

TRANSPORT AND WORKS ACT 1992
TRANSPORT AND WORKS (INQUIRIES PROCEDURES)
RULES 2004
THE NETWORK RAIL (OXFORD STATION PHASE 2
IMPROVEMENTS (LAND ONLY) ORDER)

SPONSOR
NOTES ON ISSUES ARISING DURING ORAL EVIDENCE
Chris Nash BEng Hons MBA

Document Reference	NR/Note
Author	Network Rail
Date	8 th December 2021

THE NETWORK RAIL (OXFORD STATION PHASE 2 IMPROVEMENTS (LAND ONLY)) ORDER
Sponsor Issues Arising

1. INTRODUCTION

- 1.1 I am submitting this note to the inquiry to pick up on certain matters queried by the Inspector during my oral evidence to the inquiry on 7 December 2021.
- 1.2 In particular, during my oral evidence to the Inquiry, the Inspector asked me about how NR13(a) (Botley Road PA plan) fits in with the Land Plans with regard to temporary/ permanent acquisition. This point has been dealt with subsequently by others.
- 1.3 The second question relates to para.3.2.5 of my proof and the reference to 100,000 homes and 108,000 jobs (para. 3.2.7). The first element relating to the commitment to deliver 100,000 additional homes is dealt with in the note of Colin Field following his oral evidence. The 108,000 jobs is quoted in the Oxfordshire Local Industrial Strategy, published in July 2019. No base date is quoted within this document, thus the base date is assumed to be 2019. (see Oxfordshire Local Industrial Strategy A Partner in the Oxford-Cambridge Arc July 2019 provided separately to this note).
- 1.4 The third question relates to the Covid rail bounce back figures for London and in particular the Monday to Friday; the figure for Oxford is quoted in my Proof of Evidence at paragraph 3.4.6. Network Rail does not have direct comparative figures to those quoted for Oxford, but can provide indicate overall industry recovery comparison figures (although on full week seven day basis) for the 4 weeks ending 18th September 2021:

National – similar

London – approximately between 40% and 60% of pre-covid figures
- 1.5 Question 4 relates to the current policy status of Arc and for an indication of the level of Government enthusiasm for this. A response to this has been provided by Colin Field's note.
- 1.6 Question 5 relates to document D21 (dated March 2019) and whether there is any change in the status of this document since 2019. This is addressed by Colin Field's note following his oral evidence.
- 1.7 Question 6 relates to para. 2.3 of my proof and whether OSP2 is a major Network Rail project. I can confirm that the OSP2 scheme is designated as a regionally significant scheme within Network Rail.
- 1.8 Question 7 relates to how the Outline Transport Strategy (C8) relates to the Regional Strategy. The Regional Strategy is not a Core Document, but it follows on from the Outline Strategy. The Regional Strategy has been provided with this note.
- 1.9 Question 8 relates to paragraph 3.2.5 of my proof and Oxfordshire Housing population growth based on C9 Core Document (Infrastructure Strategy), dated 2017. This document was prepared on behalf of the Oxfordshire Growth Board to provide a view of emerging development and infrastructure requirements to support growth from 2016 to 2031 and beyond. It is a regional County wide document. It has been widely quoted widely in communications with Oxfordshire County Council and its creation involved the county's 6 local authorities. It remains a current document.

THE NETWORK RAIL (OXFORD STATION PHASE 2 IMPROVEMENTS (LAND ONLY)) ORDER
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Signature & Date


A handwritten signature in black ink, appearing to be 'C. M. King', written in a cursive style.

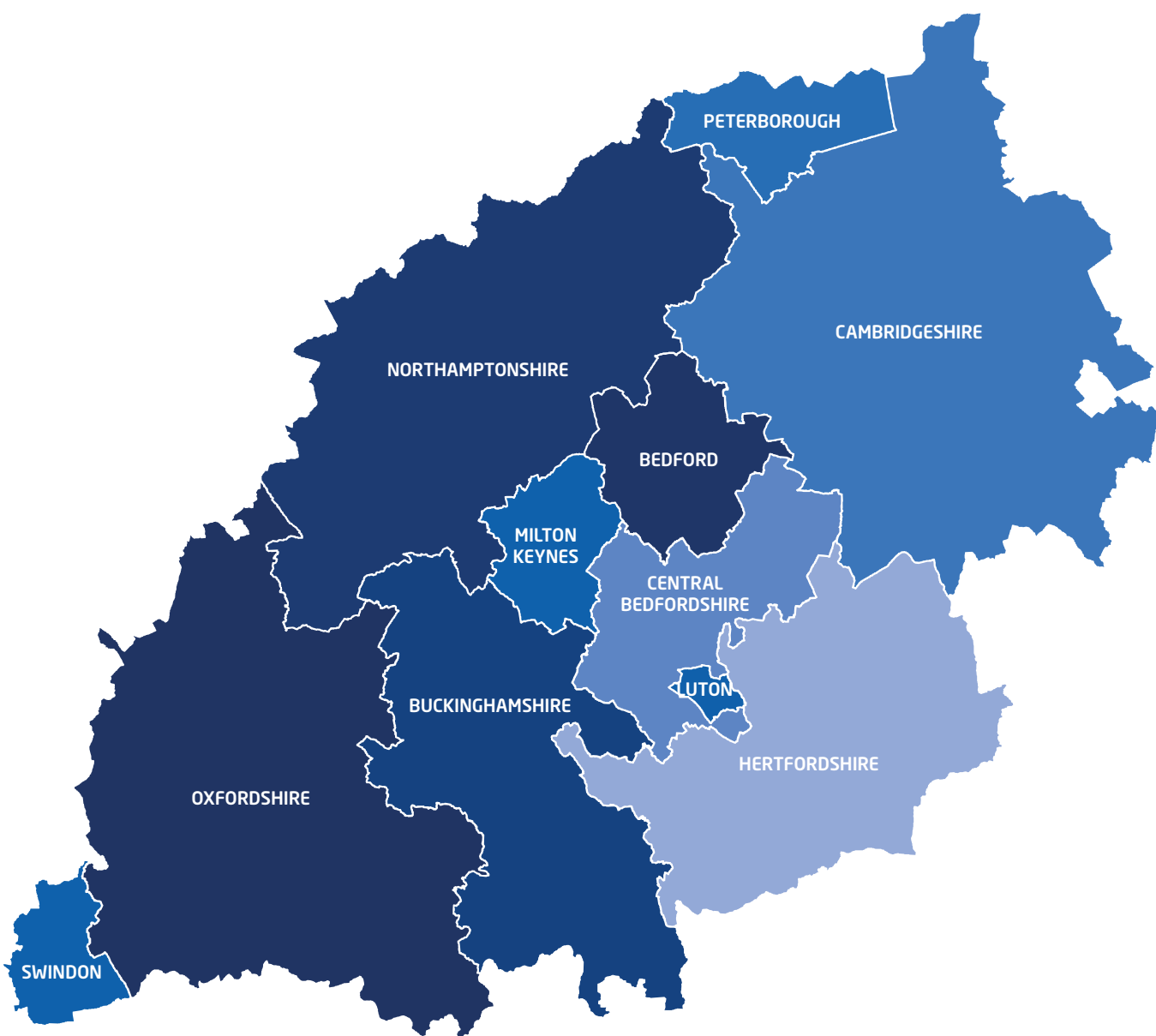
08th December 2021

Connecting People, Transforming Journeys

Regional Transport Strategy



 **England's Economic Heartland brings together the region's Local Transport Authorities in a strategic partnership that works with the region's local enterprise partnerships to provide leadership on strategic infrastructure.**



In April 2021 Northamptonshire will have two unitary councils: West Northamptonshire and North Northamptonshire.

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 *Cycling in Welwyn Garden City*

FOREWORD

England's Economic Heartland's world class economy, powered by science and technology innovation, is a national asset, with our universities and businesses at the forefront of fighting the COVID-19 virus and leading the economic recovery.

Encompassing the entirety of the Oxford-Cambridge Arc – a national economic priority for the Government – our region is a net contributor to the Treasury.

It has the potential to deliver even more. However, we must ensure that growth is sustainable. It must leave our environment in a better place than it was before and respond head-on to what is still the biggest long-term issue facing us: climate change.

As a country we are committed to achieving net zero carbon no later than 2050. However, throughout the development of this strategy the message has been loud and clear – we need to be more ambitious when it comes to our transport system – and we need to achieve net zero carbon sooner.

Drawing on the insight provided by our regional evidence base, it is clear we need to do things differently when it comes to the way we plan for and invest in our transport system. It cannot continue to be 'business as usual'.

We believe that by harnessing the strengths inherent in our region we can achieve the step change in approach required for our transport system to enable growth and achieve net zero carbon.

This strategy has been informed by our programme of technical work, taken forward in collaboration with our partners within the Heartland and Government. It has been shaped by the responses received through two rounds of public engagement that captured the views of our partners, stakeholders, residents and businesses, alongside the Integrated Sustainability Appraisal which was undertaken in parallel with the strategy's preparation.

It is ambitious in nature, challenging the region to achieve a net zero carbon transport system by 2040.

The strategy sets out how we can use that ambition to support a green economic recovery. We will work with our business and research communities to harness the Heartland's world-leading expertise in clean, green and smart technologies to enable solutions that benefit our residents and give the region a competitive edge in global markets.

The strategy sets out how we can reduce our reliance on the private car by investing in strategic public transport infrastructure, alongside investment in digital infrastructure to better connect our communities, and how that needs to be complemented by investment in active travel measures locally.

And it sets out how we need to ensure that our freight and logistics needs continue to be met, but in a way that reduces its environmental impact.

We have seen first-hand the scope to increase our use of flexible and remote working and the benefit this brings to our transport system. It demonstrates how we can do things differently – that the assumptions underpinning our approach to transport planning can change. We need to embed change when it comes to travel choices and behaviours, to bring individual networks together to form a transport system that is accessible to all, and which offers choice, flexibility and reliability to the user.

The need for change is compelling. As a region we are committed to delivering that change. Our focus must now be on turning words into actions. The strategy will require investment – from Government, from our partners and from the private sector.

We will work in support of our partners to secure the support from DfT that will enable the priorities in our investment pipeline to be delivered. We will continue to work with our partners to ensure we have the capacity and capability necessary to develop detailed schemes that are ready for delivery. Working together we can realise economies of scale and efficiencies that will enable us to do more with the funding available.

Our strategy is bold in its ambition for our transport system. It provides a pathway forward for our residents, communities and businesses. It makes the case for investment in the right infrastructure and services that will enable the region to plan with confidence and certainty for the future.

***Mayor Dave Hodgson,
Chair, Strategic Transport Forum***

February 2021



A ONCE-IN-A-LIFETIME OPPORTUNITY FOR REAL CHANGE

Our Ambition

1. England's Economic Heartland is an economic powerhouse, home to world-leading universities and innovators. It is blessed with a natural, historic and built environment that makes it an attractive place to live, work and play.
2. We will harness these attributes to the benefit of both our existing communities and future generations. Investment in our transport system will continue to be essential in order to enable growth. At the same time, we must change the way in which we plan, develop and deliver that investment.
3. Lack of capacity within our current transport system acts as a constraint on growth and reduces resilience and reliability, all of which impacts productivity. Lack of choice in travel options act as a constraint for those seeking access to services and opportunities. And we know that the environmental impact of our transport system is unacceptable, with carbon emissions significantly above the national average and growing faster.
4. We need to, and can, do better. This Transport Strategy provides the step-change in approach required to seize the opportunity to deliver the transport system our residents and businesses expect. It supports a green economic recovery and enables growth, whilst preserving and enhancing our natural, historic and built environment, creating opportunities for residents no matter their individual circumstances, and, crucially, responding harder and faster to climate change.
5. Our ambition is simple: **To support sustainable growth and improve quality of life and wellbeing through a world-class, decarbonised transport system which harnesses the region's global expertise in technology and innovation to unlock new opportunities for residents and businesses, in a way that benefits the UK as a whole.**
6. This ambition is deliverable. It requires a shared commitment between our partners in the region and national government, and bold decision making that puts people and the environment at its centre. It looks to realise synergies with other policy areas which have a major impact on the way people travel, including spatial planning and the provision of wider infrastructure and services such as digital, utilities, education and health.

-
7. This Transport Strategy sets the policy framework, supported by an initial investment pipeline, that will deliver our ambition. It is guided by four key principles:
 - Achieving net zero carbon emissions from transport no later than 2050, with an ambition to reach this by 2040
 - Improving quality of life and wellbeing through a safe and inclusive transport system accessible to all which emphasises sustainable and active travel
 - Supporting the regional economy by connecting people and businesses to markets and opportunities
 - Ensuring the Heartland works for the UK by enabling the efficient movement of people and goods through the region and to/from international gateways, in a way which lessens its environmental impact.
 8. There is now a once-in-a-lifetime opportunity to shape the future of transport in ways that might otherwise have taken many years to achieve.
 9. The COVID-19 pandemic accelerated trends that were already well established: trends that have arisen because of the choices we're making as consumers. We have seen the considerable scope for the business community to increase its use of flexible and remote working while continuing to function and provide services. These changes have significant implications for our transport system by changing the nature of travel demand.
 10. This opportunity is amplified by ongoing wider changes in societal expectations and attitudes. Changes to the way in which businesses provide services and opportunities are having their own influence. The traditional town centre continues to change as a consequence of changes in retail business models, driven by consumer choice. Business delivery models used by most retail, commercial and professional service companies continue to undergo significant and rapid change, enabled by the digital economy.
 11. This Transport Strategy is designed to harness the opportunity for change. It recognises that successful place-making requires a whole-system approach; one that is driven by an ambitious vision of the future and which 'joins-up' public sector policy to deliver agreed outcomes.
 12. Implementing this Strategy will challenge some existing assumptions. Some long-standing proposals may no longer be the right solution if we are to realise the Heartland's economic potential in ways that deliver on the legal requirement to achieve net zero carbon. But while the means by which we achieve it may change, fundamentally we need to continue to invest in connecting people and places with services and opportunities.

A National Priority: the Oxford - Cambridge Arc

13. A significant part of the Heartland has been identified by the Government as a national economic priority – the Oxford to Cambridge Arc. This designation builds on the National Infrastructure Commission's 2017 report: *Partnering for Prosperity – a new deal for the Cambridge – Milton Keynes – Oxford Arc*.
14. Whilst the Commission acknowledged that the region is home to some of the UK's most productive and fast-growing cities, it warned that its continued success cannot be taken for granted. Just as a business requires constant investment to maintain its competitiveness, so a regional economy requires continual investment in its infrastructure and services to remain competitive. The publication of the Arc Economic Prospectus in October 2020 set out the critical importance of investment in infrastructure in enabling the area to realise its potential as a leading global innovation economy.
15. The Commission highlighted how by bringing the strengths of individual areas together there is the long-term potential to transform the region into a world-leading economic area, one that acts as a hot bed for innovation. The Government has recognised that such transformation requires a need to plan for, and deliver, substantial additional infrastructure ahead of the arrival of planned growth, including the necessary transport infrastructure, utilities, digital connectivity, health and education.
16. The critical importance of infrastructure linkages beyond the Arc was highlighted by the Commission. England's Economic Heartland's geography – which extends beyond the Arc to include Swindon and Hertfordshire – ensures that the critical importance of wider economic and infrastructure linkages is fully reflected in the planning and delivery of strategic infrastructure, to the benefit of all residents, communities and businesses across the Heartland, not just those within the Arc.
17. The development of this Strategy has been informed by the work of the Heartland partners, including that undertaken as part of the Oxford – Cambridge Arc initiative. England's Economic Heartland provides leadership on strategic transport infrastructure in support of the Arc, working closely with other Arc related activity.
18. The Government has set out its commitment to develop a long-term spatial framework for the Arc. This Strategy, which is underpinned by a comprehensive Regional Evidence Base that reflects planned growth, will form a key input into the Government's work. Through its active involvement with Arc related activity, England's Economic Heartland will contribute to 'joining-up' the broader policy agenda to a common objective.



Robotics engineering developed at the Joint European Torus nuclear fusion experiment at the Remote Applications in Challenging Environments centre in Culham

Our Five-point Plan of Action

19. 'Business as usual' will not get us where we need to be. A step change is required. In order to deliver on our ambition and meet the expectations of our residents, communities and businesses, this Strategy sets out how the region will:

1 Focus on decarbonisation of the transport system by harnessing innovation and supporting solutions which create green economic opportunities

Our current pattern of travel and consumption of resources is not compatible with delivering the legal requirement to achieve net zero carbon emissions by 2050. The scale of planned growth increases the need for a step-change in our approach, as does the desire across the Heartland to achieve net zero earlier.

We will work with the region's business community to harness the Heartland's world-leading experience in clean, green and smart technology to enable solutions that deliver the decarbonisation of our transport system.

We will do this by prioritising investment not just on the basis of value for money, but for its contribution towards achieving net zero, as well as wider sustainability and environmental goals.

The focus provided by the four Grand Challenges in the Government's Industrial Strategy will be used to maximise the opportunity for innovation-led solutions and businesses to support sustainable growth and provide the UK economy with a competitive edge in global markets.

And we will harness the region's capacity to use 'living laboratories' at scale as the means of developing, trialling and subsequently adopting solutions that provide the user with choice, secures modal shift, and which create green economic opportunities in their own right.

2 Promote investment in digital infrastructure as a means of improving connectivity

Digital infrastructure allows us to 'connect' with a service, be it to better plan a journey through the use of intelligent transport systems, journey planning technologies or removing the need to travel at all.

Our modelling shows that a realistic pathway to decarbonisation includes a highly connected transport system – one that provides better transport information to the user, enables better management of the network and supports rapid deployment of connected and autonomous vehicles.

Travel is a derived demand. What we have seen in response to COVID-19 is the extent to which our demand for travel can be shaped and changed. We have seen how the assumptions underlying our approach to transport planning need to change to reflect wider changes within society. This creates the opportunity to do things differently when it comes to the planning, development and delivery of our transport system.

We need to plan for improved digital connectivity being integral to the way companies operate and services accessed. Planning for our future transport needs must factor in the ways in which the shape and scale of travel may be changed by investment in digital connectivity. Our transport system needs to be viewed as part of a wider system of connectivity – one that embraces both physical and digital access when identifying future infrastructure requirements.

The transformative potential of improved digital connectivity to reduce the need to travel is particularly strong in rural areas, where digital services have traditionally been poor (for example, according to Ofcom, only 44% of rural premises in England have access to 4G, compared to 87% in urban areas), yet where there is often a high reliance on journeys by private car (according to census data, 64% of residents living in the Heartland's predominantly rural districts normally drive themselves to work, compared to an average of 55% across England and Wales).

Our approach will ensure the Heartland seizes the opportunity for change – change in work patterns, change in travel patterns, change in our approach to connectivity.

3 Use delivery of East West Rail and mass rapid transit systems as the catalyst for the transformation of our strategic public transport networks

Investment in transformational infrastructure – particularly East West Rail and mass rapid transit schemes such as those planned for Cambridgeshire and Milton Keynes, supported by high quality first last mile provision – is central to supporting the sustainable growth of the region.

Securing the right service offer is crucial, given the varied work patterns of our communities and the need to unlock opportunities for all, including those in rural areas with limited access to the public transport network.

The offer to the travelling public must be of the highest possible standard – safe, clean and high quality, and accessible to all. We need to restore confidence, not just for the short-term, but the long-term.

We will champion the importance of ensuring our transport system is inclusive by design, allowing people to travel with confidence and ease through well designed physical infrastructure and accessible information to help aid journey planning. Information should be accessible to all ages and abilities.

4 Champion increased investment in active travel and shared transport solutions to improve local connectivity to ensure that everyone has the opportunity to realise their potential

Continued change in travel behaviour creates its own opportunities to repurpose our existing infrastructure in favour of public transport and active travel modes, but this must be done in a way that enables safe journeys and a sustainable future for our community as a whole.

We must seize the opportunity to fully integrate active travel into our daily routines with provision built in at the earliest opportunity for well designed, safe and accessible active travel.

The COVID-19 pandemic has shown the propensity for uptake in walking and cycling, particularly for leisure. We will harness the current enthusiasm for active travel, which has seen cycling levels at over 300 % increase in comparison to the previous year, with support for the development of Local Cycling and Walking Infrastructure Plans across the region to help build coherent networks of active travel infrastructure.

Incorporating green infrastructure in transport schemes and planning encourages uptake of active travel. Early integration of green infrastructure will not only improve connectivity but also help reduce the need to travel by bringing nature to people rather than bringing people to nature. This whole scale, holistic view of how we want our transport system to look and feel (and the additional benefits the approach can bring) will be at the forefront when planning our transport system.

5 Ensure that our freight and logistics needs continue to be met whilst lowering the environmental impact of their delivery

The rise in e-commerce, accelerated by COVID-19 and enabled by investment in digital infrastructure, is changing the way people access services and facilities. This in turn is having implications for the freight and logistics sector that need to be actively and positively planned for in partnership with the sector itself.

While the freight and logistics sector is essential for our businesses and communities, it is also one of the largest contributors to carbon emissions and potentially the most difficult part of our transport system to implement solutions to reduce emissions.

We are already seeing innovation across the region when it comes to servicing businesses and providing customers with novel ways of having their goods delivered – and we will build upon this.

And we will make the strongest case for investment in the capacity on our rail network to accommodate even more of the longer distance trunk movements of freight – not just to the benefit of the Heartland but the UK as a whole.



The rolling Chiltern hills

Climate Change and the Environment

20. As a region, our current pattern of travel and consumption of resources gives rise to both:
- High carbon emissions – emissions from transport are higher than the national average, and the rate at which emissions is increasing is almost double the UK average; and
 - Poor air quality – the environmental implications at a local level of our current transport system is reflected by the number of Air Quality Management Areas in the region. There is a need for urgent action to address poor air quality and reduce the number of avoidable deaths. We will continue to support Local Authority partners deploying Ultra Low and Zero Emission Zones and share best practice across the region.
21. Government's commitment to bring forward the end to the sale of new petrol and diesel cars and vans to 2030 is welcomed. We also support Government's ambition to remove diesel traction on the rail network by 2040. However, the evidence is clear: these changes will be insufficient to ensure our region meets the legal requirement to be net zero by 2050. Further action is required to change the scale and nature of existing travel demand. The need for action is heightened further by the scale of the region's planned growth.

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22. Whilst the legal requirement to achieve net zero by 2050 (and the region's ambition to achieve this ahead of the national target) serves as a key driver for change, it is part of a wider commitment, shared by the region and Government, to ensure that planned growth is delivered in a way that demonstrates net environmental gain. Net environmental gain is an emerging policy area but in the context of this strategy encompasses both natural capital and biodiversity net gain.
 23. The Government's 25-year Environment Plan provides the context within which this strategy, and its implementation, must demonstrate its contribution towards leaving the environment in a better state than we found it.
 24. The attractive natural, built and historic environment is a key factor in the region's success. Protecting and enhancing the natural environment through measures such as landscape led design, greening of the transport estate and applying a mitigation hierarchy to avoid impacts on biodiversity at the earliest point will help sustain the integrity and attractiveness of the Heartland's environment.
 25. Access to the Heartland's rich natural, built and heritage assets need to be considered in the context of their surroundings and access by sustainable modes of transport to these places is expected to be prioritised as a result of this Transport Strategy. The Environment Bill contains the requirement for responsible bodies to create Local Nature Recovery Strategies through which specific plans for improving land management for nature will be set. It will be important to link plans for local transport schemes to their Local Nature Recovery Strategies.
 26. It is in this context that all new transport-related development should protect and enhance the environment and be based on the principles of net zero carbon, net biodiversity gain, net environmental gain and contribute towards doubling the land actively managed for nature. We will work with partners to promote these principles within transport proposals. Such an approach is integral to the Government's ambitions for the Oxford-Cambridge Arc and are applicable throughout the Heartland.
 27. By taking a whole system approach we will provide opportunities to engage with partners outside the transport arena. Opportunities to integrate sectors such as transport and water management can capture wider benefits for our communities and public finance by integrating sustainable drainage solutions and flood management risk at early points in scheme development.
 28. Extreme weather events are the new normal. There is a need to invest in adapting our existing infrastructure assets to improve the resilience of our transport system and reduce the impact that disruption has on individuals (particularly the vulnerable), communities and businesses. We must continue to invest in the management and operation of our transport system as a whole so that when incidents occur, they can be dealt with in a timely and effective manner, including the provision of information to users across the transport system as a whole and to communities.

Inclusive by Design

29. Our approach to investment must ensure that our transport and digital infrastructure is inclusive and accessible to all, creating opportunities to enable individuals to realise their potential. It needs to provide the support for the more vulnerable within our communities, addressing not just physical barriers to connectivity but also issues such as affordability, loneliness and social isolation. And solutions need to reflect the cultural diversity of our communities.
30. Implementation of this Strategy will champion the principle of inclusive by design, ensuring people are able to travel with confidence and ease through well designed physical infrastructure and accessible information to help with journey planning. Information should be accessible to all ages and abilities. Service provision will be an important consideration, given our communities' varied work patterns and limited public transport provision in rural areas.

Whole System Approach

31. It is crucial there is a co-ordinated approach to shaping the future of our places, one that aligns decision making across policy areas to achieve a common vision of the future. By working with partners to adopt a vision-led approach to place-making at the local level, we will embed the philosophy of 'decide and provide'.
32. There is a need to invest in maintaining our existing infrastructure assets, deliver planned investment in additional capacity to meet future connectivity needs, and plan for the additional investment that enables sustainable growth, while at the same time preserving and enhancing our natural and historic environment and sustainable access to it.
33. For our transport system to meet the requirement to achieve net zero carbon emissions it is essential that future investment requirements for digital and utility infrastructure are considered alongside those for transport. Only by adopting a co-ordinated approach to the planning, development and implementation of strategic infrastructure will we deliver the connectivity the region needs to deliver sustainable growth.
34. The delivery of planned economic and housing growth represents an opportunity to realise benefits for both existing and new communities and businesses. However, this will be dependent upon investment in strategic infrastructure and services, complemented by investment in improved local connectivity, particularly public transport and active travel. Technological innovation in the transport sector will not on its own deliver net zero emissions, nor the wider ambition encapsulated by the place-making agenda. Decarbonising vehicles will not address concerns in relation to congestion on the network, nor the impact of that congestion on our communities and businesses.

35. In setting the long-term policy framework for our transport system this strategy both supports local authorities with the delivery of current Local Plan proposals and provides the context with which to plan for the sustainable development of our communities in the longer-term.
36. Linkages with decisions taken in other policy areas are significant in this context. Proposals that support the reimagining of our urban areas will create opportunities for further change in travel demand and behaviour. The application of a natural capital approach to the development of transport infrastructure will help create attractive transport corridors for both people and wildlife; maximise the positive impact of the transport soft estate; improve the quality of habitats; and encourage active lifestyles. It will also ensure that our future transport system has a positive benefit on air quality, water quality, flood risk management, soil quality and carbon sequestration.

 *The redeveloped Wellington Street in Swindon*



ENGLAND'S ECONOMIC HEARTLAND

37. The need for strong political and business leadership in order to deliver transformational strategic infrastructure and services, was recognised in 2015 with the establishment of what became England's Economic Heartland (EEH).
38. By working collaboratively on issues of strategic importance, the partners are better able to plan for:
 - Strategic infrastructure issues and solutions that extend beyond any one single area
 - Issues that are common to one or more local areas that benefit from a co-ordinated response
 - The case for investment in strategic infrastructure that is strengthened by having a single voice at a scale that has influence and impact.
39. Central to the work of EEH is the understanding that any consideration of strategic transport infrastructure and service requirements must also take into consideration the linkages with investment in digital infrastructure, both fixed and mobile, as well as utilities.
40. In 2016 EEH established the Strategic Transport Forum, the Sub-national Transport Body for the region. Sub-national Transport Bodies are required by Government to produce a regional transport strategy setting out a framework for supporting growth and driving investment in the region.
41. This Transport Strategy sets out the scale of the challenge we face, the need for change and the opportunities that exist to effect that change. It provides the policy framework that will enable all those with an interest in securing the future of the Heartland to work to a shared ambition that brings benefits to its residents, its businesses, its environment and the UK as a whole.

An Economic Powerhouse

42. England's Economic Heartland is one of the world's leading economic regions. Its success is founded on science and technology innovation, powered by a network of world-leading universities and research centres. The universities of Oxford and Cambridge continue to be ranked in the top three universities in the world.
43. More than one in 10 of the UK's knowledge sector jobs are located in the region's cutting-edge science parks, research institutions, businesses and incubators, creating an ecosystem of innovation and capability that is globally renowned.
44. The Heartland economy was valued at more than £163bn in 2018. Economic growth (as expressed by GVA) has consistently outstripped the UK average: with GVA growth of 25% recorded in the five-year period between 2013 and 2018 (compared to the UK average of 20%).

45. Its economic success benefits not only the region's residents, but the UK more widely, with the Heartland being a net contributor to the Treasury. However, as the National Infrastructure Commission highlighted, our continued economic success cannot be taken for granted. Whilst the COVID-19 pandemic will have implications for the economic performance of the Heartland in the short-term, the underlying strengths of the Heartland economy make its continued economic success a national priority.
46. Notwithstanding the headline economic success, businesses continue to face a number of challenges:
- In significant parts of the Heartland, productivity levels remain consistently below that of our global competitors, a consequence in part of increasing congestion on and reduced resilience of the transport system
 - Investment in enabling and supporting infrastructure takes longer to secure and deliver than planned, acting as a constraint on new economic opportunities developing as planned in a timely and cost-effective manner
 - The funds currently available to invest and maintain the existing infrastructure asset fail to keep pace with identified needs (including those as a consequence of planned growth), increasing the vulnerability of the transport system to disruption by incidents and extreme weather events.
47. The Local Enterprise Partnerships, through their Local Industrial Strategies, have identified the potential for the region's economy to grow by more than 70% by 2050.
48. Economic growth on this scale alongside the need to meet the legal target to achieve net zero carbon by 2050 (at the latest) will not be realised without a step change in the way our communities are planned and the way our infrastructure is delivered (including the level of investment).



 **Silverstone Park is at the centre of the Heartland's high performance technology cluster**

A Quality Environment

49. The Heartland is blessed with a highly attractive environment – built and natural, urban and rural – which helps make it an attractive place for investment and delivers a desirable place to live and work. The full extent and quality of the Heartland’s environment is captured in the baseline underpinning the Integrated Sustainability Appraisal (ISA).
50. Over 10% of the region is designated as being part of Areas of Outstanding Natural Beauty. The Chilterns on its own comprises 6% of the region’s total area. A healthy, well-managed and accessible natural environment contributes to people’s physical and mental health, and wellbeing. It is a significant factor in making the region an attractive location in which to do business.
51. The region also has a valuable historic environment, including a wealth of historic assets including Blenheim Palace World Heritage Site, around 1,390 Scheduled Monuments, 239 Registered Parks and gardens, over 370,000 listed buildings, and 1,191 Conservation Areas. They add distinctiveness, meaning and quality to areas; providing a sense of continuity and a source of identity. Historic places are also social and economic assets and can be used to support regeneration, place making and community development.
52. The ISA has been undertaken in parallel with the development of this strategy thereby ensuring that the policy framework is informed by the needs and opportunities presented by the Heartland’s environment.

At the Heart of the UK

53. The Heartland’s location within the United Kingdom makes our relationship with neighbouring regions of great strategic importance, both in terms of economic linkages and as part of the wider transport system that connects other regions and national with the UK’s global gateways.
54. Investing in the operational resilience and capacity of the Heartland’s transport system will not only ensure its continued economic success, but in providing enhanced inter-regional connectivity it will make a significant contribution to the levelling up of the UK economy.
55. Delivery of HS2, whilst not immediately benefiting the Heartland, will create opportunities to reallocate the capacity on the traditional rail corridors, initially the West Coast Main Line, and latterly the Midland Main Line and East Coast Main Line. Set within the context of the East West Main Line, this create opportunities to repurpose the way in which the railway network connects centres of economic activity in ways that are not constrained by the legacy of our Victorian forebears. In particular it creates opportunities to strengthen the connectivity between the Heartland and the Midlands to the benefit of both economies.



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56. Whilst the relationship with London will continue to be of strategic importance, investment in strategic linkages that avoid the need to travel through London will realise benefits for the UK as a whole, including London where the removal of transiting services will create its own opportunities to reallocate existing capacity to enable sustainable growth.
 57. In addition, investment in improved inter-regional linkages that cross through London will continue to be important in realising economic benefits across the wider South East. In this regard, the opportunities presented by Crossrail 2 are significant and are viewed as being of strategic importance.
 58. In order to realise these opportunities, we will continue to work closely with adjoining Sub-national Transport Bodies, and with Transport for London, to ensure the implementation of this strategy realises benefits for the wider UK economy.

