval in Q1 of 2019/20. Beyond that, timescales are to be determined and depend on approvals and funding. The proposals went out to consultation in February 2019.⁴

As with any such project, there are obstacles and risks. In order to proceed, the project will require land assembly (it will require third-party land) and it is within the green belt and – although it doesn't conflict with the true purpose of the green belt (preventing urban sprawl) – special circumstances will need to be proven for the planning application to succeed. In its surface access strategy, the airport identifies cost, time and risk of delivering new infrastructure schemes (LBA 2017).

3. SUPPORTING THE DEVELOPMENT OF HYDROGEN TRAINS

Context

Our current transport systems are responsible for a great deal of emissions that are extremely damaging to people's health and the environment. Transport is a major contributor to CO₂ emissions – in the UK, transport contributes 128 million tonnes of CO₂ each year – 35.8 per cent of total UK emissions (BEIS 2018). Diesel trains emit CO₂, and the UK is currently unlikely to meet the target of an 80 per cent reduction of greenhouse gas emissions by 2050, which it signed up to as part of the Paris Agreement (CCC 2017). Transport emissions also contribute to poor health: in the North, an estimated 7,200 deaths each year are attributable to anthropogenic particulate matter (PM10 and PM2.5). While rail isn't the biggest contributor to overall emissions, railway stations with diesel trains are known to be a particularly high-risk area (Chong et al 2015).

The government has pledged to remove diesel-only trains from our railways by 2040. While many railway lines and most trains are already electrified, a third of all trains are still diesel. Many of these are in the north of England and will be for the foreseeable future: the new franchises included requirements to phase out older trains (notably the notorious 'Pacer' trains)⁵ but because of limited electrification a large self-powered train fleet will still be required.

The government's reluctance to electrify lines has prompted a search for alternatives. The government has cancelled electrification on the Windermere branch line and the Midland Mainline (which connects Sheffield with the midlands). Despite long-standing plans, and successive promises, the TransPennine line has yet to be electrified and this has been repeatedly delayed. While electrification remains by far the best option

⁴ See: <https://www.yourvoice.westyorks-ca.gov.uk/parkway>

⁵ These are trains based on buses, which were rolled out as a temporary measure in the 1970s. See: <https://www.railmagazine.com/news/rail-features/pacers-the-unlikely-local-heroes-2>

for busy inter-city routes such as TransPennine, some of the other non-electrified routes could benefit from alternatives which are currently in development – such as hydrogen.

The intervention

Transport for the North plans to work toward the roll-out of hydrogen trains. In their STP, TfN states that they will: “work together to encourage vehicle retrofit, the roll-out of hydrogen vehicles and the implementation of a network of low carbon fuelling stations across the North, as part of a long-term sustainable solution” (TFN 2019).

Hydrogen is either produced from steam reforming of natural gas (which produces greenhouse gases, albeit at a lower level than diesel) or by electrolysis of water (so-called ‘green hydrogen’) (Butterworth 2018). This hydrogen can then either be burned to power an internal combustion engine, or it can be reacted with oxygen to run electric motors (ibid).

Hydrogen trains could soon be rolled-out on our railways. Hydrogen is already used to fuel buses in many UK cities including London and Aberdeen, and hydrogen trains are already being used in some parts of the world:

- **2006:** the East Japan Railway Company developed a ‘Hydrail’ hybrid in 2006 which was powered by two 95kW fuel cells
- **2010:** the US Army Corps of Engineers plus BNSF (a US freight network operator) and Vehicle Projects Inc unveiled a hydrogen-powered locomotive which used a 240kW fuel cell
- **2012:** the Republic of South Africa developed five 17kW mine locomotives in 2012
- **2013:** the South West Jaitong University in China ran a 150kW locomotive
- **2015:** 200kW hydrogen fuelled trams began operating in Qingdao, China (Butterworth 2018)
- **2018:** Alstom rolled out Coradia iLint trains into passenger service in lower Saxony and are planning to demonstrate the fleet to other regions in Germany (also below) (Alstom 2018).

Rationale and wider impact

There are numerous environmental and public health advantages of hydrogen compared with diesel trains. Hydrogen-powered trains will be far better for public health as they emit no pollution in train stations, and if green hydrogen is used then they could be far more environmentally friendly too.

The North is also particularly well placed to benefit from the economic regeneration, as well as the train services and public health benefits that hydrogen could bring.

- Teesside already produces half of the UK’s hydrogen, and has salt caverns in which it can be stored. Tees Valley mayor Ben Houchen has sought to capitalise on the region’s infrastructure to roll out hydrogen road vehicles – including cars, vans and refuse collection vehicles, and discussions are ongoing on the potential for hydrogen trials by Northern in the Tees Valley, possibly in the next three to four years. This would introduce alternative fuels onto the passenger network in the north of England for the first time. The Tees Valley region has received £1.3 million from central government after submitting a bid to the government’s Office for Low Emission Vehicles (OLEV) in order to develop this capacity (TVCA 2018a; McNeal 2019). In a report produced for the Tees Valley combined authority (TVCA), KPMG suggested that

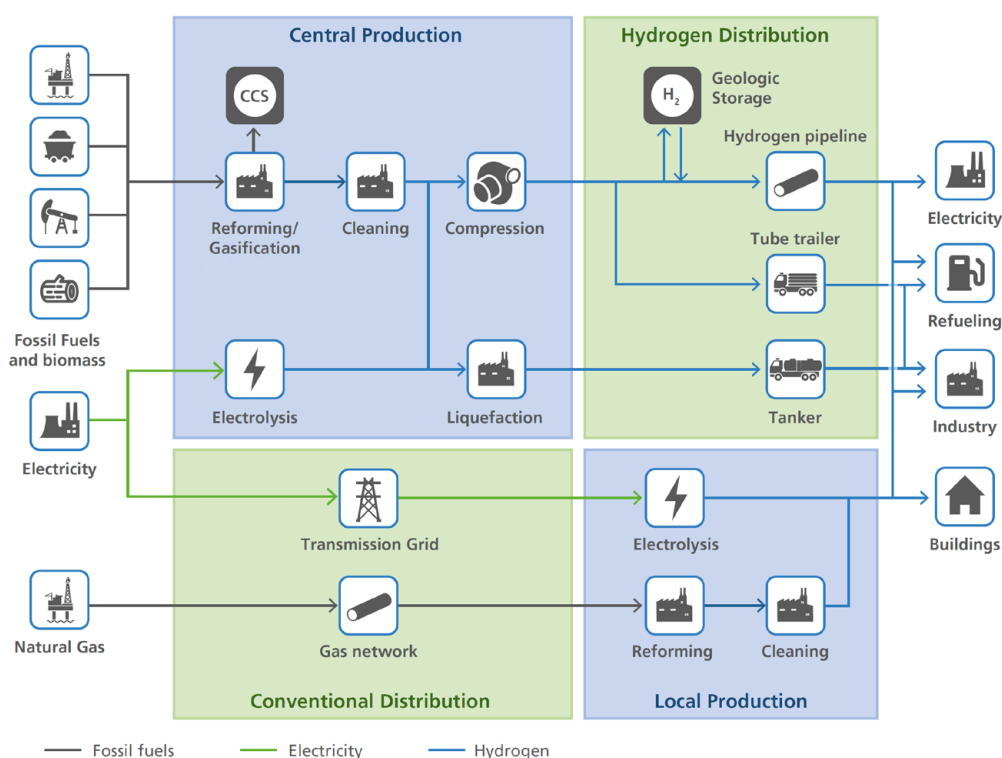
exploiting hydrogen economy opportunities could provide a significant boost to jobs and economic growth in the Tees Valley economy (TVCA 2018a).

