

DELIVERING A NORTHERN INFRASTRUCTURE STRATEGY



Foreword



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What do we – those who live and work in the North - want our Northern Powerhouse to be? I would argue that the prize is a region that has economic power and presence on the world stage, and combines that with enviable quality of life. It is a region that looks to its future not the past. A region that draws on its diversity to be much more successful than the sum of its parts. A region that is attractive and successful for those living in its cities and those living in rural areas. A region that is driving the UK's economic success, not chasing it.

As we set out to develop this report, we asked ourselves, how do we make that Northern Powerhouse a reality? Our conclusion is this can only be achieved if the North takes control of its own destiny and takes a strategic approach to development across the North.

ICE supports the devolution of infrastructure policy. As ICE argued in our State of the Nation: Devolution report it helps to drive local growth and means key decisions can be taken closer to the people that are affected and on a greater understanding of local needs.

Devolution enables the North to take greater responsibility for the planning and delivery of its infrastructure networks. Therefore, it is important that a coherent strategy is put in place to ensure that this is done effectively.

This report recommends a series of strategies for improving the North's infrastructure; including addressing the region's housing shortage, co-ordinated by the leadership of a Council for the North that has both business as well as political representation.

I would like to thank all those who have contributed to preparing this report. In particular, the steering group and the ICE project team who have invested a considerable amount of time and effort.

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Contents

1.	Executive summary	4
2.	Recommendations	5
3.	Introduction	6
4.	Governance	7
5.	Skills	10
6.	Funding	14
7.	Energy	18
8.	Transport	21
9.	Digital	25
10.	Housing	28



1. Executive Summary

Our Delivering a Northern Infrastructure Strategy report sets out a series of recommendations to enhance the planning, delivery and operation of the North's infrastructure.

The North is home to 15.2m people and generates £290bn in economic output. It has five of the UK's largest cities and a number of world-leading universities. It has huge strength in sectors as diverse as energy, food and healthcare.

The North is nonetheless underperforming. It's productivity lags the UK average by 11%, it has a higher proportion of lower skilled workers (more than 50%¹) and 39 of the 50 most deprived areas² in England are in the North³.

This report considers what the North should do if it is to become a truly global-leading region, measured both by economic productivity and quality of life. We focus first on the governance we believe is needed to allow the North to drive its own future, and then on the strategies required for specific infrastructure sectors: energy, transport, digital and housing.

Taking control – leadership for the North

Underpinning the Northern Powerhouse vision must be a clear strategy for planning and delivering high-performing infrastructure, alongside a spatial plan to guide and co-ordinate development. We support the idea put forward by IPPR North to establish a Council for the North so that a representative body with a pan-Northern remit can take responsibility for decisions that affect the whole of the North and the prioritisation of investment necessary to take optimal decisions for the region.

Delivering an ambitious infrastructure investment programme is not possible without the right funding and financing mechanisms in place. It is necessary for the Government to increase the level of infrastructure investment it makes in the North and in parallel to devolve sufficient revenue raising powers so that the region can begin funding growth from its own resources.

It is also important that the Council is given the remit to co-ordinate regional skills development to ensure that the right workforce is in place to deliver a Northern infrastructure investment programme.

Investing in our future – strategic objectives for the North

There are a number of strategic steps that should be taken to improve the performance of the North's infrastructure.

Better connectivity and improved integration across the region's transport networks will lead to faster, more frequent and reliable journeys. Transport for the North's (TfN) primary focus should be on developing programmes that deliver these benefits. The arrival of HS2 to the region must also be a key consideration in network planning.

Looking further ahead there is an onus on TfN to begin considering how new technologies can play a part in the North's future transport networks, including the digital railway, autonomous vehicles and mobility as a service.

The North should seek to enrich its energy mix by fully developing specialisations in renewables and other emerging energy technologies. As part of this approach the region should also begin to build its capacity to export generation to the UK and internationally.

Quality digital infrastructure can unlock economic growth and improve the delivery of other infrastructure services e.g. public transport and energy management. The North must have best-in-class digital infrastructure with complete geographic coverage in order for its businesses and citizens to maximise productivity and social benefit.

There is a critical housing shortage in the North. As a first step to overcoming this, local authorities should put in place standard approaches to assessing housing need. Secondly, a system that enables local authorities to access flexible funding for new housing development should be created.

1 ONS (2017) 'Number of workers in each skill level by nationality group and region'

2 'Areas' refers to Lower layer Super Output Areas, averaging a population of around 1,500, or 650 households.

3 ONS (2016) 'Proportion of LSOAs in the most deprived 20% nationally for towns and cities in England by region'



2. Recommendations

Taking control – leadership for the North

1. To oversee the delivery of the Northern Powerhouse vision, we support the creation of a Council of the North with representation of LEPs alongside metro Mayors and Leaders of local authorities.
2. To ensure the North's balanced growth and improved productivity, a Northern Infrastructure Strategy should be developed.
3. A Northern Spatial Plan should be produced to guide and co-ordinate integrated infrastructure development.
4. The provision of lifelong learning and development should be co-ordinated to ensure the North has the future skills required by employers and to deliver its infrastructure investment programme.
5. To kick-start the North's economic resurgence, central Government should increase the level of infrastructure investment and empower Transport for the North to determine transport investment priorities.
6. So the North can, over time, fund growth from its own resources, central Government should devolve sufficient revenue raising and borrowing powers.
7. The North must adopt a more proactive and ambitious approach to encouraging private investment.

Investing in our future – strategic objectives for the North

8. The North should fully develop its specialisations in renewables and new energy technologies to maintain its position as the country's energy powerhouse.
9. Transport for the North must develop programmes that enhance network integration and connectivity, enable economic development and ensure that the region is ready for the arrival of HS2.
10. Transport for the North should champion the adoption of new technologies in both passenger and freight transport, including the digital railway, autonomous vehicles and mobility as a service.
11. The North must acquire and maintain best in class digital infrastructure with complete geographic coverage to unlock economic growth and enhance the delivery of infrastructure across the region.
12. To address the North's housing shortage, local authorities should put in place standard approaches to assessing need and have access to flexible funding arrangements for new developments.



3. Introduction

The Northern Powerhouse concept places infrastructure at the heart of improving economic growth and rebalancing the country's economy⁴. Effective infrastructure supports job creation and thriving, sustainable societies, and the Government has repeatedly emphasised its commitment to infrastructure as a means of improving productivity⁵.

The North of England needs sustained, coherent investment not only in high quality, resilient infrastructure but also in giving people the cross-sectoral skills to deliver and maintain them. The area has a wealth of high profile and growing businesses and rich sets of expertise, creativity and assets; however, there is potential for the North to grow further.

There have been significant investments in infrastructure in the North over the past few years, with a more than doubling of capital investment from £3bn in 2013-14 to £6.7bn in 2015-16⁶. However, while investment may be labelled as part of the Northern Powerhouse, the reality is there is currently no prioritisation or co-ordination of spend in the region.

The starting point should be to understand what infrastructure is required, where and when.

To implement this, ICE recommends that arrangements and relationships between local and regional government and stakeholders – particularly businesses and academia – are formalised through the creation of an overarching, strategic body whose aim is to provide a coherent regional approach to meeting the North's priorities. Having a single voice for the North on infrastructure will help maximise investment.

That body would then be responsible for putting in place a regional infrastructure strategy, spatial plan and infrastructure pipeline (with the intention of identifying specific upcoming projects and providing foresight on skills/education requirements). Developing these would help business and other stakeholders by giving a clear picture of the North's direction of travel, type of work becoming available and the skills needed to deliver them.

This report does not, itself, provide these elements but sets the strategies we believe are required and the key areas they should cover. We have concentrated on the years up to 2032-33, the estimated date of HS2's completion to Manchester and Leeds⁷. The transformative effect that HS2 will have on the North's connectivity seems a suitable point at which to define our aspirations and the role of infrastructure in delivering them.



4 See, for example, HM Government/TfN (2015) 'The Northern Powerhouse: One Agenda, One Economy, One North', HM Government (2016) 'The Northern Powerhouse Strategy' and DIT (2017) 'Northern Powerhouse Investment Opportunities'

5 See, for example, HM Treasury (2016) 'Autumn Statement 2016' and HM Government (2017) 'Building our Industrial Strategy'

6 HM Treasury (2014) 'National Infrastructure Plan Pipeline Spreadsheet Summer 2014 Update' and HM Treasury (2016) 'National Infrastructure and Construction Pipeline December 2016 Update'

7 BBC (2017) 'What do we know about HS2?'



4. Governance

Recommendations

- To oversee the delivery of the Northern Powerhouse vision, we support the creation of a Council of the North with representation of LEPs alongside metro Mayors and Leaders of local authorities.
- To ensure the North's balanced growth and improved productivity, a Northern Infrastructure Strategy should be developed.
- A Northern Spatial Plan should be produced to guide and co-ordinate integrated infrastructure development.

Scene setting

Economic success and improved productivity is underpinned by integrated and coordinated economic policy. The OECD has shown that the most economically successful regions require vision and strategy but also have aligned institutions, not only to avoid duplication but also to ensure that economic development policies complement one another to maximum effect⁸.

Table 1 (below) shows the number of local and regional authorities covering the North of England. With 97 bodies, each with different responsibilities in different places, leaders can struggle to align institutions, investment and infrastructure across functional geographies. For effective economic and infrastructure development there is a need for overarching co-ordination.

To make the most of current and future investment in the North, there is a need for agglomeration and, like London, to become clearly defined geographically and politically. While the Northern Powerhouse would not have to go as far as having a directly elected mayor and assembly, there are clear benefits available for it to grow beyond the conceptual structures in place at present.

As such, regional governance should be based around delivering the infrastructure to support resilient economies, for example through co-ordinating spatial planning, transport and skills policies.

“The North is home to great cities but for them to achieve their potential and compete at a global level they need to work together.”

Table 1: Local and regional administrative bodies in the North of England⁹

	North East	North West	Yorkshire and Humber	North of England
District Councils	0	20	7	27
County Councils	0	2	1	3
Single tier authorities	12	21	14	47
Combined Authorities*	1	2	1	4
LEPs	2	5	5	12
Transport bodies**	1	2	1	4
Totals	16	52	29	97

⁸ OECD (2015) 'Local Economic Leadership'
⁹ ONS (2016) 'Local Authority District to County (December 2016) Lookup in England'

*Refers to formally constituted CAs only.

