

GREAT
NORTH
PLAN



A PROSPECTUS FOR
TRANSFORMING THE
NORTH OF ENGLAND

INTRODUCTION

The north of England needs infrastructure projects capable of genuinely transforming the northern economy as it makes the journey from an industrial past to a dynamic, diverse, and sustainable economic future. International evidence shows that investing in infrastructure is essential to competing in the global economy and driving economic growth. Yet, for a highly developed country, the UK has underinvested in major infrastructure networks and is slipping down the world rankings in terms of infrastructure provision.

Public funding is important in infrastructure. Markets often fail to provide the requisite cash for major projects that are socially and economically valuable. Even when they do, the costs borne by consumers can be extremely high.

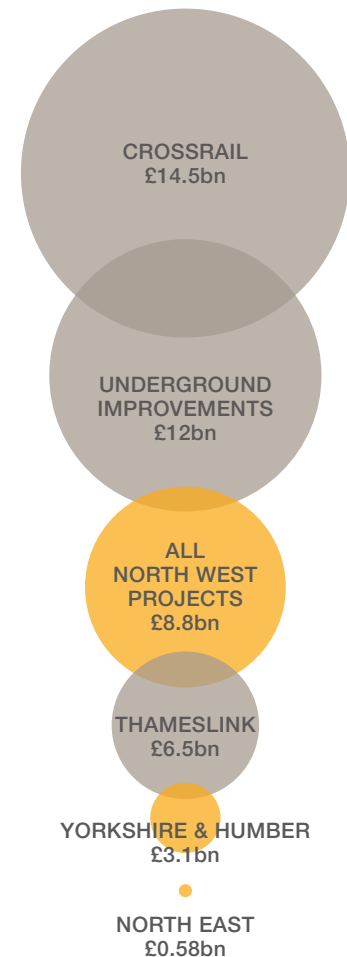
However, currently, public funding is directed disproportionately towards the capital. According to the latest National Infrastructure Plan, Crossrail, improvements to the London Underground and Thameslink will account for £34 billion of public and private investment in infrastructure in the coming decade. Combined, these three London projects are worth more than twice as much as all of the public-involved infrastructure investment in the north of England put together.

The scale of these projects is unquestionably transformational. They bring jobs and investment into the local economy and provide long-term economic gains that will benefit generations to come. What is more, a much larger proportion of infrastructure projects in London are actually underway, compared with the many northern projects that are still stuck in the starting blocks.

With all the evidence showing the importance of infrastructure investment for long-term economic growth, it is little wonder that politicians have come to recognise that such disparities in investment are at the heart of the challenge to rebalance the national economy.

MAJOR LONDON PROJECTS vs NORTHERN REGIONAL INVESTMENT

ALL FULLY AND PARTLY PUBLIC FUNDED PROJECTS,
NATIONAL INFRASTRUCTURE PIPELINE 2014



"Those looking to rebalance future investment need to see ambitious, attractive and complementary proposals from other parts of the UK"

As well as reform of the way investment decisions are made,* those looking to rebalance future investment need to see ambitious, attractive and complementary proposals from other parts of the UK looking to make major infrastructure investment. The north of England needs ideas to compete with the big London projects. This prospectus sets out the results of our initial crowdsourcing experiment to find these ideas for a 'Great North Plan'.

The north of England needs a pipeline of proposals for future investment that not only underpin ongoing investment but also shape the kind of economy the north needs to become.

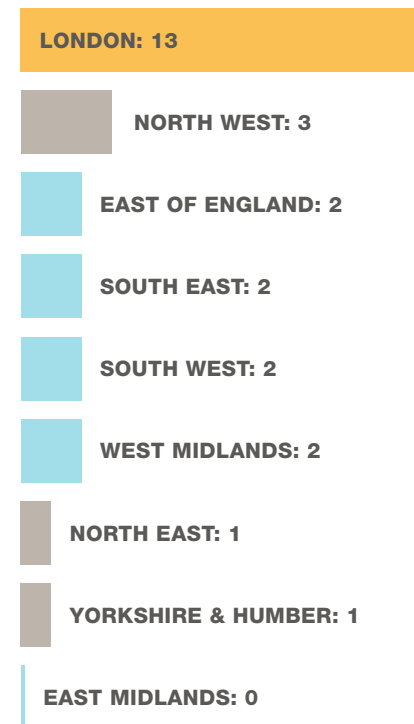
The proposals set out in our prospectus achieve both of these ambitions. One North may well become the basis upon which the so-called 'northern powerhouse' of interconnected cities will be built over the next two decades, while a Green Cities initiative and emphasis on hub airport slots as 'soft infrastructure' investments will be instrumental in promoting prosperity in the short to medium term.