A Vision that is Evidence Led

59. The development of this strategy has been informed by a comprehensive Regional Evidence Base, one that enables us to understand the current state of our transport system, as well as capturing the opportunities presented by the scale and distribution of planned growth across the Heartland.
60. The Regional Evidence Base, which has been built from the bottom up, comprises a number of detailed pieces of work, all of which are available to the Heartland partners, both within the region and nationally:
 - GIS-based Databank – containing information on known plans for growth (economic and housing). The databank is updated annually using information supplied by local planning authorities and local enterprise partnerships
 - Policy Scenario Model – a regional model that is used to assess the relative implications of alternative scenarios. The model has the ability to consider both alternative development scenarios (scale and distribution of future growth) and alternative policy scenarios. Its back-casting ability enables the interventions required to achieve a particular outcome to be explored
 - Population Segmentation – part of the output from a technical study linked with our First Mile/ Last Mile project, this provides insight into the behaviours of the region's residents in a way that complements this strategy's user-centred focus
 - Pathway to Decarbonisation – making use of the National Infrastructure Systems Model (NISMOS) to inform this strategy's approach to de-carbonising our transport system
 - Passenger Rail Study – a baseline assessment of the Heartland's rail network and levels of service, providing an evidence-led review of existing rail infrastructure and identifying where strategic connectivity gaps exist
 - Opportunities Mapping – mapping the scale and geographical extent of planned growth (economic and housing) against the backdrop of today's current situation
 - Technical Studies – the output of technical work commissioned to explore specific aspects of our transport system.

61. In grounding this strategy in a detailed understanding of the here and now, we have ensured that it complements and supports the work underway at the local level, and within the sub-regional Growth Boards and the emerging spatial framework.

A Region with Challenges

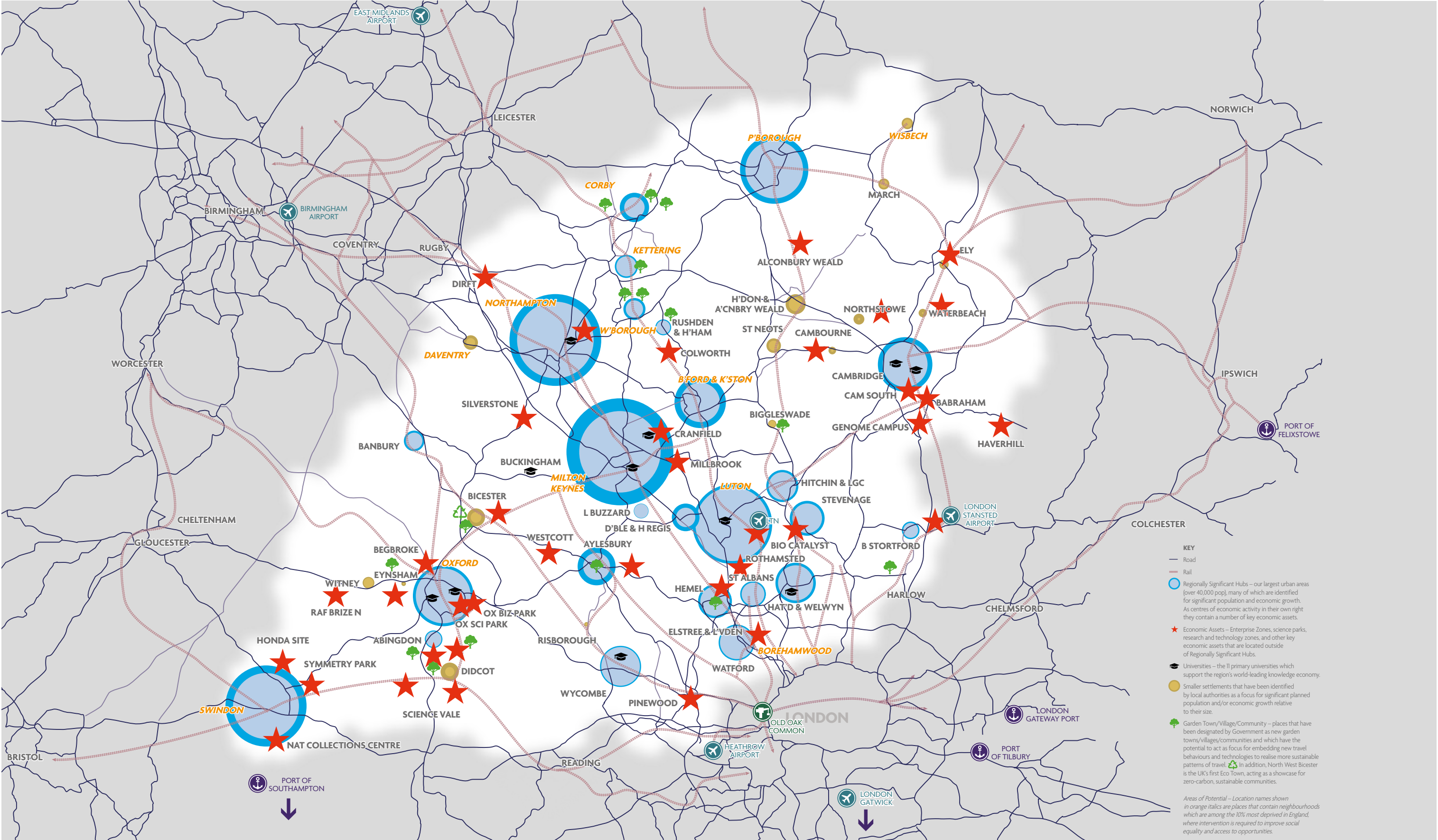
62. The requirement to achieve net zero carbon emissions is a key driver for this strategy. The scale of the challenge facing the Heartland in this regard is captured by the Regional Evidence Base. In 2017 total CO₂ emissions in the Heartland stood at 28,834kt in 2017, equivalent to 8% of the UK total. In addition, CO₂ emissions have fallen at a slower rate than the national average – 17.4% compared to 21.7% between 2012-2017.
63. Transport-related emissions are a particular challenge, rising 10% between 2012-2017, compared to 5% nationally. In 2017 transport emissions equated to 47% of the Heartland's total carbon dioxide emissions, compared with 37% nationally. And with transport emissions increasing at a faster rate than elsewhere (9.4% between 2012 and 2017 compared to the UK average of 4.9%) there is a clear need for action. More generally, the current approach to the delivery and management of the transport system is unsustainable, as demonstrated by the number of Air Quality Management Areas declared within the region. These figures reflect the fact that across the Heartland people are more likely to travel longer distances to work than the national average, and with over 67% of the workplace population travelling to work by car (compared to 60% nationally). They highlight the importance of seizing the opportunity created by changes arising from more flexible work patterns.
64. The Heartland is home to 5.1m people, approximately 9% of the total population of England. And whilst the region has a number of centres of significant economic activity, it also has a large number of small and medium sized market towns and large rural areas resulting in a diverse range of transport needs, opportunities and challenges. As a result, around 35% of the region's population live in small market towns and rural hinterlands, significantly above the national average. Whilst overall the region is an economic success, there are significant areas of social inequality and deprivation, where opportunities for individuals to realise their full potential are limited. Within rural communities the connectivity options, both physical and digital, available to residents and businesses are often limited, giving rise to implications that extend beyond the transport sector.
65. Over 812,000 people in the region live in the top third most deprived local authority areas of England – accounting for 15% of the region's population. The implications of failing to address inequality are only too evident: within Oxford for example, life expectancy amongst young adult males varies by 15 years across the city.
66. Improving access to opportunities for individuals is fundamental to helping address issues of inequality, bringing with it consequential improvements in health and wellbeing, as well as making a significant contribution to the economic success of the region.

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67. We continue to work closely with transport operators (including the EEH Bus Operators Association), local enterprise partnerships and local authorities to ensure that measures to create opportunities for individuals are taken forward in such a way as to support the requirements of this strategy.
 68. We will also use our understanding of the diversity of the region's population to develop, design and implement solutions that align with the specific needs of our communities.

Places of Strategic Importance

69. Across the region there are a number of centres of economic activity that our partners view as strategic assets and where investment in strategic infrastructure is required. At the same time, the Regional Evidence Base highlights areas where investment in strategic infrastructure is required as part of a commitment to level up opportunities across the Heartland.
70. Through the implementation of this strategy we will prioritise the need to invest in strategic infrastructure that supports the continued success of existing economic assets, as well as those communities with the greatest potential to improve social equality. The Places of Strategic Importance will be reviewed on a biennial basis to ensure they still reflect the reality of the region.
 - Regionally Significant Hubs – our largest urban areas (over 40,000 pop), many of which are identified for significant population and economic growth. As centres of economic activity in their own right they contain a number of key economic assets.
 - Economic Assets – Enterprise Zones, science parks, research and technology zones, and other key economic assets that are not located in Regionally Significant Hubs.
 - Universities – the 11 primary universities which support the region's world-leading knowledge economy.
 - Smaller settlements that have been identified by local authorities as a focus for significant planned population and/or economic growth relative to their size.
 - Garden Towns/Villages – places that have been designated by Government as garden towns/ villages and which have the potential to act as focus for embedding new travel behaviours and technologies to realise more sustainable patterns of travel. In addition, North West Bicester is the UK's first Eco Town, acting as a showcase for zero-carbon, sustainable communities.
 - Areas of Potential – places that contain neighbourhoods which are among the 10% most deprived in England, where intervention is required to improve social equality and access to opportunities.


// Places of Strategic Importance



Freight and Logistics

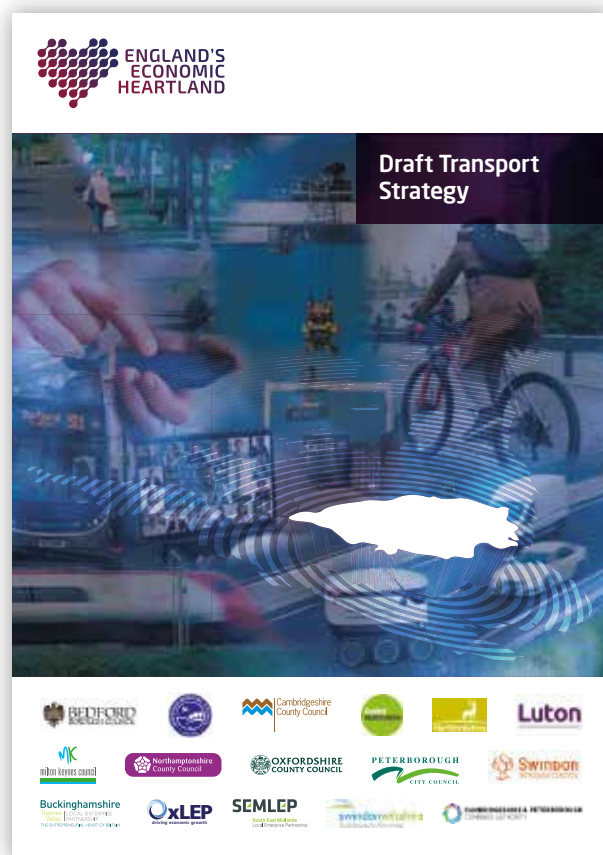
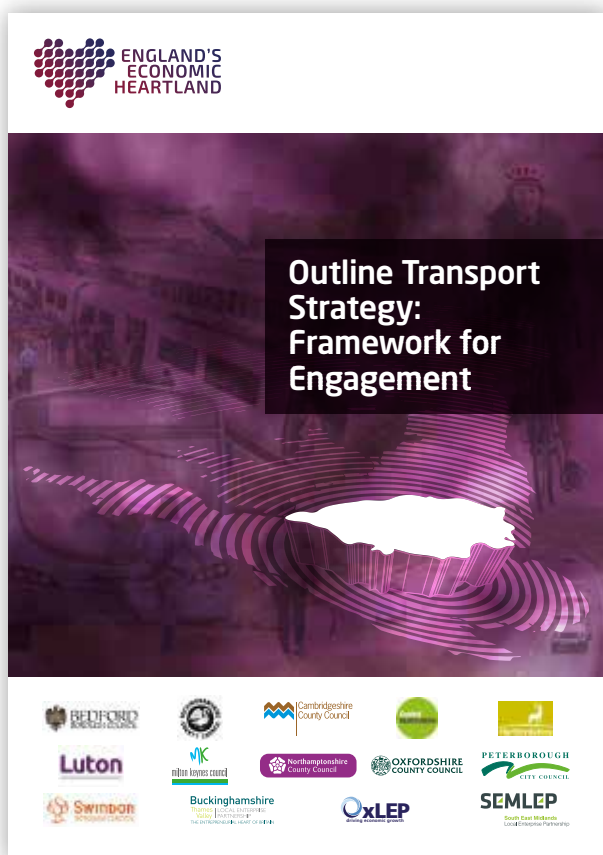
71. All too often the freight and logistics sector is overlooked in transport strategies. This strategy recognises that actively planning for and meeting the freight and logistics needs of the business community are pre-requisites for economic and environmental success.
72. The digital economy has changed the scale and nature of logistics, both in terms of business to business activities and business to end user. Notwithstanding this, catering for and managing the flow of freight associated with the deep-sea container traffic transiting through the UK's global gateway ports at Felixstowe, London Gateway and Southampton remains a key strategic priority for the Heartland.
73. The clusters of national distribution centres located within the region are a key part of our economy and a strategic asset for the UK.
74. Civilian airports located in or near the Heartland are a vital part of the UK's freight network. Heathrow Airport is the UK's biggest port by value, handling over 1.70 million metric tonnes of cargo per annum. East Midlands Airport is the UK's second busiest airport for freight, handling around 320,000 tonnes of cargo per annum. Stansted Airport handles 260,000 tonnes of cargo per annum, making it the third busiest UK airport for freight. RAF Brize Norton in Oxfordshire, home to the RAF's heavy lift aircraft, is the primary airport for the UK military and is the air bridge for all overseas deployments, making it a UK strategic asset.
75. Notwithstanding the importance of the freight and logistics sector, its environmental footprint is significant and requires action.
76. The use of conventional road vehicles is increasingly under scrutiny because of their environmental and social impact. We will work with the freight and logistics sector to develop and deploy innovative solutions that enable the servicing and support needs of the business community and public to be met in ways that respond to our environmental responsibilities, locally and nationally.



 **A heavy goods vehicle passes the Waterside Theatre in Aylesbury**

Engagement and Consultation

77. The development of this strategy has involved two rounds of engagement with the wider community.
78. In July 2019 the publication of the Outline Transport Strategy started a conversation with the region's communities and businesses about their expectations of and ambitions for our transport system. The views gathered formed an important part of our evidence base, providing an insight on the key issues that our residents and businesses consider this strategy needed to address.
79. A consultation on the draft Transport Strategy was held from July to October 2020. The comments received in more than 200 responses from partners, residents and organisations indicated a high level of overall support for the strategy, as well as providing specific proposals that have further strengthened the document.
80. Both the engagement and the consultation highlighted increased acceptance within our community of the need for change and the need to do so at pace, particularly with regards to decarbonisation.



A TRANSPORT SYSTEM FOR THE FUTURE

81. Our current pattern of travel and consumption of resources is not compatible with our ambition to achieve net zero carbon emissions ahead of 2050, nor with the need to ensure the long-term sustainability of the region. It is necessary to effect a change in travel patterns; both by reducing the need to travel and by achieving changed travel behaviours and patterns of demand, including reducing reliance on the private car.
82. The response to the COVID-19 pandemic has highlighted the extent to which rapid and widespread use of digital connectivity can act as an effective and efficient means of maintaining business activity. It also illustrates the extent to which change can be achieved at pace when the circumstances require it and providing the imperative for change is compelling.
83. The Paris Agreement enshrines a commitment to restrict the increase in global average temperature to 'well below' 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.
84. The UK Government is under a duty to ensure that the net UK carbon account for 2050 is at least 100% lower than the 1990 baseline (the 'net zero target' which was enshrined into law in June 2019).
85. Transport is now the largest sector for UK greenhouse gas emissions (28%), of which road transport accounts for over 90%.

Pathways to Decarbonisation

86. The policies set out in this strategy have been informed by the outcome of work commissioned to identify the possible pathways to decarbonisation by 2050. The outcome of that work has reinforced the need for bold decision making and long-term planning.
87. Our approach looks to build on the Government's policy as set out in the Department for Transport's Decarbonising Transport: Setting the Challenge in which the Secretary of State sets out that:

"Public transport and active travel will be the natural first choice for our daily activities. We will use our cars less and be more able to rely on a convenient, cost-effective and coherent public transport network."

88. It also builds on the fact that the majority of our local authority partners have passed resolutions declaring a 'climate emergency' and have targets to deliver organisational net zero emissions by 2030.



 Autonomous vehicle testing at RACE in Culham

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89. Harnessing this level of ambition and building on the outcome of our work on pathways to decarbonisation, we will support the implementation of this strategy through the development of a Decarbonisation Road Map for our transport sector by the end of 2021.
90. Decarbonisation requires a step-change in the way we view and plan connectivity. The factors considered and policies set out in this strategy contribute towards the wholesale change required. Taken together, they will set us on the path to meeting our ambitions.
91. This strategy has been prepared on the basis that there will be a transition to 100% zero-emissions cars, light goods vehicles (LGVs), heavy goods vehicles (HGVs) and public service vehicles (PSVs, for example buses and coaches) by 2050. In addition, delivering this ambition will require the delivery of:
- i) A highly connected future, one that enables our transport system to provide better transport information to the user, better management of the transport network, and the rapid deployment of connected and autonomous vehicles. This pathway will build on a step change in the provision of digital access and services to the home – allowing for a significant increase in home working and a significant change in travel patterns
 - ii) A policy-led behavioural shift by which decision makers at all levels agree to deploy policy levers specifically designed to reduce the number of car trips. This will require the application of measures designed to reduce the need to travel. In parallel, it requires a commitment to ensure local communities have real choice in the way they travel – with bus, rail and active travel options being attractive and viable alternatives to the private car.
92. The approach set out in this strategy is deliverable and viable. By primarily reducing the need to travel, focusing on modal shift and supporting the deployment of mass rapid transit and active travel, it highlights an affordable alternative to traditional, large-scale road projects that take many years to plan, fund and deliver.
93. We are committed to working with partners to implement the required actions within this strategy as they develop proposals that are consistent with the legally binding commitment to reach net zero emissions by 2050. Further, we are committed to supporting partners as they respond to any future changes in legislation relating to new infrastructure proposals. Together with partners we will monitor and review policies, programmes and infrastructure proposals for compliance with the need to deliver carbon reduction.
94. We will prioritise, as part of delivering this strategy and working with both public and private sector partners, the delivery of the digital infrastructure required to support the decarbonisation of our transport system. This will facilitate the establishment of a highly connected, intelligent transport system. It will allow vehicles and services to operate efficiently around the region, making better use of emerging and established technologies, enabling the Internet of Things (IoT) and big data analytics to manage our transport networks as a single system. Delivering on digital infrastructure will enable us to realise the potential of Intelligent Transport Systems (ITS) and connected (and autonomous) vehicles to grow innovation in our transport system.

95. We will also actively promote the opportunities created by change in the scale and nature of travel demand to repurpose our existing infrastructure assets (with their embedded carbon) so they give priority to active travel and public transport, primarily through bus and coach services.
96. We will work with our academic partners and local enterprise partnerships, to ensure we harness the capability of our knowledge-intensive economy to develop new user-focused services that directly reduce our carbon emissions.

Decarbonising our Transport System

Policies

- 1 In identifying future investment requirements we will prioritise those which contribute to a reduction in car journeys in line with the recommendations delivered by the UK Climate Assembly: to facilitate a reduction in the number of private car journeys by a minimum of 5% per decade (of total traffic flow compared with 2019).
 - 2 We will support and plan for the decarbonisation of the road fleet, working with the private sector, the energy sector, local authorities and Highways England to ensure the infrastructure required to support a zero-emission fleet (including buses, public transport and freight) is available.
 - 3 We will support and plan for the decarbonisation of the rail network with priority given to securing:
 - Completion of the Midland Main Line electrification
 - Delivery of East West Rail as an electrified route
 - Infill electrification schemes that enable electric haulage of rail freight services, in particular those to/from the international gateway port of Felixstowe and to/from national and regional distribution centres
 - Electrification of the Chiltern Main Line between Birmingham and London Marylebone.
97. A continued and focused approach is required to ensure that all the drivers of change that support a decarbonised, highly connected, demand-managed, transport system are utilised. The region's transport decarbonisation roadmap will be the mechanism for achieving this.
98. We will work with Government to ensure the implementation of this strategy is consistent with the ambition set out in Decarbonising Transport – Setting the Challenge. Through our Travel Hierarchy we look to make active travel and public transport the first choice for travel.
99. Working with partners, we will look to ensure the transport implications of decision making across all policy areas – including but not limited to land-use planning – are taken into account. The continued evolution of business models for the delivery of services within the public and private sectors will have implications for future travel demand. Understanding those implications as part of the decision-making process will be critical if we are to achieve net zero emissions. As part of this commitment we will work with regional and national partners to support the deployment of green infrastructure and low carbon services to enable residents to make better, low carbon travel choices.



100. The commitment to support the reduction in the number of car journeys is necessary in order to achieve net zero emissions. Given the scale of planned growth this will ensure that overall traffic do not go beyond current levels. The current target of 5% decade on decade reduction in trips will deliver a 15% reduction in the total trips by 2050 but it is likely that up to a 30% reduction in trip rates may be required to deliver decarbonisation and improved network performance. We will review the target set out in Policy One following publication of the DfT's Transport Decarbonisation Plan and completion of our Decarbonisation Roadmap for Transport.
101. We will work with partners to identify and implement local policies that will redress the decline in average private vehicle occupancy and encourage the deployment of new mobility solutions to increase the efficiency of passenger movement. We support improved access to shared mobility assets include electric vehicle car clubs, ride share schemes and better access to shared micro mobility solutions where appropriate.

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102. Improved digital connectivity will be a key component in achieving the ambitions of this strategy. It will reduce residents' need to travel, enable more flexible/remote working and improve access to employment and opportunities. We will work with our utilities partners to accelerate the delivery of improved digital connectivity. This includes innovative new approaches to delivering digital connectivity at scale, both through the deployment and reinforcement of physical fibre connectivity, and new approaches to "Over the Air" delivered by 5G and emerging satellite technologies.
 103. Electrification offers a significant opportunity to decarbonise our transport system. We will continue to support the deployment of renewable energy generation in our region and beyond, as well as the opportunity to deploy at scale new technology such as Vehicle to Grid and Hydrogen Electric Vehicles. Delivering the utility infrastructure required to support such initiatives will require partnership to ensure it is achieved at pace and at a scale that achieves economies of scale.
 104. We will build on the leadership being provided by Milton Keynes, Oxfordshire, and Cambridgeshire and Peterborough on electrification of the local transport network and use that knowledge to see it applied more widely across the region. We will work with infrastructure owners in the energy sector to ensure this is enabled by the necessary investment in electricity supply and distribution networks.
 105. Lessons learned in our region about the deployment of enabling infrastructure for Ultra Low Emission Vehicle and the behaviour of users is already shaping national policy. We will continue to support our partners to scale this activity.
 106. Implementation of this strategy requires a commitment to a regional approach to the provision of infrastructure for alternative fuels. Substitution of internal combustion engine vehicles for zero emission vehicles will make a positive contribution towards reducing carbon emissions. However, it will not address wider concerns that arise from overall volumes of vehicles in our communities and poor journey time reliability for intra-urban connectivity.
 107. Whilst electrification of the road fleet is supported, it needs to form part of a co-ordinated approach to investment in improved local connectivity. More than half of car journeys in our region are under five miles and through this strategy we are committed to supporting partners to deploy new infrastructure and services that supports modal shift, particularly focusing on these shorter journeys.
 108. Electrification/decarbonisation of our road fleet must be taken forward as part of an approach that seeks to reduce the overall number of vehicles in our urban areas and cutting the number of car trips made across the region.
 109. We will work with the rail sector to build on their traction decarbonisation business case to develop a rolling programme of electrification for our rail infrastructure. The timescales associated with the planning, development and implementation of electrification projects makes the need for a rolling programme of electrification an urgent requirement if this part of the transport system is to realise its contribution towards achieving the net zero requirement.

110. Priority will be given to the early electrification of those key rail corridors that are essential for strategic rail freight movements, reducing the carbon emissions of existing movements. This approach will improve the business case in support of long-distance freight by rail compared with road haulage, the latter being a particular concern in terms of its carbon emissions.
111. As the sole remaining non-electrified main line route serving London, we will continue to work with Network Rail, Midlands Connect and TfL to prepare the business case in support of a long-term solution for the Chiltern Main Line.
112. On those routes where electrification is not a practical or viable solution, we will work with the rail sector to identify alternatives that decarbonise the rail network, including hydrogen and emerging battery solutions.

Mobility of the Future

Policies

- 4 We will work with infrastructure owners and operators to ensure that proposals brought forward for the development of the transport system reduce reliance on the private car by considering the needs of users on the basis of the following Travel Hierarchy:
 - i) Active travel modes (pedestrians and cyclists)
 - ii) Enabling access to services and opportunities without the need for motorised travel
 - iii) Public transport and shared modes (bus, scheduled coach and rail)
 - iv) Low emission/ zero carbon private vehicles, and two-wheeler vehicles including motorcycles
 - v) Other Motorised modes.All proposals to be prepared on the basis that they provide inclusive and accessible travel options for all users and take account of relevant national and local design standards – for example, walking and cycling.
- 5 In identifying future investment requirements, we will prioritise proposals on the basis of value for money, their contribution towards achieving net zero carbon targets, and their contribution to wider sustainability, environmental net gains and health outcomes.
- 6 New transport development in the region should conserve and where possible enhance the natural, built and historic environment.
- 7 We will aim for zero deaths on the Major Road Network by 2040.
- 8 We will continue to work with partners, universities, operators, and the private sector to leverage our regional 'living laboratories' to trial innovative solutions and apply new business models at scale.

113. Additional measures over and above those already being taken forward are required to decarbonise our transport system. Measures are required to both reduce the need to travel and reduce the reliance on the private car.

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114. Given that travel is a derived demand, it is essential that the planning and development of our transport system is co-ordinated with wider policy considerations, including but not limited to land use planning.
 115. Ensuring that local communities and businesses can safely and efficiently access the services and facilities they need is an important contributory factor to managing future travel demand. Access to good quality services and facilities locally can both help reduce the length of journeys and encourage greater use of active travel modes. Integrating transport and land use planning and increasing digital connectivity to services will create additional opportunities to effect long-term change in travel patterns.
 116. Considering the needs of users in accordance with the Travel Hierarchy when developing proposals will help ensure that future investment actively encourages a modal shift. In this way, the hierarchy will facilitate an increase in investment in local measures that improve the health and well-being of individuals and help reduce the environmental footprint of our transport system. It also supports partners wishing to pursue the application of 'vision zero' principles at the local level.
 117. The hierarchy of modes needs to be equally applied to the existing infrastructure asset. Investment in maintaining the asset offers the opportunity to apply the hierarchy to repurpose the available space in favour of modes that support a more sustainable pattern of development.
 118. This strategy assumes that proposals brought forward for investment will incorporate measures for all levels of mobility so as not to exclude people who are unable to participate in active travel. Where new mobility services are deployed, all possible efforts will be made to ensure equitable access and inclusivity for all transport users. Infrastructure should take account of relevant national and local design standards.
 119. The response to the COVID-19 pandemic highlighted the extent to which more flexible/remote working has the capability to enable a significant proportion of the regional economy to function without the need for travel. Through this strategy we seek to build on this experience in support of its ambitions. Concurrently, this strategy takes account of how the continued growth of e-commerce and changing work patterns continues to impact both the need to travel and the nature of future demand. The increase in local services, in particular local delivery services, has the opportunity to reduce both the need for and length of trips.
 120. Walking and cycling is already a significant part of our overall transport system, particularly in Oxford and Cambridge. We support the conclusion of Andrew Gilligan's report for the National Infrastructure Commission – Running out of Road – that outlines the need for investment in our region to unlock low carbon economic growth. Through the Travel Hierarchy and Local Cycling and Walking Infrastructure Plans, we will work with partners to ensure walking and cycling levels continue to grow across the region.



 **Bikes for hire outside Milton Keynes railway station**

121. The transport system plays a key role in allowing communities to access, and to reduce severance to, green spaces. We support the creation of a pan-regional network of greenways which enhance opportunities for walking and cycling. These off-road walking and cycling routes provide attractive links rich with vegetation, connecting people to the natural, built and historic environment. Their design incorporates the natural environment helping to bring people closer to nature, often linking urban areas to more rural locations. Greenways also provide opportunities for wildlife corridors and enhancement of biodiversity. The Waddesdon Greenway project, connecting Aylesbury Vale Parkway and Waddesdon Manor is an example.
122. We are committed to working with our partners and the walking and cycling charity, Sustrans, to improve the national cycle network, making it segregated wherever possible. This includes maximising the potential of an Oxford-Cambridge 'Varsity Way' segregated cycling and walking route as a 'green spine' across the Heartland: one that can act as a focal point for developing a region wide network of cycle routes.
123. We support the proposed Bedford to Milton Keynes Waterway Park, a 26km canal connecting the Grand Union Canal at Campbell Park in Milton Keynes to the head of navigation of the River Great Ouse at Kempston, west of Bedford. The project, led by the Bedford & Milton Keynes Waterway Trust, will help support sustainable growth by improving options for active travel, supporting the creation of new wildlife habitats, as well as supporting a more varied and attractive built environment, while also providing significant economic benefits.

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124. Interurban and local bus travel continues to be an essential part of our transport system, providing many with their primary means of access, as well as providing an alternative to the private car. Unlike rail, and unless segregated, the reliability of bus and coach services is dependent on a well-performing road network. Through our Travel Hierarchy, we will put the needs of the bus at the forefront of our approach to connectivity, and our associated investment plans.
 125. It remains important to ensure that investment proposals continue to offer good value for money. We will use an evolution of our multi-criteria framework, originally developed to identify investment priorities for the Major Road Network programme, as the basis for ensuring that investment priorities taken forward into the investment pipeline are consistent with this strategy's vision and principles.
 126. Individual investment proposals will continue to be considered on their own merits. However, our approach also ensures that, where appropriate, a scheme's contribution as part of a wider package of measures is also considered. It is often the cumulative benefit of a co-ordinated package of investment that needs to be captured.
 127. As we develop our shift in the appraisal process, we will work with the Government to build on the outcomes of their 'Green Book' review and with other funding decision makers to ensure that the appraisal of investment proposals reflect the importance of wider sustainable development principles as well as achieving the net zero target.
 128. Through early partnership working to establish an understanding of heritage assets present, new transport developments are expected to protect and enhance heritage assets, maintaining their significance, character and sense of place.
 129. For the natural environment new transport infrastructure is expected to assess environmental gains and losses systematically and define targets for biodiversity, natural capital and environmental net gains with the intent of achieving net gains across locally important natural capital and associated eco-systems.
 130. In line with the United Nations Sustainable Development Goals to be achieved by 2030, we will champion safe, accessible and sustainable transport systems for all, expanding public transport with special attention to the needs of those in vulnerable situations, women, children, people with disabilities and older people.
 131. We will prioritise a safe transport system. Where safety or perceptions of safety impair our ability to improve connectivity we will work with infrastructure owners and operators to address this using a safe system approach, where networks are designed to reduce the risk of accidents occurring, and where they do occur, reduce the severity of injuries.

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132. Safety remains the first imperative for infrastructure operators such as Highways England and informs design principles, road standards, operational procedures and investment decisions. Improvements in safety technology and intelligent management of the Strategic Road network (SRN) result in reductions in the numbers of people killed or injured on the SRN with a 'Zero Harm' goal of bringing the number of people killed or seriously injured to a level approaching zero by 2040. We will look to match this target for the local authority-owned Major Road Network.
 133. The use of data analytics is driving the growth in user-focused services, typically accessed via smart phones. We will continue to build on the leadership being provided within the region on the deployment of user-focused services. Through our Innovation Working Group we will use that knowledge to scale this capability across the region on a consistent basis, establishing better data sharing and interoperability.
 134. As a focus for science and technology-based innovation in the UK, we are working with partners, particularly our universities and research facilities, to maximise the use of 'living laboratories' as a means of trialling innovation in the region at scale and at pace. And we will work with the private sector to develop proposals that encourage the scaling up of trials to the regional level at the earliest opportunity.
 135. The region is a leader in the development of the technology associated with the use of electric vehicles and connected autonomous vehicles, technology that has the potential to be a key part of our transport system moving forward. The work underway in Oxfordshire, Cambridgeshire and Milton Keynes provides the region with access to experience on which it can build.
 136. Delivering new approaches, ownership and business models that facilitate access to transport will be a key part of the transition to net zero. Mobility as a Service (MaaS), Car Clubs, demand responsive transport (DRT) and shared mobility (including micro mobility) will be supported where appropriate. As new forms of mobility emerge and are tested, we will review the Travel Hierarchy to ensure it continues to be relevant/ fit for transport users.
 137. The availability of fixed and mobile digital infrastructure is central to enabling the region to exploit its leadership in innovation in the transport sector to the full. Not only is digital infrastructure critical to the collection and use of the data underpinning user-focused services, it also offers the potential to help reduce the need for travel in the first place.
 138. Harnessing the potential of our business community in the development of new solutions and businesses will not only benefit the region, it will also provide the UK with a competitive edge.