- The North West also has significant assets in hydrogen. Ellesmere Port refineries produce hydrogen as a by-product of their industrial processes. Alstom are working with Liverpool City Region to investigate the possibility of reusing this hydrogen, and will base this project in Widnes (Wiseman 2019). In 2017, they opened their Transport Technology Centre in Widnes, including R&D, engineering and manufacturing facilities (ibid). Liverpool City Region is keen to pilot hydrogen-powered trains, potentially on the Liverpool–Chester line via the Halton chord (C&W LEP 2018). The North West’s hydrogen industry leaders have stated that the region has got the skills, assets, infrastructure and industry to create a productive hydrogen economy (Begum 2018).

This intervention links in to Transport for the North’s overarching objectives to provide sustainable and efficient transport across the North (TfN 2019). It also links to the North’s energy capability – one of the prime sectors that TfN is seeking to support with its programme of transport infrastructure – because it integrates with hydrogen generation and potentially renewable energy generation on each of the coasts, and in Tees Valley and Merseyside especially. Hydrogen trains would be part of a wider economy and ecosystem of production and distribution, which is illustrated in figure 3.4.

FIGURE 3.4: HYDROGEN DELIVERY PATHWAYS ARE DIVERSE AND INTERCONNECTED

Simplified diagram of hydrogen delivery pathways



Source: Staffell et al 2017

Current status, obstacles and constraints

There is now significant momentum behind hydrogen trains in the UK. A small locomotive was developed by the University of Birmingham in 2012 to demonstrate the technology. A commercial option is now being posited by Alstom, who have Coradia iLint trains in service in Lower Saxony and are already demonstrating the fleet to other regions in Germany. It has already been ordered by a local transport authority in Lower Saxony to replace the diesel trains operating on the Weser-Elbe network from 2021 (Butterworth 2018). Recent studies have demonstrated the feasibility of retrofitting hydrogen fuel cell technology to existing rolling stock (Barker 2017, Alstom 2018).

The government appears to be strongly supportive of the idea. The transport secretary Chris Grayling said: “I want the first hydrogen train to operate on our rail network within a short period of time” (Rail 2018). And, in early 2019, rail minister Andrew Jones said: “hydrogen train technology is an exciting innovation which has the potential to transform our railway, making journeys cleaner and greener by cutting CO₂ emissions even further” (Wiseman 2019).

There are constraints and obstacles, as set out below.

- **Logistical:** Issues include where to source and how to supply and store the hydrogen, how to refuel trains and how to modify or retrofit existing stock (although this has now been demonstrated).
- **Technological:** The technology is in development and performance issues are as yet unknown. The Rail Freight Group has stated that the technology is “at best unproven” for heavy duty freight.
- **Economic/financial:** The cost ratios are thought to be similar to overhead electrification, but the price of electricity does vary and can be quite expensive.

Hydrogen is no panacea for the North’s transport network, but with further development it could play an important part in the region’s future transport connectivity. Government ministers have often presented hydrogen as an alternative to electrification, but this is overstressing its potential. Like battery-powered trains, hydrogen trains suffer from inefficiency due to their low energy density, making it unsuitable for high-speed or freight – and, unlike battery trains, hydrogen can’t be recharged in transit when combined with diesel in a bi-mode train (Shirres 2018). Most importantly, electrification maintains its economic advantage over hydrogen for busy inter-city routes due to the frequency of trains (most notably between Leeds and Manchester).

However, there is clearly great potential for hydrogen trains to form part of the mix of the North’s transport network as an alternative to diesel alongside electrification. Hydrogen may be a good option for certain regional routes – it does have notable advantages over electrification in terms of the infrastructure required, and the total costs can be comparable (Butterworth 2018).

4. TEES VALLEY RAIL INTERVENTIONS

Context

The Tees Valley⁶ is a relatively small but strategically important economy. Its economic output is £12.9 billion and it is home to 666,000 people, but it has a wider economic hinterland which also covers large parts of County Durham and North Yorkshire (ONS 2018a; ONS 2018b). It has a distinctive and important

⁶ The Tees Valley comprises the local authorities of Darlington, Hartlepool, Middlesbrough, Redcar and Cleveland and Stockton-on-Tees.

economic base in oil and gas, advanced manufacturing, automotive and subsea, and in Teesport it contains one of the North's vital infrastructure assets (TVU 2016).

The Tees Valley is currently in the process of major transition. The area's Strategic Economic Plan was produced by the TVCA and sets out how 25,000 new jobs and 22,000 new homes will be created in the region. This builds on expertise in existing sectors, as well as moving to more viable and environmentally-friendly industries that capitalise on the area's unique geography and infrastructure. Local policymakers are focusing on low-carbon industries and renewables as industries of the future, as well as growing new industries where a reputation for excellence is being established, such as in the creative sector.

Transport is central to helping deliver the Strategic Economic Plan and the rail network in the Tees Valley plays a particularly important role. Tees Valley sits at an important location for both passenger and freight services which link the main centres of economic activity, reduce road congestion, and provide crucial connectivity to other parts of the country – especially to the rest of the North. Freight movements by rail in the Tees Valley continue to increase: growth in container traffic into and out of Teesport has increased by an average of 7 per cent per annum over the last five years, and approvals and funding are already in place for a 'Northern Gateway' container terminal expansion at Teesport (PD Ports 2017). The future development of the South Tees mayoral development site is also likely to add significantly to the growth potential for freight in the Tees Valley. Durham Tees Valley airport also has a role in transporting freight as well as passengers, and TVCA recently purchased a majority share in this airport.

The interventions

The rail network is clearly vital for the Tees Valley economy, but there are significant constraints that are preventing this network from reaching its full potential. The East Coast Mainline (ECML) north of York and, in particular, north of Northallerton, is now at or very close to capacity and train operators are struggling to deliver franchise commitments as a direct result. These short-term capacity concerns were clearly highlighted by Network Rail in its ECML route study, which was published for consultation in December 2017:

“Assuming today's infrastructure, no increases in the number of services would be possible on this section of railway. Changes to service levels would have to be made using trade-offs between trains in different service sectors, and/or by adjusting stopping patterns and the destinations served.”

Network Rail 2017

Three separate interventions could dramatically improve the way railways operate in the Tees Valley.

1. Darlington station upgrade

Darlington station currently has a number of constraints. These include: a lack of capacity on mainline and local passenger services, a lack of capacity on some southbound freight services, a lack of high-quality station facilities, and a lack of integration with Darlington Town Centre and the Central Park enterprise zone adjacent to the station.