Looking further into the future, energy-generating roads and a vacuum train to New York might sound like the hare-brained ideas of today's futurologists. But perhaps these could become the basis for new industries and a more sustainable northern economy, and soon. Who can say otherwise?

What is sure is that all the best plans start with a clear vision. If our prospectus achieves nothing else, we hope it inspires others to search out the kind of ideas that can define a new generation. We cannot go back in time to correct the underinvestment of the past, but we can make plans for a future where once again the north will flourish.

HOW MANY BILLION-POUND PROJECTS ARE PLANNED IN YOUR REGION?

ALL FULLY AND PARTLY PUBLIC FUNDED PROJECTS, NATIONAL INFRASTRUCTURE PIPELINE 2014



* For more on how investment decisions are made, see: Cox E and Davies B (2014) *Transformational infrastructure for the North: Why we need a Great North Plan*, IPPR North; Cox E and Davies B (2013) *Still on the wrong track: An updated analysis of transport infrastructure spending*, IPPR North. Both reports are available at www.IPPR.org/publications

BACKGROUND TO THE COMPETITIONS

To source ideas for future northern infrastructure investment, we ran two parallel competitions.

The **Great North Plan** competition was for people aged 25 and under. It focused on the long term, seeking radical ideas using new or untested technology to change the way people live their lives by 2050 and beyond.

The **George Stephenson Prize** was for infrastructure professionals. It sought economically sound proposals for infrastructure projects that could be up and running by 2030.

Entries were assessed by a judging panel of leading figures from the world of infrastructure and development. The judging criteria for both included economic benefits, social gains and environmental sustainability.

Between them, the two competitions received entries from large infrastructure businesses and agencies, SMEs, and individuals as young as 18.



Louis JF Hill @Louisjrants - Jul 21
infrastructure is too slow & costly. Create centres of excellence and sense of collective community as a region to take on London



Vi Rookie Lea @VileaviRook - Aug 5
A third major road to Scotland via the North East - to add to A1 and M1. Or just upgrade the M1 and A1 or HS2 to NE



Simon Alvey @salvey1 - Jul 18
moving Parliament and central government to a northern city, possibly Bradford



WHAT'S YOUR #GREATNORTHPLAN?



Patrick Hurley @patrick_hurley - Jul 20
A #GreatNorthPlan is to build #HS3 #HSNorth from #Newcastle to #Liverpool. Connect the cities. <http://www.greatnorthplan.com/>



Jessie Joe Jacobs @Jes.Joe.Jac - Aug 5
we need better cross rail north of region - Newcastle to Manchester should not take 3 hours!



Clare Linton @ClareLLinton - Jul 21
bikes bikes BIKES! #GreatNorthPlan



Entries encompassed a wide range of important issues and inspiring ideas, including:

- 'All Green North' – supporting renewable energy and becoming carbon-free by 2050
- A vacuum train linking the north of England to New York City.
- Atlantic Gateway investment strategy along the Mersey banks and Manchester ship canal
- A fleet of hybrid trains for use between all the major cities of the north
- Green corridors across urbanised areas to help solve the housing crisis
- 'High Speed UK' – a revised strategy for high-speed rail
- 'Kaleidoscope' – an upgraded high-speed station for Sheffield city centre
- Leeds-Northallerton-Middlesbrough line
- Make our own infrastructure plan and persuade local MPs to support it
- Manchester, Newcastle and Edinburgh as three 'terminals' of a single airport connected by hyperloop
- Northern 'Green Cities' initiative
- One North plan for pan-northern connectivity
- Pan Northern Main Line
- Pennines National Park
- 'Produce Revolution' – insect farming and consumption
- Purchasing airport slots for municipal airports
- Revising the HS2 route along a thorn-shaped route and the new city of Ringby
- SMART – Sustainable Metering & Advanced Road Technology
- Solar-powered Newcastle
- South East Northumberland – 'an industrial powerhouse reborn'
- Rail link from Rossendale to Manchester
- The UK's largest anaerobic digestion (AD) green energy park in Northumberland