**Passenger Transport Executives and TfGM, plus the pan-regional Transport for the North



4. Governance

Analysis and recommendations

The idea behind the Northern Powerhouse is to improve the growth and productivity of the North of England through the better linking and agglomeration of its cities: there is a recognition that the North is home to great cities but for them to achieve their potential and compete at a global level they need to work together. This report argues that for this to happen and for all of the North of England to succeed it is crucial that a Northern Infrastructure Strategy is put in place.

However, to ensure that the Strategy can be delivered effectively, governance structures are needed to allow the right decisions to be made at the right time, with the right people then empowered to deliver.

Council of the North

Proposals for an overarching regional body with particular remit on infrastructure are not new. In 2016, ICE argued for cross-sectoral regional infrastructure forums, bringing together government, regulators, businesses and stakeholder representatives to develop regional infrastructure strategies¹⁰.

In 2017, Institute for Public Policy Research (IPPR) North¹¹ put forward proposals to establish a Council of the North, comprising metro mayors and the Leaders of the authorities shown in Table 1 (above).

This report endorses and develops both ideas. We believe the North of England would be best served by establishing a Council of the North along IPPR North's lines but strengthened by including representatives from business including LEPS, and from academia.

In three of the four sectors considered in this report (digital, energy and housing), the private sector will be predominantly responsible for infrastructure planning and delivery and therefore should be involved in helping inform the

Strategy. While there may be concerns over conflicts of interest, these can be managed, through being open and transparent around who is involved and how the Council would not replace the work of local and Combined Authorities but rather co-ordinate and commission¹². The Council's aim should be to identify infrastructure need, maximise investment and help ensure our networks are integrated and resilient. There would also need to be careful coordination with TfN to avoid duplication. Nevertheless, TfN demonstrates that strategic decision making capacity can be created at the level of the North in a way that respects democratic structures.

As set out previously by both ICE and IPPR North, the system should be one of collective responsibility where the Council would work to establish infrastructure need and the key elements of strategic planning best achieved at the regional level. Central to this is the development of a Northern Spatial Plan and a Northern Infrastructure Strategy.

“The Northern Infrastructure Strategy should identify infrastructure need, ensuring the North of England maximises its economic growth potential while enhancing social cohesion and quality of life.”

A Northern Spatial Plan

The Council of the North should work closely with local planning authorities and other relevant statutory bodies to develop a Northern Spatial Plan: a strategic overarching development framework for resilient and sustainable growth for the North of England.

The Spatial Plan should be a lens to examine and set out current and future land use, infrastructure, their interdependencies including how they are – and will be – affected by new governance and institutional arrangements.

The Spatial Plan should complement rather than replace existing Local Plans and emerging Combined Authority spatial frameworks: planning authorities would retain control over how and what development is permitted in their areas. Rather, the Spatial Plan would establish a vision and strategy specific to the North of England, identifying in overall terms the need for development. The intention is to address the policy gap between planning determined by local authorities, for example housing developments, and those controlled at the national level such as energy.

It is important to be clear the Spatial Plan would not be a reworking of the Regional Spatial Strategies¹³ which were in place from 2004 and 2010, and often criticised for their “length and complexity of their preparation; the undemocratic nature of the bodies preparing them”¹⁴. This was particularly the case in relation to their top-down housing targets.

As such, the Spatial Plan would be high-level overview. It would ensure the North of England has a clear picture of the strategic direction through outlining the policies, priorities, programmes and land allocations required to achieve sustainable development up to 2032-33. Together with the Infrastructure Strategy, it would set the basis for cross-authority planning and infrastructure investment.

10 ICE (2016) 'State of the Nation 2016: Devolution'

11 IPPR North (2017) 'Taking back control in the North: A Council of the North and other ideas'

12 Ibid

13 See, for example, Government Office for the North West (2008) 'North West of England Plan Regional Spatial Strategy to 2021'

14 House of Commons Communities and Local Government Committee (2011) 'Abolition of Regional Spatial Strategies: a planning vacuum'



Northern Infrastructure Board

We propose that a Northern Infrastructure Board is created, with representation of the main Council of the North organisations who have responsibility for the North's critical infrastructure.

The Northern Infrastructure Board should identify the area's requirements through collaboration with local communities, relevant government departments, regulatory and delivery bodies, local government, businesses and academia. The outcome should be a Northern Infrastructure Strategy.

The recommendations of the Infrastructure Board, as endorsed by the Council, could then be translated into forward programmes of delivery agencies, such as Network Rail and Highways England.

A Northern Infrastructure Strategy

The Northern Infrastructure Strategy should identify infrastructure need, ensuring the North of England maximises its economic growth potential while enhancing social cohesion and quality of life. TfN is producing a strategy to make the delivery of transport services more effective¹⁵ and this should prove to be a useful element of a wider infrastructure strategy.

Building on the recommendations set out in this report, the Strategy would highlight key infrastructure challenges, and economic, environmental and social benefits and provide potential investors with a degree of certainty around future planning and development within the region.

It is important that the Strategy's approach recognises infrastructure's interdependencies, not only covering the key sectors of housing, energy, digital and transport set out in this report but also including flood risk management, waste and water, alongside the skills learning and development necessary to deliver and maintain the North's infrastructure.

Managing regional infrastructure as a system requires effective collaboration, planning and sharing of information to provide a systems resilience as well as individual sector resilience. The infrastructure system fundamentally requires joined up management, long-term planning and a regulatory and policy framework which provides clarity and certainty for all stakeholders through a pan-North approach.

Therefore, in drawing up the Strategy it is important that the Northern Infrastructure Board works with private utilities, communications and other data owning companies in order to develop an appropriate marketplace for access to and most effective, shareable use of data.

Such a systems approach is already being taken in Scotland¹⁶. There, a resilience advisory board composed of representatives of the emergency services and infrastructure sector advises the Scottish government. This could provide an excellent starting point for the North of England.

A Regional Infrastructure Pipeline for the North of England

It is not possible to improve infrastructure provision in the North, be it enhanced transport connectivity or secure energy supply, if there is not a workforce in place to deliver and maintain it. To generate economic growth and improve overall quality of life through infrastructure will require increased skills provision.

The development of a Regional Infrastructure Pipeline of projects for the North of England is key to this: identifying the skills, training and wider resources required in order to deliver them. The proposed Council of the North's Infrastructure Board would be an ideal body to develop it as part of its wider Northern Infrastructure Strategy.

Using the National Infrastructure and Construction Pipeline (NICP) as a starting point, the objective of the regional pipeline will be to detail the projects and programmes of regional significance, providing detail missing from the national picture. The overall aim would be to create a dynamic, 'living' document that maps on to and cross-references the NICP while giving the level of specification required by local employers and training providers.

Mapping out infrastructure developments can assist in smoothing demand cycles and improving workforce mobility and retention. By providing a clear picture of project and work type, a regional infrastructure pipeline for the North of England would help to prevent delays in the delivery of key infrastructure projects.

¹⁵ Transport for the North (2017) 'Strategic Transport Plan'

¹⁶ Scottish Government (2017) 'Resilience Advisory Board for Scotland'



5. Skills

Recommendation

- The provision of lifelong learning and development should be co-ordinated to ensure the North has the future skills required by employers and to deliver its infrastructure investment programme.

Scene setting

As demonstrated in Table 2 (below) the North of England has a greater estimated proportion of lower skilled workers – as a percentage of the total workforce – than the English average. This is particularly apparent in the North East where 51% of workers are estimated to be either 'lower middle' or 'low' skilled compared to a 45% national average.

Across all skill levels in the North of England, the proportion of workers from abroad is 6%, markedly lower than the English average of 10%, and much lower than 23%, which is the proportion in London. This shows that the North of England is more dependent on 'homegrown' skilled workers than the rest of the country, giving greater impetus to the need to ensure suitable co-ordination of skills programmes is put in place and maintained.

Table 2: Estimated proportion of skilled workers in North of England¹⁷

	High %	Upper middle %	Lower middle %	Low %
North East	22.3	27	38.6	12.1
North West	25.2	26.5	37	11.2
Yorkshire and Humber	24.7	26.8	36.1	12.3
North of England	24.5	26.7	37.2	11.7
England	27.3	28	33.9	10.7

“ Universities can act as lynchpins in regional networks joining up business and industry with the knowledge base. ”

¹⁷ ONS (2017) 'Number of workers in each skill level by nationality group and region'



Analysis and recommendations

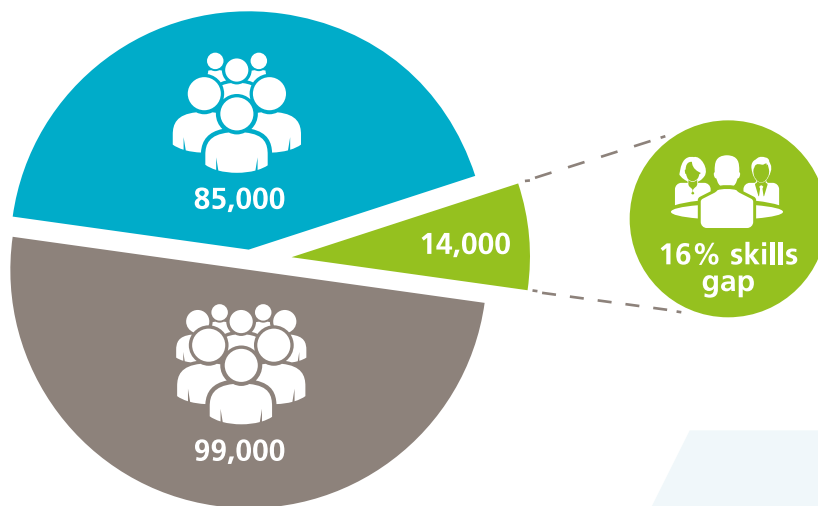
Qualifications and skills required

The lower skills and educational attainment in the North of England acts as a drag on economic growth. This is especially important because it is projected that by 2022, well over half (58%) of new jobs created in the North will require a qualification at A-level or above, with only one in 20 new jobs (6%) requiring no qualifications at all¹⁸.

The National Infrastructure Plan for Skills, highlighted an overall 16% skills gap (see Figure 1, right) in the built environment sector for the North of England, with demand expected to peak in 2020 at 99,000 up from 85,000 in 2015, giving the North the second greatest skills gap in England.

Looking at sub-sectors of built environment skills, the gap is forecast to be greatest for skilled trade and labour, where there is expected to be a 20% shortage by 2020 in the North of England. However, in comparison to other English regions this is narrow, for example in the South West it is expected to be 28% and in the Midlands 37%²⁰.