In order to tackle these constraints, a masterplan has been developed to remodel and upgrade Darlington Station. The proposals will provide: additional platform and track capacity to overcome the existing operational constraints, a significantly enhanced station building including improved retail and commercial opportunities, and much-improved accessibility and integration. A new station building will be constructed on the east side of

the station, which will link to the existing building by a new, fully accessible purpose-built footbridge. Car parking and public transport interchange facilities will also be improved, as will the approaches to the station and the wider public realm. Crucially, these improvements will deliver the required infrastructure improvements to integrate Darlington into Northern Powerhouse Rail (NPR) and HS2. The early indication is that this will cost in excess of £100 million (TVCA 2018b).

2. Middlesbrough station upgrade

Middlesbrough Station is facing several challenges. These include: a lack of platform capacity and operational flexibility for current service levels, compounded by the longer trains and additional services that are planned; a lack of integration with other modes of transport; a lack of integration with Middlesbrough town centre and with the growing Middlehaven enterprise zone site immediately adjacent on the north side of the station; and ongoing issues with the condition of the station building façade, car park and entrance, currently subject of a Network Rail renewals project.

A masterplan has also been produced for Middlesbrough Station, with the intention of developing a single solution for the station that will resolve all the issues outlined above. This will ensure that facilities and infrastructure at the station are adequate for such a major rail gateway, and that it can adequately cater for the planned increase in the number of services and passengers using the station. Crucially, it will also ensure improved integration between rail and other modes and better links between the station and the town centre to the south and the Middlehaven enterprise zone to the north. The total cost of the project will be revealed when the strategic outline business case is published.

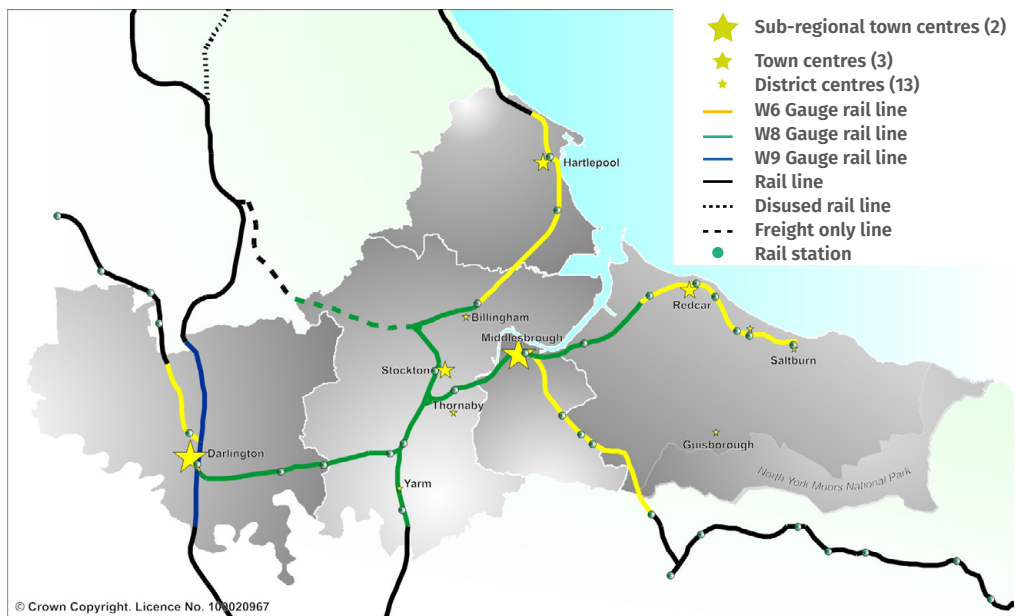
3. Teesport to Northallerton gauge clearance

Rail 'gauge clearance' in the Tees Valley is a major obstacle to improved freight connectivity. These constraints are presented in figure 3.5 – this shows how many of the railway lines in the area don't have the right gauge clearance (W12 is regarded as being preferable for freight). Currently, all container traffic from Teesport to or from the South, the Midlands, Yorkshire and the North West has to make a reversing manoeuvre at Darlington because the alternative route doesn't have the correct gauge clearance and associated electrification.

A major upgrade of the rail line between Northallerton and Teesport is proposed so that it can be used more effectively by both freight and passenger trains. A key element of this is the provision of W12 gauge clearance of the line, as a precursor to electrification of the route. This will support the ongoing development of Teesport by allowing the largest containers to be transported by rail along the most efficient routes. The provision of W12 clearance on this route, as well as on the Stillington line, will also help to alleviate capacity issues at Darlington by removing the need for significant freight movements to pass through the station, thus further boosting the business case for the Darlington Station scheme.

FIGURE 3.5: TEES VALLEY'S RAIL INFRASTRUCTURE IS OUT OF DATE

Tees Valley rail network and gauge clearance



Source: Tees Valley Unlimited 2011

Rationale and wider impact

The wider impact of these schemes is particularly important. As already highlighted, Teesport is a vital asset for the North, and for the country as a whole. The TfN freight strategy recognises that links both north and south from the Tees Valley are a major gap in the freight network, and alongside gauge clearance across the Pennines, filling these gaps is a major priority for the north of England (TFN 2018; Laybourn-Langton et al 2016). The economic links between the Tees Valley with Leeds City Region and Greater Manchester are particularly important to the economic vitality of the area. There are especially strong economic, social and cultural links between Tees Valley and Leeds, and the link to Manchester Airport is critical as it is currently the only direct link between Tees Valley and one of the country's major international airports.

These interventions are very closely linked, so there would be particular benefit in terms of economies of scale if they were delivered as a whole package. The enhanced infrastructure will clearly bring benefits for the Tees Valley but also for the wider North as all passenger and freight routes that benefit are of pan-northern or national significance.

Current status, obstacles and constraints

These three interventions are under development but at slightly different stages.

1. Darlington station upgrade

- A strategic outline business case (SOBC) for this scheme has been submitted to the DfT, and an outline business case (OBC) will be produced over the next year.
- The target date for scheme opening is 2025, which will coincide with the start of the next Northern franchise and offers the possibility of alignment.

- Elements of the scheme could be delivered earlier so the TVCA has committed local funding towards delivery of the scheme over the next four years.
- The remaining challenge is to secure all the necessary remaining funding and positioning the scheme in the national rail investment programme.

2. Middlesbrough station upgrade

- An SOBC for this scheme will be produced by March 2019.
- The immediate challenge is to ensure the station infrastructure can accommodate franchise enhancements: the new, longer First TransPennine trains (December 2019), and the new East Coast service between Middlesbrough and London Kings Cross (2021), as well as further local improvements beyond this that TVCA want to see delivered.
- The TVCA has also committed a significant amount of local funding towards delivery of this scheme over the next four years.
- As with the proposed improvements to Darlington station, the remaining challenge is to secure the remaining funding as quickly as possible in the national rail investment programme.

3. Teesport to Northallerton gauge clearance

- A GRIP3 study has now commenced, undertaken by Network Rail and jointly funded by them and TVCA. This will develop engineering solutions and robust estimates and a programme for the GRIP 4–8 stages.
- The challenge is now to ensure that the scheme obtains the full funding and is delivered as soon as possible.
- It is understood that gauge clearance of the route could be delivered relatively quickly as there are only a limited number of structures affected.