Pat Wills @GrannyPat60 - Jul 25

#GreatNorthPlan Start HS2 in Leeds with a spoke to York. Build Eco intergenerational homes on Barbican site.



EEF Economics Team @EEF_Economists - Aug 18

Our #GreatNorthPlan is for a UK Infrastructure Authority to horizon scan our future infrastructure needs



WHAT'S YOUR #GREATNORTHPLAN?



John Bradley @flypie - Sep 1

#GreatNorthPlan A High Speed Pan Northern Mainline Railway from Holyhead to Hull



Richard Blyth @RichardBlyth7 - Jul 7

Strategic coordination for England itself as well might help #Map4England At present economic policy not= housing policy



Mike Riddell @mikeriddell62 - Jul 22

#GreatNorthPlan create civic infrastructure of connected community groups that record and reward community contribution



Dr Nicola Headlam @networknicola - Jul 27

1. Have strategic institutions below the level of England 2. Require them to develop a plan 3. Fund it #GreatNorthPlan



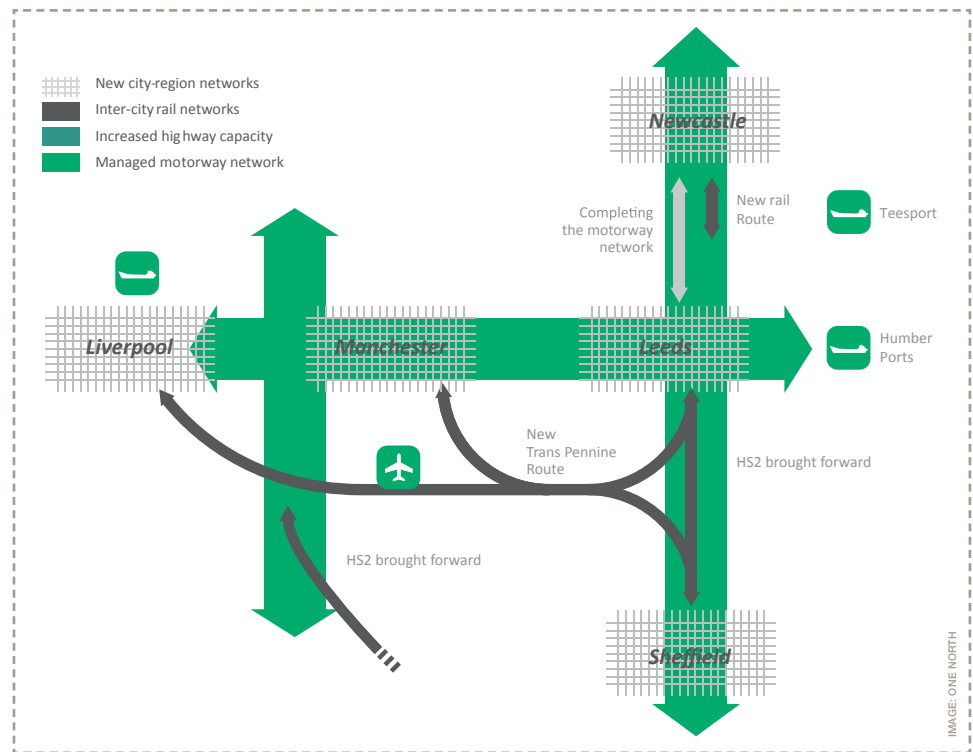
ONE NORTH



The One North proposal, submitted by Transport for Greater Manchester on behalf of the five cities involved in its development (Liverpool, Manchester, Leeds, Newcastle and Sheffield), offers a 15-year, £15 billion plan of interconnected transport infrastructure proposals covering air, roads, ports and rail, and includes a recommendation for a high-speed east-west rail route which has since been endorsed by the government.