TRANSFORMING JOURNEYS

139. Improving east-west connectivity provides the overriding transformational opportunity for our region, also unlocking opportunities to improve north-south connectivity.
140. Taken together this will transform what is currently a series of discrete functional economic areas and housing markets, creating a better connected and interrelated region, delivering agglomeration benefits for businesses and levelling up opportunities for the region.
141. Maximising the benefits and opportunities arising from the investment in strategic infrastructure is at the heart of realising our ambition for the region. The clarity provided on the future development of our transport system will enable partners to bring forward proposals for their communities with greater confidence. In this way it will enable our economic potential to be realised and the region's future housing needs to be met.

The East West Main Line

Policies

- 9 We support the delivery of the East West Rail project (including the 'eastern' section from Ipswich and Norwich to Cambridge), with the expectation that Oxford to Bletchley/ Milton Keynes is open by 2025, with links to Bedford and Aylesbury to follow at the earliest possible opportunity thereafter, and Oxford-Cambridge delivered no later than 2030.
 - 10 We will work with the East West Railway Company, Network Rail, neighbouring STBs and local partners to identify opportunities to realise the longer-term potential of the East West Main Line in support of economic activity and planned housing growth.
 - 11 We will work with partners, the East West Railway Company and Network Rail to ensure that where the East West Main Line intersects existing main lines the opportunity is taken to establish regionally significant transport hubs. Priority will be given to developing proposals in the following locations:
 - Oxford Stations
 - Bicester Stations
 - Aylesbury Station
 - Milton Keynes/Bletchley Stations
 - Bedford Midland Station
 - East West Rail/East Coast Main Line
 - Cambridge/ Cambridge South Stations.
142. The historical dominance of London within the UK economy means most of our region's strategic transport linkages are radial in nature, centred on the capital. However, travel patterns across the Heartland are more complex and emphasise the importance of improving the connectivity more generally between our places of strategic importance.
 143. Delivery of a strategic railway connecting East Anglia, with central, southern and western England is the shared strategic ambition of the local authorities comprising the East West Rail Consortium. East West Rail has been at the heart of the region's strategic priorities for 25 years.



144. The core focus for the East West Main Line is to achieve a step-change in east-west connectivity, linking Ipswich and Norwich with Cambridge, Milton Keynes, Oxford and beyond that towards Swindon and onwards to Bristol and South Wales.
145. The East West Railway Company is planning East West Rail in three 'connection stages':
 1. Oxford to Bletchley/ Milton Keynes; and Aylesbury to Milton Keynes
 2. Oxford to Bedford
 3. Oxford to Cambridge.
146. From its inception in 1995, the East West Rail Consortium has also promoted the 'Eastern Section', linking Ipswich and Norwich from Cambridge. We will continue to work with the East West Rail Consortium and Transport East to develop and promote proposals that will deliver the 'Eastern Section' at the earliest opportunity.
147. Though each section of East West Rail brings with it benefits to the communities it serves, the full transformational benefit will only to be realised through the creation of the East West Main Line in full.
148. The East West Main Line will, for the first time, offer a fast, reliable, and attractive rail link across and within our region that will have a competitive advantage over the private car. The benefit of the East West Main Line lies not just in the improved connectivity between those urban areas it directly serves, but also in the opportunity created where the route crosses the radial main lines centred on London. Removing the need for rail users to travel through London will additionally provide some relief to rail services on the radial main lines to/from the capital.

149. Identifying these points as regionally significant rail interchanges creates opportunities to offer users a range of new rail-based journeys. Our baseline of the existing rail network provides the foundation on which to work with the rail sector and identify the measures required to make those options real. Central to this will be the principle of journey options requiring no more than one-stop interchange.
150. The transformational benefit of the East West Main Line to the region, its residents and businesses, will be enhanced further by ensuring it is delivered as a digitally enabled corridor, one that provides improved digital connectivity for both passengers and communities close to the rail corridor.
151. The commitment by Government to deliver the Oxford to Cambridge sections of East West Rail represents a first step in realising the full benefit of this transformative link for the region and beyond. Building on the confidence generated by the work of the East West Railway Company, we will work with local authorities to ensure that the opportunities created by this investment are used to shape the location of future economic and housing growth proposals.
152. The longer-term potential of the East West Main Line to support planned growth and encourage further shift in passenger and freight movements on to the railway will require additional investment in its capacity and capability (see also Realising the Potential for Rail Freight section below). We will work with the East West Railway Company and Network Rail to develop the longer-term potential of the East West Main Line over and above that of the current proposal.

Improving East West Connectivity

Policies

- 12 We will prioritise improvements to east-west connectivity to support economic activity and planned housing growth, including:
- i) A northern corridor that links north Oxfordshire, Northamptonshire, and Peterborough, providing more direct passenger transport connectivity across the northern Heartland
 - ii) A southern corridor that links Buckinghamshire with Hertfordshire, providing an orbital passenger transport route between the Chiltern Main Line and West Anglia Main Line.
- 13 We will work with Western Gateway and Network Rail, Highways England and public transport operators to develop proposals that strengthen connectivity between Swindon/Oxford and the South West and South Wales in support of economic activity and planned growth.
- 14 Taken forward by our programme of connectivity studies, we will identify proposals that strengthen east/west connectivity within the following areas:
- Oxford-Milton Keynes
 - Peterborough-Northampton-Oxford
 - Oxford – Didcot – Swindon
 - Watford-Aylesbury-Bicester-M40
 - North Northamptonshire
 - Oxford – M40 junctions.

153. The output from the opportunities mapping, supported by other technical studies, illustrates the extent to which east-west connectivity acts as a constraint on the Heartland realising its economic potential.
154. Building on that output, the findings of the Phase 1 Passenger Rail Study identified two additional east west corridors where improved connectivity will support the delivery of planned economic and housing growth:
- A northern corridor that links north Oxfordshire, Northamptonshire and Peterborough which provides more direct connectivity across the northern Heartland, potentially by rail
 - A southern corridor that links Buckinghamshire with Hertfordshire and parallels the southern border of the region providing an orbital route of London between the Chiltern Route and West Anglia Main Line, potentially by rail.
155. The opportunities mapping also highlights the strategic importance of improving connectivity between Oxford and Swindon to the benefit of the economies of both centres, with improvements to both rail and road corridors required. Indeed, the National Infrastructure Commission in its report identified the need to use improved east-west connectivity in our region as the catalyst for strengthening linkages westward to the South West and South Wales. We will work with the rail sector to ensure that the benefit of investment in the East West Rail project extends through to Didcot Parkway and onward towards Swindon/Bristol and Southampton.
156. The output of the Oxfordshire Rail Corridor Study has made the strategic case for investment. We are supportive of its recommendations to strengthen connectivity on the North Cotswold Line and of the need for improvements to suburban rail services centred on Oxford, including the upgrade of the Cowley Branch Line for passenger use, as well proposals for a new Grove Station.
157. Implementation of this strategy will involve taking forward a programme of multi-modal connectivity studies. The purpose of these studies, co-designed and taken forward with local partners, will be to identify the strategic questions relating to connectivity in each study area (both in the present and as a result of planned growth), to agree the outcomes required of the transport system and to then identify the investment required to achieve those outcomes. Opportunities created by transformational public transport schemes will be incorporated into analysis for relevant corridors. Connectivity study outputs will feed into the Investment Pipeline associated with this strategy.



What remains of the old Varisty line in Swanbourne which will be reopened by East West Rail

158. A key strategic priority is the need to improve connectivity between Oxford and Milton Keynes. This has been identified as the first of the connectivity studies to be commissioned, a reflection of the strategic importance of this issue for the region as a whole.
159. We will continue to engage with, and where appropriate, support partners undertaking study work on regionally important corridors, for example, the A505 corridor from Luton across to Cambridge.

Improving North-South Connectivity

Policies

- 15 We will work with Government, Network Rail, Highways England, public transport operators and Oxfordshire County Council to develop a long-term solution to challenges on the Didcot – Oxford – Bicester/ Banbury corridor.
 - 16 We will work with Network Rail, Government and adjoining Sub-national Transport Bodies to maximise the allocation of released capacity on the classic network as a result of HS2 to benefit connectivity within the region.
 - 17 We will work with Government, Network Rail, adjoining STBs and partners to develop a solution that improves connectivity on the London – Luton – Bedford – Wellingborough-Kettering – East Midlands corridor.
 - 18 We will work with the Cambridgeshire and Peterborough Combined Authority, Cambridgeshire County Council and Peterborough City Council alongside Network Rail and Government to support the priorities identified in the Cambridgeshire Rail Corridor Study and we support the delivery of Cambridge South Station by 2025 and aspirations for services to/from a new station at Wisbech.
 - 19 We will work with partners, including Government and Highways England to develop a long-term solution to the challenges of the A1 (East of England) corridor.
 - 20 We will work with Government and Network Rail to develop a long-term solution to the challenges on the London – Bishop's Stortford – Cambridge Corridor.
 - 21 Taken forward by our programme of connectivity studies, we will identify proposals that strengthen north/south connectivity within the following areas:
 - London – Buckinghamshire – MK – Northampton
 - Luton – Milton Keynes – Daventry
 - Luton – Bedford – Northamptonshire
 - Northampton – Milton Keynes.
160. The Heartland's principle transport arteries run north to south, providing linkages with London, the Midlands and the north of England. Being located at the heart of England, these corridors perform a nationally significant role in enabling flows of people and goods to reach centres of population within and beyond our geography.

161. Continued investment in north-south strategic corridors is vital to long-term economic success of the Heartland as well as the rest of the UK. Strengthening physical connectivity along these corridors is essential to enable growth in our places of strategic importance, whilst delivering additional resilience for people and freight that utilise these routes as part of longer distance journeys.
162. Delivering a decarbonised transport system requires a multi-modal approach in identifying future infrastructure needs, one that will be taken forward by working collaboratively across multiple infrastructure operators to identify solutions that are consistent with this strategy.
163. In several instances, the benefit of transformed east-west connectivity also creates consequential opportunities to improve north-south connectivity.
164. Building on the output from the opportunities mapping and taking into consideration the views of partners made in response to the engagement on the draft strategy, a series of strategic rail corridors have been identified. These will be the focus of more detailed work as part of the implementation of this strategy:
- *Swindon/Didcot – Oxford – Bicester/Banbury*: this corridor forms part of the Southampton – Oxford – West Midlands corridor, the significance of which is exemplified by the pressures placed on both the rail corridor and the A34 corridor. A long – term solution to the challenges of supporting the economic opportunities within Oxfordshire is required, one that also accommodates longer-distance movements
 - *Northampton – Milton Keynes-Bletchley – Aylesbury – High Wycombe – Old Oak Common*: the combination of delivery of East West Rail and HS2 creates opportunities to develop a new regional service linking these regionally significant centres with key economic opportunities and allowing easier access to Heathrow Airport and HS2, supported by the provision of a twin-track solution between Aylesbury and Princess Risborough
 - *Luton – Bedford – Wellingborough – Kettering – East Midlands*: forms part of the Midland Main Line along which improved connectivity is important to support planned growth, as well as to strengthen the economic linkages with the East Midlands to mutual benefit.
 - *Watford – Milton Keynes – Northampton*: On the assumption that the principle inter-city services between London and Birmingham will be better served by HS2, there is an opportunity to improve intra-regional connectivity between the key towns of Watford junction, Milton Keynes and Northampton.



 **Cambridge North Railway Station**

165. In the longer-term completion of HS2 will create opportunities to reallocate capacity on the existing (classic) rail network to strengthen connectivity where it is required, including the West Coast Main Line, the Midland Main Line and East Coast Main Line. We will continue to work with Network Rail and adjoining Sub-national Transport Bodies to maximise the benefit of such opportunities for the region.
166. A particularly significant corridor is the A1. This corridor has some of the oldest sections of dual carriageway on Highways England's Strategic Road Network and its current operation has significant impacts on those living along its route. Highways England in its A1 (East of England) study has identified the extent of the challenges facing this corridor. Identifying a long-term solution and securing the commitment to deliver that solution is an issue of strategic importance given the role of this corridor both regionally and nationally and given the potential implications for longer-term growth.

Transforming Intra and Inter Regional Journeys

Policies

- 22 We will prioritise investment in the development of public transport-based solutions when improving intra-regional connectivity between places of strategic importance.
 - 23 To realise our decarbonisation commitments while supporting economic growth, we will expect infrastructure owners to ensure that all new strategic infrastructure investment is designed as digitally enabled corridors.
 - 24 We will support investment in the Strategic Road Network and Major Road Network where this meets one or more of the following criteria and is consistent with wider environmental objectives:
 - a. Protects and enhances the existing infrastructure asset
 - b. Delivers a solution to an identified problem on the existing infrastructure asset
 - c. Enables access to new economic opportunities and/or housing growth.
 - d. Enables delivery of sustainable transport linkages such as public transport and active travel improvements.
 - 25 We will, working with Network Rail, Highways England and public transport operators, identify the level of service required between places of strategic importance to achieve improved intra-regional connectivity. The levels of service will be reviewed on a biennial basis.
167. Investing in improving connectivity between our places of strategic importance is important to support our business community. Such investment will realise opportunities to 'level up' across the Heartland to the benefit of our residents, improve access to skills pools for our businesses and support improvements in productivity, quality of life, employability, education and participation.
168. Where there is a need to improve intra-regional connectivity, we will prioritise investment in public transport solutions, complemented by investment in improved local connectivity.

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169. However, this strategy also recognises that there will continue to be a need to invest in our highway network in order to enable planned growth to be delivered. At the regional level this means continuing to invest in the Strategic Road Network (owned and operated by Highways England) and the Major Road Network (owned and operated by Local Highway Authorities).
170. We will work collaboratively with Highways England to ensure that the Heartland's investment priorities are reflected in each five-year Road Investment Strategy.
171. We will work collaboratively with our Local Highway Authorities to ensure the Major Road Network reflects and supports the ambitions of this strategy and that investment priorities are taken forward.
172. Where investment in the highway network is taken forward, we will expect scheme promoters to determine how the use of additional capacity is allocated in line with our Travel Hierarchy.
173. Investment in our highway network will be particularly important where it supports one or more of the following criteria:
- It is required to protect and enhances our existing infrastructure asset thereby improving network resilience and productivity for businesses
 - It is required to provide a solution to an identified problem on the existing infrastructure asset, particularly where this is required to the delivery of planned growth
 - It is required to enable access for new economic opportunities or to enable planned housing or economic growth
 - It is required to enable delivery of sustainable transport linkages such as public transport and active travel improvements.
174. A transport system of the future must consider the role and function of the highway network. Given the level of ambition and expectation amongst users and wider communities with regards to decarbonisation, it is clear our highway network needs to be future proofed. This will be achieved through rapid and widespread adoption of new and emerging technologies, together with investment in digital infrastructure that is available to users beyond the highway network. Integration between modes should be key in planning the network.
175. Investment in our highway network needs to be taken forward in accordance with good design principles in order to provide an attractive and usable active travel network, one which addresses local concerns about community severance. Investment in the maintenance, operations and targeted enhancements of the existing highway network which addresses areas such as safety, air quality and pinch points will provide opportunities to address known concerns in ways that help minimise environmental impact.
176. Our programme of connectivity studies reflects the need to develop a package of measures to support economic and housing growth opportunities. Through them we will work with partners to ensure that the travel implications of longer-term ambitions for local communities are reflected in our future infrastructure requirements.

CONNECTING PEOPLE

177. Connecting people to the opportunities and services they require will help them to realise their potential. The economy of the Heartland is dependent on a thriving labour market where people can move and access jobs across the region, but as our Regional Evidence Base shows, our current approach to connectivity is not sustainable.
178. Many people with poor connectivity are denied choice, with implications for health and wellbeing, and contributing to social isolation.
179. While land-use planning is a key driver in determining the longer-term nature of place, changes to the business delivery models (in both the public and private sector) can, and do, have significant implications for the scale and nature of future travel demand in the short to medium-term.
180. Our current approach to connectivity can also have significant implications for social isolation, contributing to people having poor access to local services or activities, such as jobs, learning, healthcare, food shopping or leisure. Lower income households may be restricted in their ability to afford transport, or unable to rely on bus routes running to the right places. Age and disability can also stop people driving and using public transport.
181. Increasingly connectivity can be achieved digitally, as an alternative to physical links. This can create new opportunities for individuals by providing them with access to jobs and services, whilst reducing the need to travel.
182. Notwithstanding the rise of the digital economy, residents and businesses will continue to need access to services and other supporting facilities (including social infrastructure) that requires travel. This reinforces the importance of proposals coming forward that ensure the transport system is designed to be affordable and accessible for all.
183. The removal of barriers to travel – be that physical, financial, technological or societal – is a key priority for this strategy. By embracing a user-driven approach, one based on a deeper understanding of the behaviours of individuals, we will be better able to deliver tailored solutions that address the needs of our communities.
184. Critical to the implementation of this strategy is ensuring that our transport system is inclusive in its design and accessible for all.



 **Artists impression of Cambridge metro CAM**

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185. Research by disability charity Leonard Cheshire estimates that nationally, a fully accessible rail system could help more than 50,000 people with work-limiting disabilities into employment, benefiting not only the individual, but the economy more widely and the Government. Improved accessibility on public transport and active travel also benefits other users, most notably older people and young families, increasing their ability to maintain mobility and better quality of life.
 186. When planning new infrastructure, we must continue to challenge ourselves to ensure the needs of disabled people are properly taken into account. In developing policies and prioritising investment, we expect proposals to demonstrate their compliance with the Government's Inclusive Transport Strategy.
 187. We support Leonard Cheshire's national campaign for all rail stations to be fully accessible by 2030 and we will work with our partners to realise this ambition. Going forward, we champion the use of transport technologies and services to ensure our transport system is genuinely inclusive to the benefit of society.
 188. The polycentric nature of the Heartland means that the existing pattern of movements is complex. This makes it even more important to ensure that the solutions put forward for investment are tailored to local needs. The information held in the Regional Evidence Base provides an invaluable insight that will support partners in the development of those solutions.
 189. But transport solutions alone will not create an accessible, affordable, decarbonised transport system. There is much that the public sector as a whole can do to create the conditions that enable healthy place making and more sustainable patterns of activity – from the framework that it sets out in Local Plans to the ways it plans for and delivers services for residents and businesses. Likewise, the policy frameworks used by Government to plan for and deliver its services have a significant effect on the need to travel.
 190. Putting consideration of decarbonisation, digital connectivity, and active travel at the centre of a first mile/last mile approach will ensure the needs of the user and our environment are at the heart of investment decisions.
 191. This strategy seizes the opportunity to embrace this approach. We will work collaboratively with our partners and use our convening role to help embed the principles of transport orientated development principles as part of the Local Plan process. Application of the best practice set out in documents such as the Chartered Institution of Highways and Transportation's (CIHT's) Better Planning, Better Transport, Better Places should not just be restricted to new developments but used more widely to ensure continuity of approach between existing and new infrastructure.
 192. The Travel Hierarchy in this strategy sets the framework for connecting people. Working with partners, operators, Government and local decision makers, such as local planning authorities, implementing this strategy will require a collective commitment to maximise the use of the levers available to put connectivity of users and the environment around us at the forefront of future decisions.

193. In support of this strategy we have developed a tool that enables us to work with our partners to plan and deliver tailored and specific first mile/last mile transport solutions. Utilising the Experian Mosaic dataset, it provides an understanding of the characteristics of the region's population at a micro level. When coupled with accessibility and population data, it provides a powerful insight into existing journey patterns as well as individuals' and communities' propensity for change to sustainable or active forms of travel. In this way we will enable the development of investment proposals that are bespoke to the needs of the local community, increasing the likelihood of their success.

Sustainable, Healthy Places

Policies

- 26 We will work with local planning authorities and local enterprise partnerships to align decision making on strategic infrastructure with that associated with land use planning and economic development in order to enable growth that is sustainable for the long-term.
- 27 Working with partners and operators, we promote the development and delivery of high-quality public transport and segregated mass transit systems. Initial priority will be given to supporting the delivery of Mass Rapid Transit in the following locations:
- Cambridgeshire Autonomous Metro
 - Milton Keynes Rapid Transit
 - The A414 corridor in Hertfordshire
 - Oxford sub-urban network – Bus rapid transit and Cowley branch line.

Where further transit systems are identified, we will work with partners to maximise their potential and deliverability.

194. We will work with our partners to maximise the impact of the Travel Hierarchy to inform land use planning decisions, prioritisation of investment, scheme design, and through improving the integration of travel modes (including digital).
195. Rail stations and stops on mass transit systems have the potential to be the focus for a transport-oriented development. To realise this potential, investment in strategic infrastructure must be complemented by investment in measures to improve local connectivity as part of a co-ordinated package.
196. Investment in dedicated infrastructure to support buses and other mass transit systems can have a similar catalytic effect where it can be demonstrated that there is the potential to secure its long-term sustainability.

197. In addition, bus, coach and emerging new forms of mass transit form the bedrock of the public transport system. Measures to encourage co-ordination between strategic public transport locations, including mobility hubs, must be supported by onward local bus services, both to residential areas and areas of economic activity within the surrounding urban area. Where possible, and in line with the Travel Hierarchy this should be supported by investment that repurposes the existing infrastructure in favour of such measures.
198. Across the region, we will work with bus operators, through the EEH Bus Operators Association, to develop a long-term plan to support the role of scheduled bus and coach services. In order to achieve the ambitions of this strategy it will be important to maximise the potential of existing and new forms of mobility, including digital service and information provision, in a way that creates a single public transport system for communities. Shared modes including car-clubs and shared micro-mobility (including e-micro mobility) have an important role to play, however the success of these modes will be their interoperability with a wider public transport system.

Improving Local Connectivity

Policies

- 28 We will support the establishment of 'mobility hubs' as locations where interchange between travel modes will be prioritised. We will work with public transport operators and the Government to enable frictionless, affordable travel using a combination of travel modes.

199. Across the region there is a high prevalence of communities with low population densities – both within our urban areas and more widely amongst small market towns and their surrounding rural hinterlands.
200. At the same time, the growth in user-focused transport services enabled by digital connectivity, and facilitated by the spread of contactless payment, continues to transform the opportunities for public transport to create new integration, ticketing and timetabling options, all of which enhance the user experience.
201. Interchange between modes of travel can introduce 'friction' into the journey. Users seek reassurance that the interchange will be convenient, predictable, reliable and safe, as well as being supported by appropriate facilities on site.



 A bus stop outside St Albans City Station

202. Mobility hubs are locations where demand for movement can be concentrated in a way that supports local public transport services, primarily via bus provision, ensuring greater opportunity to run services where they otherwise may not have been viable. Park and ride facilities are an example of mobility hubs, but they could also be a viable way of improving local connectivity between district centres in larger urban areas.
203. The establishment of 'mobility hubs' that serve local communities within a larger urban area offers the opportunity to offer 'frictionless' interchange between modes, primarily bus, rail and active travel. In addition, mobility hubs provide an opportunity for integrated planning of modes, integrating not just public transport but future mobility solutions and a comprehensive network of pedestrian and cycling routes. Adequate provision at hubs will be needed for disabled parking, drop-off zones and taxi provision.
204. Onward connectivity from the hubs into local communities creates opportunities to encourage active travel to/from local public transport services. These should be considered as part of a comprehensive approach to improving local connectivity in areas of regional significance.

Rural Connectivity

Policies

- 29 We will work with partners to develop tailored solutions for our smaller market towns and rural areas that improve access to services and opportunities, including options for centres of mobility.

205. With 34% of the Heartland's population living in small market towns and their hinterlands, connectivity for our rural communities is a strategic issue.
206. In our rural areas, a frequent and conventional bus service is becoming increasingly difficult to provide. However, the wider social and economic benefits of local and regional bus services make it essential that we continue to work with Government, local partners and the EEH Bus Operators Association to create an accessible and future-ready bus network across the region. Innovation and digital solutions have a key role to play in bus and coach services of the future.

207. Connectivity for our rural communities face several challenges, including:

- Access to digital connectivity, which is critical for businesses, yet the cost of its provision in rural areas can be a barrier to making the investment required to provide expected levels service
- The digital economy, which is encouraging new business models for consumer goods and new ways of accessing services and facilities, can add to the pressures facing retail services in our small market towns
- Traditional business models for providing public transport in rural areas are increasingly unsustainable, leading to the reduction, and in some instances, removal, of services.

208. When considering the connectivity needs of our rural communities, context is important. Where a town acts as commuter settlement for a larger regionally significant hub this results in a concentrated flow of movements that are predictable and capable of sustaining local public transport services. A similarly sized town that is free-standing is more likely to perform as a sub-regional centre for its rural hinterland. The resulting pattern of movements is more varied and disparate, making the case for traditional solutions harder to sustain.

209. Although the scale of their application will be different, the concept of 'mobility hubs' offers the opportunity to concentrate demand for travel in ways that support connectivity to adjoining urban areas or areas of economic opportunity. Mobility hubs in rural areas will need to reflect the needs of the community and can help support the provision of other services by offering a focus for concentration of demand at one point. However, the creation of mobility hubs in rural areas will also provide access to facilities and local services that could help reduce isolation and the need to travel.

210. Investment in digital connectivity in rural areas will enable businesses to operate more efficiently and provide opportunities to conduct business remotely, thereby reducing the need for travel. In addition, digital connectivity offers the potential for innovative solutions to be developed where there remains a need to travel. Where there is a travel need that is to be met, opportunities to make provision for and encourage the use of low-carbon travel choices should be prioritised.



 The village of Glapthorn in Northamptonshire

MAKING THE HEARTLAND WORK FOR THE UK



 London Luton Airport from the air

Connecting to Global Markets

Policies

- 30 We will work with infrastructure owners/operators, Network Rail, Highways England and government to improve surface access by public transport to international airports in order to reduce the environmental footprint of their operations, with priority given to:
 - Luton Airport – with a focus on improving travel opportunities via services on the Midland Main Line, and ensuring the right level of service and capacity on the Direct Air Rapid Transit service (DART)
 - Heathrow Airport – with a focus on improved interchange and connectivity via the Old Oak Common transport hub, and through delivery of Western Rail Link to Heathrow
 - Stansted Airport – with a focus on improved travel opportunities via services on the West Anglia Main Line between Cambridge, Stansted, Bishops Cleeve and London.
- 31 We will work with relevant Sub-national Transport Bodies, as well as Network Rail and Highways England, to prioritise the development of proposals that enable improved connectivity along the key inter-regional corridors: priority will be given to identifying solutions to future needs on the following corridors:
 - Swindon/Southampton – Reading – Didcot/Oxford – West Midlands
 - London – Watford – Luton – Bedford – Northampton-East Midlands.

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211. As one of the world's leading economic regions our continued success is dependent upon being connected globally.
212. Notwithstanding the growth in digital connectivity, the physical access provided through the UK's international gateways – most of which lie outside our region – continues to be fundamental to the ability of our business community to retain its global competitiveness.
213. Whilst addressing emissions from aviation are not considered to be in the scope of this strategy, the measures being taken to achieve a sustainable aviation industry are supported. The work of the region's universities to develop and deploy alternative fuel technology demonstrates the economic opportunity that exists to decarbonise the aviation sector.
214. This strategy actively encourages investment in improved, decarbonised surface access connectivity that addresses and reduces the environmental impact of international gateways, in particular:
- *Luton Airport* – located within the region, a focus for European services and a key hub for private business aviation services in Europe. Delivery of the Direct Air Rapid Transit (DART) will improve connectivity between Luton Airport Parkway Station and the airport. Improving travel opportunities via national rail services stopping at Luton Airport Parkway is key to reducing the need to travel to the airport by private car
 - *Heathrow Airport* – located within London, the UK's global hub airport and a key gateway for business travellers and international visitors with interests in our region. Realisation of the potential to develop a new regional rail service linking Northampton – Milton Keynes/Bletchley – Aylesbury – High Wycombe – Old Oak Common will represent a step change in public transport connectivity for those requiring access to Heathrow Airport. Delivery of the Western Rail Link to Heathrow will improve connectivity for large parts of the Thames Valley, including Oxfordshire and Swindon.
 - *Stansted Airport* – located just outside the region and one of Europe's fastest growing major airports. Delivery of improvements to the West Anglia Main Line (as promoted by the West Anglia Main Line Taskforce) has the potential to unlock significant economic potential along the London-Stansted-Cambridge Corridor (the Innovation Corridor).
215. We will work with adjoining Sub-national Transport Bodies and Network Rail to assess the need for improved surface access to the other international gateways that support our region including Birmingham Airport, East Midlands Airport and St Pancras International. Swindon acts as a gateway between the Heartland and the South West and South Wales and we will work with adjoining Sub-national Transport Bodies to improve connectivity along this corridor to the benefit of economic activity in both regions.

Realising the Potential for Rail Freight

Policies

- 32 We will work with Network Rail and all relevant Sub-national Transport Bodies to develop proposals that increase freight on the rail network with priority given to the following corridors:
- Felixstowe to Nuneaton
 - East West Main Line
 - Southampton to West Midlands
 - West Coast Main Line (Inc. Northampton Loop).
- 33 We will work with Network Rail and all relevant Sub-national Transport Bodies to maximise the conveyance of construction materials by rail with priority given to the following corridors:
- Midland Main Line – providing access into the region from aggregate sources in the Midlands
 - Great Western Main Line – providing access into the region from aggregate sources in western England and Wales.

216. Our evidence base has highlighted that freight and logistics is one of the largest contributors to carbon emissions. It is also potentially the most difficult to implement solutions to reduce emissions.
217. Encouraging greater use of rail for freight and logistics will provide additional resilience for the business community, while also acting on the need to achieve net zero.
218. Rail is most effective when hauling loads between medium and long distances. Our study of the freight and logistics sector identified that a high proportion of road-based freight involves trips over 200-300km. Many of these movements are prime candidates for a shift to rail for the trunk haulage, with the final stage of the journey being delivered by vehicles powered by electricity or other low carbon fuels.
219. Unlocking the opportunity to grow the market for rail freight requires investment in infrastructure to provide the capacity and resilience to enable it to be a more attractive offer for logistics companies.
220. The Heartland is uniquely placed to benefit from growth in use of rail freight given it is at the heart of the 'Golden Triangle' for logistics with many of the world leading distribution companies already operating national distribution centres here. Our strategic infrastructure already accommodates significant freight flows linked with international gateways at Felixstowe, Southampton and London Gateway, with shippers forecasting long-term growth in these flows in response to economic growth and the use of global supply chains. Forecasts for the sector consistently predict strong growth for intermodal freight and construction materials.
221. The 23 active rail freight terminals in our region already handle a mixture of containerised freight, construction materials, domestic waste, automotive and metals. The provision of additional floor space served by rail freight terminals increases the attractiveness and competitiveness of rail versus road haulage.

222. Demand for rail freight is forecast to grow exponentially in the long-term, driven by continued growth in deep-sea shipping markets, particularly at the Port of Felixstowe. Investment in the capacity of the Felixstowe branch line will enable 47-48 trains per day in each direction, however longer-term there is a need to increase this further to at least 60 trains per day.
223. Bottlenecks on the Felixstowe-Nuneaton line mean that a significant proportion of containerised freight travels south along the Great Eastern Main Line, across North London and onward to multiple destinations. This leads to conflict with the need to provide additional capacity for rail passenger services, particularly along the North London line. The need to integrate rail passenger services between Shenfield and London along the Great Eastern Main Line as the full Crossrail service becomes operational will only exacerbate the need for additional rail freight capacity along the key corridors for rail freight movements.
224. The constraints on rail connectivity between Felixstowe and the Golden Triangle of Logistics places additional pressure on our strategic road infrastructure, with consequential implications for their operation and carbon emissions. Investment in rail freight will realise benefits on the strategic road network.
225. Delivery of the Ely Area Capacity Enhancements currently planned will provide some additional capacity on the Felixstowe to Nuneaton corridor. However, further investment in and electrification of that corridor will be required if rail freight is to realise its full potential. In addition, the East West Main Line has the potential to act as a catalyst for transformational change in the rail freight offer by:
- *Providing alternative routing:* trains operating between the Port of Southampton and Daventry International Rail Freight Terminal (DIRFT) could use the East West Main Line and thereby avoid the need to operate via Birmingham or London. Trains serving the Port of Felixstowe could use the East West Main Line avoiding the need to traverse the heavily congested North London Line
 - *Enabling rail delivery of construction materials:* as the transformational infrastructure investment at the heart of our region, the East West Main Line has the potential to enable delivery of aggregates by rail to freight terminals in our region. It offers the opportunity to directly support the delivery of planned growth in ways that reduces the pressure on local roads and deliver wider environmental benefits in the process
 - *Growth in intermodal rail freight:* given the role East West Main Line has to play in supporting the realisation of economic opportunities there is the potential to develop new freight handling facilities along the corridor thereby providing businesses and communities with quicker access to goods, as well as providing new business and employment opportunities in their own right.
226. The need to meet the increased demand in construction materials required to enable delivery of planned growth within the region is another market where the scope for rail growth is significant. Making additional capacity available on the Midland Main Line as a strategic rail freight corridor is of regional significance.