While there is clear merit in delivering these as a Tees Valley package, the on-going uncertainty around scheme delivery and general governance/structures/processes within the rail industry and the impact this may have on available funding is of concern to TVCA. Various high-profile reviews are underway looking to address this but at present a large degree of uncertainty remains.

5. INTEGRATION OF TRAFFIC MANAGEMENT TO IMPROVE AIR QUALITY

Context

Air quality is a major health problem across the world – especially in major cities. Vehicle emissions are the major contributor to this problem – particulate matter and nitrogen oxides cause numerous health problems, including asthma and lung cancer. Road transport accounts for at least 50 per cent of these emissions – and this is likely to be an underestimate (Cox and Goggins 2018). Clearly the *volume* of traffic is the principal cause, but so is the ‘stop/start’ of traffic flows, which tends to further increase emissions (O’Brien et al 2014). Exhaust fumes aren’t the only source – 60 per cent of particulate matter emissions come from the tyres and brakes (Cox and Goggins 2018).

The government has been required to act on air quality. The government has identified areas where NO₂ emissions are above legal limits and where urgent action is required by EU law. Each of these places has been required to draw up a plan, but outside of London places don’t have the powers, strategies or capacity to do so.

Greater Manchester has some of the worst air quality in the country, and needs to act to resolve it. Policymakers have tended to focus on London – both due to its prominence as the capital, and because the evidence base has historically been better developed. But parts of the North have far worse air quality problems than London – Salford and Manchester are especially hazardous (Cox and Goggins 2018).

Recent IPPR North research drew on King’s College London (KCL) analysis to estimate the impact of poor air quality on Greater Manchester. As table 3.1 shows, this research estimated that:

- poor air quality will cost Greater Manchester 1.6 million life years in the coming century
- air pollution is costing between £1 billion and £1.2 billion per year (Cox and Goggins 2018).

TABLE 3.1: LIFE YEARS LOST AND ECONOMIC COST OF EMISSIONS IN GREATER MANCHESTER

	PM _{2.5}			NO ₂		
	Life years lost	Estimated economic impact		Life years lost	Estimated economic impact	
	Central	Lower	Upper	Central	Lower	Upper
Bolton	162,938	£71,629,372	£119,293,195	90,488	£40,915,722	£68,141,979
Bury	101,506	£45,017,051	£74,972,427	60,037	£27,421,362	£45,668,163
Manchester	368,816	£155,796,302	£259,466,727	243,068	£105,043,816	£174,942,375
Oldham	135,801	£59,284,381	£98,733,565	81,491	£36,486,809	£60,765,966
Rochdale	122,354	£53,988,953	£89,914,438	69,811	£31,672,210	£52,747,624
Salford	160,086	£69,247,961	£115,327,139	103,194	£45,957,433	£76,538,560
Stockport	148,290	£66,790,243	£111,233,999	90,573	£41,918,527	£69,812,074
Tameside	130,292	£57,856,692	£96,355,859	78,990	£35,991,016	£59,940,262
Trafford	121,221	£53,842,802	£89,671,035	72,932	£33,339,469	£55,524,315
Wigan	186,743	£83,775,621	£139,521,836	90,935	£42,009,734	£69,963,972
GM	1,638,047	£717,229,378	£1,194,490,220	981,519	£440,756,097	£734,045,290

Source: Dajnak et al 2018; Cox and Goggins 2018

The intervention

One innovative way to bring down emissions is to manage traffic more effectively using new technologies. TfGM’s highways department are currently trialling interventions at signalised junctions that would improve air quality. These could be rolled out further in the following ways.

- Freight priority schemes: for example, prioritising HGVs at junctions in order to reduce their braking and accelerating, and thus reduce emissions.
- Bus or cycle priority at signals to encourage use of public transport or sustainable travel (the Beelines system of cycling and walking routes, for example).
- Changing signal timings to reduce congestion at junctions most populated with pedestrian traffic, to lessen the public exposure to poor air quality.
- Using variable message signs (VMS), websites or social media to inform and encourage the public to make alternative travel plans if air quality is poor at certain junctions.

The next step will be to automate the implementation of these air quality interventions in a live operational environment. TfGM plan to utilise their advanced traffic management (AToM) system to do so: this would use data on air quality and traffic from Highways England, TfGM and the Manchester

University Meteorological Observatory to create strategies that intervene in traffic management based on the data. This approach is at the early stages of development and it has yet to be fully costed or scaled up, but it is potentially a highly efficient way of reducing emissions.

Once this is fully operational in Greater Manchester, TfN could support the adoption of such schemes in other parts of the North too. It is important to note that these interventions won't resolve the North's severe air quality problems on their own, but could form a part of the wider toolkit that authorities in the North use – a toolkit which would include low emissions zones, workplace parking levies and congestion charges for example.

Rationale and wider impact

These interventions clearly align with the objective to improve air quality in Greater Manchester. As part of the GM Air Quality Action Plan, these schemes could help improve air quality across the region while supporting sustainable economic growth. TfGM aims to reduce emissions by focusing on two key performance indicators (KPIs):

1. **reducing traffic:** for example, by encouraging travellers to switch from cars to use public transport, cycle and walk more
2. **increasing efficiency:** improving traffic flow by reducing congestion and stop-start travel to decrease air pollution peaks and to lower emissions overall (TfGM 2019).

But they also align with pan-northern objectives, and the pilot could be upscaled or transferred to other northern cities. One of TfN's objectives is sustainability: "reducing emissions and impacts from air quality and carbon from transport; making best use of existing transport infrastructure before investing in new capacity" (ibid). The strategic transport plan also commits to "support the UK in meeting commitments under the Climate Change Act 2008 by collaborating with partners and stakeholders to deliver a low-carbon northern transport network, including a zero-carbon public transport network, by 2050" (ibid). As figure 3.6 shows, many of the North's major cities have air quality problems that are among the most severe in the country.