Figure 1: Northern Powerhouse built environment skills profile (2015)¹⁹



By 2022, 58%

of new jobs will require a qualification at A-level or above.

Only 6% will require no qualifications



¹⁸ UK Commission for Employment and Skills (2014) 'Working Futures 2012 to 2022'

¹⁹ HM Treasury (2015) 'National Infrastructure Plan for Skills'

²⁰ HM Treasury (2015) 'National Infrastructure Plan for Skills'

5. Skills

Projected qualification attainment

Figures 2 and 3 (right) demonstrate the current (2014) highest qualifications in the North of England and projections for 2024. The North lags - and will continue to lag - behind the UK average. For example, across the North, 16.2% of people have a first degree as their highest qualification for the UK as a whole it is 20%, a difference of 3.8%.

Projections show that unless the approach is altered, this gap is set to increase to 4.9% in 2024. Similar numbers are seen for university level qualifications as a whole.

Figure 2: Highest qualification held, % of population, North of England and UK, 2014²¹

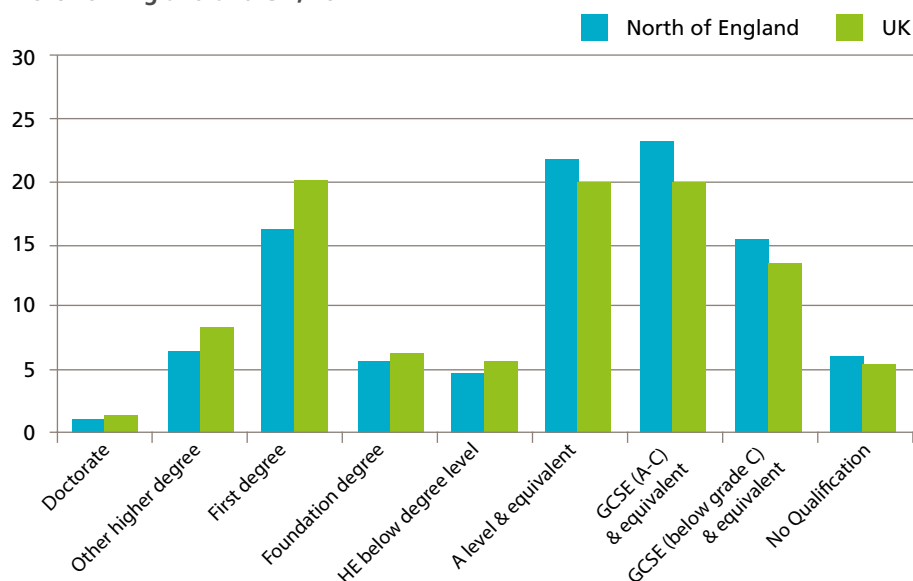
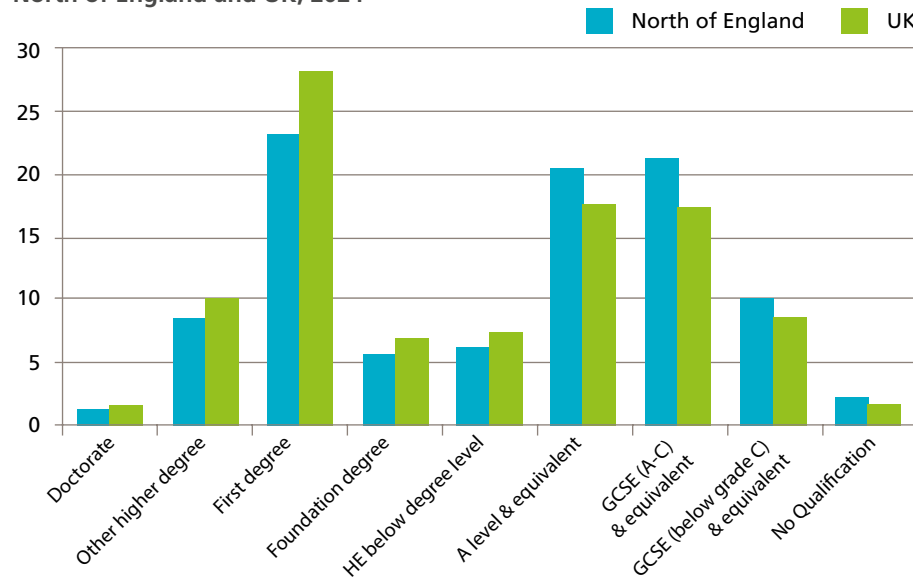


Figure 3: Highest qualification held, % of population, North of England and UK, 2024



In the North **16.2%** of people have a first degree as their highest qualification for the UK as a whole it is **20%.**

21 UKCES (2016) 'Working Futures 2014-2024: Annexes May 2016'



Universities

There are five universities in the North East, 14 in North West and 11 in Yorkshire and Humber. Together, the 30 universities in the North of England represent 22% of the English total. They have combined revenue of £5.9bn and employ around 73,000 people²².

As such, universities can act as lynchpins in regional networks joining up business and industry with the knowledge base, and helping them to access both skills and the knowledge they need to drive business development and growth. Indeed, the 2013 Witty Review suggested that universities should assume a responsibility for facilitating growth²³. Therefore, it is recommended that the North's universities join with other learning providers such as FE colleges, local authorities and LEPs to help develop a skills plan for the North of England.



By 2024 it will be
23.2% and
28.1% respectively

A skills plan for the North of England

As indicated above, delivery of infrastructure improvements is key to realising the Northern Powerhouse vision. Progress is being made with the North of England seeing a doubling of investment in infrastructure over the past decade, a trend which is set to continue²⁴. Doing so requires skilled workers to construct and, importantly, run and maintain such developments. However, the evidence shows the North of England suffers (and is likely to continue to suffer) from a lack of skilled employees. It therefore follows that a successful Northern Powerhouse hinges on the North improving its skills provision planning.

By highlighting upcoming developments, the proposed regional infrastructure pipeline (see Governance section) will help identify the skills needed in the near future, giving relevant and timely labour market intelligence. Nevertheless, the question remains of how best to deliver them.

As skilled workers – particularly in the infrastructure construction sector – are mobile, it makes sense for skills gaps to be addressed on a regional basis through a Northern Skills Plan. The Council of the North, working with education institutions and training providers, should help to co-ordinate the provision of learning and development to ensure the North has the skills it requires. It should organise and facilitate ongoing employer-educator dialogue to match identified needs with sustainable provision.

Potentially using Wales' Regional Skills Partnerships²⁵ as a model, the North of England's Skills Plan must recognise that a region's people is its greatest asset supporting employee access to high-quality education, training and life-long learning providing more effective use of skills to drive productivity and growth.

The Skills Plan should examine requirement challenges and opportunities, learning from areas (both geographic and economic) which are performing well and outlining how to assist those which require support. It should also influence the provision of skills based on the North of England's economic need, to support growth and improve productivity with a particular emphasis on delivering and maintaining infrastructure projects in each region.

In line with the North of England's geography, the Skills Plan should ensure a pan-North strategic fit working with anchor and other regionally important companies to support the work of local authorities and LEPs and taking close consideration of the identified priorities for those areas.

The North has challenges due in part to its differing geography ranging from inner city Manchester with its wide employment make up and significant transportation links, to the remote and rural areas of Cumbria with low population densities. In addition, consideration will need to be given to the economic influence of bordering regions.

The ability to meet the North's aspiration for transformational growth and rebalancing the economy is dependent not only on investment. It is also essential the skills to deliver are available in the workforce.

²² Universities UK (2014) 'The Economic Impact of the North East Higher Education Sector'

²³ BIS (2013) 'Universities and growth: the Witty review'

²⁴ HM Treasury (2016) 'National Infrastructure and Construction Pipeline December 2016 Update'

²⁵ Business Wales (2017) 'Regional Skills Partnerships'

6. Funding

Recommendations

- To kick-start its economic resurgence, central Government should increase the level of infrastructure investment in the North
- So ultimately it can fund growth from its own resources, central Government should devolve to the North sufficient revenue raising and borrowing powers.
- The North should adopt a more proactive and ambitious approach to encouraging private investment in the region.

Scene Setting

Underinvestment in Northern infrastructure

The North is suffering from a legacy of under-investment going back many decades, affecting the delivery of new projects and the maintenance of existing assets. It is evident in the poor East-West road connections, with the M62/A63 corridor experiencing 70-80% risk of congestion during peak periods²⁶. It is evident in the slow speed of railway connections between the main cities of the region. Leeds to Manchester, for example, has an average speed of 49 mph and Hull to Sheffield an average speed of 43 mph. Furthermore, many cities in the North, particularly Leeds, lack high capacity public transport networks. This results in productivity levels that are around 25% lower than the English average²⁷.

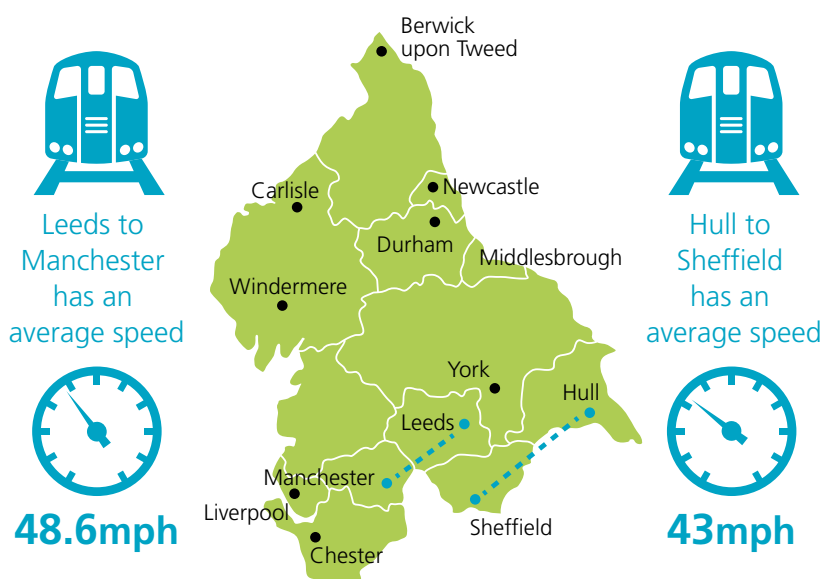
“According to the OECD, the UK Government has invested less in UK infrastructure as a percentage of GDP than each of the US, Canada and France in every year from 1980 to 2011.”