227. In the west, containerised freight from Southampton, serving Daventry and the West Midlands, is constrained by capacity issues between Didcot and Oxford, and along the West Coast Main Line. In addition, construction materials moved into the region from the Mendips and Wales make the Great Western Main Line a second strategic rail freight corridor for the region.
228. We will continue to work with the freight and logistics sector, along with Network Rail and the East West Railway Company to develop detailed proposals that will enable the potential for rail freight to be realised. Given the strategic nature of the rail freight movements we will work closely with adjoining Sub-national Transport Bodies and London to promote and prioritise investment in enabling infrastructure.

Specific opportunities that this strategy prioritises include:

- Identifying required enhancements along the Felixstowe to Nuneaton corridor, particularly between Bury St Edmunds and Ely, and in the Leicester area to increase capacity
- Exploring the potential benefit of providing a chord at Manton that would offer a route serving Felixstowe that would avoid the need to transit London
- Exploring the potential for an east-north chord at Bletchley between the East West Main Line and the West Coast Main Line would again offer a route serving Felixstowe which would avoid the need to transit London
- Understanding the nature of existing capacity constraints between Bletchley and Milton Keynes and their possible infrastructure solutions, both pre and post HS2 to ensure freight requirements are taken fully into consideration.



 **Starship robots in Milton Keynes**



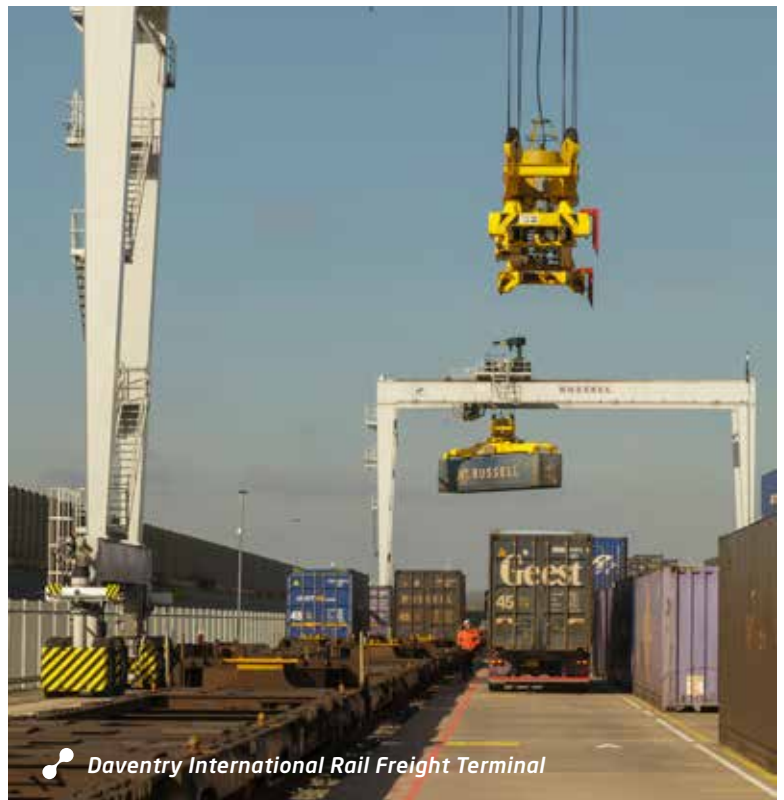
 **Symmetry Park in Swindon**

Strategic Rail Freight Interchanges

Policies

- 34 We will support the development of Strategic Rail Freight Interchanges where they support the ambitions of this strategy and their impact on the transport network can be suitably managed.

229. Realising the full potential of the rail network to accommodate additional rail freight requires the availability of rail connected warehousing. These facilities range in size from Strategic Rail Freight Interchanges to smaller intermodal facilities.
230. The shortage and cost of land-supply for industrial storage and distribution in London may see more companies relocating their distribution centres in the Heartland.
231. We will work with partners and the freight and logistic sector to identify the need for additional Strategic Rail Freight Interchanges where they support the overall ambition of our region.



Daventry International Rail Freight Terminal



A freight train passes through Corby railway station

Supporting Road Freight

Policies

- 35 We will work with Highways England, local highway authorities, local planning authorities and the freight sector to ensure that strategic corridors for road freight and logistics are fit for purpose: priority will be given to the following corridors:
 - The M25/M1
 - The A34 and M40 north of Oxford
 - The A1 corridor (north of Huntingdon)
 - The A14
 - The A508 into Northampton.
- 36 We will work with Highways England, local highway authorities, local planning authorities and the freight sector to use improved planning and the application of innovative solutions to reduce the impact of freight on the environment, in terms of carbon emissions and its impact on communities living in and around freight corridors.
- 37 We will work with Highways England, local highway authorities, local planning authorities and the freight sector to address the need for secure overnight lorry parking and their associated facilities.
- 38 We will work with local transport authorities, local planning authorities and the freight and logistic sector to ensure the local servicing and support needs of the business community are met.

- 232. This strategy acknowledges that road haulage will remain an important part of the freight and logistics sector moving forward.
- 233. We will work with Highways England, local highways authorities and the freight sector to ensure the key parts of the Strategic Road and Major Road Networks continue to support the movement of road haulage and thereby minimise the impact of road freight on local communities. A key issue in this regard is ensuring the provision of adequate overnight parking for lorries and the associated facilities.
- 234. While the Strategic Road and Major Road Networks are crucial to the long-distance movement of road freight, movement of goods to, and around urban centres is vital for the retail, leisure and cultural sectors. Failure to account for these requirements in the development of the local transport system will lead to increased congestion, deterioration in air quality and difficulties for businesses to operate efficiently. We recognise that with the scale of growth planned, there will be an increase in the demand for logistics space and that provision for such requirements will need to be addressed.
- 235. We will support our local partners to make full use of Government funding to support road freight firms seeking to upgrade their vehicles or explore innovative ideas for reducing road freight such as urban consolidation centres or alternative fuel refuelling hubs.

236. As a centre of innovation in the UK we will harness the opportunity to trial new solutions that enable the servicing and support needs of the business community in our urban centres to be met. Priority will be given to the implementation of solutions that provide the required level of access whilst at the same time reducing the impact of freight and logistics on local communities and their environment.



 **The A5 Dunstable Northern Bypass**

IMPLEMENTATION

A Mechanism for Change

237. This strategy is the foundation on which we will plan the strategic development of the region's transport system. Ensuring its policies are implemented will be key to its success.
238. The strategy sets out the need for change in order to deliver the vision for our transport system: change in the way we develop solutions to the issues to be addressed; change in the way we appraise the merits of individual proposals; and change in the way we plan for and deliver an investment pipeline.
239. It requires a whole-system approach which brings consideration of individual networks together as a single transport system: one that meets the expectations of its users – both individuals and businesses.
240. Ultimately, delivery of specific proposals will remain the responsibility of individual infrastructure owners and service providers. Implementation at the regional level complements and builds upon their role, providing added value in three ways:
- Strategic influence – ensuring the regional voice shapes the development of national investment programmes, overseen by the Government and delivered by Network Rail, East West Railway Company and Highways England
 - Co-ordination – providing the mechanism for developing and implementing solutions which offer most benefit at a regional scale
 - Accelerating delivery – helping to ensure that schemes and initiatives which cross local authority boundaries are delivered efficiently and that the benefits for our communities and businesses are realised as soon as possible.
241. In bringing forward proposals for implementation it is important to take into account the opportunities and challenges created by decisions in other areas of public sector policy, including but by no means limited to consideration of proposals in the land use planning system. In addition, the choices made in respect of transport solutions need to support wider ambitions for place-making at the local level.
242. The COVID-19 pandemic has demonstrated the ability to achieve fundamental shifts in travel behaviour at scale and at pace. Change, driven by necessity and if applied consistently at scale, is not only possible, but deliverable providing the imperative is compelling.
243. The pandemic also highlighted the need to treat fixed and mobile digital infrastructure as integral components of a co-ordinated approach to providing individuals and businesses with access to services. Investing in the quality and resilience of digital networks will be crucial to sustaining long-term change in travel patterns (including a reduction in overall travel), and travel behaviours.
244. And in keeping with the whole-system approach, the need to decarbonise our transport system highlights the importance of the investment made in the utility infrastructure networks – in particular, electricity supply networks and/or other low carbon fuels – being aligned with investment in our transport system.

Harnessing Innovation

245. We will continue to harness the opportunity created by the Heartland being a centre for science and technology-based innovation. The Government's Industrial Strategy and its four Grand Challenges will encourage the development of new business models within the transport sector which both meet the need to improve connectivity and deliver environmental net gain.
246. We will build on the region's existing successes to continue to grow our global leadership as a region of innovation, particularly in the key sectors of high-performance technology, life sciences, creative and digital technologies and aerospace.
247. The business models operating in large parts of the retail and service sectors will undergo further change, most likely at an accelerated pace in the aftermath of COVID-19. We will use this as the opportunity to embed fundamental change in travel demand and travel behaviour to the benefit of individuals, their communities and businesses.

Creating Confidence, Providing Flexibility

248. Investment in strategic infrastructure requires a long-term commitment at national and regional level. Maintaining and repurposing our existing assets requires investment – both revenue and capital. Developing and delivering proposals takes time and typically extends over several political cycles.
249. Fundamentally our approach to implementation seeks to generate confidence:
- For business investors – clarity that the transport system will provide access to the labour pool and to markets
 - For the local authorities – certainty that the investment required to support planned growth will be available
 - For local communities – reassurance that infrastructure will be delivered in a timely manner.
250. At the same time our approach is flexible enough to actively encourage new solutions and business models to come forward, and to do so at pace.
251. This is a key challenge facing the transport system as we transition from a traditional approach to investment to the one required to achieve our strategic ambitions of the region.
252. The timescales associated with strategic investment are such that proposals currently in the early stages of development may need re-evaluation in order to determine whether their benefits remain consistent with our strategic ambition. Where they are not, we will use our programme of connectivity studies to identify alternative proposals.

Connectivity Studies

253. Connectivity studies form a key part of this strategy's implementation.
254. The development of the programme has been shaped by the information held in the Regional Evidence Base, together with responses received from partners in response to the outline Transport Strategy. The programme identifies those parts of the region where we will work with partners to identify the strategic questions relating to connectivity in each study area (both in the present and as a result of planned growth), to agree the outcomes required of the transport system and to then identify the investment required to achieve those outcomes. Each study will be co-designed with partners. This will enable our partners to use the connectivity studies to identify the implications of future growth scenarios they are considering as part of their longer-term ambition for their communities.
255. The studies will also enable the transport implications of choices in other areas of public sector policy to be considered. This is particularly important where new models of service delivery are being considered that would have the potential to significantly change future travel demand.



 **The A6 bridge over the Great River Ouse in Bedford**

Accelerating Delivery

256. Where the need for investment in our transport system has been established, we will continue to work with infrastructure owners and service providers to accelerate the delivery of that investment. This includes committed schemes included in Highways England's Road Investment Strategy, EEH's Major Road Network programme and Network Rail's investment pipeline.
257. We will work with Network Rail, the East West Railway Company and Highways England to ensure that their investment programmes reflect the needs of our region. Where those investment programmes include identified regional priorities, we will actively support these infrastructure owners as they take individual proposals through their statutory processes into delivery.



 **East West Rail will transform journeys in the Heartland**

THE INVESTMENT PIPELINE

A Co-ordinated Approach

258. A key benefit of a regional approach lies in the ability to provide a clear, prioritised view of strategic transport investments and to do so in a way that ensures investment in individual networks is co-ordinated in order to deliver on a shared strategic ambition.
259. The co-ordination of investment is particularly important given the crucial role that digital infrastructure, and indeed utility infrastructure, has to play in realising the strategic ambition for our transport system.
260. We will work with all infrastructure owners to ensure that their long-term strategic planning activity is co-ordinated with our programme of connectivity studies. This will realise efficiencies and ensure we embed the need for a whole-system approach into our way of working across the region.
261. The programme of connectivity studies will ensure that regional priorities inform and shape the future development of strategic infrastructure networks that are the subject of cyclical reviews. These include:
- The Rail Network Enhancements Pipeline
 - Highways England's Road Investment Strategy
 - EEH's Major Road Network Investment Pipeline
 - Future Rail Franchise Specifications (and their replacement)
 - Digital Infrastructure
 - Five-year Assessment Management Plans for utility infrastructure – in particular energy supply.



262. The output from the connectivity studies – specifically the solutions identified – will establish the need for investment in infrastructure and services.
263. The investment pipeline will be updated with the outputs from the connectivity studies for subsequent development and delivery. It will be reviewed at least every five years. This will enable the region to ensure that its requirements shape the investment programmes of Highways England and Network Rail. It will also provide our partners with the confidence to allocate resources to develop detailed proposals for implementation.

Investment Pipeline

Strategic Issue	Infrastructure Opportunity
Electrification of the rail infrastructure (region-wide).	Decarbonisation of rail network (relevant for both passenger and freight services) – immediate opportunities: <ul style="list-style-type: none"> • Extension of Midland Main Line electrification • East West Rail – Oxford to Norwich/ Ipswich • Infill electrification schemes to enable electric haulage of freight services • Electrification of the Chiltern Main Line.
Digital Infrastructure provision - 5G and fibre connectivity (region-wide).	Provision of digital infrastructure delivers opportunities for business transformation, new business models to emerge – immediate opportunities: <ul style="list-style-type: none"> • East West Rail –Oxford to Cambridge and Aylesbury to Milton Keynes.
Electrification of road infrastructure (region-wide).	Investment in charging facilities required to support decarbonisation of vehicle fleet – significance increased by banning of new petrol, diesel and hybrid vehicles from 2030
Enhanced capacity for rail freight.	Four strategic corridors serve/cross the region: <ul style="list-style-type: none"> • Felixstowe to Nuneaton • East West Rail • Southampton to West Midlands • West Coast Main Line (including Northampton Loop). Two strategic corridors are important in terms of providing access for construction materials: <ul style="list-style-type: none"> • Midland Main Line • Great Western Main Line.

Strategic Issue	Infrastructure Opportunity
Improved connectivity (east west) - northern.	<ul style="list-style-type: none"> • A northern corridor that links north Oxfordshire, Northamptonshire, and Peterborough, providing more direct passenger transport connectivity across the northern Heartland.
Improved connectivity (east west) - middle.	<p>Realisation of East West Rail's full capability – this will require:</p> <ul style="list-style-type: none"> • East West Rail – Oxford to Cambridge and Aylesbury to Milton Keynes as planned represents minimum scheme • Cambridge South Station by 2025 • Cambridge to Norwich and Ipswich.
Improved connectivity (east west) - southern.	<ul style="list-style-type: none"> • A southern corridor that links Buckinghamshire with Hertfordshire, providing an orbital passenger transport route between the Chiltern Main Line and West Anglia Main Line.
Improved connectivity (north south) - western.	<p>Enhanced rail connectivity between West Midlands – Oxford/Didcot – and onwards to Southampton.</p> <p>Improved service capacity on North Cotswold Line.</p>
Improved connectivity (north-south) - central.	<p>HS2 released capacity is the catalyst for enhanced regional connectivity.</p> <p>For example, linking Northampton – Milton Keynes/Bletchley – Aylesbury – High Wycombe – Old Oak Common and improved inter/intra-regional connectivity on the Midland Main Line.</p> <p>Enhanced rail connectivity between London-Luton-Bedford-East Midlands.</p>
Improved connectivity (north-south) eastern.	<p>Enhanced connectivity on the Midland Main Line – to include as a minimum restoration of services previously removed.</p> <p>New railway station at Wixams to support planned growth.</p> <p>Enhanced connectivity on the London-Bishop's Stortford-Cambridge corridor.</p> <p>Reopening of railway from March to Wisbech.</p> <p>Cross Rail 2 linking eastern Hertfordshire with Surrey via London.</p>

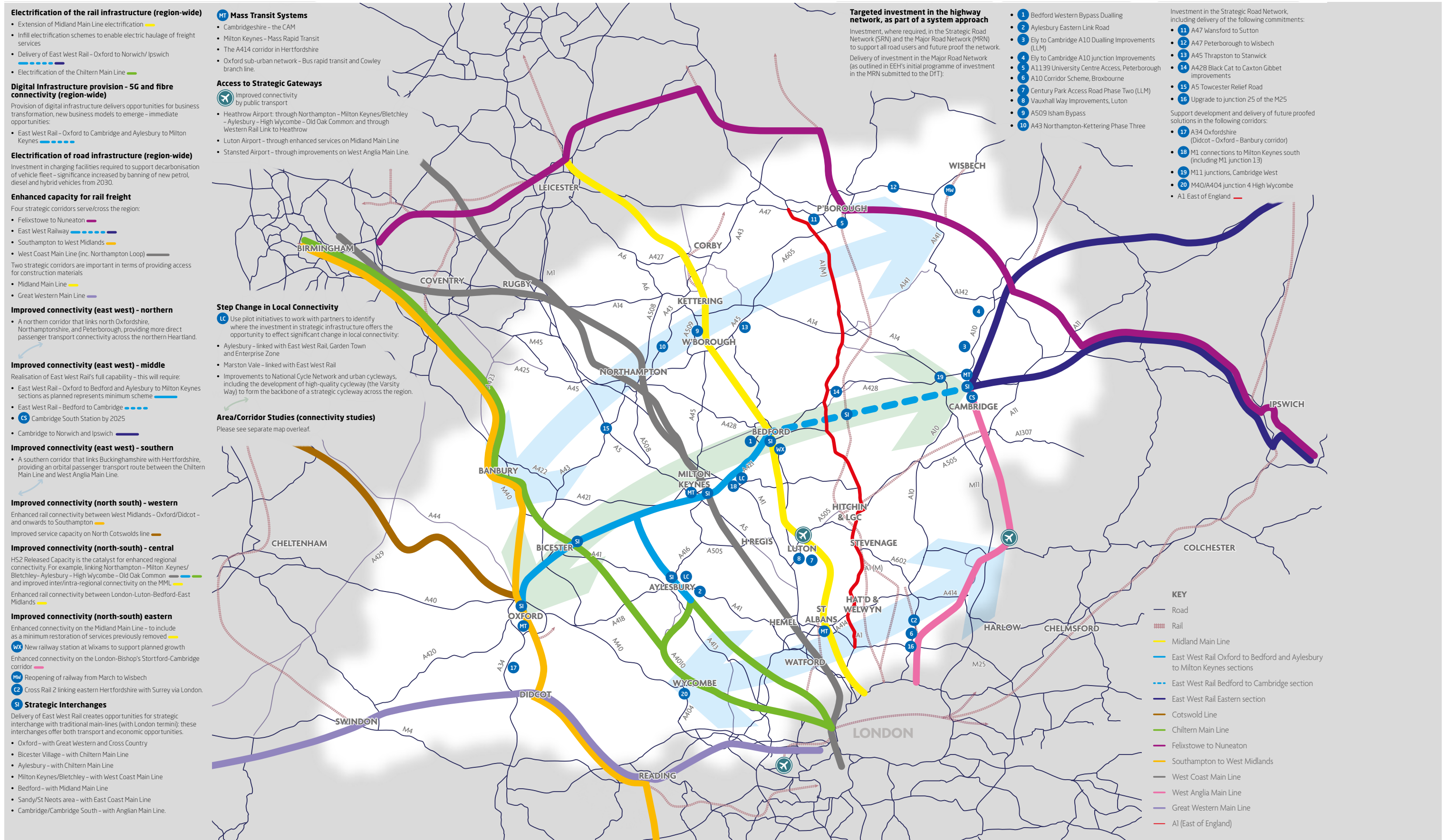
Strategic Issue	Infrastructure Opportunity
Strategic Interchanges - delivery of East West Rail creates opportunities for strategic interchange with traditional main lines (with London termini): these interchanges offer both transport and economic opportunities.	<p>Strategic Interchanges:</p> <ul style="list-style-type: none"> • Oxford – with Great Western and Cross Country • Bicester Village – with Chiltern Main Line • Aylesbury – with Chiltern Main Line • Milton Keynes/Bletchley – with West Coast Main Line • Bedford – with Midland Main Line • Sandy/St Neots area – with East Coast Main Line • Cambridge/Cambridge South – with Anglian Main Line.
Mass Transit Systems.	<p>Cambridgeshire – the CAM.</p> <p>Milton Keynes – Mass Rapid Transit.</p> <p>The A414 corridor in Hertfordshire.</p> <p>Oxford sub-urban network – Bus rapid transit and Cowley branch line.</p>
Access to Strategic Gateways.	<p>Improved connectivity by public transport:</p> <ul style="list-style-type: none"> • Heathrow Airport: through Northampton – Milton Keynes/ Bletchley – Aylesbury – High Wycombe – Old Oak Common: and through Western Rail Link to Heathrow • Luton Airport – through enhanced services on Midland Main Line • Stansted Airport – through improvements on West Anglia Main Line.
Step Change in Local Connectivity.	<p>Use pilot initiatives to work with partners to identify where the investment in strategic infrastructure offers the opportunity to effect significant change in local connectivity:</p> <ul style="list-style-type: none"> • Aylesbury – linked with East West Rail, Garden Town and Enterprise Zone • Marston Vale Line – linked with East West Rail. <p>Improvements to National Cycle Network and urban cycleways, including the development of high-quality cycleway (the Varsity Way) to form the backbone of a strategic cycleway across the region.</p>

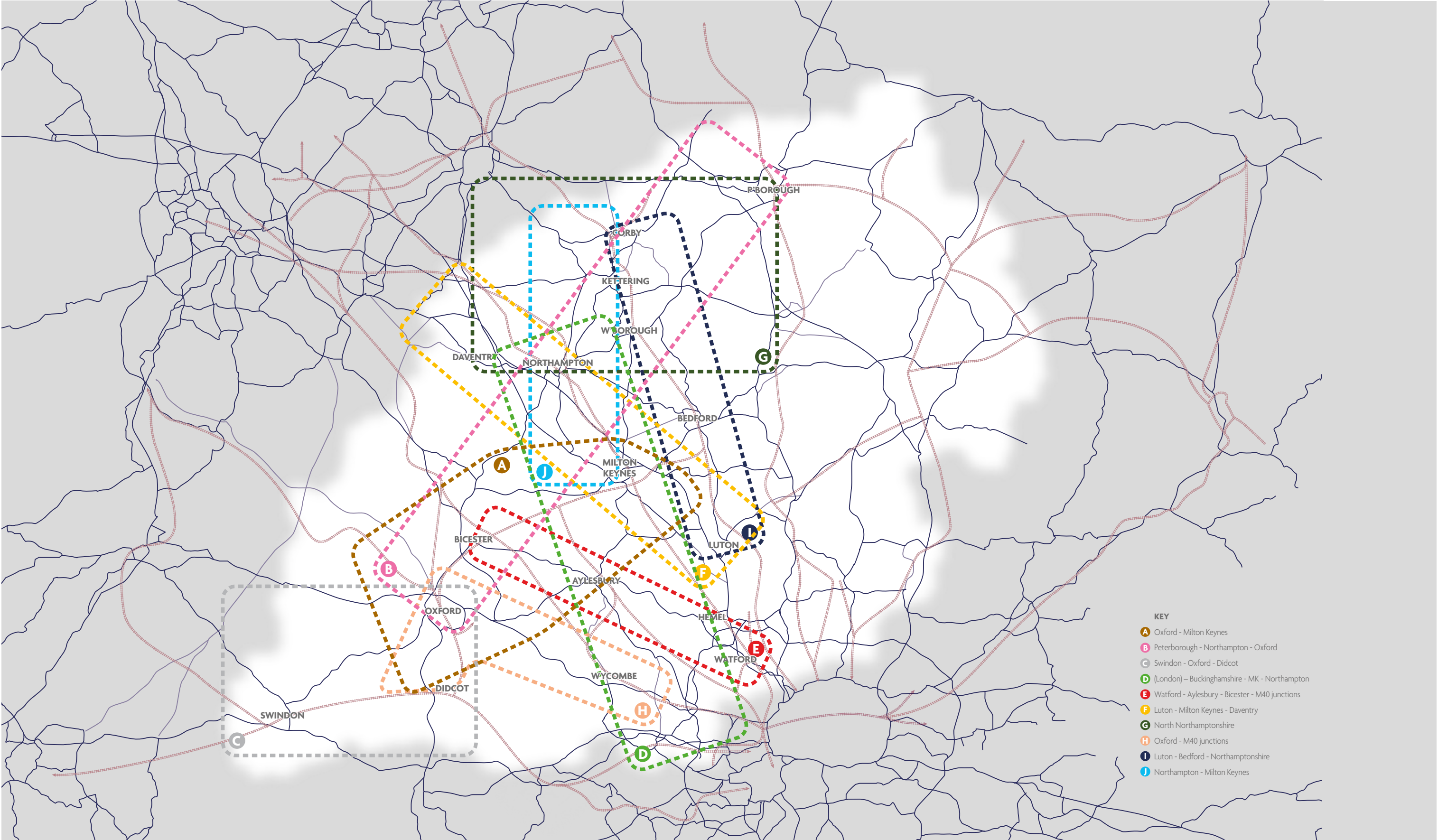
Strategic Issue	Infrastructure Opportunity
Area/Corridor Studies (connectivity studies).	<p>Use connectivity studies to develop integrated package of measures that connect key strategic locations across the region. Priority areas for study work are:</p> <ul style="list-style-type: none"> • Oxford – Milton Keynes • Peterborough – Northampton – Oxford • Swindon – Didcot – Oxford • London – Bucks – Milton Keynes – Northampton • Watford – Aylesbury – Bicester – M40 • Luton – Milton Keynes – Daventry • North Northamptonshire • Oxford – M40 junctions • Luton – Bedford – Northamptonshire • Northampton – Milton Keynes.



 A girl cycling in rural north Buckinghamshire

Strategic Issue	Infrastructure Opportunity
<p>Targeted investment in the highway network, as part of a system approach.</p>	<p>Investment, where required, in the Strategic Road Network (SRN) and the Major Road Network (MRN) to support all road users and future proof the network.</p> <p>Delivery of investment in the Major Road Network (as outlined in EEH's initial programme of investment in the MRN submitted to the DfT):</p> <ul style="list-style-type: none"> • Bedford Western Bypass Dualling • Aylesbury Eastern Link Road • Ely to Cambridge A10 Dualling Improvements (LLM) • Ely to Cambridge A10 junction Improvements • A1139 University Centre Access, Peterborough • A10 Corridor Scheme, Broxbourne • Century Park Access Road Phase Two (LLM) • Vauxhall Way Improvements, Luton • A509 Isham Bypass • A43 Northampton-Kettering Phase Three. <p>Investment in the Strategic Road Network, including delivery of the following commitments:</p> <ul style="list-style-type: none"> • A47 Wansford to Sutton • A47 Peterborough to Wisbech • A45 Thrapston to Stanwick • A428 Black Cat to Caxton Gibbet improvements • A5 Towcester Relief Road • Upgrade to junction 25 of the M25. <p>Support development and delivery of future proofed solutions in the following corridors:</p> <ul style="list-style-type: none"> • A34 Oxfordshire (Didcot- Oxford – Banbury corridor) • M1 connections to Milton Keynes south (including M1 junction 13) • M11 junctions, Cambridge West • M40/A404 junction 4 High Wycombe • A1 East of England.





Capacity and Capability

264. A review of the infrastructure delivery process, undertaken in collaboration with our partners, identified several 'pinch-points' where lack of access to specialist skills and knowledge introduces risk into the development and delivery of individual projects. Experience suggests that more efficient management of programmes and scheme development could reduce overall costs by as much as 20%. Managing this risk will represent better value for money to the public sector, as well as creating greater confidence within the community that proposals will be delivered in a timely manner.
265. We will therefore establish a 'centre of excellence': a regional resource which will provide our partners with access to the specialist skills and support required to address the identified 'pinch points'. Access to this resource will support our partners realise efficiencies that will help accelerate the delivery of investment and reduce costs.
266. The establishment of a regional 'centre of excellence' accessible to all partners will ensure the knowledge and experience accumulated through the development of individual proposals is retained within the region. Enabling all partners to have access to that accumulated knowledge will enable the benefits to be applied more widely to their own proposals.

Delivery of the Pipeline

267. The region's investment pipeline establishes the need for investment in order to support the delivery of planned growth. Realising that growth will in turn be dependent upon securing the funding and/or finance to enable the region's investment priorities to be developed and then delivered.
268. A combination of public and private sector funding will be required, as will a mixture of capital and revenue investment.
269. Adopting a co-ordinated approach to the development of the investment pipeline and its delivery will realise efficiencies by enabling a more effective use of the resources available to develop proposals and secure required permissions.
270. The specialist skills and accumulated knowledge held within the regional 'centre of excellence' will supplement existing skills available to partners. This addresses the risks previously identified by our partners that are associated with the development and delivery of investment proposals.

Regulation

- 271. As part of whole system approach to the development of the region's transport system we will keep under review the need for change in the regulatory regime governing the sector.
- 272. Where our work identifies there is benefit in seeking a change, we will work with other Sub-national Transport Bodies and Government to make that case in a timely manner.

Investment Framework

- 273. This strategy provides clarity on where investment in strategic infrastructure and services is required to support the work of local authorities and growth boards as they look to plan and deliver planned growth in the longer-term.
- 274. It also provides the foundation for a conversation with institutional investors with regards to securing long-term commitments to invest in the region. We will work with the investment sector to develop a long-term investment framework, one that enables institutional investors to work with the region to secure the long-term strategic ambition of the region.


Monitoring and Evaluation

- 275. For the ambitions of this strategy to be implemented it is necessary to measure the policies and programme of activities set out within the Investment Pipeline against indicators of success. Monitoring and Evaluation will enable us to track, analyse and report on progress with implementation.
- 276. A series of indicators have been developed that will champion data-driven decision making and help understand the relationship between our interventions and their contribution to achieving our ambitions. Measuring progress in this way will inform and shape future work activity as required and allow us to address any unforeseen effects at an early stage.
- 277. The indicators set out below form the basis of our monitoring and evaluation framework and will be assessed and reported on an annual basis. Each indicator is aligned with the strategy principle it best supports. Further work will need to be undertaken with partners to baseline and confirm the specific datasets used to measure each indicator.

Principle	Indicator	Measure
Achieving net zero carbon emissions from transport no later than 2050, with an ambition to reach this by 2040.	Delivering a net-reduction in CO ₂ emissions at 5-year intervals.	Baselining and measuring the region's aggregated CO ₂ estimates.
Achieving net zero carbon emissions from transport no later than 2050, with an ambition to reach this by 2040.	Conserving and enhancing the natural and historic environment: 1) Conserving and enhancing the provision of ecosystem services from the region's natural capital and contributing to environmental net gain. 2) Conserving and enhancing the historic environment.	Baselining and measuring environmental assets and ecosystem services within the Arc.
Achieving net zero carbon emissions from transport no later than 2050, with an ambition to reach this by 2040.	An improvement in air quality arising from transport related vehicle emissions at identified sites.	Baselining and measuring air quality at identified sites.
Improving quality of life and wellbeing through a safe and inclusive transport system accessible to all which emphasises sustainable and active travel.	An increase in the number and percentage of journeys made by walking and cycling between 2-5k and public transport between 5k-60k.	Baseline and measure data at a regional level to measure method of travel to work by distance travelled.
Improving quality of life and wellbeing through a safe and inclusive transport system accessible to all which emphasises sustainable and active travel.	Greater levels of accessibility and inclusivity available to all transport users.	Undertake bespoke research with partners to develop appropriate measure.

Principle	Indicator	Measure
Supporting the regional economy by connecting people and businesses to markets and opportunities.	Reduced journey time variability of the strategically important road network.	Baseline and monitor journey time variability of the strategically important road network.
Supporting the regional economy by connecting people and businesses to markets and opportunities.	An increase in the number of people able to access fixed and mobile broadband.	Baseline and monitor digital coverage data.
Supporting the regional economy by connecting people and businesses to markets and opportunities.	A decrease in generalised journey time between the Heartland's key rail nodes.	Baseline and monitor journey time speed).
Ensuring the Heartland works for the UK by enabling the efficient movement of people and goods through the region and to/from international gateways, in a way which lessens its environmental impact.	Increase the number of rail freight movements and its market share.	Baseline and monitor rail freight volumes and percentage of freight moved by rail than by road.
Ensuring the Heartland works for the UK by enabling the efficient movement of people and goods through the region and to/from international gateways, in a way which lessens its environmental impact.	Reduction in time taken by public transport to international airports.	Baseline and monitor travel times to international airports.