Current status, obstacles and constraints

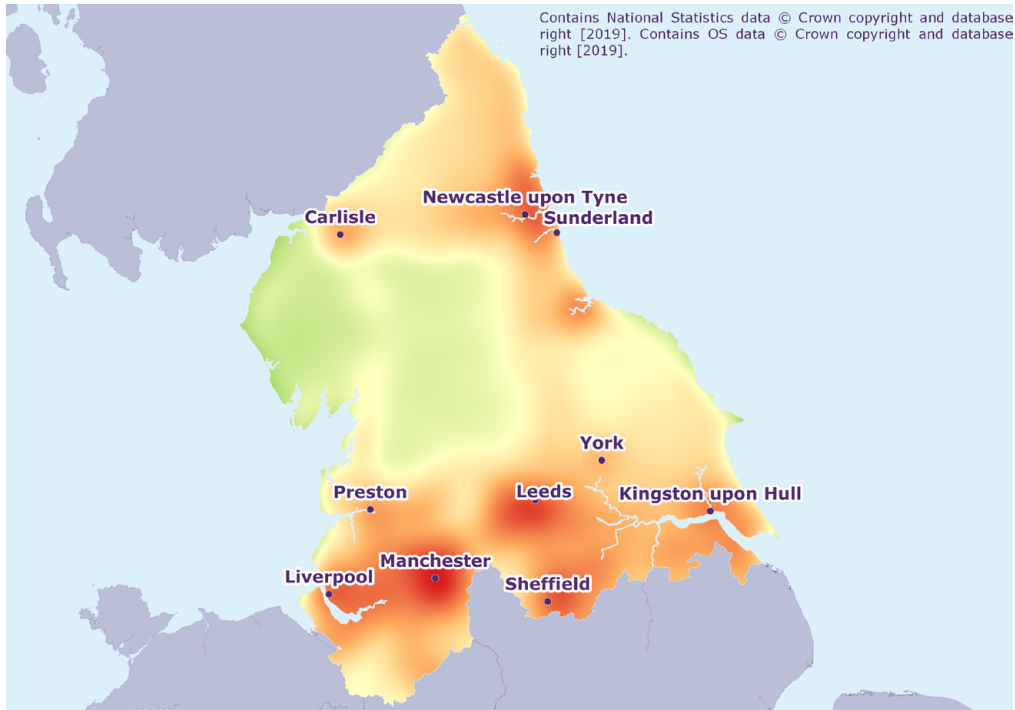
These interventions are currently at their preliminary stages. First, the status of air quality before the scheme was assessed prior to the intervention. At the time of publication, the air quality sensors have been in place for several months, and the freight priority scheme is being implemented, after which there will be a period of monitoring before a final report is produced. Elsewhere, TfGM continues to change signal timings in order to relieve congestion but are yet to do so to improve air quality in real time.

The wider push towards improving air quality in Greater Manchester has made significant recent progress. In 2019 the Greater Manchester Combined Authority set out a Clean Air Plan, which proposed a low emission zone for buses, taxis and goods vehicles.⁷ TfGM's 2040 strategy aims to increase public transport use with new 'tram-train' proposals and bus reform and there are plans to invest in the 'Beelines' – a network of cycle lanes that are integrated across the city region. Real-time emission monitoring isn't yet integrated with these wider initiatives, but, following these trials, there is the potential to roll out such schemes more widely in Greater Manchester and across the North.

7 See: <https://cleanairgm.com/clean-air-plan>

FIGURE 3.6: MANY NORTHERN CITIES HAVE SEVERE PROBLEMS WITH AIR QUALITY

NO₂ concentrations (shown in red) across the North (2015 projections)



Source: DEFRA 2015

6. TEES CROSSING

Context

Roads are essential for the internal operation of Tees Valley's economy and in order to connect it to the wider North. Passenger rail connectivity remains poor and light rail is non-existent. The economy's residential and employment centres are highly dispersed across its geography. A modern bus network might relieve pressure, but the deregulated and underfunded network has seen passenger numbers fall and services cut (Brown 2018). The level of freight activity in Teesport and Hartlepool mean that these ports are highly dependent on the road network as well as rail.

The A19 is a vital road north south link both for the Tees Valley: an important direct link to and from Tyne and Wear, and for wider connectivity from North Yorkshire and Middlesbrough through to the North East. But there is currently heavy congestion crossing the Tees: 107,000 vehicles a day cross over the Tees via the A19 bridge, but only 50 per cent of journeys are classified as 'on time', as research from Highways England shows (Lodge 2017). This also impacts on the operation of the A66 where it intersects with the A19. This has a knock-on effect for the connectivity to Teesport – which is among the worst ports for road congestion (HE 2016). The area's congestion problems are clear (ibid).

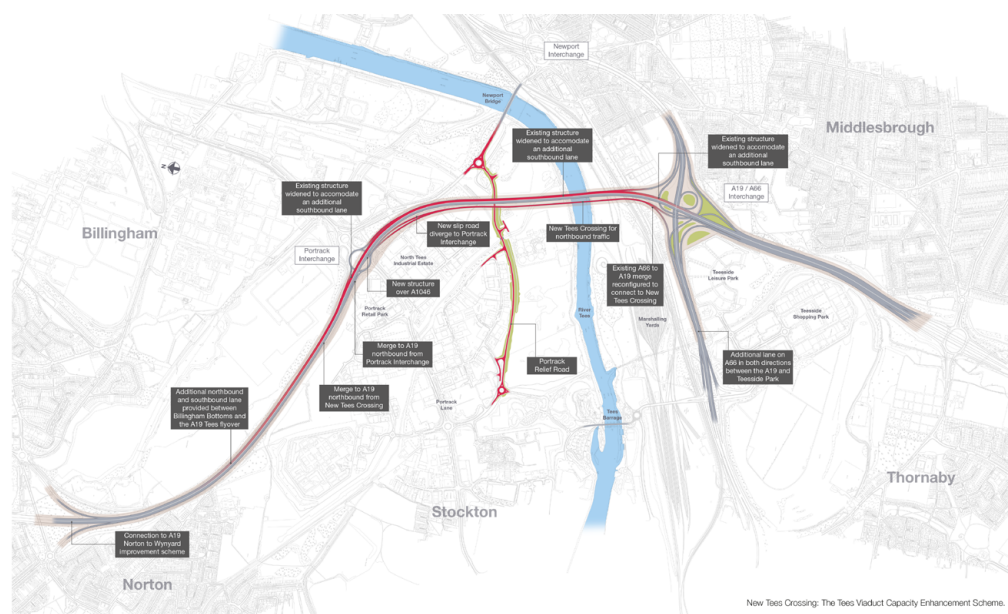
The intervention

After looking at 14 possible options, the TVCA says it has identified improvements to the A19 Tees bridge. As figure 3.8 shows, a new northbound crossing to the west of the A19 to support traffic from the A66 turning north, whilst improvements on

the existing structure would support all southbound traffic and A19 through traffic northbound. The current estimated cost is £221 million.

Additionally, the TVCA is considering funding opportunities for an Eastern Tees Crossing to support the redevelopment opportunities of the South Tees Development Corporation site and support the employment areas on the north bank of the river.

FIGURE 3.7: TVCA ARE PROPOSING A NEW NORTHBOUND TEES CROSSING
Proposed Tees Crossing pinch-point removal scheme



Source: TVCA 2019

Rationale and wider impact

As figure 3.7 shows, Tees Valley’s assets would benefit from these improvements. Of the 12 enterprise zone sites in Tees Valley, 11 are within 20 minutes’ drive of the A19 and eight are within 20 minutes’ drive of the A66. There would be particular benefit to industries on each side of the Tees River, which are amongst the biggest industrial clusters in the UK. This could enhance the access that local residents have to jobs in the area if supported in the right way - by for example bus services or other forms of local public transport.

Current status, obstacles and constraints

The scheme is currently in a good position. The DfT’s Large Local Majors Fund will fund the next stage of development for the Central Tees Crossing, while the next stage of development of the Eastern Tees Crossing will be funded by the TVCA (TVCA 2017). If the projects proceed as planned, then the work is likely to start in 2023/24 and will take three to four years to complete (ibid).

4.

CONCLUSIONS AND RECOMMENDATIONS

This report has shown that small transport improvements are extremely important for the north of England. The region's economy, society and environment could benefit from a series of 'quick wins' to support TfN's long-term programme of transformative investments.