²⁶ Jacobs/TfN. Major Roads Report (Awaiting publication)

²⁷ TfN (2016) 'Transport, productivity and rebalancing the UK'



Rail connections between the North's cities are slow:



The level of investment in the North is a primarily a consequence of the UK's fiscal centralisation where regions have neither the authority nor the resources to control their own future. Instead, the North is heavily dependent on decisions taken in Whitehall, as to the proportion the UK's wealth invested in infrastructure generally, and the allocation of that funding across the country.

The UK system of funding local authorities relies on central Government distribution of general taxation. According to the City Growth Commission report, in 2014 the UK raised and controlled locally around 1.7% of GDP compared to an average of 10% for OECD countries, and up to 20% in federal democracies such as Germany²⁹. That means in Germany taxes raised centrally and locally are roughly equal, whereas in the UK around 94% is centrally raised and distributed³⁰.

In practice, the North has little or no ability to raise funding locally to invest in priority projects, and certainly not on the scale required to realise the Northern Powerhouse economic opportunity. This position is compounded by the failure of successive Governments to invest in the UK's infrastructure, and to allocate sufficient of that funding to the North.

²⁸ The Government's decision to allow local government to retain incremental business rate income, announced in 2016 has been delayed with legislation to enable it being absent from the 2017 Queen's Speech (Property Week (2017) 'New minority government puts business rates reform on the back burner'

²⁹ RSA (2014) 'Unleashing Metro Growth Final Recommendations of the City Growth Commission'

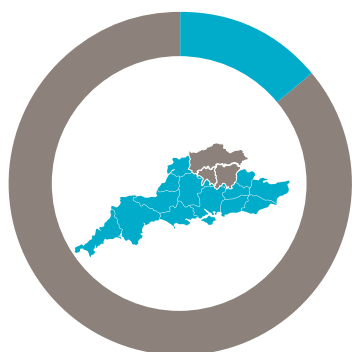
³⁰ Council Tax, typically makes up just 6% of the total tax take, and cannot be increased by more than 2% each year without a referendum.

6. Funding

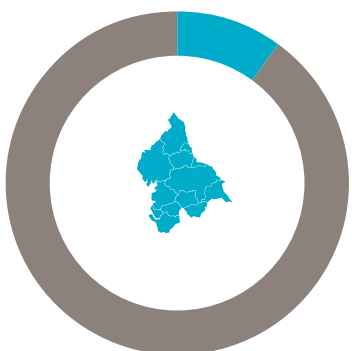
Expenditure on large-scale infrastructure -



65% (£326bn)
benefiting the whole of the UK



14% (£72bn)
in the south of England and



10% (£48bn)
for projects in the North

Low levels of infrastructure investment

According to the OECD, the UK Government has invested less in UK infrastructure as a percentage of GDP than each of the US, Canada and France in every year from 1980 to 2011. The National Needs Assessment published in 2016 suggests that between 2010-11 and 2014-15, £49bn has been invested in infrastructure from a combination of public and private sources³¹. That falls a long way short of the OECD recommended target of £80bn per year by 2020-21³² and the proportions of GDP spent on Infrastructure by competitors such as Germany, the US and Australia who tend to spend around 2.5-3.5% of GDP.

If the £80bn per year figure were allocated on a per capita basis, it would mean £18.5bn a year - or more than £11,000 per head - being spent on infrastructure in the North of England. The Government's most recent National Infrastructure and Construction Pipeline (2016) shows a total expenditure on large-scale projects and programmes of £502bn. Based on the Government's classifications, 65% (£326bn) is for projects benefiting the whole of the UK. 14% (£72bn) is for projects in the south of England and 10% (£48bn) for projects in the North.

On a projected spend per head basis, it appears there will be equal funding between the North and the South over the period³³. But IPPR takes issue with that conclusion, reallocating the classification of the national spend to reach the view that London will receive a third more infrastructure spending than that attributable to all the English regions³⁴. Furthermore, looking at projected transport spending in isolation, IPPR estimates that transport spending between 2016-17 and 2020-21 at £1,870 per head in London compared to £280 in the North³⁵.

Analysis and recommendations

It is clear the currently planned level of central Government expenditure on infrastructure will not deliver the level of change required for the economic opportunity of the Northern Powerhouse to be realised, or indeed the national productivity gap to begin to be addressed. Additional new sources of funding are needed: these could be central or local, but in reality, a combination of both will be required.

Local infrastructure funding

Over recent years, Government policy towards devolution has led to a range of initiatives, in particular City Deals and Combined Authorities, which increase local control of resources. Greater Manchester has been at the forefront of proposing and taking advantage of a range of approaches to greater fiscal devolution. A summary of the Manchester story is set out below in Box 1.

Box 1: Infrastructure funding case study: Greater Manchester Combined Authority

Greater Manchester Combined Authority (GMCA) has argued that funding for transport infrastructure should place greater weight on the economic payback and wider economic returns of investment. They also suggest the process of linking benefits to return is more easily achievable at a regional level than locally as multi-modal transport systems can be considered³⁶.

This led to an 'earn back' model agreed in the 2012 Greater Manchester City Deal³⁷. GMCA committed to investing £1.2bn in infrastructure with the majority provided local through prudential borrowing against revenues and a levy on the local authorities³⁸. The agreement saw defined contributions made to GMCA split between resource and capital.

31 ICE (2016) 'National Needs Assessment'

32 OECD (2015) 'OECD Economic Surveys: United Kingdom 2015'

33 KPMG (2016) 'National Infrastructure and Construction Pipeline: KPMG Analysis'

34 IPPR (2017) 'Paying for our Progress'

35 Ibid

36 TfGM/TfL (2014) 'Investing in City Regions'

37 DCLG (2012) 'Manchester City Deal brings 6,000 jobs boost'

38 GMCA (2012) 'Greater Manchester City Deal'



Attracting investment

None of the mechanisms seen to date actually change where or how taxation is raised. The low value economy of the Northern Powerhouse region means, compared to the rest of the UK were it to be fiscally independent it would not be able to generate a surplus of wealth to invest. Even Greater Manchester, the economically most successful of the northern cities, is estimated to spend £4bn to £5bn more than is raised in tax revenues from the city region³⁹.

It follows that in the near term, central Government must kick-start investment in the growth of the North's economy, until the region can be economically self-sustaining. In the medium to longer term, greater fiscal autonomy will not only support and incentivise investment but will also enable the Council of the North and its stakeholders to design, plan and deliver appropriate infrastructure across the region that will match its needs and priorities.

In 2014, the 'earn back' scheme was replaced by the investment fund in the first GMCA devolution deal. This was due to difficulties between GMCA and HM Treasury in agreeing the formula to determine revenues³⁹.

The new investment fund - standing at £1.5bn - is to be assessed at five-yearly at independent 'gateway' reviews where GMCA must demonstrate the realised economic benefits of the scheme. The continuation of the fund will depend on evidence that its use has contributed to economic growth⁴⁰.

The investment fund is not tax increment financing schemes, as there are no local tax revenues involved. Instead, it is funded from a combination of grants from the Department for Transport, GMCA revenues and borrowing and local, third party contributions⁴¹. As such, it resembles a conditional grant scheme with conditions open to central-local negotiation⁴².

Given fiscal constraints, the North should also explore much more actively the scope for investors to bring forward schemes that can be privately financed. Private investment is not a substitute for the ultimate funding of schemes, which must come from users or taxpayers. But it could delay the start of payment for new infrastructure and spread costs over time. This would allow the North to put in place the infrastructure investment it needs now, and pay for it later.

Borrowing is a fair way to realise investment in infrastructure, in matching more closely those who benefit from infrastructure with those who pay for it. For example, if a new railway were to be paid for over 30 or 40 years, it would be funded by those using it over many decades, not entirely from taxpayers today. In addition, investments in the North's infrastructure will grow its economic wealth, and increase its spending capacity in the future.

Steps have been taken over the last few years to advertise to investors, both domestic and overseas, the investment opportunity of the Northern Powerhouse⁴⁴. However, much more could be done to sell to investors a vision of the Northern Powerhouse future as a whole, rather than the investment opportunity in individual city regions.

Specific schemes

The Government has recently signalled interest in receiving privately promoted proposals for infrastructure development, for example in the rail sector. The Catch-22 is that authorities are generally reluctant to support schemes which lack detailed business cases and private promoters struggle to attract funding to develop those cases without clear political support. Given the fiscal position, we recommend the region adopts a more proactive and ambitious approach to encouraging private investment.

The region could also embrace a much more holistic approach to borrowing potentially creating a regional investment fund. Central Government support may be needed for relaxation of prudential borrowing limits, (see Housing section), but with the benefit of reducing the level of central Government funding required.



39 House of Commons Library (2016) 'Local government in England: capital finance'

40 GMCA (2014) 'Greater Manchester Agreement'

41 GMCA (2017) 'GMCA Capital Programme 2016/17 – 2019/20'

42 House of Commons Library (2016) 'Local government in England: capital finance'

43 The Guardian (2014) 'Cameron hails plan to fast-track devolution for English cities'

44 HM Government (2017) 'Northern Powerhouse: Investment Opportunities'

7. Energy

Recommendation

- The North should fully develop its specialisations in renewables and new energy technologies to maintain its position as the country's energy powerhouse.

Scene Setting

Electricity generation

The North of England is home to 23GW of electricity generation capacity⁴⁵, 41% of the English total (see Figures 4 and 5 for details). By way of comparison, the North of England has a population of around 15.2 million or 27% of the English total.