Get in touch

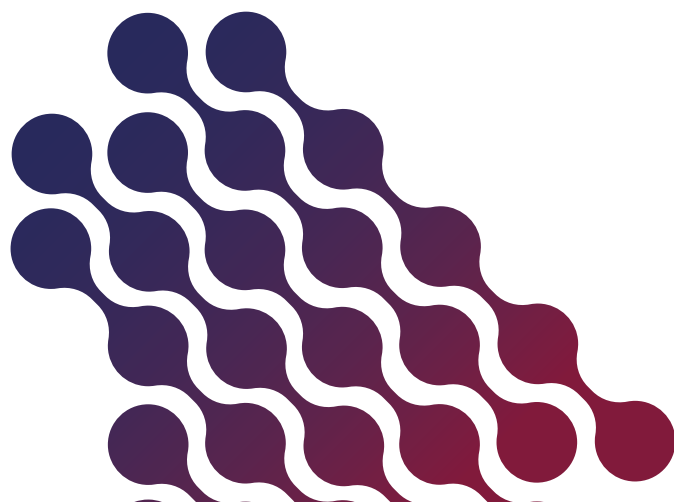
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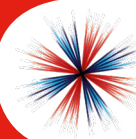
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HM Government



INDUSTRIAL
STRATEGY

Oxfordshire Local Industrial Strategy

A Partner in the Oxford-Cambridge Arc

July 2019





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Foreword

When Howard Florey came to Oxford in 1935 as the newly appointed Professor of Pathology, he arrived to state of the art but largely empty labs in the new Sir William Dunn School.

He soon set about recruiting a research team and – by the early war years – Florey, Ernst, Chain and others had turned over the department to making penicillin and demonstrating how effective it could be against bacterial infections. Penicillin then seemed nothing short of miraculous, banishing many infectious diseases that were some of the leading killers of the time. Indeed, the work of the Oxford team ushered in the modern age of antibiotics.

Nearly 85 years on, Oxfordshire is today a global centre of research and innovation. It is home to a number of world-leading science and technology companies which are located across leading business clusters and hubs that form a hive of knowledge intensive economic activity and anchor the area's strengths in breakthrough sectors.

Oxfordshire is the UK's engine for innovation: ground breaking R&D is driving the creation of new, dynamic businesses hungry to grow and scale up; cutting edge products and services are solving the challenges in healthcare, mobility, energy and communications; and commercialisation of these new ideas is delivering manufacturing and supply chain opportunities across the length and breadth of our country.

Oxfordshire's success, therefore, is critical to the success of the UK.

This Oxfordshire Local Industrial Strategy sets out an ambitious plan to build on Oxfordshire's strong foundations and world-leading assets. It will deliver transformative growth and prosperity for all communities across the county, supporting the objectives of the national Industrial Strategy. This Strategy looks to build on these strengths and assets to drive R&D and innovation across the region as a pioneering contributor to the Industrial Strategy's target for national R&D spending to reach 2.4 per cent of GDP by 2027 and three per cent in the longer term. In doing so, it will drive Oxfordshire's ambition to become one of the top three global innovation ecosystems by 2040.

Achieving this bold and ambitious target will require collaborative working between all partners across Oxfordshire and Government. We will need to develop the physical, digital, financial and knowledge infrastructure of Oxfordshire to foster a successful innovation ecosystem that is focused on competing at a global level against our rival international hubs.

This will be supplemented by a thriving business environment which makes Oxfordshire the playground for innovators and entrepreneurs to translate big ideas into commercially successful products and services.

Oxfordshire wants to be a pioneer for clean and sustainable growth, known as the location which harnesses the dynamic potential of its science and technological innovation for the benefit of local residents, business and improved public services which is an exemplar for contemporary living and design, and delivers sustainable and flourishing communities.

Most critical of all, Oxfordshire will be relentless in maximising the full potential of each and every person who lives and works in the county, ensuring that they are equipped with the very best skills which can provide them with the capability to secure the new employment opportunities generated across the innovation ecosystem. The Oxfordshire Social Contract will be central to the ambition to drive social mobility and ensure local residents benefit from the dynamic location which is their home.

This Local Industrial Strategy, therefore, presents a long-term framework against which private and public sector investment decisions can be assessed, grouped around the five foundations of productivity. We will use **Ideas** to establish a globally connected and competitive innovation economy; our **People** will benefit from a more responsive skills ecosystem creating better

opportunities for all; **Infrastructure** will enable greater connectivity especially across key growth locations; the **Business Environment** will enable Oxfordshire to become a powerhouse for commercialising transformative technologies; and finally, we will develop Oxfordshire as a living laboratory to help solve the UK's Grand Challenges for all **Places**.

Everyone has a role to play in making Oxfordshire's Local Industrial Strategy successful, real and relevant - communities, investors, educators, entrepreneurs, innovators and more.

We invite you to join us in this exciting journey and seize the opportunities which lie ahead of us.



Rt Hon Greg Clark MP

Secretary of State for Business,
Energy and Industrial Strategy



Jeremy Long

Chair of the Oxfordshire Local
Enterprise Partnership

Executive summary

Oxfordshire has been at the centre of innovation in the UK for centuries. National and local investments have built up a network of science parks and innovative firms across the county, and now wider investments in the region offer the opportunity to cement the area's reputation as one of the best locations in the world to innovate.

This Local Industrial Strategy sets out an ambitious plan to build on Oxfordshire's strong foundations and world-leading assets, to deliver transformative growth which is clean and sustainable and delivers prosperity for all communities across the county. It will deliver the aims of the national Industrial Strategy, government's long term plan to boost productivity, by backing businesses and investing in skills, industries and infrastructure.

This growth will be driven by innovation and higher productivity - both in those emerging sectors which will harness transformative technologies, and in sectors that have historically driven the economy. It will be inclusive, place-sensitive and sustainable, responding to increasing concerns around climate change, and will enhance the natural environment and the quality of life for everyone in Oxfordshire.

Building a global innovation ecosystem: Oxfordshire in 2040

This Local Industrial Strategy is framed by Oxfordshire's ambition to be a top three global innovation ecosystem by 2040.

Oxfordshire will achieve this through developing the five foundations of productivity, as set out in the national Industrial Strategy, and by building on the county's world-leading science and technology clusters.

This will knit together the existing strengths of the county - in the historic academic assets in the City of Oxford, within dynamic and creative residential communities, and across its science and technology parks throughout Oxfordshire - into a coherent network, able to exploit the latest technologies.

As well as supporting 'breakthrough' firms, this will enable growth in the 'cornerstone' local businesses that form the backbone of the Oxfordshire economy, providing jobs, essential services and supply chains across the innovation ecosystem and delivering growth in the UK as a whole.

Oxfordshire in 2019

Oxfordshire has one of the strongest economies in the UK, contributing £23bn Gross Value Added (GVA) to the UK exchequer in 2017. It is also rapidly growing at an average of 3.9 per cent growth year-on-year since 2006.

The county has significant assets in research and development ('R&D') being home to the top performing university in the world, the University of Oxford, as well as Oxford Brookes, a leading university in the UK for teaching and research. These anchor institutions support an international brand that draws talent and investment to both the City of Oxford and across Oxfordshire in the number of science, innovation, technology and business parks located in the county. The Oxfordshire knowledge-led economy generates the highest number of university spin-out companies in the UK, underlining its importance to the national economy.

However, despite Oxfordshire's many strengths, it has low productivity relative to many peers. Whilst the region's productivity per hour worked is above average for England, in recent years it has fallen below the south east. Moreover, as Oxfordshire's economy grows there is an increased strain on the county's infrastructure. Housing is becoming increasingly unaffordable and rail, road and energy infrastructure are not sufficient to meet rising demand.

This also places it at an increasing disadvantage to its international competitor locations in attracting foreign investors, talent and business investment.

This Local Industrial Strategy recognises these challenges to the Oxfordshire economy and sets out the opportunity to ensure that this growth is coordinated county-wide. It sits alongside the Oxfordshire Housing and Growth Deal, agreed with government in 2017, which sets out the commitment to deliver 100,000 new homes across the county before 2031 as well as improvements in necessary accompanying infrastructure. This strategy looks to integrate the county's leading R&D and innovation assets into future housing and infrastructure. This will provide pioneering solutions to deliver transformative and sustainable neighbourhoods that prepare communities for the future and make Oxfordshire a clean and prosperous place to live and work.

Ideas

Oxfordshire is a global centre of research and innovation. The county is home to two renowned universities - the University of Oxford and Oxford Brookes - and a number of world-leading science, innovation, technology and business parks. This hive of knowledge-intensive economic activity attracts international talent and investment and encourages the highest intensity of university spin-outs in the UK.

This engine of innovation in Oxfordshire also benefits the wider UK and is key in building innovation excellence across the country and competing globally for investment and talent.

This Local Industrial Strategy looks to build on these strengths and assets to drive R&D and innovation across the region as a pioneering contributor to the Industrial Strategy's target for national R&D spending to reach 2.4 per cent of GDP by 2027, and three per cent in the longer term.

For Oxfordshire to reach this ambition, this Local Industrial Strategy recognises that the county needs to develop its physical, digital, financial, knowledge and social infrastructure to foster a successful innovation ecosystem that competes at a global level. This means ensuring that there is a sufficient pool of leadership talent, funding and business premises to support growing businesses. Oxfordshire will therefore support the transformation of science and technology parks, and the potential creation of a new Global Business District as part of the Oxford Station quarter. Additionally, it prioritises local investment in the breakthrough technologies set out in the Oxfordshire Science and Innovation Audit and this Local Industrial Strategy to accommodate fast-growing businesses. The county will also set out a distinctive global brand to raise Oxfordshire, and the Oxford - Cambridge Arc's, international profile for innovation and R&D to attract more investors and talent.

This will include the launch of the '*Connecting Globally*' platform, a digital platform to showcase success across the region and facilitate collaboration with other global innovation ecosystems.

People

Oxfordshire has a highly skilled workforce, with 51 per cent of the working age population educated to degree level or above. The county's unemployment rate is over 50 per cent lower than the UK average, at 1.3 per cent compared to 2.7 per cent nationally. However, the county has pockets of significant deprivation and wage disparity.

The priority in this Local Industrial Strategy is to build a skills system that better responds to local demand, which provides a range of opportunities for all across the county. This will help develop a more responsive skills ecosystem to support our innovation ambitions. Oxfordshire will take forward a series of measures to support business engagement with the skills system through the development of an *Oxfordshire Social Contract*, including:

- ▶ establishing a Skills Advisory Panel for Oxfordshire;
- ▶ championing T levels locally, so that they map to the county's technology sectors and support local employers to deliver industry placements and develop new apprenticeships;

- ▶ establishing an *Oxfordshire Entrepreneurship Hub* to support students and young people across the county to develop business propositions and develop connections across the innovation ecosystem;
- ▶ working with the Careers and Enterprise Company, local colleges and Oxfordshire County Council, to improve social mobility for young people by ensuring they will have greater access to career pathways within Oxfordshire;
- ▶ developing *OxLife*, a targeted programme to reskill and upskill older workers and armed forces personnel, returning to the Oxfordshire workforce, so that they can actively engage in the new innovation economy;
- ▶ driving growth in apprenticeships and maximise local take up of the apprenticeship levy through working with local employers to maximise their usage of their levy allocation; and
- ▶ working through the Oxfordshire Growth Board to convene local leaders, academic experts, businesses and community organisations to form an *Inclusive Growth Commission*. This will consider how Oxfordshire can ensure that the benefits of a world leading innovation ecosystem can be equitably shared and reach all communities, learning from other global ecosystems.

Infrastructure

Oxfordshire has strong transport links along the Bristol-Birmingham-London corridors and enjoys close proximity to Heathrow and Birmingham airports. The county is committed to improving links across the Oxford-Cambridge Arc with the development of the East-West Rail scheme. However, a growing economy and population is putting strain on rail and road infrastructure, as well as the energy sector. Housing also faces rising demand and affordability pressures. In order for Oxfordshire to deliver on the vision to be a world-leading innovation ecosystem, it must continue to work with government to develop resilient infrastructure that can respond to future demands and is sustainable for the environment.

Oxfordshire will do this by:

- ▶ identifying opportunities to progress the ambitions in the Oxfordshire Infrastructure Strategy, supporting local plans to improve rail and roads across the area and make space for sustainable, multi-modal transport;
- ▶ working to realise the ambitions of the Oxfordshire Energy Strategy using local funding streams, to harness the opportunities of clean growth and put in place a low carbon energy grid that supports business growth and leads to the development of pioneering new models of energy management and the application of ground breaking battery technologies; and
- ▶ developing an ambitious Digital Investment Plan to provide world leading digital coverage.

Government is supporting these initiatives through investment in East-West Rail and the Expressway and by offering policy support on the development of the Oxfordshire Digital Investment Plan.

Business environment

Oxfordshire is home to thousands of great businesses and is one of the strongest engines for growth in the UK. With over 31,000 VAT registered businesses across a broad range of sectors. Oxfordshire has a well-balanced, resilient economy which has been instrumental to its track record of continued growth.

However, many firms continue to struggle to grow to scale and do not translate ideas into business growth as well as some other competitor locations.

This Local Industrial Strategy looks to address identified challenges (including access to premises and finance) to ensure the region can maximise its commercial and innovative potential. Oxfordshire will enhance its business support offer through the Growth Hub to develop a world class 'Scale Up' programme that provides a single, coordinated and collaborative service that delivers dedicated support for high growth potential breakthrough businesses. Oxfordshire Local Enterprise Partnership will establish an 'Oxfordshire Finance Hub' as part of the Growth Hub, to help firms access finance, and will seek further opportunities to attract institutional investors such as Sovereign Wealth Funds into the area.

Government will support this by working closely with Oxfordshire to develop an *Internationalisation Delivery Plan* to expand on the county's global brand and attract trade and investment opportunities to support business growth.

Places

Oxfordshire has a wealth of assets in research, innovation, natural capital and cultural heritage.

Towns and villages across the county are vibrant and distinct, driving a strong and growing tourism industry attracting over 30 million visitors a year to Oxfordshire.

The county is also an increasingly attractive place to live and work, but this success, however, is putting strain on the county's infrastructure - compounded by flooding and environmental issues that limit housing developments.

The vision set out in this Local Industrial Strategy, therefore, is designed to help the county retain its distinctive character, while seizing the opportunities of the twenty-first century. It provides Oxfordshire with the opportunity to innovate in place-making, building healthy and sustainable communities that are technology-enabled, improve quality of life, and utilise innovative solutions to the challenges of modern living and respond to the increasing concerns around climate change.

Oxfordshire's communities themselves have the opportunity to become exemplars of contemporary living - preparing for technological and environmental change, whilst retaining natural landscape and a high-quality living experience.

This will be based on developing new technologies with private sector partners, coordinated by multidisciplinary teams to respond to the Grand Challenges as set out in the Industrial Strategy.

In addition, government will work in partnership with Oxfordshire to support the delivery of these new housing communities, not least through the Oxfordshire Housing and Growth Deal, and through other initiatives such as the Local Growth Fund and the Housing Infrastructure Fund. Government also recognises the importance of natural capital assets across the county, including its three Areas of Outstanding Natural Beauty and seven Special Areas of Conservation.

Working across the Oxford-Cambridge Arc

This strategy is one of a family of four linked strategies covering the Oxford-Cambridge Arc ('the Arc'), with the other strategies covering, Buckinghamshire, Cambridgeshire and Peterborough and the South East Midlands. It therefore includes a summary of the wider economic context and identifies those priorities within each Local Industrial Strategy which can be developed at scale across the Arc, complementing the specific Oxfordshire strategic objectives which sit at the heart of this strategy. This includes:

- ▶ Working together collaboratively across all of the foundations of productivity to ensure that the implementation of the

four Local Industrial Strategies maximises the economic potential of the wider Arc region.

- ▶ Harnessing the collective strength of the Arc's research base - driving greater collaboration on science and research; and growing the role of the Arc as a global research and innovation hub.
- ▶ Bringing employers and skills providers together to understand the current and future skills needs, and planning provision to meet them.
- ▶ Maximising the economic benefits of new transport, energy and digital infrastructure within the Arc.
- ▶ Developing an improved business support and finance programme for high growth companies, a shared approach to commercial premises and an *Internationalisation Delivery Plan* to encourage greater trade and inward investment in the Arc.
- ▶ Embodying Government's 25 year Environment Plan and contributing to the Clean Growth Grand Challenge Mission to halve the energy use of new buildings by 2030.

Together, the strategies reflect the close collaboration and partnership working between Local Enterprise Partnerships (LEPs) across the region.

Introduction

Oxfordshire is one of Britain's success stories.

It has one of the highest concentrations of innovation assets in the world with universities and science, technology and business parks which are at the forefront of global innovation in transformative technologies and sectors such as fusion technology, autonomous vehicles, quantum computing, cryogenics, space, life sciences and digital health.

The economy is high-skilled, knowledgeable and dynamic. The county is one of the most popular places in the country to live, visit, and pioneer new industries; the markets for these technologies are increasingly global and are set for rapid growth between now and 2040. Oxfordshire has already created a number of high-tech companies that have been valued at over US\$1bn, which is testament to the ability of the innovation ecosystem to nurture and spin out companies. This success is not limited to the City of Oxford: the region also has some of the highest levels of productivity for agriculture, and an increasingly mature network of business hubs throughout the county.

Oxfordshire can leverage these strengths to become one of the top three innovation ecosystems globally by 2040. That means ensuring research strengths are developed and deepened further; that they accelerate the translation into business innovation and rising

productivity outside the gates of science parks; and that this is delivered while enhancing, rather than compromising, cultural, social and environmental assets.

This Local Industrial Strategy recognises and responds to the challenges facing Oxfordshire: its relative wealth and success disguises lower productivity than elsewhere in the south east, due to longer hours worked; a stagnating or declining working age population; and housing affordability in the region which is among the worst in the country, driving deprivation in some areas. The fact that housing affordability varies across the region suggests simply building more homes won't be enough: they need to be in the right areas, and with advanced transport links to ensure residents can make the most of the economic opportunities the region offers.

Potentially transformative change is taking place in Oxfordshire. The Oxfordshire Housing and Growth Deal, agreed with government in 2017, committed up to £215m of national government investment into the county for infrastructure and affordable homes to assist in achieving the ambition of planning and delivering up to 100,000 new homes in the county by 2031.

Alongside this a Joint Statutory Spatial Plan, coordinating all local authorities to ensure a county-wide, integrated, sustainable planning framework to 2050 is being prepared for submission in 2021. Taken together, this also offers the catalyst for significant transformation across the wider Oxford-Cambridge Arc.

This Local Industrial Strategy is based on a partnership between representatives of Oxfordshire's businesses, universities, education bodies, local authorities and the government. It presents a long-term framework against which private and public sector investment decisions can be assessed, grouped around the five foundations of productivity:

- ▶ **Ideas:** Establish a globally connected and competitive innovation economy;
- ▶ **People:** Develop a more responsive skills ecosystem creating better opportunities for all;
- ▶ **Infrastructure:** Enable greater connectivity and accessibility especially across key growth locations;
- ▶ **Business environment:** Become a powerhouse for commercialising transformative technologies; and
- ▶ **Places:** Develop Oxfordshire as a living laboratory to help solve the UK's Grand Challenges.

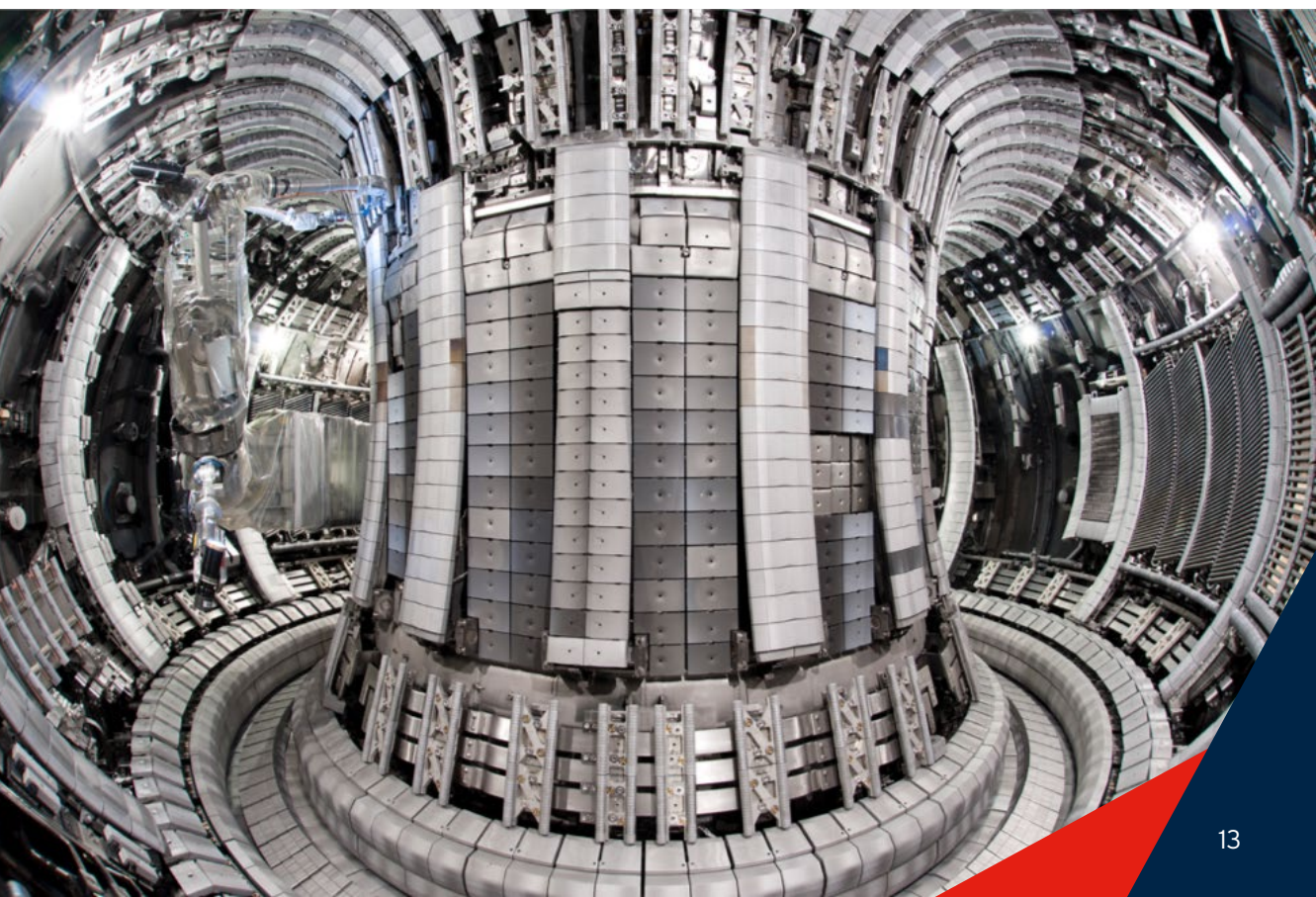
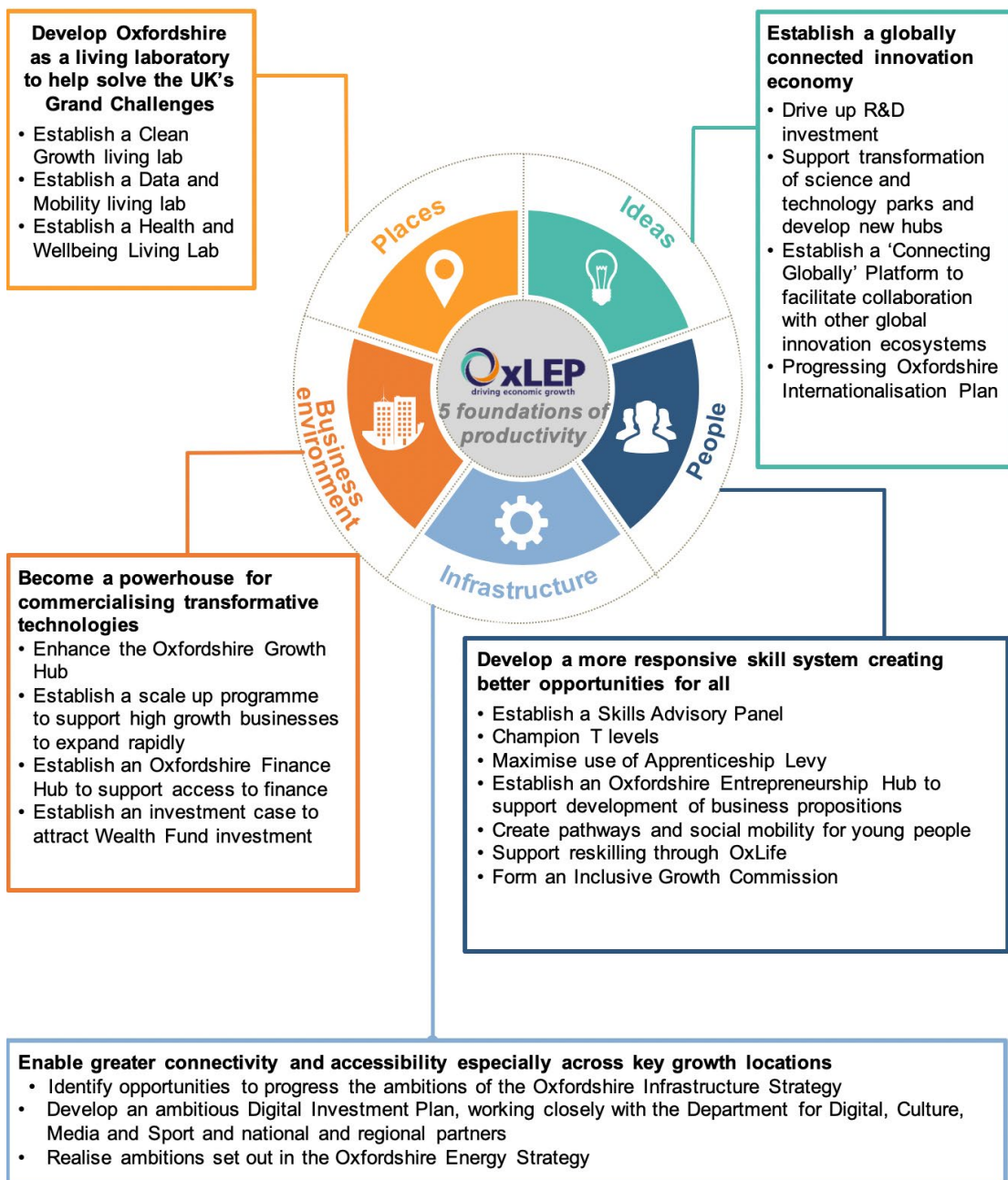


Figure 1: Foundations of Productivity



Oxford-Cambridge Arc: economic context

Oxfordshire and the Oxford-Cambridge Arc

This Local Industrial Strategy for Oxfordshire articulates government and local partners' shared ambitions for the area at a sub-regional level, outlining how specific interventions in the local area will drive future growth in Oxfordshire and across the Arc more widely.

These local ambitions sit alongside a range of work which will be progressed collectively at an Arc level.

Each of the Local Industrial Strategies across the Arc should be read as 'local chapters' of the national Industrial Strategy - outlining not only the ambitions for the local areas, but also how their strengths and assets will contribute to national objectives.

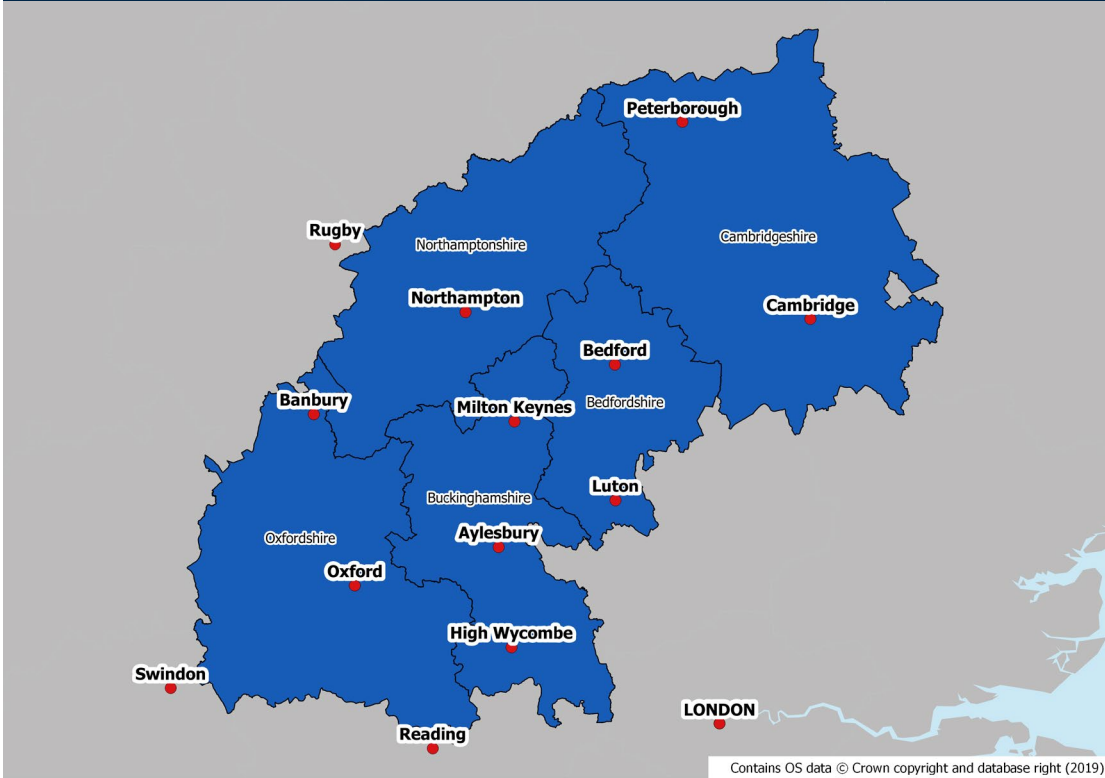
The economic opportunity presented by the Arc is significant. But it will not happen by itself. It will take concerted and coordinated work by both government and the local areas to ensure that the Arc remains an economic asset of international standing over the coming decades. This Local Industrial Strategy for Oxfordshire published alongside those for Buckinghamshire, Cambridgeshire and Peterborough and the South East Midlands, shows how this will be done.

Introduction to the Arc

The Oxford-Cambridge Arc is a world leading economic area, underpinned by a high-quality environment, which has the potential to deliver transformational growth that will create jobs and boost local and regional economies for the benefit of existing and future communities. It currently has 3.7 million residents and over two million jobs, contributing £111bn GVA annually to the UK economy¹ and the transformative economic potential to contribute around £191.5bn by 2050. It is a highly productive and prosperous region with global strengths in science, technology and high-value manufacturing.

The Arc covers the ceremonial counties of Oxfordshire, Buckinghamshire, Northamptonshire, Bedfordshire and Cambridgeshire. The economic landscape is covered by the Oxfordshire, Buckinghamshire and South East Midlands Local Enterprise Partnerships and the Cambridgeshire and Peterborough Mayoral Combined Authority's Business Board.

Figure 2: Map of the Oxford-Cambridge Arc



The Arc as a whole is a strongly knowledge-intensive economy. It contains ten diverse universities², including the Universities of Oxford and Cambridge, two of the world's greatest and most internationally recognisable centres of learning, and a network of cutting-edge science parks, research institutions, businesses and incubators.

The Arc is home to world-leading R&D and is already renowned as a place of global firsts - pioneering cures for disease, forging breakthroughs in engine technology, innovation in future

energy and transport systems, and developing world-leading strengths in technologies that are shaping the twenty-first century. But it has the ambition and ability to go further. Its continued success will be critical if the UK is to meet its target of 2.4 per cent of GDP being spent on R&D by 2027 and its knowledge and innovation assets enable the area to be world-leading in industries that have rapidly growing global markets.

The Arc today: Key growth sectors

Transformational growth of the scale envisaged across the Arc will need to build on the breadth of existing assets and strengths found across the local area.

The Arc is home to two globally renowned life sciences clusters in Oxford and Cambridge - the most productive life sciences clusters in Europe, which already compete internationally with the global leaders in San Francisco and Boston, Massachusetts. These clusters feature prominently in the UK's Life Science Sector Deals, published in 2017 and 2018. The Cambridge life sciences cluster alone is home to over 400 companies, with 15,500 employees and contributing around £2.9bn annually to the UK economy³. Oxfordshire is home to a world-leading bioscience cluster, with an estimated 180 R&D companies and over 150 companies in associated industries. It has world-class R&D facilities, with four new innovation centres at the Oxford BioEscalator, the Begbroke Accelerator, Harwell Science and Innovation Campus and Culham Science Centre. Buckinghamshire is also home to a growing med-tech sector and the county also houses national facilities such as the spinal centre in Stoke Mandeville.