There is a clear message from these case studies and corroborated by evidence from other developed countries. The message is that devolved decisions tend to be more efficient: schemes such as Leeds Bradford Airport Parkway station show that devolving spending to a local area tends to accelerate progress; meanwhile reopening Ashington-Blyth and Tyne has been relatively slow – because the decision has rested with hitherto-centralised Network Rail. The evidence from Scotland and from countries overseas also shows that devolved government tends to mean more investment in infrastructure and more innovation (Cox and Raikes 2015; Raikes et al 2018).

This paper has added weight to an already-strong case for devolving further power to TfN and local transport authorities within the North (see Cox and Raikes 2015; Blakeley 2017). More specifically, it has highlighted the need for TfN to have the power and funding to bring forward projects into the relevant national pipelines.

Recommendation 1: Central government should provide a £400 million project development fund for Transport for the North

TfN needs to build its capacity in order to bring these 'quick wins' forward. It recently set out an investment programme of road and rail interventions,⁸ which come to a total of £2.7 billion in additional funding (this excludes the £4 billion already in Highways England's initial RIS2 pipeline and the £3 billion allocated to the TransPennine Route Upgrade). The amount of funding required to develop projects is often 10-15 per cent of their total capital cost. It therefore follows that TfN should hold an equivalent amount of funding in order to bring forward this pipeline.

The 2019 spending review should allocate and devolve a £400 million project development fund to TfN (over the whole spending review period) – equating to 15 per cent of the new 'asks' in TfN's investment programme – to be spent in conjunction with constituent transport authorities, and in line with TfN's appraisal methodology. It would have the following features.

- This is a revenue fund to develop projects – not direct capital spending on a transport project itself – and it should therefore be in addition to the capital spending requested of government.
- The North should have full discretion over this fund; it should not be restricted to one form of transport or type of spending, but it should be underpinned by TfN's STP and support the SDCs.

8 See: <https://transportforthenorth.com/wp-content/uploads/TfN-final-investment-programme-19-20.pdf>

- The interventions this fund enables could be delivered by central or local government agencies (such as Network Rail). At this stage in TfN’s institutional development they would not actually deliver transport capital projects.⁹

Recommendation 2: Transport for the North should prioritise ‘quick wins’ alongside long-term investment plans

TfN is rightly focused on long-term plans and the big transformative projects the North needs to reach its potential. But there are clear benefits to some relatively small interventions as this paper has discussed.

TfN should work with local transport authorities to prioritise ‘quick wins’ including but not limited to:

- reopening the Ashington Blyth and Tyne railway for passenger services
- Leeds Bradford Parkway rail station
- supporting the development of hydrogen trains
- Tees Valley rail interventions
- integration of traffic management to improve air quality
- Tees Crossing.

TfN should therefore develop a set of criteria for selecting further ‘quick win’ priorities – starting with the eight principles we have outlined as criteria for shortlisting in this paper. They should then use the project development fund to provide the necessary support for these projects and progress them through the relevant processes as quickly as possible.

Recommendation 3: Transport for the North should develop its own appraisal methodology and increase its positive impact on social and environmental outcomes

Many of the interventions listed in this report will have wider social and environmental benefits as well as being economically transformative. They are often in areas where the economy is in long-term decline and many residents lack access to good quality jobs. Currently, the Treasury’s ‘Green Book’ appraisal processes don’t sufficiently recognise the true social and environmental value of such projects – although this improved in 2018. This means that they don’t recognise transport schemes’ transformative potential for local economies, or the wider social and environmental benefits (and the reduction in costs to the state) that can result. Devolution is an opportunity to start to change this. TfN has already undertaken some work on this issue and this should now be developed further.

TfN should continue to develop their approach to appraisal, by tailoring their methodologies to the North’s economic geography and directing them toward economic, social and environmental outcomes. This would have the following features.

- This methodology would be supported by the economic analysis of a refreshed Northern Powerhouse independent economic review.
- They should also include a broader range of economic, social and environmental outcomes, for example: reductions in unemployment, better paid jobs, improved health outcomes and reduced CO₂ and NO₂ emissions.

⁹ In future, TfN should be in a position to directly invest in northern transport. See: <https://www.ippr.org/publications/transport-for-the-north-a-blueprint-for-devolving-and-integrating-transport-powers-in-england>

- This methodology should be used to underpin TfN's own sequencing and priority setting – deciding which projects to develop to the stage where funding is requested (TfN doesn't currently have the power to decide where capital investment should be directed).
- This should also be used to influence the decision-making of the Treasury and any future revisions to the Green Book.
- If TfN takes control of its own capital budget – as IPPR North has previously recommended¹⁰ – then this methodology would be used to approve their own capital spending.
- This methodology should be refreshed and reviewed as the evidence base develops and the broader context changes
- TfN should also develop a social value policy, which would mean the contracts they tender would have to comply. This could then help support, for example, local employment outcomes when such schemes are delivered.

¹⁰ See: <https://www.ippr.org/publications/transport-for-the-north-a-blueprint-for-devolving-and-integrating-transport-powers-in-england>