Figure 4: Electricity generation capacity in the North of England⁴⁶

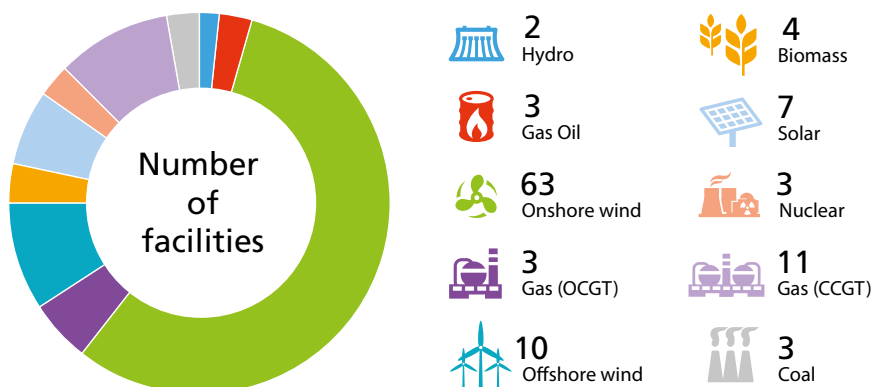
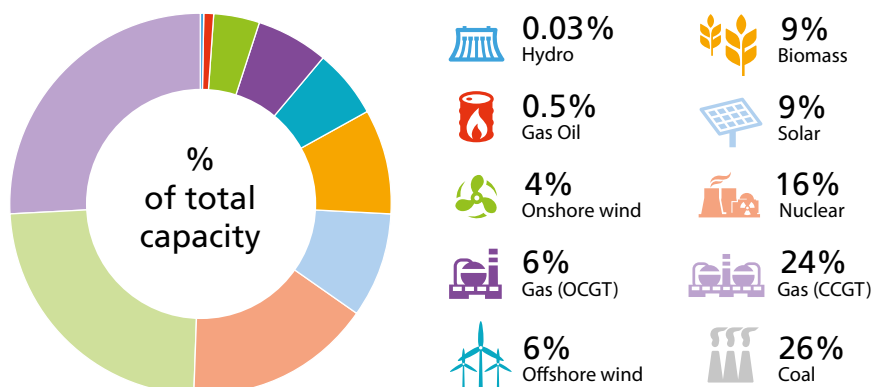


Figure 5: Number of electricity generation facilities in the North of England⁴⁷



⁴⁵ BEIS (2016) '5.10 Power Stations in the United Kingdom'

⁴⁶ Ibid

⁴⁷ Ibid



Gas capacity

The North of England is home to five of the UK's seven reception terminals for domestically produced gas from the Irish and North Seas⁴⁸ one of two North Sea oil pipeline terminals and seven of the nine onshore gas storage sites, providing 1.1bn m³ - or 75% - of the UK's 1.5bn m³ onshore gas storage⁴⁹.

Energy distribution

In addition to the high voltage electricity networks that are owned and operated by National Grid, the North of England area has three low voltage electricity distribution operators: SP Energy Networks (covering Merseyside and Cheshire), Electricity North West (North West England) and Northern Powergrid (Yorkshire and North East). Between them, they manage 200,000km of cables and overhead lines and plan to invest an average of £400m per year in the current price control period running up to 2023⁵⁰.

The high pressure gas transmission network is again owned and operated by National Grid. There are also two gas distribution networks in the North: Northern Gas Networks (Yorkshire and the North East England) and National Grid Gas Distribution (North West England). Together they distribute gas to around 9.4 million customers and will invest an annual average of £249m to 2021⁵¹.

“The North of England has significant potential across a wide range of energy technologies to maintain and build on its position as the country's energy powerhouse.”

Energy demand

In 2015, the North of England consumed 67,000 GWh of electricity, 28% of the English total. For non-domestic electricity demand in particular, the region has the highest average consumption per meter: close to 90,000 MWh compared to an English mean of 74,000 MWh⁵².

For gas, across the North of England in 2015 consumption stood at 130,000 GWh, which represents 32% of the English total⁵³. Non-domestic gas consumption was over 100 MWh more than the English average⁵⁴.

The north of England has the local authorities with the greatest proportion of homes off the gas grid. For example, in Eden in Cumbria and Ryedale in North Yorkshire 66% and 57% of properties do not have access to mains gas. It is also notable that properties off the gas grid are more likely to suffer from fuel poverty.

Analysis and recommendations

National Grid's Future Energy Scenarios forecasts that demand in the North of England will continue to slow until around the mid-2020s before picking up again around 2030 as transport and to a lesser extent, heat is electrified⁵⁵.

All coal power stations are due to close by 2025 due to emissions regulations and several open cycle gas turbine (OCGT) and combined cycle gas turbine (CCGT) gas plants will come to the end of their lifespan in the next decade. The existing nuclear plants in the North of England at Hartlepool and Heysham - with six reactors and 3.5GW capacity between them - are all expected to shut down by 2030⁵⁶.

This might seem like a grim outlook but the North of England has significant potential across a wide range of energy technologies to maintain and build on its position as the country's energy powerhouse. To do so it must further develop its strength in energy generation, particularly in renewables and new energy technologies, allowing it export to the rest of the UK and abroad.

Renewables

The North of England is fast becoming the leading English area for renewables, generating 26,000 GWh or 48% of the country's total in 2015, in particular wind (both on and offshore) with 9,000 GWh generated in 2015 in the North of England and 5,000 GWh in the North West alone⁵⁷.

While central Government policy on subsidies means it is unlikely there will be further large-scale onshore wind farms in the near future, offshore wind is set to continue its expansion. There is 1GW offshore capacity under construction with cabling that will landfall in the North of England and a further 7.3GW consented or in planning⁵⁸.

48 BEIS (2016) 'Digest of United Kingdom Energy Statistics (DUKES) 2016'

49 Ibid

50 Northern Gas Networks / KPMG (2017) 'Energising the North'

51 Ibid

52 BEIS (2016) 'Sub-National Electricity and Gas Consumption Statistics'

53 Ibid

54 Ibid

55 Kiln (2015) 'The Non-Gas Map'

56 Energy and Utilities Alliance (2017) 'Fuel Poverty - A Connected Solution'

57 IPPR North (2017) 'Who Will Power the Powerhouse?'

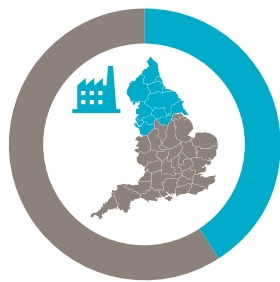
58 World Nuclear Association (2017) 'Nuclear Power in the United Kingdom'

59 BEIS (2016) 'Digest of United Kingdom Energy Statistics (DUKES) 2016'

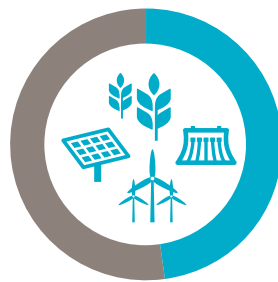
60 The Crown Estate (2015) 'Energy and infrastructure key facts 2015-16 UK offshore wind'

7. Energy

The North of England is home to **23GW** of electricity generation capacity:



41%
of the English total



48%
of renewables but only



27%
of the population

As shown in Figures 3 and 4 above, biomass is also of significance to the North of England with 15,000 GWh generated in 2015⁶¹. However, this is largely due to one power station – Drax which partially converted from coal between 2013 and 2015 and now has a renewables capacity of 2GW and generated 13,000 GWh in 2016⁶².

Other plants are following suit. Lynemouth coal-fired power station in Northumberland is due to convert to a 390MW biomass facility by 2018 and a major new plant at Teesport is scheduled to open in 2020. Biomass is important for electricity security as unlike wind or solar, which by their nature are intermittent, it allows for continuous generation.

At present, the only planned new nuclear power plant in the North of England area is by NuGen at Moorside. Here, three 1.1GW reactors are proposed with construction for the first scheduled to begin in 2019⁶³. However, well-publicised financial difficulties with developer Toshiba its subsidiaries and partners have put this in doubt⁶⁴. In addition, there are also plans by GE Hitachi and Candu energy to use waste plutonium from Sellafield as fuel to generate electricity⁶⁵ but at present it is unclear whether the proposals will go ahead.

It should also be noted that the proposed new 2.7GW nuclear power station at Wylfa Newydd, Anglesey is likely to involve a significant supply chain from the North of England. It is likely in the near future that small modular reactors (SMR) will be manufactured within the Northern Powerhouse with a potential SMR site at Trawsfynydd, north Wales. In addition, there is significant potential for collaboration between the Northern Powerhouse and north Wales through the Cheshire Science Corridor⁶⁶.

Electricity storage will be a key technology in the future. As more intermittent renewables come on stream it can help maintain balance in the electrical system by importing at times of increased (or even excess generation) for exporting at times of peak demand. Distribution level storage is more appropriately located close to generation to help manage potential network constraint issues. As such, the North of England with its significant wind generation capacity is likely to become central to the development of storage over the coming years.

The Government cancelled a competition to build a carbon capture and storage (CCS) demonstration plant in 2015 that Drax was in the running for. Nevertheless, many scenarios suggest that CCS will have a key role in the UK's future energy mix⁶⁷. The North of England and in particular

Teesside, with its concentration of energy and chemical plants, is one of the most suitable locations in the country for the development of a CCS. Such infrastructure would allow the continued deployment gas-fired power stations improving energy diversity and flexibility, necessary with increasing amounts of intermittent renewables.

Gas capacity

The outlook for domestic natural gas production is not as positive. National Grid project that demand for gas in the north of England is likely to decline to 2030 before levelling off to 2040⁶⁸.

Gas supply from the North Sea is expected to continue to decline. National Grid's Ten Year Gas Statement estimates that Teesside capacity is likely to have by 2030. Irish Sea gas is projected to be close to running out completely with Barrow terminal's capacity reducing to zero⁶⁹.

This will lead to increased importation of gas both via liquefied natural gas (LNG) terminals (all currently located in the south of England and in Wales) and through interconnector pipelines, of which there is only one in the North of England at Easington. However, both Barrow and Teesside are expected to open LNG terminals in the coming years⁷⁰.

While North and Irish Sea gas is on the wane, the North of England has an important opportunity through the development of its unconventional gas resources. The Bowland-Hodder shale gas formation is the largest in the UK. The British Geological Survey carried out a resource estimation that showed a potential 38 trillion cubic metres of gas available⁷¹. If significant amounts of this could be extracted, it could partially offset the decline in production from the North and Irish Seas, and could reduce the UK's reliance on overseas energy sources.

61 BEIS (2016) 'Generation of electricity from renewable sources, 2015'

62 Renewable Energy Foundation (2016) 'Renewable Generators'

63 World Nuclear Association (2017) 'Nuclear Power in the United Kingdom'

64 Daily Telegraph (2017) 'Toshiba left holding the baby as NuGen partner backs out of Moorside nuclear project'

65 IMechE (2015) 'UK Plutonium, CANDU with CANMOX?'

66 Cheshire and Warrington Local Enterprise Partnership (2017) 'Cheshire Enterprise Corridor Enterprise Zone'

67 Ofgem (2016) 'Future Insights'

68 IPPR North (2017) 'Who Will Power the Powerhouse?'

69 National Grid (2016) 'Gas Ten Year Statement'

70 Ibid

71 BGS (2016) 'British Geological Survey Gas In Place Resource Assessment of the Bowland Shale'

8. Transport



Recommendations

- Transport for the North must develop programmes that enhance network integration and connectivity, enable economic development and ensure that the region is ready for the arrival of HS2.
- Transport for the North should champion the adoption of new technologies in both passenger and freight transport, including the digital railway, autonomous vehicles and mobility as a service.