The proposals included:

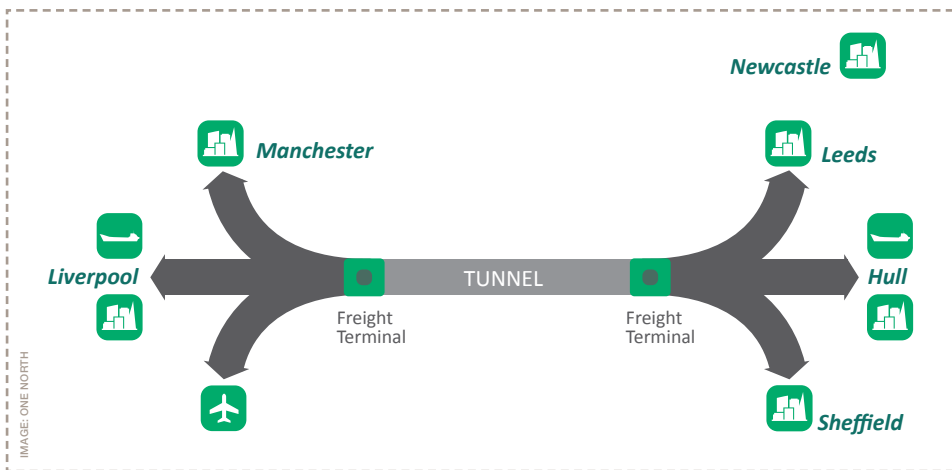
- A new trans-Pennine route to improve the speed and capacity of east-west rail connectivity (effectively an 'HS3').
- As part of the HS3 plans, a new tunnel through the Pennines, with freight terminals at either end to increase east-west rail freight capacity and trade.
- Plugging strategic gaps in the road network, and the introduction of managed motorway schemes to improve speeds on major link roads and curb congestion, especially on the M62 motorway.
- A wider improvement in the existing network of rail infrastructure, through a programme of incremental electrification of major lines.
- Strategic investment to improve access to the major international ports and airports in the north.



"This is a really comprehensive and well thought out integrated transport plan which would benefit the whole of the north directly. We like that it plans to integrate HS2. This is a much more rounded proposition than other submissions. It's ambitious, but it could be delivered on time"



The poor quality of connections, especially for rail, in the north of England has been well documented. A comprehensive plan to improve the quality of transport connections for both passengers and freight would allow the three northern regions of England to stay competitive with other more connected regions of the UK and Europe.



KEY FEATURES OF THIS PROPOSAL:

- **clear identification of current weaknesses in northern infrastructure**
- **comprehensive multi-modal plans across roads, rail, air and ports**
- **cooperation between five northern cities with different strategic priorities**
- **a realistic timetable for delivery by 2030**

The panel felt that One North was clearly the most comprehensive infrastructure proposal submitted to George Stephenson Prize. The achievement of the One North proposal was felt to not only be the detail of the proposals, but also how local governments have worked together to create a pan-northern infrastructure strategy as a companion – and potential rival – to the mayor of London’s infrastructure plan for 2050.