REFERENCES

- Alstom (2018) 'World premiere: Alstom's hydrogen trains enter passenger service in Lower Saxony', press release. <https://www.alstom.com/press-releases-news/2018/9/world-premiere-alstoms-hydrogen-trains-enter-passenger-service-lower>
- Association of Train Operating Companies [ATOC] (2009) *Connecting Communities: Expanding Access to the Rail Network*. https://ccc-live.storage.googleapis.com/upload/www.cambridgeshire.gov.uk/residents/travel-roads-and-parking/_Connecting_Communities_to_the_rail_network.pdf?inline=true
- Barker R (2017) 'Team shows fuel cells can be used to power UK trains' *Fuel Cell Systems, webpage*. <https://www.fuelcellsystems.co.uk/team-shows-fuel-cells-can-used-power-uk-trains/>
- BBC (2017) 'What impact can restoring rail lines have?', news article. <https://www.bbc.co.uk/news/uk-42167169>
- Blake J Lewis R and Foster N (2017) 'Open letter about proposed parkway station serving Leeds Bradford Airport', *Leeds City Council, open letter*. <https://news.leeds.gov.uk/open-letter-about-proposed-parkway-station-serving-leeds-bradford-airport/>
- Blakeley G (2017) *Paying for our progress: How will the northern powerhouse be financed and funded?*, IPPR North. <http://www.ippr.org/publications/paying-for-our-progress>
- Brown M (2018) 'Austerity cuts to buses mean 'entire communities are isolated' as millions fewer travel by bus', *Gazette Live, news article*. <https://www.gazettelive.co.uk/news/teesside-news/austerity-cuts-buses-mean-entire-14905978>
- Butterworth P (2018) 'Hydrogen trains - a viable alternative to diesels in the UK?', blog post, DB – ESG. https://www.db-esgrail.com/esg/news/blog/blog_hydrogen_trains-2731212
- Centre for Towns (2017) '894-towns', dataset. <https://www.centrefortowns.org/our-towns>
- Chen W, Los B, McCann P, Ortega-Argilés R, Thissen M and van Oort F (2017) 'The Continental Divide? Economic Exposure to Brexit in Regions and Countries on Both Sides of the Channel', *Papers in Regional Science*
- Cheshire and Warrington Local Enterprise Partnership [C&W LEP] (2018). *Report – Development of an Energy Strategy and Implementation Plan for Cheshire & Warrington, Micklethorpe/Bizkat*. http://www.871candwep.co.uk/content/uploads/2018/07/CWLEP-Energy-Technical_May_18_low.pdf
- Chong U Swanson JJ and Boies AM (2015) 'Air quality evaluation of London Paddington train station', *Environmental Research Letters*, Volume 10, Number 9. <https://iopscience.iop.org/article/10.1088/1748-9326/10/9/094012>
- Civil Aviation Authority (2017) *CAA Passenger Survey Report 2017*. https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Datasets/Passenger_survey/2017CAAPaxSurveyReport.pdf
- Committee on Climate Change [CCC] (2017) *Meeting Carbon Budgets: Closing the policy gap, report to Parliament*. <https://www.theccc.org.uk/publication/2017-report-to-parliament-meeting-carbon-budgets-closing-the-policy-gap/>
- Cox E and Goggins D (2018) *Atmosphere: Towards a proper strategy for tackling Greater Manchester's air pollution crisis*, IPPR. <http://www.ippr.org/publications/atmosphere>
- Cox E and Raikes L (2015) *Transport for the North: A blueprint for devolving and integrating transport powers in England*, IPPR North. <http://www.ippr.org/publications/transport-for-the-north-a-blueprint-for-devolving-and-integrating-transport-powers-in-england>
- Coyle C and Sensier M (2018) *The Imperial Treasury: appraisal methodology and regional economic performance in the UK*, Bennett Institute for Public Policy working paper no: 02/2018. https://www.bennettinstitute.cam.ac.uk/media/uploads/files/The_Imperial_Treasury_appraisal_methodology_and_regional_economic_performance_in_the_UK.pdf

- Dajnak D, Walton H, Beevers S and Smith S (2018) *Greater Manchester Health and Economic Impact Assessment study*, King's College London. <http://hieh.hpru.nihr.ac.uk/publications/greater-manchester-health-and-economic-impact-assessment-study>
- Department for Business, Energy and Industrial Strategy [BEIS] (2018a) 'Regional Statistics 2003-2017: Generation', dataset. <https://www.gov.uk/government/statistics/regionalrenewable-statistics>
- Department for Business Energy and Industrial Strategy [BEIS] (2018b) 'UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2016', dataset. <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbondioxide-emissions-national-statistics-2005-2016>
- Department for Business, Energy and Industrial Strategy [BEIS] (2017) *Industrial Strategy: Building a Britain fit for the future*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/730043/industrialstrategy-white-paper-print-ready-a4-version.pdf
- Department for communities and local government [DCLG] (2015) 'Indices of deprivation 2015 explorer', dataset. <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015>
- Department for Environment, Food and Rural Affairs [DEFRA] (2015) *Background Mapping data for local authorities – 2015*. <https://uk-air.defra.gov.uk/data/laqm-background-home>
- Department for Transport [DfT] (2017) *Connecting people: a strategic vision for rail*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/663124/rail-vision-web.pdf
- Department for Work and Pensions [DWP] (2018) 'Households Below Average Income, 2016/17', dataset. <https://www.gov.uk/government/statistics/households-below-average-income-199495-to-201617>
- Forth T (2017) 'Investment is Political', webpage. <https://www.tomforth.co.uk/investmentispolitical/>
- Frontier Economics (2016) *Assessing the productivity benefits of improving inter-city connectivity in Northern England: A report prepared for the national infrastructure commission*. <https://www.nic.org.uk/wp-content/uploads/Assessing-the-productivitybenefits-of-improving-inter-city-connectivity-in-Norther-England.pdf>
- Gibbons S, Heblich S and Pinchbeck E (2017) *The Spatial Impacts of a Massive Rail Disinvestment Program: The Beeching Axe*, LSE. http://personal.lse.ac.uk/gibbons/Papers/Beeching_June_2017_v2.pdf
- Greater Manchester Public Transport Executive [GMPTEx] (2010) *Network Rail Northern Hub Rail Study*. http://www.transportforgreatermanchestercommittee.gov.uk/download/2989/item_09_network_rail_northern_hub_rail_study
- Highways England [HE] (2016) *International gateways and the strategic road network*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/600269/SEGP_-_Underpinning_Report_-_International_gateways_and_the_SRN.pdf
- HM Treasury (2018) *The Green Book: Central government guidance on appraisal and evaluation*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf
- Independent international connectivity commission [IICC] (2017) *Independent international connectivity commission report*, Transport for the North. https://www.transportforthenorth.com/wp-content/uploads/International-Connectivity-Report_websafe.pdf
- Laird J and Mackie P (2010) *Review of methodologies to assess transport's impacts on the size of the economy*, The Northern Way
- Laybourn-Langton L, Corlett J and Cox E (2016) *Gateways to the northern powerhouse: A northern ports strategy*, IPPR North. <http://www.ippr.org/publications/gateways-to-the-northern-powerhouse>
- Leeds Bradford Airport [LBA] (2017) *Leeds Bradford Airport Strategic Development Plan – Surface Access Strategy*, Fore Consulting. <https://www.leedsbradfordairport.co.uk/media/2521/route-to-2030-strategic-development-plan-update.pdf>