Scene setting

The importance of a strategic approach to transport in the North

Transport is not an end in itself. Good transport links enable agglomeration, increase productivity and boost innovation. All of this in turn drives economic growth and improves our quality of life.

TfN has been established to oversee the planning and promotion of a pan-regional transport strategy through collaboration with key local and national transport bodies across the North. While transport has long been a focus for growth in the North, much of the emphasis has tended to be on traditional approaches to transport planning and delivery to improve inter-urban connectivity.

A strong vision for the future must include the role of new technologies in improving end-to-end journey's for people and goods. Likewise, emphasis should be placed on solutions that encourage modal shift, reduce urban congestion and create better local connectivity throughout the region.

Rail

Passenger rail usage across the North grew by approximately 2% during 2015-16, with a total of 214m journeys made within, to or from the region⁷². However, rail connectivity between the North's largest cities is currently falling short of where it should be; in terms of destinations served and the speed and frequency of services.

High Speed 2 (HS2) will improve both labour market and business connectivity to cities across the North. For example, labour connectivity by rail could grow by up to 31.8% in South Yorkshire as a result of investment in HS2 (see Table 3, below). The challenge is to ensure that local connectivity with HS2 is developed in time to maximise the benefits.

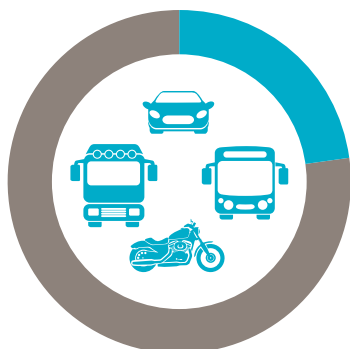
Table 3: Average change in connectivity by region in 2037 after investment in HS2⁷³

City regions	Change in labour connectivity by rail	Change in business connectivity by rail
Greater Manchester	1.4%	18.8%
South Yorkshire	31.8%	22.5%
West Yorkshire	9.1%	19.7%
Rest of Great Britain	5.3%	11.3%

72 ORR (2017) 'Regional Rail Usage (Passenger Journeys) 2015-16 Annual Statistical Release'

73 HS2 (2013) 'HS2 Regional Economic Impacts'

8. Transport



The North's roads carry **over 23%** of all UK traffic and between **2015 and 2016** approximately



214 million train journeys started or ended in the region

Roads

The road network in the North accounts for 17.7% of the UK total and carries a 23.2% share of overall traffic⁷⁴. High-performing and resilient roads are critical for the effective movement of people and goods that enable economic growth.

Large levels of congestion across key parts of the road network in the North mean that journey times are hard to predict and long delays are common.

As part of the Government's first Road Investment Strategy £2.9bn is being invested in the North's roads to help alleviate congestion and improve reliability throughout the strategic network⁷⁵.

Two strategic studies – to help inform the Government's second Road Investment Strategy for the period 2020-2025 – are being undertaken to identify solutions for improving network connectivity and capacity.

- A New Trans Pennine Tunnel to link Greater Manchester with Sheffield city centre⁷⁶
- Improvements to Northern Trans-Pennine roads⁷⁰ and M60 Manchester North West Quadrant⁷⁸.

This approach is welcome; as are proposals for a new Roads Fund and the classification of Major Roads⁷⁹. However, there remain huge challenges in the North for improving the connectivity and performance of local roads both in cities and in rural areas.

Airports, ports and international connectivity

The North's airports handle 15% of all passenger trips made to or from the UK, contributing £5.5m to the North's gross value added (GVA). Ports create approximately £0.2m in GVA and handle 2m passengers per year⁸⁰.

Freight and logistics provide the basis for Northern businesses to access other national and international markets. Currently 33% of all UK freight tonnage moves through Northern ports, while as little as 2.3m tonnes of freight move through the North's airports per year⁸¹.

Freight movement is hampered by poor road connectivity with ports and airports. At the same time the expansion into greater use of rail is restricted by available rail capacity both in terms of routes and train paths.

Long-haul links from the region, limited at the present time, will need to be increased if the North is to benefit from a move to a more global economy

Quality of life and smarter journeys

TfN's plans to deliver integrated ticketing, simpler fares and better online services for passengers through its Integrated and Smart Travel Programme⁸² are welcome.

As the use of mobile technologies and applications grows it is important that traditional transport planning and delivery models are challenged further, and that wider opportunities for mobility as a service (MaaS) and the personalisation of services across the North are exploited.

74 RoadFile (2015) 'Regional Road Networks'
75 TfN (2016) 'The Northern Transport Strategy: Spring 2016 Report'

76 DfT (2016) 'Trans-Pennine tunnel strategic study: stage 3 report'

77 DfT (2016) 'Northern Trans-Pennine strategic study: stage 3 report'

78 DfT (2016) 'Manchester north-west quadrant strategic study stage 3 report'

79 DfT (2017) 'Transport investment strategy'

80 TfN (2017) 'Independent International Connectivity Commission Report'

81 Ibid

82 TfN (2017) 'Integrated and Smart Travel Programme'



Analysis and recommendations

The future of transport in the North

MaaS solutions mean transport services that are delivered based on a series of consumer preferences: journey planning and management, personalised service and flexible payment⁸³. MaaS is being driven by private innovation and investment, but to thrive requires the encouragement of forward-thinking authorities. We believe the North should aspire to be at the forefront of this revolution.

An example of this future can be seen in The Whim App⁸⁴, first developed in Helsinki and now being trialled in the Midlands. The customer can subscribe and then book a whole journey in real time using a range of modes in the region including taxis, car rental, cycles, buses, trams and rail. The aspiration is one-stop journey planning, mobile-based ticketing and hassle-free payment.

The choices which individuals make about how they travel depend on quality of information – on available modes, timetables, levels of congestion, cost, and the end-to-end journey time. Much of the data for this information comes from publicly-provided transport systems. As a strategic priority, TfN should work with supporting providers to make the sharing and use of this data as effective as possible for service users.

Electric vehicles, autonomous vehicles and mobility as a service

The combination of electric vehicles (EVs), autonomous vehicles (AVs) and MaaS will radically transform travel by vehicle in the region. The former will make road transport much more environmentally sustainable and there is an urgent need for the region to promote the provision of charging points across the North's network to encourage EV ownership.

AVs will increase mobility opportunities for the young, old, disabled and especially for those in the region's rural communities where public transport is scarce. AVs are predicted to reduce the number of road accidents, reduce the need for on-street parking, and permit radical redesign of our streets⁸⁵. Capacity could increase, roads could become narrower, but investment will be needed in much more advanced mobility control systems, covering private AVs as well as public transport.

MaaS opens up the possibility that far fewer vehicles are privately owned, and vehicle use moves predominantly to an Uber-like pay as you go service. This could reduce vehicle numbers in the region.

At the heart of the North's road (and wider transport) strategy should be anticipation and acceleration of this opportunity. TfN should undertake work to examine the implications for transport and land-use planning.

Box 2: Future focus

There is an urgent need for TfN to secure investment in the existing rail network. In parallel TfN should also use its role to encourage technologies which could transform the region over the longer term.

An example is Hyperloop, a proposed 600 mph maglev in small tunnels that offers the scope to radically reduce journey times between the North's major cities. For example, the technology could reduce the journey time between Manchester and Leeds to nine minutes. A Hyperloop network could allow the whole of the North to operate as one economic zone, without impacting the natural beauty of the parks and open countryside between its major cities. Visionary and transformational schemes are by their nature risky, but where successful deliver huge benefits.

“AVs are predicted to reduce the number of road accidents, reduce the need for on-street parking, and permit radical redesign of our streets.”

83 Transport Systems Catapult (2016) 'Mobility as a Service: Exploring the opportunity for mobility as a service in the UK'

84 The Whim App (2017) 'Whim for West Midlands Coming Soon!'

85 WSP (2016) 'Making Better Places: Autonomous Vehicles and Future Opportunities'



8. Transport

A multi-modal approach to urban transport delivery

Greater demand placed on the North's urban transport systems – overcrowded inner city roads, metro systems and orbital routes – require policy interventions that encourage modal shift. This means improving urban bus services, light rail and tram systems, whilst encouraging higher rates of active travel such as walking and cycling.

Active modes of transport also reduce greenhouse gas emissions, improve air quality and reduce noise levels. There is also an economic case to be made – historic studies have shown that payback on £1m of investment in cycling infrastructure requires only 109 people a year to become regular cyclists when considering the benefits to health, congestion and pollution⁸⁶.

Roads

Improving the performance of strategic roads in the North cannot simply be achieved through building new capacity into existing networks.

The introduction of smart motorways – the management of traffic flows in real time – to other parts of the Strategic Road Network (SRN) throughout the UK has already resulted in a number of improvements to journey reliability and a reduction in accidents⁸⁷. This includes the effective use of gantry signs for communicating roads hazards, variable speed limit management and all-lane running.

Improving the condition of the local road network across the North and ensuring it is fully integrated in the development of the SRN are critical for enhancing connectivity at the intra-urban and rural levels, as well as between urban centres. A collaborative approach to planning between the new Combined Authorities and the national delivery bodies (Highways England and Network Rail) is critical to achieving this.

Rail

HS2 is predicted to bring significant economic benefit to the North (See Table 3, above). To take full advantage requires the North to invest in local transport services which will dovetail into the new HS2 station hubs, and develop the land around the sites.

The delivery of improved east-west rail links across the North is central to achieving the agglomeration effects of linking up the region and should be implemented without delay. Application of the Digital Railway Programme⁸⁸ across this new network will further improve rail travel in the North.

The successful delivery of the programme will transform the passenger and freight network; delivering a modern railway with greater availability of paths that can accommodate more trains, enable more and faster connections, and greater reliability.

The wider impact of HS2 in the region, beyond the Liverpool/Manchester/Leeds corridor, has great potential to benefit those major centres to the North and East that will gain greater connectivity when HS2 is complete. Preston, Darlington, Hull and Newcastle are some of the key Northern cities where development potential is already being championed by the new Combined Authorities and which can raise their ambitions even further with improved rail links.

Airports

Airports must be an integral part of transport connectivity across the North but meeting demand growth can only be achieved by delivering key rail and road improvements and effectively integrating them into the North's overall strategic transport networks.

For the North to be identified as a region for strong inward investment and to have greater international connectivity, emphasis needs to be on the direct long-haul capability of key Northern airports. The 'Team North'⁸⁹ approach that TfN is pursuing to secure new opportunities is welcome.