The Arc has significant strengths in the space and satellite sector. The Harwell Science and Innovation Campus in Oxfordshire comprises over 90 space organisations employing nearly 1,000 people and is the largest space cluster in Europe incorporating the European Space Agency, the Space Applications Catapult and the National Satellite Testing Facility. This is complemented by Westcott Venture Park in Aylesbury Vale with a growing space cluster with particular strengths in upstream space, and also home to the National UK Propulsion Test Facility. In aerospace, Central Bedfordshire's Cranfield University, which is home to the Aerospace Integration Research Centre and the UK's Aerospace Technology Institute, is building a Digital Aviation Research and Technology Centre that will spearhead the UK's research into digital aviation technology.

The Arc is a world leader in advanced manufacturing, with particular specialisms in high-performance technology and motorsport engineering. Silverstone is home to 40 advanced manufacturing companies, testing facilities for materials and vehicles and the iconic F1 Circuit. More widely, there are over 4,000 businesses operating in 'Motorsport Valley'⁴, which extends from Northamptonshire into Oxfordshire and beyond - a £6bn global cluster of automotive, motorsport and advanced manufacturing companies.

The Future of Mobility features heavily across the Arc as a whole, specifically in the research, development and commercialisation of Connected and Autonomous vehicles (CAV). Key assets include the RACE Centre at Culham Science Centre, which is a UK centre of excellence in robotics and autonomous systems, Millbrook Proving Ground in Central Bedfordshire and, at Milton Keynes, a hub of the Connected Places Catapult and the UK Autodrive project.

There are several leading creative and digital clusters within the Arc. In Buckinghamshire, Pinewood Studios and the National Film and Television School comprise two globally renowned state-of-the-art facilities. Milton Keynes, Peterborough, Cambridge, Luton, Northampton, Oxford, High Wycombe, South Bucks and Aylesbury all have highly concentrated creative and digital clusters with diverse specialisations. Oxfordshire is home to a range of strengths including computer games, software development, cybersecurity, high performance computing as well as film and TV including the new £78m studio facilities at Didcot opened by Rebellion. In Cambridge, the information and digital technologies cluster is highly concentrated, with a strong track record of establishing and growing globally significant companies. This high concentration of modern, creative, industries, have led to Arc businesses featuring heavily in the UK's Creative Industries Sector Deal.

Policy Context

Recognising the importance of the area and the opportunity it provides for the UK, the government has already made significant investment to support local growth and productivity in the Arc over recent years. This has included:

- ▶ committing over £400m of Local Growth Funding to the LEPs in the Arc from 2015/16 to 2020/21, to fund growth enabling projects;
- ▶ agreeing over £800m of funding for economic growth, transport and skills through the Cambridgeshire and Peterborough Devolution Deal;
- ▶ continuing to invest in the four LEPs' Growth Hubs to provide business support across the Arc and investment in the Greater South East Energy Hub;
- ▶ supporting the accelerated development of key sites through our Enterprise Zone programme, including in Science Vale, Northampton Waterside, Aylesbury Vale and Alconbury Weald; and
- ▶ investing, through Innovate UK, £670m in 1000 businesses in the Arc since 2010 to help them develop and innovate new products and services.

It was part of recognising the national importance of the Arc that, in 2016, the government commissioned the National Infrastructure Commission (NIC) to undertake a study to strengthen our collective understanding of the area's economic growth potential. The NIC published its report⁵ - Partnering for Prosperity: A new deal for the

Cambridge-Milton Keynes- Oxford Arc – in 2017, concluding that, with the right interventions, the Arc could harbour transformational growth, even against its existing levels of output. It explained that meeting this long-term potential would require both significantly more homes to be built and improvements in east-west transport connectivity.

In its response to the NIC report⁶, published in 2018, the government designated the Arc as a key economic priority, outlining a breadth of actions to seize the opportunity for growth identified in the NIC's report. The government also affirmed its ambition to deliver more homes in the Arc, supported by measures such as the £215m Oxfordshire Housing and Growth Deal and the recent confirmation of £445m Housing Infrastructure Funding for the Arc. The government has committed to deliver transformational infrastructure projects to improve east-west connectivity across the Arc, most notably by completing the £1bn East West Rail scheme and the Expressway. Government is also working with partners to identify what utilities, digital and environmental infrastructure, planning and investment is required. Importantly, the government's response to the NIC recognised that delivering ambitious growth on this scale had to go hand in hand with environmental enhancement to maximise the benefits to local people, leaving the environment in a better state for future generations.

Since then, the government and local leaders have been working in partnership across the Arc to match the level of ambition for the area. This includes working collaboratively to realise the area's potential through four inter-related policy pillars:

- ▶ Productivity – ensuring businesses are supported to maximise the Arc's economic prosperity, including the skills needed to enable communities to benefit from the jobs created;
- ▶ Place-making – creating places valued by local communities, through the delivery of sufficient, affordable and high-quality homes, to increase affordability and support growth in the Arc, as well as wider services including health and education;
- ▶ Connectivity – delivering the infrastructure communities need, including transport and digital connectivity, as well as utilities; and
- ▶ Environment – investing in environmental infrastructure and ensuring growth leaves the environment in a better state for future generations.

Oxfordshire in 2019

Oxfordshire is a unique economy in its own right and a core part of the Oxford-Cambridge Arc. This chapter sets out further context on the opportunities and challenges facing the county's economy, and the policy framework under which they are being addressed.

Oxfordshire Local Enterprise Partnership (OxLEP) has produced two detailed reports setting out the current state of the Oxfordshire economy and future growth potential. These reports sit alongside and inform the approach outlined in this Local Industrial Strategy. They are:

- ▶ *The Baseline Economic Review*, exploring how Oxfordshire has performed relative to the UK as a whole, as well as the relative performance of each district authority and different types of businesses⁷ and sectors within the county; and

- ▶ *The Future State Assessment* which sets out what Oxfordshire has the potential to achieve and what being a 'top three global innovation ecosystem' could mean for the County, as well as detail on the key industries in which Oxfordshire can be globally competitive. It details an ambitious economic growth agenda for Oxfordshire, along with a spatial vision to ensure that growth in the County is achievable and sustainable.

An Investment Prospectus to underpin the Oxfordshire Local Industrial Strategy, allowing both public and private investors to understand how they can invest in Oxfordshire to enable the region to achieve its growth potential, will be developed during 2019/20.

Oxfordshire's economic strength

Oxfordshire has one of the strongest economies in the UK. It is a net contributor to the UK exchequer, contributing £23bn GVA in real terms in 2017. It is also rapidly growing, with an average growth of 3.9 per cent growth year-on-year in nominal terms since 2006. Oxfordshire is home to around 678,000 people and 31,000 VAT registered businesses, including a

high concentration of technology-based businesses that are at the forefront of global innovation. The region is home to the University of Oxford, the top performing university in the world, as well as Oxford Brookes, one of the leading young universities in the UK for teaching and research.



Oxfordshire has the highest intensity of university spin out companies in the country. The University of Oxford continues to generate more spin-outs than any other university nationally. Between 2014 and 2015, a total of 136 spin-out companies generated approximately £147m of GVA, supporting 2,421 jobs in the Oxfordshire economy. On a per-head basis, the output of local workers is in the top 20 per cent of English regions, and Oxfordshire is leading the way in the UK for 'good growth' – Oxford is the highest ranking city in the UK in PwC's 2018 Good Growth for Cities report, which measures the performance of cities against key economic and wellbeing indicators, such as employment, health, income and skills.

This impressive track record of growth has been delivered through close partnership working between government, local authorities, business leaders and universities. Over £600m worth of government and European funds have been secured through Growth Deals, a City Deal, European Structural Investment Funds and Infrastructure Funds – all part of an overall investment programme in Oxfordshire worth £2.2bn.

Figure 3: Overview of the Oxfordshire Economy



Economy

£23bn

GVA generated in real terms each year

3.9%

GVA growth in nominal term year-on-year since 2006

1 of 3

County areas which are net contributors to the UK exchequer

Population

51%

of working age population educated to degree level or above

1.3%

unemployment rate in the working age population

The Baseline Economic Review

The Baseline Economic Review sets out the macro-economy of Oxfordshire:

- ▶ The Oxfordshire economy supports 417,000 jobs and 31,000 VAT registered businesses.
- ▶ 160,000 people live in Oxford.
- ▶ Employment is very high across Oxfordshire with the participation rate being 82 per cent, compared to 75 per cent for UK and 79 per cent for south east.
- ▶ Output growth has continued to be strong since the financial crisis (3.9 per cent per annum since 2007), well above national averages. Even during the last recession Oxfordshire continued to grow. Total output per worker is 20 per cent above the UK average.

Strengths

1st

Oxford University rank in Times Higher Education global rankings 2018

£600m

largest fund for university spin outs in Europe: Oxford Sciences Innovation

\$1bn

track record of growing businesses with market values of over US\$1bn

30m

visitors to Oxfordshire each year, many of them international

50,000

new jobs created since 2011/12

Challenges

50%

higher median house prices than the English average

7%

full fibre rollout, well behind many international competitors

3%

annual growth in apprenticeships, well below the UK average of 12.5 per cent

55%

increase in population aged over 85 by 2031

- ▶ Wage growth tracked UK and South East averages from 2007, but has accelerated above the national averages since 2014, rising at twice the rate of the UK. This is true even adjusting for house prices.
- ▶ Despite this, productivity in Oxfordshire is slightly below the south east average. Oxford itself has the lowest productivity rate (measured as value add per hour worked) of the five authorities. South and West Oxfordshire perform well (at 47th and 48th of 379 local authorities). Oxfordshire's high incomes therefore imply that its residents are working longer hours than others elsewhere.
- ▶ With the exception of the Vale of White Horse, Oxfordshire's population has been roughly stable or in decline since 2014 - the Vale of White Horse has seen substantial growth. Oxfordshire is already 'older' than the UK average and will continue to age at comparable rates.

Oxfordshire is rightly ambitious to be a leading economic region not just in the UK, but globally. However, future growth is being put at risk by a number of critical challenges that need to be addressed. Physical and digital connectivity lags behind global competitors, and housing affordability and the rising cost of living is detracting from Oxfordshire's quality of life. The economy is dependent on a highly skilled workforce that is at risk as the population changes - requiring more action to nurture, attract and retain talent aligned to business needs. Oxfordshire has pockets of both urban and rural deprivation, and inequality. This Local Industrial Strategy aims to respond to this challenge and to address inclusive growth opportunities for all of our residents and businesses across the county.

To maximise the potential of the region, investors need to be encouraged to look beyond the university system to the breadth of world-class assets and knowledge-based strengths that Oxfordshire is home to - for example, Culham Science Centre, Harwell Campus and other world-leading assets and locations in the region.

Finally, despite its many strengths, Oxfordshire has its own 'productivity puzzle', underperforming relative to many peer regions. The ultimate objective of this Local Industrial Strategy is to raise productivity, and the five chapters dedicated to the foundations of productivity below set out further analysis and opportunities to solve that puzzle.



Figure 4: Oxfordshire's Local Industrial Strategy

UK Industrial Strategy

The UK Industrial Strategy is a region-led approach to growth. It seeks to boost Britain's productivity and raise living standards by:

- ▶ Strengthening the foundations of productivity
- ▶ Building long term strategic partnerships between industry and government through sector deals
- ▶ Inviting business, academia and civil society to tackle the Grand Challenges, to ensure the UK takes advantage of global trends and industries of the future

Oxfordshire Housing and Growth Deal

The recent Housing and Growth Deal has secured an initial £215m of investment over the next five years to build the infrastructure and homes we need to thrive.

As part of the deal we have committed to:

- ▶ plan for and support the delivery of 100,000 homes by 2031
- ▶ develop a Joint Statutory Spatial Plan
- ▶ unlock enabling infrastructure
- ▶ produce the Oxfordshire Local Industrial Strategy as a headline commitment under the productivity strand of the Deal.

Oxfordshire Local Industrial Strategy

This Oxfordshire Industrial Strategy is one of the first Local Industrial Strategies to be developed and sets out how we can take forward these ambitions.

Foundations of productivity:

Ideas: to be the world's most innovative economy

People: to promote a diverse and inclusive economy with good jobs and greater earning power for all

Infrastructure: a major upgrade to the UK's infrastructure

Business environment: to be the best place to start and grow a business

Places: to have prosperous communities across the UK

Grand Challenges:

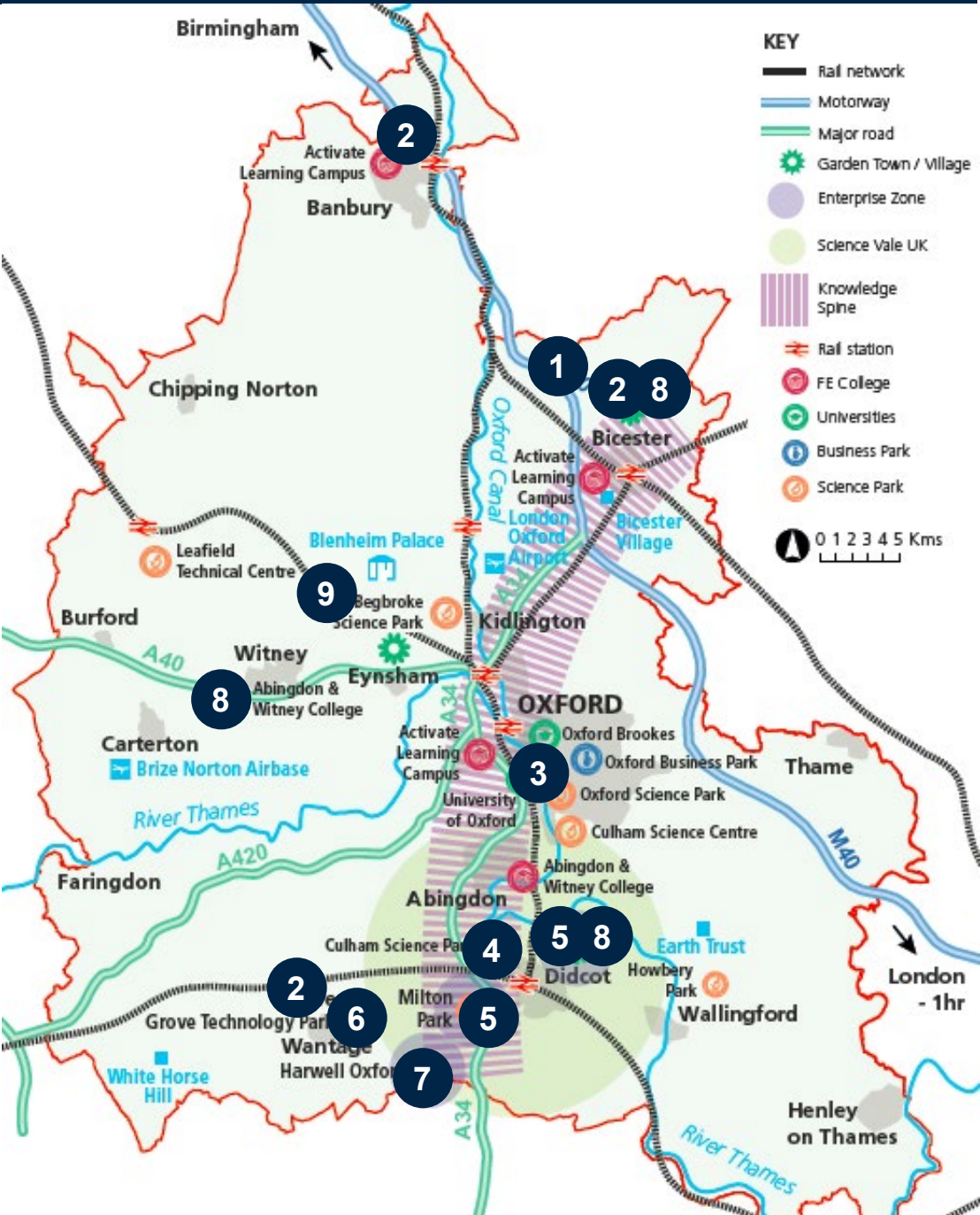
- ▶ Growing the artificial intelligence and data driven economy
- ▶ Shifting towards clean growth
- ▶ Shaping the future of mobility
- ▶ Meeting the needs of an ageing society

Existing and emerging strategies

The Oxfordshire Local Industrial Strategy will align to and build on a number of existing and emerging strategies. These include:

- ▶ 2016 Strategic Economic Plan and sister strategies e.g. Skills, Innovation and Creative, Culture, Heritage and Tourism.
- ▶ Oxfordshire Plan 2050 (Joint Statutory Spatial Plan)
- ▶ Oxfordshire Infrastructure Strategy (and NIC First Mile/Last Mile 2050 plan)
- ▶ 2017 Science and Innovation Audit
- ▶ Oxfordshire's Local Transport Plan 5
- ▶ Oxfordshire Rail Connectivity Study
- ▶ The Local Plans for housing and development for each District
- ▶ Oxfordshire Energy Strategy
- ▶ Oxford - Cambridge Arc Economic Vision
- ▶ Oxfordshire Joint Health & Wellbeing Strategy

Figure 5: Oxfordshire's critical economic sectors, assets and growth opportunities within the innovation ecosystem



1 Upper Heyford Creative
City key sectors: creative industries inc proposed 130 acres international film & tv studio complex

2 Motorsport Valley key sectors:
 advanced engineering, battery technology, high performance motorsport technologies

3 Oxford City Science Area
key sectors: Life Sciences, AI Technologies, Digital Health, Quantum Computing, Global CBD

- ▶ Oxford BioEscalator
- ▶ Old Road Campus Medical Research Centre
- ▶ John Radcliffe, Nuffield & Churchill Hospitals Quarter
- ▶ Centre for Applied Semi-Conductivity
- ▶ Oxford Science Park
- ▶ Osney Innovation District
- ▶ Oxford Northern Gateway
- ▶ Oxford Station Quarter and Global Central Business District

4 Culham Science Park key sectors: Fusion Energy, Robotics & Autonomous Systems

- ▶ Over 2000+ world leading scientists on site working with UK strategic assets

▶ Centre for Fusion Energy and Supply Chain Cluster

▶ Remote Applications in Challenging Environment Centre (RACE)

▶ 3500 homes proposed at adjacent Culham Smart Village providing testbed for new mobility solutions (linking with Harwell and Culham), digital health and smart technologies to deliver improved public service outcomes

5 Milton Park / Didcot Garden Town key sectors: Life Sciences, Creative Industries

▶ 250+ high technology companies employing 9000+ people, encompassing leading life sciences cluster

▶ EZ1 package of 9 separate development sites totalling 21ha

▶ Adjacent to EZ2 Didcot Growth Accelerator offering grow on space across 102ha of land

▶ Testing of new forms of mobility via Autonomous Vehicles pilot linked to Didcot Garden Town

▶ International Film & TV Studios Hub anchored around Rebellion Studios development

6

Williams Innovation & Technology Campus key

sectors: advanced engineering inc new high-performance technology campus cluster

7

Harwell Campus key sectors:

Health Sciences (med tech, life sciences, digital health), Space Applications, Energy

- ▶ 200+ world leading research and technology companies on site employing c6000 people
- ▶ designated UK Space Agency gateway with Europe's largest space cluster of 90 companies
- ▶ location of critical UK strategic assets including Diamond Light Synchrotron, Medical Research Council, Public Health England
- ▶ EZ1 development site of 93ha
- ▶ proposed 1000 new homes as part of Harwell Innovation Village to pioneer solutions for grand challenges focused on clean growth and mobility

8

Living Labs Testbed

Undertake smart living pilots at scale using emerging technologies integrated into major housing development to tackle Grand Challenges:

- ▶ Bicester Garden Town 13000 homes (inc healthy town and EcoTown)
 - ▶ Didcot Garden Town 15000 homes
 - ▶ Oxfordshire Cotswolds Garden Village 2200 homes
-

9

Begbroke Science Park key sectors:

advanced engineering, medical tech

- ▶ 60+ world leading research and technology companies employing 900+ staff
- ▶ Begbroke Innovation Escalator spin out hub
- ▶ Proposed 4000 homes as part of wider A44 corridor vision to double capacity at Begbroke including new station and linking to Oxford Airport and Oxford Parkway

Building a global innovation ecosystem: Oxfordshire in 2040

Oxfordshire's Vision Statement

To position Oxfordshire as one of the top three global innovation ecosystems by 2040, building on the region's world leading science and technology clusters to be a pioneer for the UK in emerging transformative technologies and sectors

An 'innovation ecosystem' describes the large and diverse nature of participants and resources that are necessary for innovation. Typically, innovation ecosystems comprise a flourishing environment for innovation and business creation; world-leading experts in knowledge and technology development; and a dynamic, agile and skilled workforce.

Oxfordshire already has many of the ingredients for success. The University of Oxford is considered the best in the world, topping the Times' Global University Rankings since 2016. Oxford Brookes University is a top performing young university in the UK for teaching and research.

This provides a ready stream of globally-competitive graduates, post-graduates and researchers in world-leading science, technology and humanities. The region is internationally connected through swift rail links to international airports. Quality of life is already very high.

The Future State Assessment compares Oxfordshire to similar areas in other countries - from Silicon Valley in the USA, Helsinki in Finland and Tel Aviv in Israel to Pangyo Techno Valley in South Korea and the Zhongguancun Science Park in Beijing, China.

Innovation ecosystems have different trajectories of growth and have succeeded with different combinations of qualities and strengths, but they share a number of common characteristics (see figure 6). Innovation ecosystems also rely on a distinction between 'Cornerstones Businesses' - forming the backbone of the ecosystem, providing jobs and critical services to high-technology businesses - and 'Breakthrough Businesses'. The following chapters set out how Oxfordshire will develop these characteristics in the county.

Figure 6: Building a world-leading innovation ecosystem



Iconic Brand

It is essential for a globally-leading innovation ecosystem to have a distinctive proposition and a strong vision that differentiates itself from other ecosystems, around which citizens, businesses, leaders and investors can unite.



Liveable Place

To attract people, business and investment, an innovation ecosystem needs to have thriving communities. These must be healthy, sustainable, provide a high quality of life, and support both urban and rural living. They must be affordable, well connected, and have a vibrant community and cultural offer.



Strong Financing

Availability of finance is essential to creating and commercialising innovation, scaling spin-outs and investing in the talent and infrastructure necessary for innovation to flourish. Investment can come from a number of sources.



Commercial Culture

A strong commercial culture is an environment in which entrepreneurship, investment and innovation thrives. It covers broad factors such as regulation and competition, as well as cultures of collaboration and knowledge exchange that encourage innovation and commercialisation.



Keystone Assets

An innovation ecosystem must be anchored by national or international keystone assets - these can range from education institutes, national research facilities, world-class industry clusters and knowledge-intensive assets.



Talent Proposition

Talent is integral to the innovation ecosystem. A strong innovation ecosystem must have the ability to attract and retain world-class talent, as well as nurture the talent and skills of its own citizens, developing skills aligned to business need and across a number of sectors.

Oxfordshire's breakthrough sectors

Oxfordshire thinks globally. This level of ambition stems from national and international leadership in transformative industries. These industries are shaping the twenty first century and expect rapid growth in the coming decades. As well as providing a home for these industries, Oxfordshire's research strengths give it global leadership on many underpinning technologies - ensuring the county is well-placed to capitalise on future industries too.

The 2017 Oxfordshire *Science and Innovation Audit* and the *Future State Assessment* sets out eight emerging sectors where Oxfordshire has particular research and industrial strengths.

These emerging industries will provide jobs for generations, providing a sustainable economic base for Oxfordshire and the country through the twenty first century.

In addition - as set out in the business environment chapter below - Oxfordshire is already demonstrating increasing success in turning ideas into businesses, helping them grow quickly, and retaining their talent locally rather than losing them to international competitors.



Case Study: Oxford Nanopore

Oxford Nanopore Technologies was originally spun out of the University of Oxford Chemistry department as Oxford Nanolabs, in 2005 and since its foundation it has established IP collaborations with twenty institutions including Harvard, Boston and the University of California. The company has developed and commercialises novel and highly disruptive DNA / RNA sequencing technology.

Unique in this rapidly-growing market, only Oxford Nanopore provides devices that are scalable from pocket size, to providing population-scale sequencing, providing 'long reads' (conferring substantial biological benefits), real-time data streaming (for rapid, dynamic workflows), and interrogate the DNA or RNA molecules directly using electronics rather than light.

The current and potential applications of this technology are broad and potentially transformative. Following the launch of the MinION sequencer, nanopore sequencing is now being used for rapid cancer characterization, infectious disease diagnostics, food safety testing, population-scale genomics and myriad other uses.

To date, Oxford Nanopore has raised £451m in funding from international investors and selling its technology into more than 80 countries. It is opening a new high-tech manufacturing facility at Harwell in 2019.

Factors in the ecosystem that have enabled growth:

► **Proximity to world leading assets:** Oxford Nanopore has grown to more than 450 employees worldwide, with its HQ at Oxford Science Park. The company has taken advantage of cutting-edge facilities available on Begbroke and the Oxford Science Park, as well as world class facilities suitable for manufacturing at Rutherford Appleton at Harwell Campus.

► **Access to Talent:** Oxford is an attractive location for the most senior employees to the newest wave of talent who may be considering their first role or a transition from academia. The reputation as an intellectual centre of excellence, along with entertainment, schooling, culture and leisure facilities, supports the recruitment and retention of the best employees.

Factors in the ecosystem that are constraining growth:

► **Cost of living:** With property and other expenses rising inexorably, Oxfordshire has an increasing affordability challenge which can make it more difficult to recruit, especially more junior staff.

► **Infrastructure:** The A34 and other key routes are severely congested making access to key science parks and hubs increasingly challenging across Oxfordshire.

Success in Oxfordshire will help the UK, as a whole, meet Industrial Strategy ambitions: leading on emerging technologies, raising the share of output that goes into R&D, and helping us all to respond to the Grand Challenges: an Ageing Society; Clean Growth; the Future of Mobility; and Artificial Intelligence (AI) and Data. The close links between Oxfordshire and other regions – the Arc, London, the West Midlands, West of England, and the M4 Corridor – will generate spill-over effects and supply chain opportunities across the UK.

Life sciences

Oxfordshire has one of the strongest life sciences clusters in Europe and is a global hub for life sciences entrepreneurship and business. The region hosts a broad range of strengths including med-tech, pharma, diagnostics, digital health and biomedical engineering, and is shaping the future of the industry using technologies such as artificial intelligence and machine learning. Oxfordshire is home to numerous national assets including the Rosalind Franklin Institute, the Big Data Institute and the Structural Genomics Consortium.

There are also clear strengths in commercialising life sciences innovation, with three companies that have previously been valued at over \$1bn: Oxford Nanopore; Immunocore; and Adaptimmune, and manufacturing opportunities demonstrated by the new Vaccines Manufacturing Innovation Centre announced in the UK Life Sciences Sector Deal.

World leading businesses are supported by strong academic leadership and connections across the UK from Birmingham and Cambridge to Dundee as well as the Medicines Discovery Catapult in Alderly Park. Oxfordshire can help the UK compete with areas such as the Boston Metropolitan Area and the Research Triangle in North Carolina that uses its research capabilities to power biological and digital health breakthroughs.

Quantum computing

Oxfordshire is leading the way for the world in quantum readiness. Oxford University is leading a consortium of nine UK universities to build the first Q20:20 Quantum Computer Demonstrator by 2020, gaining significant international advantages. Quantum businesses are being created locally, underpinned by technologies such as cryogenics and artificial intelligence that are in turn attracting top talent from across the world to Oxfordshire. Research will provide an opportunity for rapidly increasing links with the Birmingham-based Quantum Hub in Sensors and Metrology and Quantum Enhanced Imaging (QuantIC) Hub at Glasgow.

The UK has a strong global position in the race to develop quantum technologies, competing with the likes of Quantum Valley in Canada, Hefei in China, key tech firms, such as Google and IBM and start-ups such as Rigetti.

Oxfordshire needs to continue to innovate in quantum technologies in partnership with other areas in the UK, if the country is to continue to compete internationally and attract global investment in these technologies and linked industries.

Space-led Data Applications

Harwell Campus is the heart of the UK's space industry and the largest space cluster in Europe. It hosts over 90 organisations including the European Space Agency (ESA) Centre for Satellite Applications and Telecoms; the ESA Business Incubation Centre; the Science and Technology Facilities Council's RAL Space Centre; and the Satellite Applications Catapult. The sector currently employs around a thousand people, primarily in high-value, knowledge-intensive roles.

By 2021 Oxfordshire will also be home to the UK National Satellite Test Facility. Oxfordshire organisations are involved in a wide range of space activities, from designing and building components and satellites to go into space, to developing end-user applications that utilise space data for a wide variety of sectors.

Space organisations in Oxfordshire are working closely with new space opportunities across Cornwall, Glasgow and the East Midlands and is integral to upstream satellite innovation from Airbus, Surrey Satellite Technologies Ltd, the National Physical Laboratory and the Universities of Surrey and Southampton, with complementary satellite data analytical capability from the University of Portsmouth.

These assets are essential if the UK is to remain at the forefront of global competition and compete with the likes of Silicon Valley, which is home to the NASA-Ames Research Centre, and clusters in France, Germany and Beijing.

Development of Oxfordshire's space sector is critical if the UK is to achieve its target market share of 10 per cent of the global space market by 2030.

Robotics and Autonomous Systems (RAS)

Oxfordshire is at the heart of RAS activity in the UK, with RACE at Culham Science Centre a key UK centre of excellence. Connected and Autonomous Vehicles (CAV) are a vanguard application of RAS and will show us how robots can move people and goods more efficiently with far-reaching implications across industries.

Oxfordshire is at the forefront of CAV development: the Oxford Robotics Institute kick-started the UK's CAV programme in 2010; their spin-out Oxbotica is leading a UK consortium to launch a fleet of driverless vehicles to drive from Oxford to London; and RACE is one of the four national CAV testbeds. Other companies in the CAV ecosystem include Zeta, Amev, Nominet, Latent Logic, Williams, Arrival, StreetDrone and FiveAI. Public sector innovation in CAV has been mirrored with Oxfordshire County Council being the first UK local authority to include CAVs in the local transport strategy and to have a dedicated CAV team, currently the largest in the UK.

Oxfordshire is at the centre of the @UK CAV testing area, with London and Birmingham at each end. The area includes public testing environments including the 5G innovation centre, and autonomous vehicles trials of Nissan (Cranfield), Oxbotica (Culham), Jaguar Land Rover (Coventry) and Volvo (Drive Me London).

RAS is predicted to impact 15 per cent of UK GVA worth £266bn to the UK economy by 2035.

Developing Oxfordshire's RAS industry is essential to growth and to remaining globally significant, competing with areas such as Silicon Valley, where Uber, Google and Tesla are developing CAVs.

Cryogenics

Oxfordshire is the global leader in cryogenics - the production and behaviour of materials at very low temperatures. The blend of academic, research and industrial expertise makes Oxfordshire home to the most powerful concentration of cryogenic expertise in the world. Cryogenics is a critical enabling technology with sub-sectors such as cryocoolers, instrumentation and superconducting magnets. Cryogenic technologies underpins around 17 per cent of the UK economy, including many of our high-growth sectors, particularly space, life sciences, energy and quantum computing.

Oxfordshire is responsible for the majority of the UK cryogenic sector which includes: the world-leading Rutherford Appleton Laboratory at Harwell Campus, which pioneered the development of a multifilament

superconducting cable known as the 'Rutherford Cable'; companies such as Innovative Cryogenic Engineering in Witney and Thames Cryogenics in Didcot, a world-leader in the manufacture and supply of cryogenic piping; and the University Technical College in Didcot, the first school globally to install a cryogenics lab.

Cryogenic technologies developed in Oxfordshire are manufactured across the UK in areas such as the north east of England, creating high value jobs.

Oxfordshire is world-leading in the sector but faces competition from a number of markets including the USA, Japan and France where governments are investing heavily in cryogenic sub-sectors, recognising the strategic importance of this technology.

Energy

Oxfordshire is at the forefront of innovation in energy technologies and systems of the future. The region has strengths in areas such as novel batteries; battery management systems; and data analytics through its wealth of energy businesses pioneering clean growth, including the Culham Centre for Fusion Energy (CCFE) and the Faraday Institution at Harwell Campus, which is home to 30 industry, academic and public organisations.

This is complemented by leading innovation in local grid systems in the county through Project LEO and the Energy SuperHub which are delivering pioneering smart energy management solutions, battery storage technologies and new low carbon ground source heating to residential and commercial properties.

The UK Atomic Energy Authority (UKAEA) is a lead participant in the co-ordinated EU fusion programme managed by EUROfusion and operates the largest fusion device in the world, JET. By hosting JET, UKAEA has developed globally unique fusion capability, which is creating high value jobs and exports across the country.