- Leeds City Council (2017) *HS2 Growth Strategy*
- Leving M and Dunsby B (2017) 'Leeds Bradford Airport Parkway Station', *Yorkshire Rail Campaigner*. <http://www.harrogateline.org/>
- Lodge B (2017) 'New Tees crossing - where it might go, how much it will cost and when it will be ready', *Teesside Live*, news article. <https://www.gazettelive.co.uk/news/teesside-news/new-tees-crossing-might-go-13315012>
- McNeal I (2019) 'Hydrogen-powered cars coming to Teesside roads after success for £1.3m project', *Teesside Live*, news article. <https://www.gazettelive.co.uk/news/teesside-news/hydrogen-powered-cars-coming-teesside-15785207>
- Metro Dynamics (2018) *Investing in the Future*. <https://www.peel.co.uk/government-urged-to-prioritise-infrastructure-spending-to-grow-and-rebalance-the-economy/metro-dynamics-investing-in-the-future-november-2018/>
- Network Rail (2017) *East coast mainline route study*. <https://www.networkrail.co.uk/running-the-railway/long-term-planning/>
- Northumberland County Council [NCC] (2015) *Ashington, Blyth & Tyne Line*. http://committeedocs.northumberland.gov.uk/MeetingDocs/32119_M7820.pdf
- Northumberland County Council [NCC] (2019) *Proposed Ashington Blyth and Tyne*
- Office for National Statistics [ONS] (2018a) 'Regional gross value added (balanced) by combined authority, city regions and other economic and enterprise regions of the UK', dataset. <https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/regionalgrossvalueaddedbalancedbycombinedauthoritycityregionsandothereconomicandenterpriseregionsoftheuk>
- Office for National Statistics [ONS] (2018b) Country and regional public sector finances: financial year ending 2017, dataset. <https://www.ons.gov.uk/releases/countryandregionalpublicsectorfinances2016to2017>
- Office for National Statistics [ONS] (2018c) 'Business register and employment survey', dataset. <https://www.nomisweb.co.uk/default.asp>
- Office for National Statistics [ONS] (2019) 'Subregional productivity: labour productivity indices by UK NUTS2 and NUTS3 subregions', dataset. <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/datasets/subregionalproductivitylabourproductivitygvaperhourworkedandgvaperfilledjobindicesbyuknuts2andnuts3subregions>
- PD Ports (2017) *Teesport and Hartlepool port handbook 2017/18*. <https://www.pdports.co.uk/documents/media%20centre/brochures/tees%20and%20hartlepool%202017.pdf>
- Port of Blyth (2018) *Port of Blyth Annual Review 2017*. <http://portofblyth.co.uk/wp-content/uploads/2018/04/Port-of-Blyth-Annual-Review-2017.pdf>
- Raikes L (2018) *Future Transport Investment in the North: A briefing on the government's new regional analysis of the National Infrastructure and Construction Pipeline*, IPPR. <http://www.ippr.org/publications/future-transport-investment-in-the-north-briefing>
- Raikes L, Cox E and Carella L (2016) *The state of the North 2016: Building northern resilience in an era of global uncertainty*, IPPR North. <http://www.ippr.org/publications/the-state-of-the-north-2016>
- Rail (2018) 'Grayling: "I want the first hydrogen train to operate on our rail network within a short period of time', *Rail Magazine*, news article. <https://www.railmagazine.com/news/network/grayling-i-want-the-first-hydrogen-train-to-operate-on-our-rail-network-within-a-short-period-of-time>
- Shirres D (2018) 'Is hydrogen the answer?', *RailEngineer*, web article. <https://www.railengineer.co.uk/2018/03/05/is-hydrogen-the-answer/>
- South East Northumberland Rail Action Group [SENUG] (2018) 'Re-open Ashington Blyth & Tyne Line', webpage. <http://www.senrug.co.uk/Re-open-AshingtonBlythTyneLine.php>
- SQW and Transport for the North [SQW and TFN] (2016) *Northern Powerhouse Independent Economic Review, Workstream 3: Competitive Advantage and Sector Strengths – Final Report*, SQW report prepared for Transport for the North. <http://www.transportfornorth.com/pdfs/NP/Overview-NP-IndependentEconomicReview.pdf>

- Staffell I, Dodds P, Scamman D, Abad AV, MacDowell N, Ward K, Agnolucci P, Papageorgiou L, Shah N and Ekins P (2017) *The role of hydrogen and fuel cells in future energy systems*, a H2FC Supergen white paper. http://www.h2fcsupergen.com/wp-content/uploads/2015/08/J5212_H2FC_Supergen_Energy_Systems_WEB.pdf
- Tees Valley Combined Authority [TVCA] (2018a) 'Plans to Bring Hydrogen Trains, Cars and Buses to the Region Take a Step Forward', TVCA, news article. <https://teesvalley-ca.gov.uk/plans-to-bring-hydrogen-trains-cars-and-buses-to-the-region-takes-a-step-forward/>
- Tees Valley Combined Authority [TVCA] (2018b) *Darlington 2025 masterplan delivery*, report to the tees valley combined authority cabinet. <https://www.darlington.gov.uk/PublicMinutes/Council%5CNovember%2029%202018%5CItem%20No%208%20a%20-%20Leader%20and%20Efficiency%20and%20Resources%20Overview.pdf>
- Tees Valley Combined Authority [TVCA] (2019) Tees Valley Crossing consultation
- Tees Valley Unlimited [TVU] (2011) *Connecting the Tees Valley: Statement of Transport Ambition*. <https://teesvalley-ca.gov.uk/wp-content/uploads/2016/04/Statement-of-Transport-Ambition.pdf>
- Tees Valley Unlimited [TVU] (2016) *Tees Valley economic assessment 2015/16*. https://teesvalley-ca.gov.uk/wp-content/uploads/2016/03/tees_valley_economic_assessment_2015_full.pdf
- The Institution of Mechanical Engineers [IMECHE] (2019) *The future for hydrogen trains in the UK*. <http://www.imeche.org/policy-and-press/reports/detail/the-future-for-hydrogen-trains-in-the-uk>
- The Transport for the North (2016) *Northern Freight and Logistics Report*. <https://transportforthenorth.com/reports/tfn-freight-logistics-report/>
- Transport for Greater Manchester [TfGM] (2019) *Greater Manchester Clean Air Plan*. <https://cleanairgm.com/clean-air-plan>
- Transport for the North [TFN] (2019) *Strategic Transport Plan*. <https://transportforthenorth.com/onenorth/>
- Walker J (2018) 'Step forward for plans to re-open Newcastle to Northumberland rail services', *Chronicle Live*, news article. <https://www.chroniclelive.co.uk/news/north-east-news/step-forward-plans-re-open-13970849>
- West Yorkshire Combined Authority, City of Bradford MBC, Calderdale Council, Kirklees Council, Leeds City Council, Wakefield Council and Leeds City Region local enterprise partnership [WYCA et al] (2017) *Transport Strategy 2040*. <https://www.westyorks-ca.gov.uk/media/2664/transport-strategy-2040.pdf>
- What Works Centre for Local Economic Growth [WWCLEG] (2015) *Evidence Review 7: Transport*. http://www.whatworksgrowth.org/public/files/Policy_Reviews/15-07-01-Transport-Review.pdf
- Whitfield G (2018) 'Bank of England chief visits Ashington to hear how economy is affecting people', *Chronicle Live*, news article. <https://www.chroniclelive.co.uk/business/business-news/bank-england-chief-visits-ashington-14270784>
- Wiseman E (2019) 'Hydrogen fuel cell trains to run on British railways from 2022', *Telegraph*. <https://www.telegraph.co.uk/cars/news/hydrogen-fuel-cell-trains-run-british-railways-2022/>
- Wiseman E (2019) 'Hydrogen fuel cell trains to run on British railways from 2022', *Telegraph*. <https://www.telegraph.co.uk/cars/news/hydrogen-fuel-cell-trains-run-british-railways-2022/>
- York Aviation (2015) *The Economic Impact of Leeds Bradford Airport*

Institute for Public Policy Research

The background of the page is composed of several overlapping geometric shapes in shades of purple. A large, light purple trapezoidal shape is positioned in the upper left and center. To its right, a dark purple triangular shape points downwards. Below the light purple shape, there is a vertical dark purple bar on the left side and another dark purple triangular shape pointing upwards from the bottom center.



GET IN TOUCH

For more information about IPPR North,
please go to www.ippr.org/north

You can also call us on +44 (0)161 694 9680,
e-mail north@ippr.org or tweet us [@ipprnorth](https://twitter.com/ipprnorth)

Institute for Public Policy Research

Registered Charity no. 800065 (England & Wales),
SC046557 (Scotland), Company no, 2292601 (England & Wales)

The progressive policy think tank