It is necessary that there is full collaboration between the airports in the North to set clear priorities and to press for improved surface transport links that suit their individual commercial needs as well as recognising the growth ambitions of the entire region.

Ports

It is important that the Memorandum of Understanding⁹⁰ between the four key Northern ports (Liverpool, Hull, Tees and Tyne) to create the Northern Ports Association is built upon to create a true pan-Northern approach to port growth and development. Doing so will create jobs, open up new export opportunities and contribute to wider economic growth across the region.

This approach also adds weight to the importance of better east-west connectivity with ports on the east and west coasts linked across the country by much improved road and rail links.

The vision for growth in the North must ensure that its ports are fully integrated with the long-term strategy for investment. The key to supporting port development lies in continuing investment in the links between its ports and inland destinations for freight.

86 SQW (2008) 'Planning for Cycling – Report to Cycling England'

87 Highways England (2016) 'Smart motorways programme'

88 Digital Railway (2016) 'A Digital Railway for a Modern Britain'

89 TfN (2017) 'Independent International Connectivity Commission Report'

90 PD Ports (2016) 'Northern Ports form Powerhouse Partnership'

9. Digital



Recommendations

- The North must acquire and maintain best in class digital infrastructure with complete geographic coverage to unlock economic growth and enhance the delivery of infrastructure across the region.

Scene setting

Productivity and digital maturity in the North

The wider application and effective use of digital technologies in businesses creates an agile workforce, reduces operating costs and increases productivity. Digital maturity levels (investment in digital technologies, training and security) among small and medium enterprises (SMEs) in the North tend to lag behind other UK regions⁹¹. Government strategy should focus on boosting awareness and highlighting how digital technologies contribute to successful businesses.

The North's digital economy

The North is home to a strong digital economy – despite the challenges many ordinary businesses face in adopting digital technologies and practices. Policy interventions and solutions should seek to exploit this for the benefit of the wider Northern economy, including its economic infrastructure networks and services.

The North's digital economy is worth some £9.9bn in GVA and it employs 283,500 people⁹². Productivity levels in the region's digital economy are also growing four times faster than other sectors⁹³.

Specialist technology capability in the North include⁹⁴:

- Connected devices and Internet of Things
- Digital advertising and marketing
- E-commerce and marketplaces
- Social networking

Connectivity – superfast broadband

Through its Broadband Delivery UK programme the Government has set a target for at least 95% of premises to be covered by superfast speeds by the end of 2017. Under the UK superfast classification (>24 Mbps) current coverage levels across the UK are approximately 93.20%⁹⁵. Coverage across the North compares relatively well to the UK average, but there is still variation between urban and rural areas.

Superfast broadband coverage across the North is currently as follows⁹⁶:

- **North East 96.2%**
- **North West 94.8%**
- **Yorkshire and Humber 91.3%**

Greater access to and uptake of superfast broadband by businesses will drive efficiency savings, boost economic growth in the North and help to address the region's productivity deficit.

Government policy should focus on attracting and incentivising this investment, and directing any public expenditure at areas where it can make a critical difference. Going forward emphasis should also be placed on overcoming the technological, investment and policy barriers to the rollout of ultrafast broadband coverage across the region.

⁹¹ Lloyds Bank (2014) 'UK Business Digital Index'
⁹² Tech North (2016) 'The Digital Powerhouse: the innovation potential of tech clusters in the North'
⁹³ Ibid
⁹⁴ Ibid
⁹⁵ thinkbroadband (2017) 'UK Superfast and Fibre Coverage.' (Coverage levels correct at time of printing)
⁹⁶ Ibid (Coverage levels correct at time of printing)

9. Digital

Connectivity – mobile networks

In 2014 Ofcom held licensing auctions aimed at incentivising operators to deliver wider 4G mobile service coverage, faster speeds and lower prices. By the end of 2017 the regulator anticipates that nearly all of the UK population will be able to receive 4G mobile services⁹⁷.

Ofcom's annual connectivity report (published at the end of 2016) found that only 40% of the UK's outdoor geographic area was covered by 4G. In addition only 38% of A and B roads were covered by 4G mobile networks, while train coverage was also poor⁹⁸.

It follows that 4G geographic coverage in the North is also relatively low.

Where there are high levels of 4G coverage in the North this tends not to be accompanied with high levels of download speed. For example, Middlesbrough and Sheffield are among the best performing cities in the UK on 4G coverage availability, but conversely are among the least well performing for download speeds⁹⁹.

The policy and regulatory landscape must continue to incentivise network operators to invest in their networks to expand 4G coverage and capability. More reliable and faster 4G coverage will enable the more effective use of mobile technologies for the delivery of infrastructure services across the North, including:

- Real-time journey management
- Mobility as a service and flexible payment
- Remote energy and utilities management

Analysis and recommendations

Cross-sector importance of digital infrastructure

Digital technologies benefit both infrastructure service providers and users, enhancing the overall performance of core networks and assets. For example, the use of digital signalling in rail boosts track capacity improves connections and increases network resilience. The wider application of digital technologies and smarter networks also produces similar efficiency gains in the energy and waste sectors.

The digital transformation of infrastructure assets improves our ability to manage networks through a systems approach. The availability of energy supply directly impacts the ability of communications, transport and water networks to function at capacity. Using smart technologies to monitor the health of this supply against demand optimises the performance of these networks and increases resilience.



The North's digital economy is worth
£9.9bn in GVA
and employs
283,500 people

A digital vision for the Northern Powerhouse

There is a great opportunity to improve connectivity across the North taking advantage of current market developments, available investment, and Government aims to create a world class digital infrastructure in the region. Digital railway, smart motorways, smart energy networks are all opportunity areas for the region.

The successful delivery of a digital railway will mean more efficient passenger and rail freight operations through timetable flexibility, the greater availability of paths and optimised running. Increased real time management of motorways will improve journey times and reduce incidents.

Smart energy networks will enable more effective demand and supply side management of energy, driving efficiency and reducing the cost of energy.

Universal ultrafast broadband coverage (>100 Mbps) would have a transformational impact on the Northern economy, while fundamentally improving quality of life. Alongside enhanced mobile networks it will also enable the more effective use of smart travel and energy applications that deliver time and cost efficiencies, and reduce the environmental impact of major infrastructure.

New industry and public service opportunities underpinned by digital connectivity such as eHealth and advanced manufacturing and logistics, will also emerge as a result of the development of the North's digital infrastructure capability.

⁹⁷ Ofcom (2013) 'Ofcom announces winners of the 4G mobile auction'

⁹⁸ Ofcom (2016) 'Connected Nations 2016'

⁹⁹ Which? (2017) 'Which UK cities get the best 4G signal?'



Connectivity – superfast to ultrafast

It is important that the good progress made in rolling out superfast coverage across the North is matched by increasing access to this type of coverage and uptake. But with Government support, the longer term aim should be to create a market environment that enables domestic and business customers to move from superfast to ultrafast broadband.

Understandably current levels of ultrafast broadband coverage are still relatively low in the North.

Ultrafast broadband coverage across the North is currently as follows¹⁰⁰:

- North East **52.7%**
- North West **48.5%**
- Yorkshire and Humber **53%**

However, through investment and advances in technology ultrafast broadband is being delivered to the North via a number of national and regional rollout programmes.

National:

- Virgin Media is delivering ultrafast broadband services to domestic and business properties in the North through its £3bn Project Lightning investment programme¹⁰¹
- Openreach is targeting thousands of Northern businesses as part of plans to deliver ultrafast Fibre-to-the-premises (FTTP) to one million SME's throughout the UK by the end of 2020¹⁰²

Regional:

- KCom are aiming to have rolled out ultrafast FTTP to 150,000 properties in Hull and East Yorkshire by the end of 2017¹⁰³
- Broadband for the Rural North now have over 3000 connected properties across remote parts of the North West¹⁰⁴

In order to achieve near universal coverage by 2033 there is a major role for Government in incentivising further private investment. Longstanding challenges to commercial deployment around regulations governing pre-noticing, wayleaves and new build must also be overcome. Any public funding available for deployment should avoid distorting this market, but instead focus on reaching areas not served by commercial operators.

Connectivity – developing 5G capability

Notwithstanding the considerable amount of work that needs to be done to improve 4G coverage and access, there are big opportunities for the Northern economy to seize in terms of developing 5G.

5G is much more than just faster mobile data. As well as generally faster mobile broadband, features within 5G can offer connectivity to support emerging sectors identified as key to the Northern Powerhouse.

In the transport sector, this includes the delivery of the Northern section of HS2 and improvements to east-west rail connectivity. 5G will also be integral to the successful roll-out of AVs, which will depend on the capability for ubiquitous networks for data access, and ultra-low latency communications for instant control.

The UK Government has announced an ambition for the UK to be a global leader in 5G to take early advantage of its potential¹⁰⁵ and it is encouraging that the North East Local Enterprise Partnership is already carrying out work to secure a 5G testbed.

The North East offers a perfect environment to develop 5G technology. It has dense urban areas with high mobile data demand, in close proximity to deeply rural places hard to reach with fixed high speed broadband. It offers a range of transport facilities from main line rail to urban transit systems. Its strong digital economy means that the region is capable of meeting the demand for new applications. Clusters of expertise in the health, automotive and energy sectors, alongside academic support, offer the ability to prove the viability of many use cases.

“Digital technologies benefit both infrastructure service providers and users, enhancing the overall performance of core networks and assets.”



100 thinkbroadband (2017) 'UK Superfast and Fibre Coverage' (Coverage levels correct at time of printing)

101 Virgin Media (2017) 'Project Lightning'

102 BT (2016) 'Openreach to target one million SMEs with new ultrafast services'

103 thinkbroadband (2017) 'KCom on its way to 150,000 premises of full fibre'

104 B4RN (2017) 'About us'

105 DCMS (2017) 'Next Generation Mobile Technologies: A 5G strategy for the UK'

10. Housing

Recommendation

- To address the North's housing shortage local authorities should put in place standard approaches to assessing need and have access to flexible funding arrangements for new developments.

Scene setting

Population

As shown in Table 4 (below) the estimated population of the North of England in 2015 (the most recent year available) was 15.2 million, 27.7% of the English and 23.3% of the UK totals¹⁰⁶.

At 388 people/km² population density is below the English average of 420 people/km² but above the UK's 268 people/km². As we would expect, across such a diverse region the population density varies greatly from 4,571 people/km² in the City of Manchester to just 25 people/km² in the district of Eden, which is the most sparsely populated local authority area in England¹⁰⁸.