For example, the robotics capability at Culham has enabled major contracts worth more than £200m to be won around the UK in the last few years, including supporting hundreds of jobs in the north west and north east. Oxfordshire is also home to Tokamak Energy and First Light Fusion, two of the leading fusion start-up companies in the world.

Despite increasing competition from Japan and Canada, Oxfordshire's unique assets and strengths have the capability to push the UK to the forefront of innovation.

Digital and creative

Over 3,000 digital and creative businesses are based in Oxfordshire generating £1.4bn to the UK economy each year. Oxfordshire has strengths in a range of digital technologies, such as cyber security and data analytics - these transferable strengths enable the County to be world-leading across other industries from space to bio-tech and quantum.

Creative strengths range from animation and digital gaming to digital publishing and media. This has produced a number of spin-outs, notably Natural Motion which was recently acquired for US\$500m, and Rebellion which has recently announced a £78m new film complex in Didcot creating 500 new jobs.

Oxfordshire collaborates within the UK across the Golden Triangle and with other areas such as Bristol where there are strong creative and digital entrepreneurial communities. Oxford Innovation has recently opened an innovation centre in West Belfast, Innovation Factory, to boost start-up development in the region.

The UK has a number of global competitors in this sector, particularly in the USA where tech and social media giants have disrupted the sector, as Alibaba has done in China. Helsinki is another key competitor, with strengths in digital and gaming, along with a strong start-up culture.

Motorsport

Oxfordshire is a critical part of the UK's iconic 'Motorsport Valley', a £6bn automotive global cluster of high-performance technology, motorsport and advanced engineering companies. Oxfordshire is home to a number of world-renowned motorsport names including Williams F1 in Grove, Renault Sport F1 in Chipping Norton and Prodrive and Haas in Banbury, as well as global supply chain companies such as SS Tube Technology and Lentus, and the iconic BMW MINI manufacturing plant.

Oxford's universities are also world-leading centres for education in motorsport engineering, with Oxford Brookes providing race engineers for all the major Formula 1 teams. Oxfordshire has a number of research

strengths, including in advanced engines and battery technology, where companies like Williams and Prodrive have been driving Oxfordshire to the forefront of global competition for over a decade. Williams is also responsible for the IP and research and development for HyperBat Joint Venture battery manufacturing which is based in Coventry, showing how our energy cluster generates additional growth across the UK.

Oxfordshire competes and collaborates globally in this industry, as an integral part of the UK's dynamic motorsport cluster. There are over 4,000 businesses operating in 'Motorsport Valley', which extends from Oxfordshire and into Northamptonshire and beyond.



Ideas

Oxfordshire is a global centre of research and innovation. The region brings together the dense networks of excellent research, knowledge-intensive businesses and skilled workers that are essential to a successful innovation ecosystem.

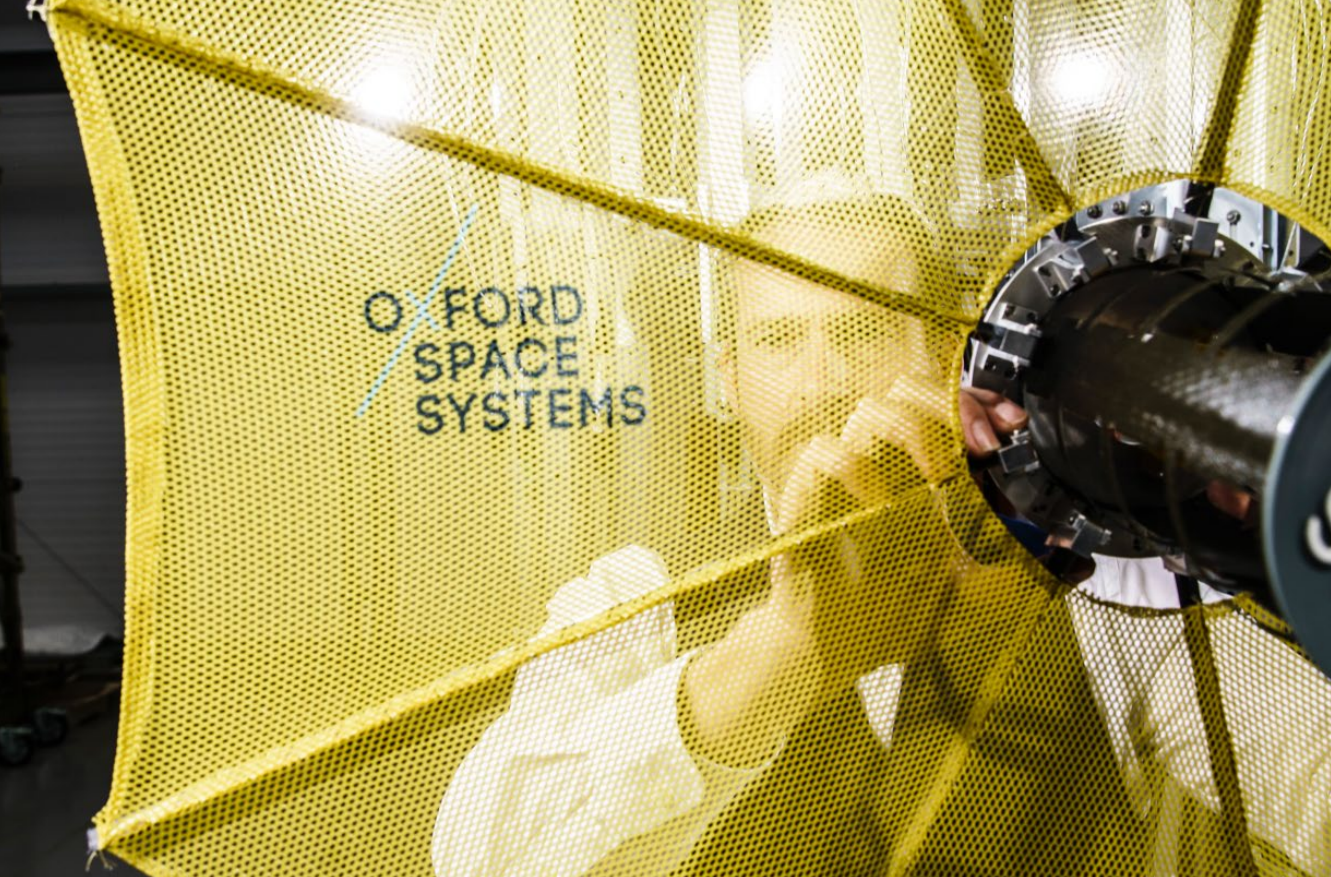
The Oxfordshire Local Industrial Strategy affirms the area's ambition to work with government as a pioneering contributor to the Industrial Strategy's target for national R&D spending to reach 2.4 per cent of GDP by 2027 and 3 per cent in the longer term.

This chapter sets out Oxfordshire's approach to driving up R&D and innovation across the region and beyond. It prioritises:

- ▶ supporting universities, local authorities, investors and developers to deliver world-class science and innovation hubs throughout the county, to deepen collaboration and accelerate the commercialisation of new ideas. This will complement the wider Oxford-Cambridge Arc economy.
- ▶ Driving local R&D investment and growth in the area's breakthrough sectors and technologies.
- ▶ Internationalising Oxfordshire, connecting the region's innovation to world-wide opportunities and ecosystems and broadening the established 'brand' of Oxford.

Summary of 'Ideas' strengths and challenges

- ▶ Oxfordshire has long been a world-leading centre for research and innovation across a wide range of technologies and sectors.
- ▶ It contains the University of Oxford, ranked number one in Europe for both research and commercialisation, significant national government investments (more £2bn in internationally leading scientific facilities and assets) especially at Harwell and Culham, leading industry clusters in life sciences, scientific instrumentation and motorsport, and the largest investment fund for university spin-outs globally.
- ▶ Oxfordshire local authorities collaborate closely with universities and local business to use local innovation to improve public service delivery. This provides a base for integrated approaches to address the Grand Challenges.
- ▶ Many of the science and business parks are at capacity and lack sufficient commercial and innovation space. Innovative industries and businesses are world-leading but face significant competition from established global hubs and other challenger regions.



- ▶ Oxfordshire's brand currently centres on the university system and needs to be expanded to encompass the entirety and breadth of opportunities across the whole innovation ecosystem.
- ▶ One of the top two barriers to growth for businesses in Oxfordshire is access to markets and customers internationally.

World-leading assets

Oxfordshire combines the ingredients of a successful innovation ecosystem in a single place - exemplified by the breakthrough sectors and technologies set out in the *'Building an Innovation Ecosystem'* chapter, above.

The region has a world leading research base. This includes two renowned universities - the University of Oxford and Oxford Brookes - and high levels of R&D undertaken by the private sector. Ongoing investment from UK Research and Innovation (UKRI) continues to support the area's strengths. Oxfordshire's business R&D spending is high, at £1600 per capita (compared to £360 in London). This is the seventh highest rate of 42 upper-tier authorities. Recent research by the Enterprise Research Centre has also put Oxfordshire as having the highest percentage of firms undertaking R&D activity of any local economic area.

The diversity of Oxfordshire's business base, coupled with its ability to generate 'unicorn' firms (businesses achieving market valuation of US\$1billion) at a rapid rate suggests this investment by the private sector in R&D is broad based, rather than depending on a small number of major firms, which predominates in other regions.

This is underpinned by excellent R&D and innovation infrastructure where Oxfordshire is home to a number of world-leading science, innovation, technology and business parks that form a hive of knowledge intensive economic activity and anchor the area's strengths in breakthrough sectors. These include Begbroke Science Park in Cherwell, Milton Park, Oxford Science Park, and national labs in Culham Science Centre in South Oxfordshire, the Harwell Campus in Vale of the White Horse and the University Science Area in Oxford City. Public and private investment into Oxfordshire in recent years is bolstering innovation capability. The City Deal Programme and Local Growth Fund resulted in four new innovation centres: the BioEscalator at the Old Road Campus in Oxford, the Begbroke Accelerator, the Remote Applications in Challenging Environments (RACE) Centre at Culham Science Centre and the Innovation Centre at Harwell Campus. Each of which are now at capacity, underlining the huge demand for innovation space across the ecosystem. Oxfordshire has also received investment into two Enterprise Zones, which sit across Milton Park, Didcot and Harwell.

Government has also recognised the strategic importance of world-class assets within Oxfordshire, having invested in key sectors to drive the UK's leadership in new and emerging technologies through the national Industrial Strategy:

- ▶ £100m for the Rosalind Franklin research institute at Harwell Campus to improve health through physical science innovation;
- ▶ £65m for the Faraday Institution at Harwell Campus, charged with tackling the global energy and battery storage challenge;
- ▶ £99m for a National Satellite Testing Facility at RAL Space at Harwell Campus;
- ▶ £86m for a National Fusion Technology Platform at Culham Science Centre; and
- ▶ £68.3m for the Satellite Applications Catapult at Harwell Campus.

Finally, Oxfordshire combines this research strength with the highest intensity of university spin-out companies in the country. The University of Oxford continues to generate more spin-outs than any other University in the country. There are currently 149 active start-ups and spin-outs from the University, with local ambition to accelerate this in coming years. Between 2014 and 2015, a total of 136 spin-out companies generated approximately £147m of GVA, supporting 2,421 jobs in the Oxfordshire economy.

The county also has capacity to grow businesses to values of over US\$1bn, such as Oxford Nanopore. It has significant research strengths to support future spin-outs, as set out in the breakthrough sectors section above.

These strengths do not just benefit the immediate county. Oxfordshire's innovation ecosystem is a national asset that drives growth across the UK. Ideas that are born here do not stay in the county, and the collaborations between universities and businesses in Oxfordshire with those in other regions are key to building innovation excellence across the country. For example, R&D and innovation activity developed by the Space Cluster at Harwell is central to the development of manufacturing and supply chain opportunities in the South West, East Midlands and

Scotland and are playing crucial roles in delivering new opportunities around spaceport and in-orbit launch services which will revolutionise satellite technologies. The success of Oxfordshire is key to attracting international talent and investment to the UK, as well as achieving the Industrial Strategy's aim for the UK to be the world's most innovative economy and driving up R&D investment.

Whilst these strengths provide a powerful engine to drive UK growth, Oxfordshire is aiming to compete with its global peers. To play its full role as a global innovation hub and to help meet the UK's 2.4 per cent R&D target, Oxfordshire must continue to be at the forefront for commercialising the ideas that it generates.



Case Study: Evox Therapeutics

Evox Therapeutics is a privately held, Oxford-based biotechnology company. It focuses on harnessing and engineering the natural delivery capabilities of exosomes to develop an entirely new class of therapeutics for the treatment of various severe diseases. Evox was founded in 2016 based on work coming out in part from Oxford University and received £10m in seed funding from Oxford Sciences Innovation (OSI). This funding allowed Evox to lease laboratory space in Oxford Science Park, advance R&D, and grow the team from one person to thirty over eighteen months. In autumn 2018, Evox raised an additional £35m funding from internationally-known venture capital investors, and re-investment from the University of Oxford and OSI. Evox anticipates future significant capital raises and further expansion of the team to over 100 employees as it continues to compete internationally.

Factors in the Oxfordshire ecosystem that have enabled growth:

- ▶ **Access to world-class funding:** OSI's significant initial funding was critical to Evox's ability to

rapidly grow, attract global top talent and investors, and compete on an international stage. Access to more UK-based sources of significant funding, especially for later stages, would better enable companies to continue to grow.

Factors in the Oxfordshire ecosystem that have constrained growth:

- ▶ **Laboratory space:** Access to readily available lab space is a key constraint to growth. While Evox has been able to lease a space in Oxford Science Park, options to expand are limited. Lab space might not meet demand in Oxfordshire over the next five years as more companies are spun out of the universities.
- ▶ **Connectivity:** The science parks in Oxfordshire are challenging to serve with public transport. Science parks need to be better connected to multi-modal public transport options and with direct and easy access to the central rail station. This will help accommodate the expected growth and enable people to live in outlying communities with more affordable housing and easily commute to work.

Partners across the county will need to address a number of constraints facing Oxfordshire businesses looking to innovate and drive-up R&D.

The right leadership and funding

High growth potential businesses frequently struggle to secure long term patient capital - particularly at early stage investment points in the business lifecycle. Oxford University Innovation (OUI) has stated that the level and duration of available finance will need to be sustained over the long term, in order to maximise the commercial and competitive advantage that high growth companies can secure. Many Oxfordshire firms are simply unaware of the support available, or unable to access it. Firms continue to underutilise tax and other fiscal incentives available to accelerate the commercialisation of R&D. The Intellectual Property Office has highlighted a continued deficit in awareness and understanding among high growth firms of intellectual property (IP) ownership in international markets, and the necessary regulatory factors which need to be considered. Innovate UK analysis revealed that Oxfordshire firms across the ecosystem are also below average in their share of UK Research and Innovation (UKRI) funds and programmes, in comparison to the range and breadth of R&D assets in the region.

Due to the acceleration of spin outs, analysis from Oxford Sciences Innovation (OSI) notes the increasing importance (and growing deficit) of high-quality leadership, management and business strategy skills within the senior teams of firms. This may be a critical drag on the growth potential and scale-up plans of businesses competing in global markets and seeking to secure future stages in funding or collaboration, as well as increased risk of UK firms being sold or taken over by foreign competitors.

Discussions led by OUI with East and West Coast US investors have raised concerns about the perceived ability of high growth firms in the Oxfordshire innovation ecosystem to harness and access the talent required to scale up at pace, compared to other locations competing for investment such as Boston and San Francisco in the US and innovation hubs in the Far East. These ecosystems have a faster growing pipeline of researchers and postgraduates with the skills to commercialise ideas and offer a pool of talent which gives investors more confidence.

The county's wider offer

Oxfordshire also faces a challenge with constraints on innovation space. While Oxfordshire has excellent R&D infrastructure, many of the science and business parks across the region are at capacity, particularly new laboratory facilities, clean rooms and flexible science working spaces.

Recent analysis by Bidwells noted that Oxfordshire's critical hubs are struggling to respond to demand for new premises which is also resulting in record rental costs. OSI has highlighted that Oxfordshire currently has 15,000 sq ft of wet laboratory incubator space available to meet demand, compared to over 10m sq ft in the Boston Metropolitan Area in Massachusetts.

Finally, Oxfordshire is globally renowned with a strong international brand centred on its world-leading university system. However, there is less visibility and awareness of the region's other core assets, including its innovation, science and technology parks, and leading businesses. Oxfordshire's brand needs to encompass the full breadth of the region's offer, and to compete with international rivals who are investing heavily in brand building.

There are general challenges to all firms in the region that are addressed in other foundations - including connectivity, business space, housing affordability, and skill shortages - that will also affect innovative firms.

Delivering the vision

To address these challenges, partners across Oxfordshire will work together and with government and UKRI on the following priorities.

Firstly, Oxfordshire has a critical mass of innovation and R&D assets. But they are currently not acting as the full sum of their parts: both in collaboration and in providing space for businesses.

To support research and development across Oxfordshire, local partners will support the transformation of science and technology parks and creation of new hubs, by acting as a broker and supporting organisations to access local, regional, and national funds. This will be knitted-together by a tailored spatial approach, that recognises the contrasting roles of different assets in the county:

- ▶ **Stage 1: Ideation.** Research will be driven in and around core hubs, taking advantage of the universities and other research and professional assets.
- ▶ **Stage 2: Innovation corridor.** Development will take place in growing clusters for testing and developing new businesses. These are primarily located within the existing innovation corridor which extends from Begbroke in the north to Harwell in the south.
- ▶ **Stage 3: Commercialisation region.** A wide-reaching commercialisation area that extends to the whole of Oxfordshire acknowledging that business of different scales will contribute to growth from across the region, the Oxford-Cambridge Arc and the UK economy. This recognises the reality that not all of this growth needs to be captured within the boundaries of the county.

Commercial Space

Oxfordshire partners will examine options to meet its ambition to double the floor space at Culham, Begbroke and Harwell science parks – the latter of which requires land remediation through accelerating a programme of local and private funding, and support universities, local authorities and developers to deliver new, well-connected world-leading innovation hubs and clusters around key locations including Oxford Technology Centre at Kidlington, Bicester, Upper Heyford, West Oxfordshire and Grove.

Linked with this, Oxfordshire will look to leverage planned developments which can offer the potential for creating a major global business district of scale encompassing the Oxford Station and West End quarter, creating an iconic global gateway into the ecosystem for investors, visitors and leading talent. This will aim to meet the demand and interest of Fortune 500 and NASDAQ company R&D HQs to locate in the region. The comprehensive redevelopment could generate significant job creation for the county and major spill-over effects across the Arc and wider UK.

Prioritising breakthrough technologies

The huge growth potential of the breakthrough technologies set out in the Science and Innovation Audit and this Local Industrial Strategy – including quantum technologies, robotics and autonomous systems and space-led data applications – give them a unique role in driving up R&D and innovation.

Oxfordshire will encourage university and business collaboration around these breakthrough sectors at all levels. This will include new linkages between the ecosystem's network of global hubs and international clusters to harness the opportunities of increasing convergence of transformative technologies which will create new capacity for innovation and collaboration which can spearhead an acceleration in the commercialisation of these technologies.

Oxfordshire will also look to channel investment into its breakthrough sectors from a range of different sources, including successful bids into competitive public sector funding rounds, leveraging private sector funding and attracting international investment. This will be enhanced by increased collaboration between universities along the Oxford-Cambridge Arc, which will support each institution's engagement with businesses as part of their preparation for the new Knowledge Exchange Framework.

In addition to this, the region will deepen greater engagement between Oxfordshire's research institutions, universities and 'cornerstone businesses' to drive greater innovation into more mature sectors which can improve firm level productivity in these markets. The *Business Environment* chapter sets out our approach to commercialising research in our breakthrough sectors and technologies.

Figure 7: Proposed network of global hubs and international clusters

Global Health & Life Sciences Quarter, Oxford	International Space Cluster, Harwell Campus
Global Business District, Oxford Station & West End	Global Quantum Computing Hub, Harwell Campus
Global Innovation Hub, Begbroke	Robotics & CAV UK Cluster, Culham Science Centre
Global EnergyTec Cluster, Oxfordshire-wide	Global Fusion Technology Cluster, Culham Science Centre
Oxford Science Park Quarter Cowley, Oxford	Bioscience and Technology Quarter, Milton Park
Global HealthTec Cluster, Harwell Campus	Williams Technology Campus, Grove
Carterton & RAF Brize Norton Industrial Hub, West Oxfordshire	West Oxfordshire Science Park, Eynsham
Bicester Eco Zone & Corporate HQ Hub, Cherwell	Banbury Industrial Zone, Cherwell
Creative City, Upper Heyford	

A top global investment destination

Oxfordshire will help make the UK a top destination for international R&D talent and investors. To build Oxfordshire's international brand, local partners will:

- ▶ set out a distinctive brand to raise Oxfordshire and the Arc's international profile for innovation and R&D, enabling the local area to seize new opportunities for international connectivity, trade and investment;
- ▶ launch the *Connecting Globally* platform. This will include an integrated digital platform across online and social media, to showcase successes across the region; increase communication and knowledge exchange between firms; and to promote Oxfordshire as a major global hub for investors and innovators. Over time, Oxfordshire will work to build *Connecting Globally* into a programme to facilitate networking with other global innovation ecosystems, including through trade missions and sponsor visits; and
- ▶ work with the Intellectual Property Office to launch a pilot programme to accelerate IP and commercialisation across the ecosystem to help 'breakthrough businesses' capture the value of their IP across the business cycle. This will complement an Internationalisation programme - set out in the Business Environment chapter - to support firms understand and manage investment decisions with their IP in key global markets.

Retaining Oxfordshire's talent

Finally, Oxfordshire will create a pipeline of talent for businesses looking to innovate through developing a *High Flyers* programme. This will support early stage post-graduates and local businesses, by placing students in firms to support innovation commercialisation. This will nurture the talent necessary to commercialise innovation in the ecosystem and develop leaders who can realise impact from R&D activity. Providing new opportunities such as this will also encourage graduates and those early in their careers to remain in Oxfordshire.

Commitments

Ambition:

To establish a globally connected innovation economy and trailblazing region in support of the 2.4 per cent R&D target.

To accelerate progress towards achieving this priority, Oxfordshire will:

- ▶ Drive up R&D through prioritising local investment in the breakthrough technologies set out in the Science and Innovation Audit and this Local Industrial Strategy.
- ▶ Support the transformation of science and technology parks across the county to provide fast-growing business the space they need, by acting as a broker and supporting organisations to access local, regional, and national funds.
- ▶ Examine options to double the floor space at Harwell, Culham and Begbroke science parks through accelerating a programme of local and private funding.
- ▶ Drive up R&D through prioritising local investment in the breakthrough technologies set out in the Science and Innovation Audit and this Local Industrial Strategy.
- ▶ Support local authorities, universities and developers to deliver new, well connected world-leading innovations hubs and clusters around key locations including Oxford Station and West End, Oxford Technology Centre at Kidlington, Bicester, Upper Heyford,

West Oxfordshire and Grove.

- ▶ Help make the UK a top destination for international R&D talent and investors by:
 - setting out a distinctive brand to raise Oxfordshire's and the Arc's international profile for innovation and R&D;
 - launching the *Connecting Globally* platform, an integrated digital platform across online and social media to showcase successes across the region; increase communication and knowledge exchange between firms; and to promote Oxfordshire as a major global hub for investors and innovators; and
 - working with the Intellectual Property Office to launch a pilot programme to accelerate IP and commercialisation across the ecosystem to help 'breakthrough businesses' capture the value of their IP across the business cycle.

Working with local partners across the Arc, Oxfordshire will also:

- ▶ Harness the collective strength of the Arc's research base will be essential. The new Arc Universities Group will act as the focal point from cross-Arc collaboration on science and research, identifying and delivering joint R&D projects and providing a pipeline of talent to knowledge-intensive businesses.

- ▶ Strengthen its ability for businesses to commercialise ideas coming out of its universities and others. Arc partners will also use assets such as Harwell, Silverstone and Cranfield to establish new networks that support the convergence of technologies across sectors and seek to develop emerging districts such as West Cambridge.
- ▶ Seek to grow its role as a global research and innovation hub, acting as a UK magnet for international talent, R&D, Foreign Direct Investment and research collaborations. The LEPs and MCA will work with the Department for International Trade, the Arc Universities Group and others to channel foreign investment in the assets and projects that will make the biggest impact on Arc-wide and UK growth.

Government is working in partnership with Oxfordshire to support the delivery of this priority by:

Substantial on-going and capital funding to major national assets. This includes developing sites across the county:

- investments into the Harwell Campus, including £65m for the Faraday Institution, £99m for the National Satellite Testing Facility, £100m for the Rosalind Franklin research institute and £68.3m for the Satellite Applications Catapult;
- £86m for the National Fusion Technology Platform at Culham Science Centre; and
- City Deal and Local Growth Fund support for four new innovation centres: BioEscalator, Begbroke

Accelerator, Remote Applications centre at Culham and the Harwell Innovation Centre.

- Supporting research and development of new transport systems and technologies across the Arc through investment by the Centre for Connected and Autonomous Vehicles (CCAV), the Office for Low Emission Vehicles (OLEV), UKRI, Zenzic (formerly known as Meridian Mobility) and Innovate UK.
- Working with the LEPs within the Arc and other local partners, including England's Economic Heartland, to:
 - ▶ support the delivery of the Future of Mobility Grand Challenge mission and Road to Zero Strategy: utilising the considerable R&D assets within the Arc to put the UK at the forefront of the design and manufacturing of zero emission vehicles, supporting government's commitment to end the sale of new conventional petrol and diesel cars and vans by 2040;
 - ▶ build on the Arc's existing role as a testbed for new transport technologies, such as automated vehicles and drones, working with government and Zenzic to access existing research and development support, and identify further opportunities to trial new mobility services within the Arc; and
 - ▶ support local authorities within the Arc to implement the Principles of the Future of Mobility Urban Strategy, providing guidance on design and planning to ensure new communities are designed and built to enable new approaches to mobility.

People

Oxfordshire's Local Industrial Strategy will help to develop a more responsive skills ecosystem and create better opportunities for all.

It will help underpin the county's ambition for a global innovation ecosystem and provide the talent to capitalise on emerging industries.

Summary of 'People' strengths and challenges

- ▶ Oxfordshire is effectively at full employment. The employment rate is 82 per cent - above UK and south east averages - and unemployment is 1.3 per cent.
- ▶ The workforce is also one of the most highly skilled in the country, with 51 per cent of the working age population educated to degree level or above. The City of Oxford has one of the lowest levels of workers with no qualifications, at 3.2 per cent, compared with a UK average of 8 per cent. However, 22 per cent of Oxford residents have no or low qualifications.
- ▶ Although Oxfordshire's workforce is highly skilled, there is still a shortage of school leavers with STEM skills. Between 2010-15, Oxfordshire's annual growth in apprenticeships was three per cent, below the UK average of 12.5 per cent.

- ▶ Population growth has remained largely stable over the past decade, and - according to current ONS forecasts - working age population will fall by 0.3 per cent per year by next year. On the other hand, the over-65 population will rise by two per cent per year.
- ▶ Following recent growth, wages for the bottom 10 per cent of the population are second highest in the country (after Inner London). However, social mobility rates are low, and housing affordability and quality in Oxford is driving deprivation.

The Oxfordshire economy has seen high levels of employment in recent years, relative to the rest of the country. Oxfordshire has a 1.3 per cent unemployment rate in the working age population, which is 50 per cent lower than the UK average for the last two decades. At nearly full employment, this has increased pressure on businesses to be able to find, attract and retain suitably skilled workers as they grow and expand.

The workforce is one of the most highly skilled in the country, with 51 per cent of the working age population educated to degree level or above. All districts in Oxfordshire comfortably exceeded the national average for the proportion of the population with the highest level of

qualifications – NVQ4 – in 2017. The City of Oxford has one of the lowest levels of workers with no qualifications, at 3.2 per cent, compared with a UK average of eight per cent, yet also contains a high proportion of the workforce with low skills and qualifications.

The region is home to two renowned universities and it is recognised that graduate retention and nurturing this supply of talent is key to future growth for the wider ecosystem. Across both universities the graduate retention rate is around 23 per cent - placing the area in the mid quartile nationally, but behind other locations across the UK and internationally. Whilst access to high value employment is a key driver in retaining talent locally, proximity to London and higher salaries and the cost of housing are key challenges impacting improved graduate retention.

ONS forecasts suggest that, under the status quo scenario, Oxfordshire's population will grow slowly over the next twenty years (from 678,000 in 2016 to 720,800 by 2036). However, this expansion is expected to be driven entirely by a rising over-65 population. The county's 15-64 population is expected to fall by 0.3 per cent per year for the next twenty years (compared to an England-wide growth rate of 0.1 per cent), while the over-65 population will rise by two per cent per year (compared to 1.9 per cent per year). This is compounded by lower graduate retention rates in Oxfordshire than places like London or Manchester, despite high-paying firms reporting difficulty recruiting.

Inclusive Growth

Oxfordshire is effective at generating good jobs. Wages for the bottom 10 per cent are among best in country - second only to inner London by 2017. This is a relatively recent phenomenon (up from 15th of 42 counties in 2008). This headline masks significant challenges:

- ▶ Oxfordshire's primary and secondary schools fall below the UK average on a number of measures: at A Level, Oxfordshire is below average in grades achieved, while Oxfordshire's local authorities are also struggling on performance in indices of early years education.
- ▶ Convergence on wages has not occurred consistently across the county with South and West Oxfordshire having average salaries at around two-thirds the rate of the other three authorities.
- ▶ Although median wages for the lowest earners in Oxfordshire are above the UK average, there are wide income disparities and pockets of deprivation. Fifteen of the county's neighbourhoods are in the 20 per cent most deprived in England, with these residents increasingly marginalised from the economy. This lack of inclusive growth in Oxfordshire is a key challenge that needs to be addressed if Oxfordshire's future growth is to be truly inclusive.

All five lower tier local authorities are in the top performing half on the Index of Multiple Deprivation. However, the City of Oxford itself is in the bottom quartile for deprivation related to housing and air quality. This includes measures of affordability, overcrowding, housing quality, and homelessness.

Delivering the vision

The evidence paints a picture of a highly effective, skills-led economy in Oxfordshire. However, it is one that is at risk as the population ages, and which does not distribute opportunity equally. This Local Industrial Strategy therefore prioritises:

- ▶ getting the fundamentals right - building a skills system that better responds to local demand; and
- ▶ making the most of all our people - with longer and more flexible careers for older workers, and improved access to emerging jobs for younger people.

Key to this will be establishing a new Skills Advisory Panel (SAP) for Oxfordshire which will support OxLEP to fulfil its local leadership role in the skills system by helping the local area understand current and future skills needs and labour market challenges, and strengthening the link between public and private sector employers, local authorities, colleges and universities.

Oxfordshire's Social Contract

In addition to the SAP, Oxfordshire will take forward a series of measures to support business engagement with the skills system. The SAP will provide a greater understanding of the labour market which will be used to develop our Oxfordshire's Skills Priority Statement in early 2020, in response to the challenges identified in the SAP and LIS.

As part of the development of the Skills Priority Statement local partners will develop a Social Contract which will bring together local teachers, education professionals, the County Council and businesses. The Social Contract will go beyond simply orientating skills provision around employer demand: it will consider how to improve student-business mentoring programmes; and how businesses can become more involved in local schools. Its overall objective will be to equip pupils with the skills they need to understand the emerging employment opportunities being created within Oxfordshire's innovation ecosystem, the new technologies being pioneered which will transform future skills, careers and education pathways and the interrelationships and interdependencies with which businesses across the ecosystem are increasingly working.

Excellent performance in higher education is not matched at Key Stage 3 and Key Stage 4 in Oxfordshire, and this is reflected in lower-than-average rates of social mobility.

Employers in Oxfordshire agree that there is a lack of STEM-related skills, and that this is a barrier to scaling up local firms.

To address these twin challenges, Oxfordshire will work with the Department for Education to champion T levels locally so that they map to our technology sectors, as part of the Oxfordshire Social Contract. The LEP will play a key role in supporting local employers to deliver T level industry placements. In addition, Oxfordshire will increase business leadership and engagement to create pathways and support social mobility for young people by working with companies across Oxfordshire to maximise the benefit of the apprenticeship levy and develop new apprenticeships in emerging technology-based opportunities.

Through the Social Contract, Oxfordshire will work with the Careers and Enterprise Company, local colleges and Oxfordshire County Council to improve social mobility for young people by ensuring they will have greater access to career pathways within Oxfordshire, to promote opportunities to access coaching and mentoring with world-leading businesses across the ecosystem. This will improve social mobility for young people who will have greater access to career pathways within Oxfordshire; it would also enable skills development to align to business need and promote more tailored skills that will release pressure on the tight labour market.