FUTURE ROADS

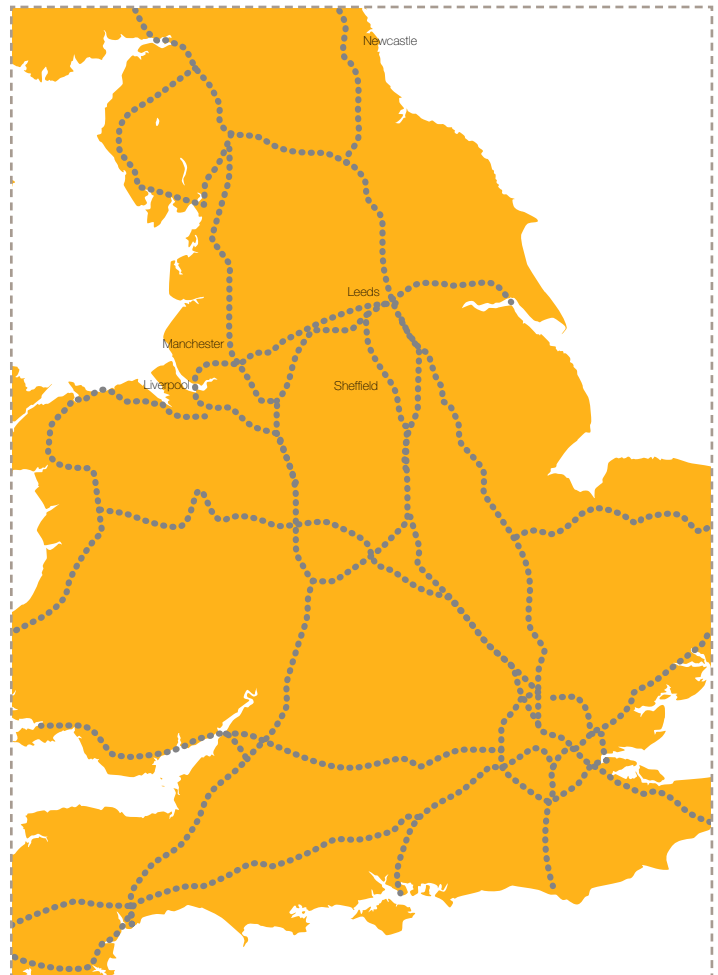


Car use, measured by distance driven per capita, is falling in Britain and across much of the developed world. However, electric vehicles make up a growing share of automotive market. Yet, the infrastructure to support them is limited. The trio of winning Great North Plan entries between them developed an innovative approach merging car use with renewable production to offer separate but connected ideas on the future of road technology.

Two of the entrants, Ben Puddicombe and Edward Davies, advanced the idea of using solar panelling to replace sections of asphalt roads. This would blend energy infrastructure with transport infrastructure, and is based on technology currently under development in the US.

The third winning entry, from Alexandru Buruiana, pulled energy harvesting technology together with refuelling infrastructure. This idea uses a variety of emerging technologies to harness the energy wasted on Britain's roads through noise, wind speed and braking. Sections of roads equipped with energy capturing technology, such as wind-capturing baffles and vibration ribs, would be connected to e-filling stations to support the growing number of electric cars on Britain's roads.

The illustration highlights the meshing of future technologies, where solar panels lining the road surfaces are used provide energy to the national grid while simultaneously powering electric vehicle filling stations.



KEY FEATURES OF THIS PROPOSAL:

- solar cells in the road surface
- vibration ribs to capture friction energy
- piezoelectric sensors to capture noise energy
- roadside baffles to capture wind energy
- vehicle charging points to return energy to road users

JUDGES' COMMENTS

"It's noteworthy that three separate entries suggested ways to make our roads more sustainable. Looking ahead, if these technologies could be combined with driverless vehicles then car travel as we know it could be transformed"

The judges recognised that neither the technology nor the demand for these developments is fully realised at this point. Nonetheless, the falling price of renewable energy sources, such as solar power, together with advancements in battery technology within a growing electric vehicle industry, means that by 2050 these pieces may well have fallen into place, sparking a boom in electric vehicle use.

The benefits of this vision are clear: a reduction in the use of fossil fuels in powering transport and an expansion in the availability of renewable energy to future vehicles.



GREEN CITIES



The Green Cities proposal, submitted by Alexander Bryan, would see northern cities pitching for government funding and devolved powers in exchange for setting out clear environmental and green technology plans, under the rubric of a 'Green City status'. Similar to a 'city deal', this status would devolve some capital investment and planning powers to the local area to allow it to drive environmentally sustainable infrastructure projects and to encourage green investment technology companies to relocate to the city.

JUDGES' COMMENTS

"We love the thought of local people having more of a voice in deciding the future investments in their environment"

CARBON-FREE NORTH



The 'Carbon-Free North by 2050' proposition, submitted by Elizabeth Hamilton, set out how northern cities could compete to become carbon-neutral by 2050 by creating 'carbon-neutral investment zones'. The plans included using a northern investment bank to channel low-cost loans into manufacturing renewable technologies, supported by centres of excellence in renewable energy technology to drive innovation and create new skills.