Households

The number of households in the North of England in 2014 (the most recent available data) stood at 6.5 million, up 6.7% on 2004. This compares to an English average increase of 9%. The North's household makeup is also similar to England as a whole: the majority (57%) are either a single adult or couple with no dependent children. 28% have dependent children and 7% comprise a number of adults living together. The average household size was 2.3 people¹⁰⁹.

Housing stock

While there are significant variations across the region, overall, people in the North of England are more likely to live in terraced (30.8%) or semi-detached (29.2%) houses than in the rest of England (26.7% and 24% respectively). There are correspondingly far fewer flats/maisonettes in the North (15.9% compared to national average of 22.6%).

At 20%, the proportion of homes in the social rented sector in the North of England is slightly higher than the country's average of 18%¹¹⁰. Across the North of England 18.6% are provided by local authority or Registered Social Landlords, slightly lower than the English average of 17.5%¹¹¹. However, as shown in Table 5 (below) over the past five years, the proportion of new social housing being built in the North of England is falling behind the national average.

Table 4: Population of the North of England¹⁰⁷

	Population (2015, million)	Population change since 2005	Population density (2015, people/km ²)
North East	2.62	+3%	306
North West	7.17	+4.5%	509
Yorkshire and Humber	5.39	+5.4%	350
North of England	15.18	+3.4%	388
England	54.79	+8%	420

¹⁰⁶ ONS (2016) 'MYE2: Population estimates by single year of age and sex for local authorities in the UK, mid-2015'

¹⁰⁷ ONS (2016) 'MYE5: Population estimates and population density for the UK, mid-2001 to mid-2015'

¹⁰⁸ Ibid

¹⁰⁹ DCLG (2016) 'Household projections for England and local authority districts'

¹¹⁰ Calculated from: Chartered Institute of Housing (2017) 'Changes in the regional stock of dwellings by tenure'

¹¹¹ Calculated from: ONS (2017) 'Number of dwellings by tenure and district, England'



Housing quality

39 of the 50 most deprived areas¹¹² in England of are in the North¹¹³. However, this does not seem to translate to an above average incidence of poor quality housing. 21.3% of homes in the North of England are rated 'non-decent' in terms of their material condition and 4.6% as overcrowded. This compares to an English average of 24.3% and 5.3% respectively¹¹⁴. Nevertheless, the North of England has the lowest house prices in the country. The average in 2015 was £184,000, falling to £170,000 in the North East. In comparison, the average in the West Midlands was £211,000 and in London £514,000. The overall English average was £291,000¹¹⁵.

Analysis and recommendations

Population

Office for National Statistics' projections are for the population of the North of England to increase from 15.1 million now to 16.1 million in 2032, an increase of 7%; this compares to a projected increase of 13% for England as a whole¹¹⁶. Consequently, population density across the North is set to increase from 388 to 424 people/km², an increase of 9.3%. This compares to an English average increase from 420 to 469 people/km² or 11.7%.

Households

Between 2014 and 2032, the number of households in the North of England is predicted to increase by 11% or 720,000¹¹⁷. There is significant variation across the North. The greatest demand is expected in Warrington (up 16%) and Manchester (up 15%) whereas both Copeland and Richmondshire are forecast to have to have no change – the only local authorities in England not expected to see an increase¹¹⁸.

It should be noted, however, that the projections for number of households, while giving a good general indication are based on extrapolating existing trends as opposed to robust, detailed analysis for each housing authority.

“720,000 new homes are needed in the North by 2032-33.”



Between **2014 and 2032**, the number of households in the North of England is predicted to increase by **11% or 720,000**

112 'Areas' refers to Lower layer Super Output Areas, averaging a population of around 1,500, or 650 households.

113 ONS (2016) 'Proportion of LSOAs in the most deprived 20% nationally for towns and cities in England by region'

114 NatCen (2013) 'People living in bad housing – numbers and health impacts'

115 Chartered Institute of Housing (2017) 'Average regional house prices'

116 ONS (2016) 'Table 5: 2014-based Subnational Population Projections with Components of Change'

117 DCLG (2016) 'Household projections for England and local authority districts', projections based on continuation of current policies

118 Ibid



10. Housing

Housebuilding

As shown in Table 5, in 2016-17, 32,650 new homes were completed in the North of England. This represents both a continued year-on-year increase – and a significant overall increase – on the 23,070 completions in 2012-13¹¹⁹.

In 2014-15 more than 5,000 more new homes were completed than in the previous year. This is partly due to a relaxation of rules around permitted development for change of use, making conversions of properties from commercial to residential easier, which came into force in January 2013¹²⁰. Across England as a whole, new homes created through change of use increased from 10% of the total in 2013-14 to 16% in 2015-16¹²¹. If translated evenly to the North of England, this would represent an increase in conversion from 2,406 per year to 4,859.

Table 5 also shows that the number of housing association and local authority homes completed in the North of England peaked in 2014-15¹²³. Nevertheless, the proportion of social sector housing¹²⁴ completed in the North of England over the past five years averages 14.3%, compared to an average across England of 20.6%¹²⁵.

Demand for housing

The overall number of completions is still somewhat short of the 40,000 per year required to build the 720,000 new homes by 2032-33 the household forecast suggests. However, it should be noted that in 2016-17, just under 42,000 new homes were started in the North of England. This rate (factoring in the 2,000 or so that Table 5 suggests will not be completed) will need to be continued year-on-year to meet forecast demand of 720,000 by 2032-33.

While the latest new housing starts are encouraging, without careful management there is a real risk of too few homes being built, which has led to the private sector's ability to meet the demand for the number of homes being questioned¹²⁶. However, there are also examples of innovative solutions in the North (see Box 3).

“The current restrictions on the ability of local authorities to borrow to build social housing are arbitrary and anomalous and should be freed up.”

Meeting demand

As shown below in Table 5, the vast majority – around 85% – of housebuilding in the North of England is carried out by the private sector. Here, the North lags behind the English average with around 6% fewer social sector housing units built.

As set out in the recent Housing white paper¹²⁷, a first step in addressing demand is for high quality data on local housing need. For there to be deliverable housing land, local authorities must have as full an understanding as possible of demand and potential supply. Therefore, it is recommended the proposal in the White Paper for all Housing Authorities to put in place robust assessments of housing need and available land be fully implemented¹²⁸.

Such appraisals should follow a standardised approach to set out not only the current and projected demand for housing and the land/commercial buildings available to provide it but also the type of housing necessary. In addition, the standardised appraisals should include full consideration of how transport would be integrated into any new housing developments. The information from the local authority housing assessments could also help form the recommended Northern Spatial Plan (see Governance section).

Table 5: Number of new homes started and completed in North of England, by tenure 2014-15 to 2016-17¹²²

	HOUSES STARTED				HOUSES COMPLETED			
	Private	Housing assoc.	Local authority	All*	Private	Housing assoc.	Local authority	All*
2012-13	19,190	2,490	580	22,190	20,380	2,290	460	23,070
2013-14	27,810	4,570	530	32,860	20,730	2,990	350	24,060
2014-15	27,740	3,950	680	32,270	23,630	4,960	630	29,180
2015-16	29,330	3,430	350	33,100	26,070	3,930	400	30,370
2016-17	38,370	3,060	260	41,590	28,410	3,940	370	32,650

119 Compiled from: DCLG (2017) 'Housebuilding: permanent dwellings started and completed, by tenure and district'

120 DCLG (2013) 'Change of use: promoting regeneration'

121 DCLG (2016) 'Housing supply; net additional dwellings, England: 2015-16'

122 Compiled from: DCLG (2017) 'Housebuilding: permanent dwellings started and completed, by tenure and district'

123 DCLG states this reflects the transition from the 2011-15 affordable housing programme to new packages, arguing that delivery increases towards the end of each tranche of housebuilding grant and would therefore expect the number of social housing completions to begin to rise again by 2020. DCLG quoted in The Guardian (2016) 'Housebuilding is up – but what type of homes are being built?'

124 'Social sector housing' refers to housing association plus local authority completions.

* Totals may not equal the sum of component parts due to rounding to the nearest 10 in original figures.



Local authorities have caps limiting their borrowing for housing developments. These are based on the debt the council already has, which varies significantly across the country. It does not bear any relation to the number of houses they have or the demand for new housing. Therefore, despite the prudential borrowing rules in place on councils and historically low interest rates, few local authorities can finance new house building¹²⁹.

Allowing local authorities flexibility will enable investment to provide high-quality housing, suitable for their location. In turn, this will help to retain and attract skilled workers, therefore making a significant contribution to attracting inward investment and in stimulating regeneration¹³⁰.

The current restrictions on the ability of local authorities to borrow to build social housing are arbitrary and anomalous and should be freed up. Without this contribution, it is unlikely the number of homes needed to be completed year-on-year will be realised.

Box 3: Modular housing / off site construction

Off-site-built modular homes can be produced in about half the time of traditional construction. In addition, costs can be decreased by up to 30% while improving possibilities for increased flexibility and design accuracy¹³¹.

Urban Splash – New Islington, Manchester

Urban Splash's first modular homes development is of 43 houses set in a traditional terrace. The homes in New Islington are made of volumetric timber pods that are delivered pre-assembled to site. The project aims to combine the cost benefits of modular construction with the flexibility offered by architect-designed properties.

Internally layouts can be configured to tailor one to five bedroom homes. Residents can choose between open-plan or more traditional room-based layouts, specify the number of bedrooms, and select whether living rooms are upstairs or downstairs.

L&G Homes - Leeds

Legal & General set up L&G Homes in a factory near Leeds to build up to 3,500 homes a year. The modular manufacturing process uses cross-laminated timber and can be used to build most building types of various heights. As well as traditional family homes, the process can build flats, elderly and student apartments. The first prototype – a 26m² one bed apartment - was produced in June 2017.



125 Compiled from: DCLG (2017) 'Housebuilding: permanent dwellings started and completed, by tenure and district'

126 House of Lords Select Committee on Economic Affairs (2016) 1st Report of Session 2016–17 HL Paper 20 'Building more Homes'

127 DCLG (2017) 'Fixing our broken housing market'

128 The Queen's Speech 2017 announced plans for a Housing Bill based on the White Paper but, to date it has not been published

129 Chartered Institute for Housing (2014) 'Why is it important to change local authority borrowing rules?'

130 CABE (2005) 'Housing audit assessing the design quality of new homes in the North East, North West and Yorkshire & Humber'

131 Ellen McArthur Foundation (2017) 'Achieving Growth Within'

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