JUDGES' COMMENTS

"This project has huge ambition that could filter across the regions"

PENNINES

The panel commended an entry setting out a Pennines National Park covering the entire Pennines range. The Pennines range runs through a number of existing national parks, including the Peak District and the Yorkshire Dales, and also includes four areas of outstanding natural beauty.

The proposal explained how the industry and pollution of the manufacturing base of the last century had prevented the Pennines area from achieving full national park status, but with the decline in manufacturing in the region, these challenges are beginning to disappear. The objective of the proposal was to restore the heritage of the landscape, to clean it up, and attract both tourism and jobs to the area by exploiting the benefits that national park status attracts.



NATIONAL PARK



The entrant, Professor Ian Wray noted:

'Much of this area was proposed as a national 'Conservation Area' in 1947, but never designated either as a national park or area of outstanding national beauty. It is also particularly rich in industrial archaeology. Some of these moors were the birthplace of a system of 'proto-industrialism' which lit the fuse for the industrial revolution in Manchester and Yorkshire (and the rest of the world). They should be considered as potential World Heritage Sites.'

Environmental infrastructure is essential for achieving sustainable development, and it must go hand-in-hand with sensitive economic development too. The panel were keen to stress that any designation of national park status should nonetheless permit the application of One North's high-speed route, which will tunnel through the Peninnes.

JUDGES' COMMENTS

"Extending both the Lake District and Yorkshire Dales National Parks to include the Pennines range would enrich lives, drive visitor and tourist numbers and hopefully boost investment"



SECURING HUB AIRPORT SLOTS



This 'soft' or non-physical infrastructure initiative proposes that regional airports, such as Newcastle International, should secure more air traffic slots at major airports, such as Heathrow. Municipal airports face challenges in attracting and retaining long-haul international flights – while such flights are potentially beneficial, they can threaten an airport's viability if there isn't enough demand. Linking regional airport capacity more closely with hub-airport capacity would seek to reduce that risk while enhancing connections between regional and hub-airport capacity. It is hoped that this would drive trading and tourist activity towards the regions further from the hub, and in turn support regional development.

Graeme Mason from Newcastle Airport argued that: 'New slots at Heathrow should be defined as infrastructure to benefit the North East and the whole of the UK. Connections would improve trade, tourism and cultural exchanges between nations. For the North East to benefit from those long-haul connections, the region needs slots into Heathrow.'

JUDGES' COMMENTS

"This reminds us that northern prosperity may also hinge upon decisions further afield and the 'soft infrastructure' created by external agencies"

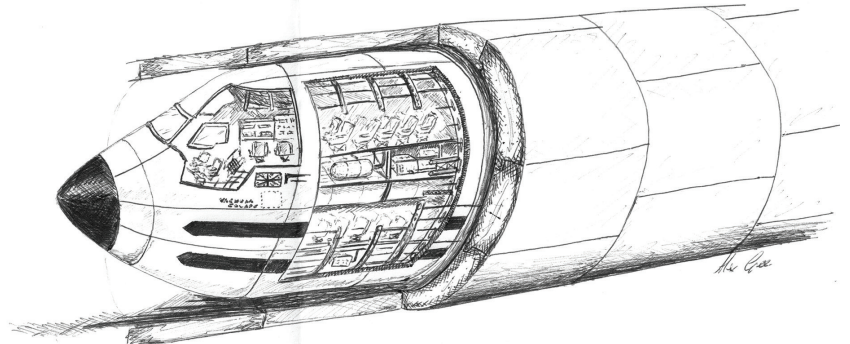
VACUUM TRAIN TO NEW YORK



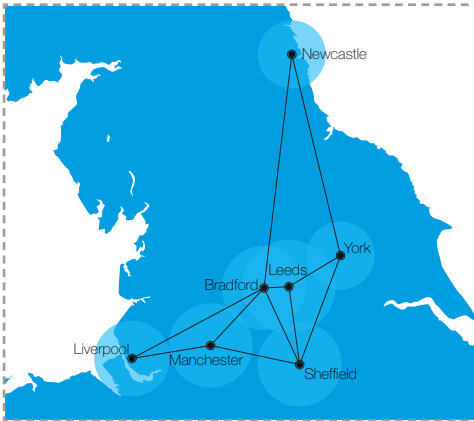
Simon Horton and several colleagues submitted the concept of a vacuum train to travel from the north west of England to eastern seaboard of the US. 'Our train is contained within a pipeline under the Atlantic Ocean, running between Manchester and New York City. This pipe will form a perfect vacuum. Within it, the train is levitated in mid-air using electric magnets. This reduces nearly all causes of friction and drag, enabling both huge speeds and a completely smooth (and silent) journey.'

JUDGES' COMMENTS

"This may prove to be the Concorde of the tunnelling world: fantastic technology but costs too much to run"



HYPERLOOP



Using similar technology to the vacuum train, the Northern Hyperloop, suggested by Paul Batty, would connect the airports of northern cities into an 'airport superhub'. The individual city airports would act as terminals within a single rapidly connected local, national and international rail and air connectivity network.

The Hyperloop mode of transport, popularised by US entrepreneur Elon Musk, combines the vacuum tunnel concept with the addition of a propeller on the front of the train to force any remaining air resistance to the back of the train.

The judges felt that the argument on rapid connectivity in the north, across different modes of transport, was a strong one, but would have been improved by connecting the cities directly, rather than their airports.

JUDGES' COMMENTS

"The Hyperloop would certainly require flights of engineering and design genius for it to become a reality. It is a hugely expensive technology and untested"



FROM VISION TO REALITY

Our creaking national infrastructure is not fit for the 21st century. By comparison with our advanced neighbours, the UK has tended to underinvest in major infrastructure networks, particularly beyond the capital.

To continue to underinvest generally and to invest disproportionately in weaker economic regions can only lead to increased economic dependency on London and the greater south east, widen the gap in economic performance between the most and least advanced regions of the UK, and stymie efforts to create a great northern powerhouse.

Bringing balance to future investment is entirely possible. To do this, we need to bring together two vital elements: the connectivity problem and the connectivity answer. The urgent needs of northern infrastructure need to be spelled out in greater clarity, as in the One North proposal, and pegged to major transformative infrastructure ideas to drive investment where it is needed. This would enable great northern ideas to compete with the other major projects already sitting on the desks of civil servants and ministers in Whitehall.

In many cases, the ideas are already out there. Given an outlet – whether in a meeting with a government agency or local authority, or via an open source infrastructure competition – the innovation and energy of both industry and individuals can be drawn out, exposing vision they can bring to the complex and often daunting challenges facing the UK now and in the future.

Drawing out these ideas must be a process, not an event. Beyond this prospectus, the search for ‘Great Northern Plans’ must continue as a public dialogue about what we want from our collective futures, what technology will be needed to make people’s lives better and more sustainable, and how we go about bringing forward investments that will bring down the current social, economic and digital barriers that reinforce major inequalities.

In that spirit, we hope that our prospectus has inspired deeper contemplation about the challenges and possibilities facing the future of the north of England, and hope that the dialogue and generation of new ideas will continue beyond these pages.

THANKS TO...

We would like to thank the following individuals, organisations and firms for taking part.

- Adam Shanley
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- Alexandru Buruiana
- Andrew Dixon
- Atlantic Gateway
- BeemCar Ltd
- Ben Puddicombe
- Cheshire and Warrington Enterprise Partnership
- David Bamford
- Edward Davies
- Elizabeth Hamilton
- Gary Legg
- Hannah Moxon
- High Speed UK
- Jie Ji
- John Bradley
- Keir Baker
- Leeds Bradford Airport and Newcastle Airport
- Michael Bell
- Paul Batty
- Ross Cairnie
- Simon Horton
- Stephen McFarland
- Steve Hughes
- Thomas Price
- Transport for Greater Manchester
- University of Liverpool, Department of Geography and Planning



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We are very grateful to Luis and Jakob at MapOut, who created the graphics for the Future Roads, Pennines National Park and Hyperloop concepts.

Heathrow



www.WeMapOut.com

GREAT NORTH PLAN