Finally, Oxfordshire will continue working with local partners to establish an *Oxfordshire Entrepreneurship Hub* to support students and young people across Oxfordshire to develop business propositions and develop connections across the innovation ecosystem, in close collaboration with the Said Business School. The *Oxfordshire Entrepreneurship Hub* will be primarily focussed on students and young people in Oxfordshire. It will provide open sessions and targeted advice to support young people to develop ideas, business propositions and entrepreneurship. It will be a place where people from across the innovation ecosystem can connect to share ideas, and where they can be directed and supported to take advantage of opportunities across the ecosystem.

Retaining and retraining older workers

To maintain and improve productivity, to reflect the pace of technological change and to continue to be a net contributor to the UK exchequer, Oxfordshire recognises the need to support people to continue to contribute to the economy into later life through longer and flexible careers.

Oxfordshire will therefore promote workplace health and well-being, continuing to develop a programme to support residents to participate in the workforce: OxLife.

This will be designed to include support for those furthest from the labour market and people with long term illness and disabilities to actively engage in the economy, building on existing community learning initiatives through working with Jobcentre Plus. It will also support retention and progression for local residents aged 50+ and armed forces personnel returning to the Oxfordshire workforce.

This will be increasingly important as technologies disrupt the labour market and changing job needs which will mean increasing the importance of re-skilling and development of new capabilities. Retraining and upskilling opportunities for Oxfordshire's residents will support inclusive growth, enabling more people to continue to contribute to the local economy.

Delivering inclusive growth

Oxfordshire wants to better understand the impacts of how growth is currently distributed in the county and what can be done differently to ensure that, in future, those benefits are more fairly distributed. Through the Oxfordshire Growth Board, Oxfordshire will convene local leaders, academic experts, businesses and community organisations to form an Inclusive Growth Commission. This will consider how the county can ensure that the benefits of a world leading innovation ecosystem can be equitably shared and reach all communities, learning from other global ecosystems.



Commitments

Ambition:

Oxfordshire's Local Industrial Strategy will help to develop a more responsive skills and employment ecosystem and create better opportunities for all

To drive progress towards achieving this priority, Oxfordshire will:

- Get the fundamentals right by developing a demand-led skills system that meets the needs of employers and breakthrough business sectors
- ▶ Take forward a series of measures to support business engagement with the skills system under the *Oxfordshire Social Contract*, including:
 - establishing a new Skills Advisory Panel (SAP) for Oxfordshire;
 - championing T levels locally so that they map to the county's technology sectors and supporting local employers, to deliver industry placements;
 - working with technology companies across Oxfordshire to maximise the use of apprenticeship levy to develop new apprenticeships in emerging technology-based opportunities; and
 - working with the Careers and Enterprise Company, local colleges and Oxfordshire County Council to improve social mobility for young people by ensuring they will have greater access to career pathways within Oxfordshire;

- ▶ continuing work with local partners to establish an *Oxfordshire Entrepreneurship Hub* to support students and young people across the county to develop business propositions and develop connections across the innovation ecosystem.

Make the most of all of our people

- ▶ Continue to develop OxLife, a targeted programme to reskill and upskill workers and armed forces personnel returning to the Oxfordshire workforce so that they can actively engage in the economy.

Support Inclusive Growth

- ▶ Oxfordshire will convene local leaders, academic experts, businesses and community organisations to form an Inclusive Growth Commission.

Working with local partners across the Arc Oxfordshire will also:

- ▶ Review labour market intelligence across the Arc, to gain a better understanding of how skills provision is currently delivered and funding utilised. This will include working closely with the Department for Education and providers across the Arc to consider how local provision supports the objectives set out throughout these strategies.

- ▶ Work with local employers to increase apprenticeship uptake across the Arc, supporting employers to maximise their Apprenticeship Levy contributions and drive social mobility.
- ▶ Work with local employers to support the effective role of T levels and utilise local labour market intelligence to work with providers to consider how the local T level offer will support local businesses.
- ▶ Establish an Arc-wide skills marketplace, enabling the LEPs continue to build on the positive working relationships with the Careers and Enterprise Company and other careers services. This will utilise the evidence provided by each Skills Advisory Panel, connecting businesses with skills providers and people with targeted support including apprenticeships, STEM skills, T levels, technical and degree apprenticeships.

Government is working in partnership with Oxfordshire to support the delivery of this priority by:

- ▶ Providing £142.5m of Local Growth Funding to support local growth in Oxfordshire, which has invested in:
 - The Advanced Engineering and Technology Skills Centre which will supply skilled technicians at Harwell and elsewhere in Oxfordshire supported by £3.8m Local Growth Fund investment;
 - The Livestock Innovation Centre which will focus on delivering the high-tech skills needed to meet the sustainable agriculture, food production and precision farming agenda across Oxfordshire, supported by £1.13m Local Growth Fund investment; and
 - The Oxford Centre for Technology and Innovation which will address skills shortages across engineering, electrical, design, and emerging technologies, supported by £4.5m Local Growth Fund investment.



Infrastructure

To successfully deliver on the vision to be a world leading innovation ecosystem, Oxfordshire will continue working with government to develop a resilient and responsive physical infrastructure, connecting all communities to future economic opportunities and ensuring the benefits reach all parts of the county.

Summary of 'Infrastructure' strengths and challenges

The county has strong transport links along the Bristol-Birmingham-London corridors.

Oxfordshire has a higher proportion of adults (44 per cent) participating in active travel (walking and cycling) compared with similar counties and England, as a whole.

Economic success is placing significant stress on transport and energy infrastructure. Rail demand has risen 70 per cent in the ten years to 2017. This is well above the UK average of 53 per cent.

Energy capacity constraints are already biting and will be increased by rising housing demand and pushes towards renewable energy.

Whilst seven per cent of premises in Oxfordshire have full fibre connectivity - which is double the national average - it remains well behind many global competitors.

Oxfordshire enjoys a central location that is well connected across the UK and internationally, with fast rail links to London, Birmingham and Bristol which

provide connections to the west, the midlands and the north. Oxfordshire is close to Heathrow and Birmingham airports as well as southern ports, within an hour of international transport hubs and connections to global markets - buoyed by the success of the new Chiltern rail service to London Marylebone from Oxford and the new station at Oxford Parkway. With the development of East West Rail and the Oxford-Cambridge Expressway, there will be new and improved connections across the Arc and the Golden Triangle with Cambridge and London.

The region is working together across the public and private sector to innovate in transport and mobility, with multi-modal transport solutions and pro-public transport policies. Oxfordshire is home to companies such as the MobOx Foundation, which brings together local government, academia and industry to lead on innovation in mobility-related issues in Oxfordshire. It also has the first dedicated CAV team within any UK local authority, based at Oxfordshire County Council.

Case study: 'PICKMEUP' demand responsive bus service

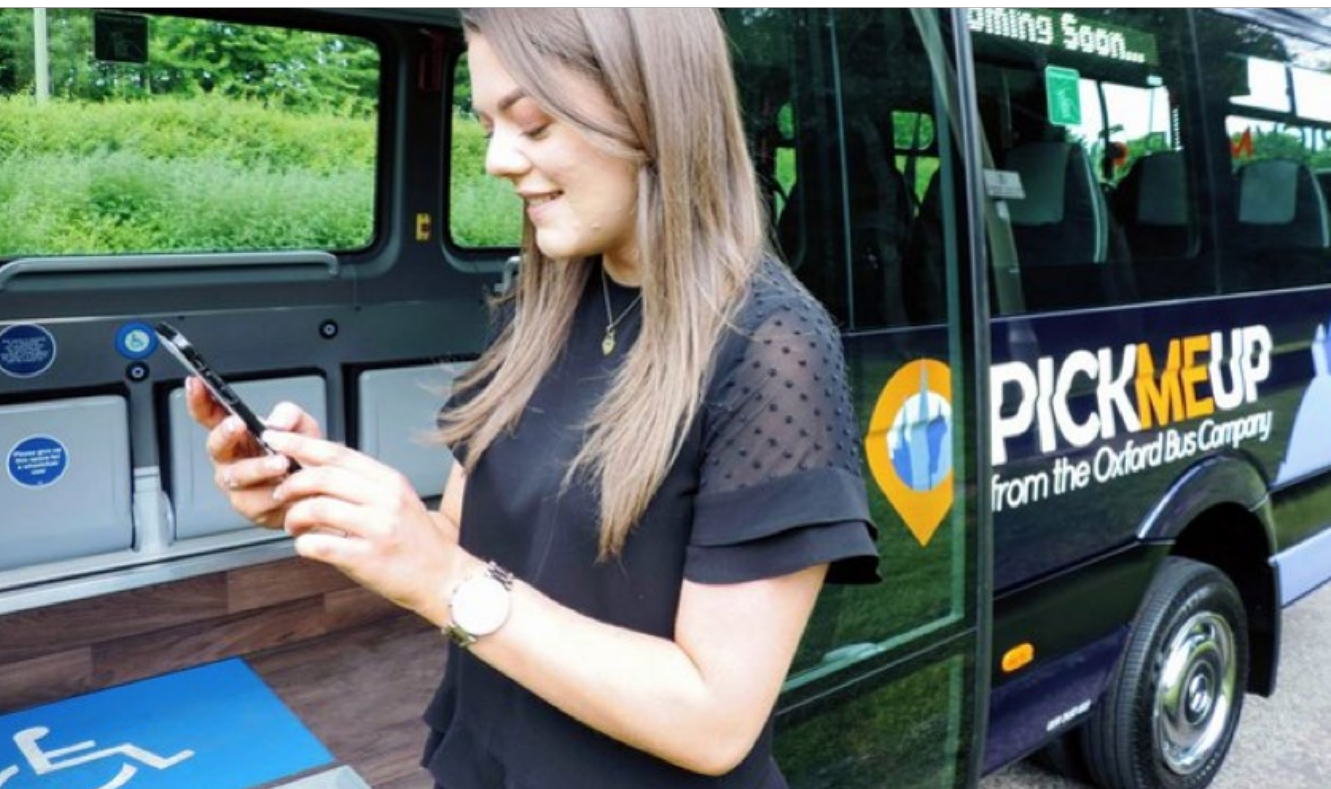
PickMeUp is the UK's largest intelligent demand responsive bus service and was launched in June 2018 by Oxford Bus Company. PickMeUp has shown strong growth, and by the end of its 24th week of operation had carried over 50,000 passengers, with more than 16,000 people having downloaded the app and registered an account. Factors in the Oxfordshire ecosystem that have enabled growth:

► **Strong public transport:** The local authority has a track record of supporting public transport and effectively managing private car use in the city, back to the establishment of the UK's first Park & Ride site in 1973. As a result, the

city has a high quality bus network and a large portion of the public are open to using bus services. This has made it easier to achieve the behavioural change necessary for people to embrace this new service.

► **Investment:** Oxford Bus Company provided an investment of over £800k to start the service and employed 20 dedicated staff to support the operation.

► **Strong business networks:** the design of the service was informed by extensive consultation with major employers and stakeholders in the area, facilitated by OxLEP, the Chamber of Commerce and local authorities.



Constraints holding Oxfordshire back

Infrastructure in Oxfordshire is under strain and the projection for the Oxfordshire economy to double in size and create 108,000 additional jobs by 2040, means infrastructure must be improved to relieve the existing pressure and accommodate future growth, while responding to increasing concerns around climate change.

Demand for rail travel has also grown rapidly, with a 70 per cent increase in journeys to and from Oxfordshire stations in the ten years up to 2017. The growing economy is placing significant stress on the existing infrastructure. Growth has been higher at stations other than Oxford (which rose below the UK average at 40 per cent), suggesting rising commuter travel has been the main driver of demand growth. This is likely to continue rising, given increased levels of housing growth and planned rail investments - including Crossrail from Reading.

Moreover, given Oxfordshire's largely rural nature, there is still heavy reliance on car travel between housing and employment locations. This contributes to severe traffic congestion on key routes, such as the A34 and the A40. The A34 is a key route to the southern ports and often becomes congested with north-south freight traffic servicing the UK. Increasingly, congestion affects workplace productivity, health and well-being, quality of life and the environment, and may deter prospective investment in the region. Lack of transport

connectivity and choice in some urban and rural areas also negatively impacts access to public services, increasing inequalities in the county.

Housing is under pressure and unaffordable, due to demand from the expanding labour market. Median house prices are 50 per cent higher in Oxfordshire than the English average, and the price to earnings ratio is one of the highest in the country at 12:1, with some parts of the county rising to 17:1. This has led to a cost of living challenge for many residents as well as pockets of deprivation across the county which is explored in more detail in the Places chapter.

Digital connectivity in Oxfordshire has significantly improved in recent years. The *Better Broadband for Oxfordshire* programme has enabled over 96 per cent of premises across the county to have access to superfast broadband. However, whilst 7 per cent of premises in Oxfordshire have full fibre connectivity - which is double the national average - it is still well behind many of the region's global competitors.

Oxfordshire's energy network is heavily constrained, both for additional load and for new generator connections. Future growth will be restricted unless energy infrastructure responds to changing requirements and next-generation needs of energy-intensive science and technology assets.

To meet the scale of demand, Oxfordshire will look into multiple energy sources and new service models. The region will also encourage innovation in low carbon solutions and ways to reduce demand - currently only 10 per cent of Oxfordshire's energy is from renewable sources in comparison to 25 per cent for the UK average. The Garden Town developments at Didcot and Bicester, and the emerging Oxfordshire Cotswold Garden Village, provide the opportunity to develop new and innovative energy solutions to begin addressing these challenges.

Delivering the vision

This foundation, therefore, focuses on developing the critical physical infrastructure that underpins the ecosystem. This will increase connectivity, mobility and competitiveness both within Oxfordshire and out to the rest of the UK, and to gateways to the world. To do this, Oxfordshire will identify opportunities to implement the Oxfordshire Infrastructure Strategy, the Oxfordshire Energy Strategy, and develop an ambitious Digital Investment Plan which is genuinely world-leading and rivals other global innovation ecosystems. This will highlight opportunities to provide high quality connectivity across the ecosystem and meet the additional capacity requirements of economic growth. Better infrastructure will improve Oxfordshire's quality of life for residents and its attractiveness as a location, to attract top talent and encourage talent to stay.

Complementing the projects set out in the Oxford-Cambridge Arc chapter, Oxfordshire will take forward existing plans including:

Digital Investment Plan: Oxfordshire will work with regional partners to develop an ambitious Digital Investment Plan to scope locally led options to accelerate the roll out of full gigabit fibre to premises and public assets, 5G and next generation telecommunications across the innovation ecosystem to provide world-leading digital coverage in urban and rural areas, with government taking a challenge and advisory role on this work. The Digital Investment Plan will work across planning authorities to have a formal, standardised approach to the use of public sector assets for deploying digital infrastructure in order to combine with street furniture investment to support the roll out of Internet of Things and 5G networks and provide high quality connectivity across the county. It will provide the digital foundation to support the Living Lab approach and deliver an uplift in services to communities. Improving Oxfordshire's digital infrastructure is critical to enable connectivity between sites whilst preserving the natural environment, ensuring residents in Oxfordshire benefit from greater connectivity and digital technological advancements and that Oxfordshire remains competitive with respect to other world-wide innovation ecosystems.

► **The Oxfordshire Infrastructure Strategy:**

Oxfordshire will work with local and national partners to identify opportunities to progress its infrastructure ambitions as set out in the Oxfordshire Infrastructure Strategy (OxIS). The OxIS identifies, maps and prioritises Oxfordshire's strategic infrastructure ambitions up to 2040, bringing together all the strategic infrastructure that supports local plans. These ambitions include road, rail and bus rapid improvements for sustainable, multi-modal transport, along with new stations and Park and Ride hubs which would better connect the ecosystem, supporting business growth, innovation and commercialisation including:

- plans for the development of the Oxford Station National Rail Hub (new track, platform and station capacity) to realise its strategic potential with critical connections throughout the UK, Arc wide under East-West Rail and through enhanced countywide services and stations connecting housing sites, science and technology parks with a world-class gateway to the proposed Global Business District; and
- growth of the Didcot and Bicester Garden Towns, Oxfordshire Cotswold Garden Village and expansion of science parks. This would address the critical connectivity issues that are hindering growth of the ecosystem and release the pressure on existing infrastructure that is causing congestion, pollution and extensive commuting times.

► Government and Oxfordshire are already progressing this, including through the recently announced £218m support from the Housing Infrastructure Fund for Didcot Garden Town, enabling growth at Culham, Harwell and Milton Park.

► **Oxfordshire Energy Strategy:** As outlined in the Oxfordshire Energy Strategy, local partners will seek to deliver a new market place that connects the grid, suppliers and consumers. The Energy Strategy will commit to a 50 per cent reduction of CO2 Emissions by 2030 compared to 2008, with the ambitions to achieve net zero emissions by 2050. In addition to this, it aims to roll out the UK's first 'Zero Emission Zone', in Oxford City Centre from 2020. This will provide a strategy that will seek to secure investment to meet the additional capacity requirements of economic growth, innovate in low carbon energy products and services and seek ways to reduce energy demand, both in new and existing communities where novel solutions can be applied. In support of this, UKRI has announced £60m of funding for two energy systems demonstrator projects in Oxfordshire.

Commitments

Ambition:

To successfully deliver on the vision to be a world-leading innovation ecosystem, Oxfordshire aims to relieve the pressure on its infrastructure and connect all communities to future economic activity.

To drive progress towards achieving this priority, Oxfordshire will:

- ▶ Work with regional partners to develop an ambitious Digital Investment Plan to scope locally led options to accelerate the roll out of full gigabit fibre to premises, 5G and next-generation telecommunications, with government taking a challenge and advisory role on this work.
- ▶ Work with local and national partners to identify opportunities to progress its ambitions in the Oxfordshire Infrastructure Strategy (OxIS), which identifies, maps and prioritises the county's strategic infrastructure requirements up to 2040.
- ▶ Work with local and national partners to realise the ambitions set out in the Oxfordshire Energy Strategy using local funding streams, which will put in place a low carbon energy grid to support growth and lead the development of new models for energy management.
- ▶ Encourage innovation in low carbon solutions and ways to reduce demand. The Garden Town developments at Didcot and Bicester, and the emerging Oxfordshire Cotswold Garden Village provide the opportunity to develop new and innovative energy solutions to begin addressing these challenges.

Working with local partners across the Arc Oxfordshire will also:

- ▶ Collaborate with Department for Transport, Highways England, East West Rail Company and England's Economic Heartland to expand the economic benefits of planned strategic transport links and improvements to the Major Roads network across the Arc and develop the first-mile-last-mile connections across the Arc.
- ▶ Work with government to develop a shared evidence base for the current and future energy needs of the Arc, including through the identification of opportunities to test new energy policies or approaches within the Arc.
- ▶ Work with government to identify and diffuse best practice on digital infrastructure planning in the Arc and explore opportunities to align new transport infrastructure with digital infrastructure in the Arc. This will aim to support industry to accelerate the roll-out of full fibre networks, enabling accelerated growth of 5G technologies across the Arc.

- ▶ Work to standardise public data where possible, and with support from government policy experts, to ensure that the opportunities to collect and capitalise on data are utilised - with a view to addressing Grand Challenges around the future of mobility, the ageing society, and clean growth.
 - ▶ Work with government across the wider Oxford-Cambridge Arc to explore proposals for new approaches to funding infrastructure, as set out in Government's response to National Infrastructure Commission Report at Autumn Statement 2018.
 - ▶ Investing in the Oxfordshire Housing and Growth Deal, committing to deliver up to 100,000 homes by 2031, with up to £215m of investment. This includes £60m for affordable houses and £150m over five years for infrastructure - and builds on £340m of housing and infrastructure funding committed by Oxfordshire councils over the period.
 - ▶ Funding Oxfordshire to develop its local energy strategy and supporting implementation via the South East Energy Hub.
 - ▶ Working, through Network Rail, with Oxford City Council, Oxfordshire County Council, OxLEP and local developers, to take forward the Oxfordshire Rail Study.
- Government is working in partnership with Oxfordshire to support the delivery of this priority by:**

- ▶ Investing in significant new transport infrastructure through East West Rail and the Expressway, and first-mile-last-mile connectivity, as detailed in the Joint Statement on the Arc published at Spring Statement 2019.
- ▶ Investing £200m of funding through Oxfordshire's Growth and City Deals, supporting a wide range of road and public transport schemes, as well as design and testing facilities for new transport technology and broadband funding.

Business environment

Oxfordshire: a powerhouse for commercialising transformative technologies.

Central to this Local Industrial Strategy is creating the right business environment to support a world-leading innovation ecosystem. Oxfordshire has great businesses and is one of the strongest engines for growth in the UK, but it does have scope to be even more productive by driving productivity gains in businesses across a number of sectors. This indicates the region could be better translating ideas into tangible business growth and support other parts of the UK.

Summary of 'Business Environment' strengths and challenges

- ▶ Stochastic Frontier Analysis can be used to assess the economic efficiency of businesses in Oxfordshire relative to the rest of the UK. The Analysis forms part of the Economic Baseline Review and suggests Oxfordshire has higher than- usual volumes of both highly efficient and highly inefficient firms.
- ▶ The region is showing net business growth and rising business density, and there are clearly successful scale-ups – with five 'unicorns' spun out of the university in recent years.
- ▶ The Scale Up Institute's latest figures show Oxfordshire as

having the fastest growth in scale-up firms in the UK.

- ▶ In 2015, 69 per cent of firms said skills gaps were inhibiting growth – but growth has accelerated markedly since then, in spite of this.
- ▶ The region has a strong financial support offer, with OSI (Oxford Sciences Innovation) raising over £600m in private equity to fund spin-outs.

Through this Local Industrial Strategy, Oxfordshire aims to enable businesses to capture new growth and export opportunities that result from commercialisation, and thus increase productivity. It will support businesses to grow to scale more quickly and enable the creation of more unicorn businesses in Oxfordshire.

Oxfordshire's business models

In the *Building a Global Innovation Ecosystem* section above, we introduced the distinction between 'cornerstone businesses' and 'breakthrough businesses.

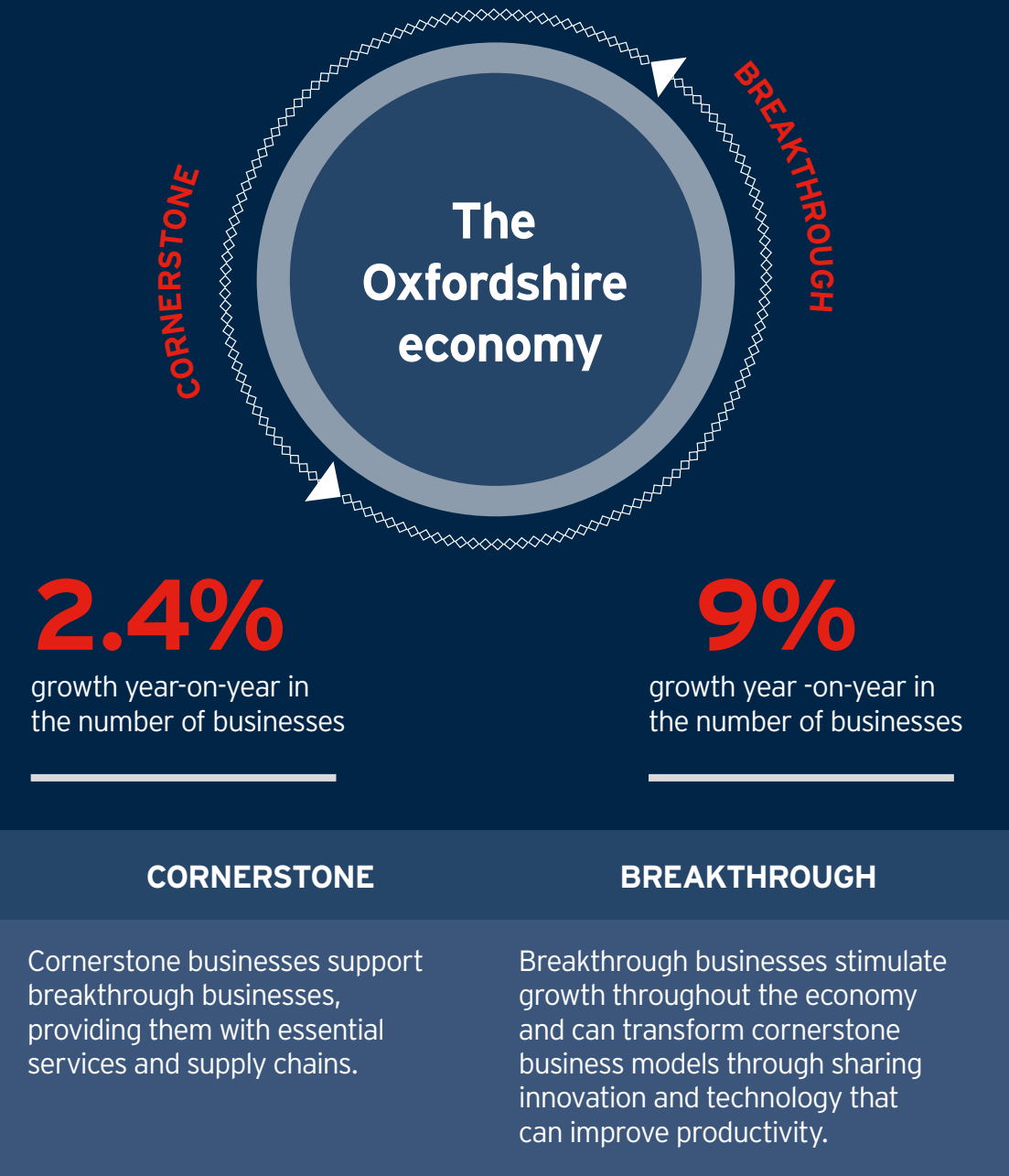
Cornerstone businesses are the backbone of the economy and provide the platform for economic growth. Their performance is closely linked to the performance of the economy as a whole, as they tend to be in mature sectors, including education, health, professional services, transport, logistics, retail, leisure and tourism. Nearly all of Oxfordshire's businesses are more productive than their UK counterparts. Cornerstone business sectors are also steadily growing, with 2.4 per cent year-on-year growth in the number of businesses operating within them. Oxfordshire's strong base of cornerstone businesses is essential to future growth. They are the sectors which have contributed to historical growth in Oxfordshire – for example, contributing to over 50,000 new jobs created since 2011/12 – and they underpin and support Oxfordshire's strong economy.

Breakthrough businesses tend to rely on innovation and transformative technologies. These technologies, and the innovation spurred by the convergence of technologies across industries, have the potential to drive economic growth at scale and will increasingly drive productivity across all sectors. These businesses tend to be riskier but have the potential for accelerated growth, becoming 'gazelles' (businesses that grow by 20 per cent for a period of four years consecutively) or 'unicorns' (businesses with a market value of over US\$1bn).

Oxfordshire is known in the UK for its high concentration of breakthrough businesses. These companies are growing rapidly, with 9 per cent year-on-year growth in the number of businesses. The region benefits from high levels of R&D investment, and a large number of start-ups and spin-outs. Several of these spin-outs have grown into unicorn businesses, with market values of more than US\$1bn. The City of Oxford ranks in the top ten cities nationwide for number of patent applications per resident, according to Centre for Cities in 2018, and the University of Oxford continues to generate more spin-outs than any other university in the UK. Oxfordshire aims to help more of its businesses to grow to scale.

Moreover, Oxfordshire has a higher concentration of businesses in transformative technologies than in the rest of the UK. Approximately seven per cent of jobs in Oxfordshire were located in the four science and technology sectors as identified in the Science and Innovation Audit (SIA), compared with four per cent in the UK. The markets for transformative technologies are rapidly growing, and Oxfordshire is well-placed to tap into this potential for growth. The SIA suggested that, by 2030, transformative technologies could contribute 800,000 jobs to the UK economy, eight per cent of which could be in Oxfordshire.

Figure 8: Cornerstone v Breakthrough Businesses



However, Oxfordshire also has challenges to address, to ensure the region can maximise its potential to commercialise and innovate transformative technologies.

There is room for productivity to increase. Whilst the region's GVA per hour is above average for England, in recent years it has fallen below the south east. This is driven by a high number of hours worked on average in Oxfordshire, so although net GVA is high, productivity per hour is lower. *The Economic Baseline Review* also shows that Oxfordshire firms are quite polarised in their productivity. There are larger than expected numbers of low productivity and highly efficient and productive businesses when compared with the UK as a whole. Oxfordshire aims to provide the best conditions possible for high-potential businesses to grow, while supporting low-productivity business to bridge this productivity gap.

Access to premises

Recent analysis by Bidwells highlights that Oxfordshire's critical hubs are struggling to respond to demand for new premises, leading to record rental costs. Despite plans to expand, it is uncertain whether the development of new facilities will meet the scale of the ecosystem's need, which will have a major impact on its ability to increase investment in R&D activity overall. In particular, Oxfordshire lacks flexible laboratory and innovation space as well as Grade A office space, which are critical to attracting foreign direct investment and secure international business headquarters in the region.

Access to Finance

There remains a complex and confusing finance market with continued challenges for high growth potential businesses being able to secure long-term patient capital - particularly at early stage investment points in the business lifecycle. Furthermore, the nascent technologies which the Oxfordshire ecosystem is pioneering are cutting edge. There is a particular lack of long-term patient capital available to firms to develop to scale and grow and enable ideas and innovations to develop as new products and services. Both Oxford University Innovation (OUI) and the Oxford Investment Opportunity Network have identified the continued gap in early stage investment and seed capital within the ecosystem and its lack of capacity when compared to other global ecosystems.

Oxfordshire's future success will require a more coherent and long-term financing landscape, with a range of finance options for high-potential businesses at different stages of their growth cycle. Local partners are committed to undertaking further analysis of the financial marketplace to further understand the key factors affecting the ecosystem in order to put in place solutions which can enable greater access to flows of business finance.

Transformative technologies are, by their nature, evolving and nascent: businesses within the ecosystem have expressed the need to de-risk investment opportunities in these high risk, high-value markets to make them more attractive for firms to attract and accelerate investment in R&D activity. In order to achieve the step change proposed by the government's 2.4 per cent R&D investment target, measures need to be put in place which factor in the overall risk level involved for firms and offers a better calibration of the long term trajectory of product development and testing which can be put in place to incentivise business investment alongside UKRI funds.

Foreign Direct Investment

Foreign Direct Investment (FDI) has grown steadily over recent years. 2017/18 saw a record 98 new investors landed primarily due to the opening of the £440m Westgate Shopping Centre and expansion at Bicester Village. Notwithstanding expansion in the visitor economy Oxfordshire's core FDI strengths lie in life sciences, space and satellite and advanced manufacturing which collectively account for the majority of recent investments. The chart below shows Oxfordshire's growth in FDI over a seven year timeline.

Delivering the vision

Partners across Oxfordshire will work together to create the best conditions possible for the next generation of high-growth firms: the best place in the UK for businesses and sectors that do not exist yet.

This Local Industrial Strategy prioritises:

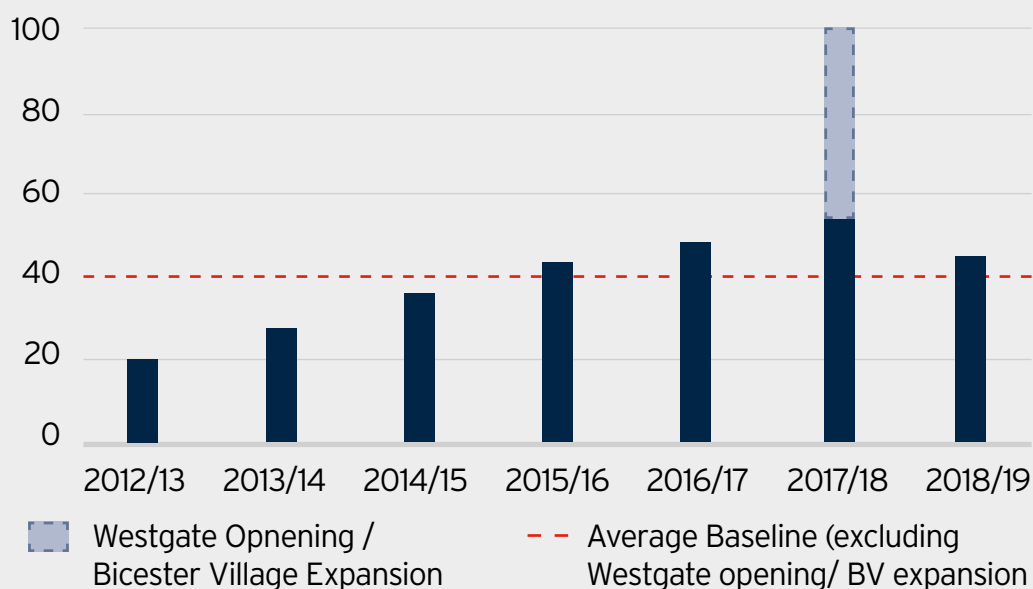
1. bringing even more high-potential firms into Oxfordshire's innovation ecosystem; and
2. attracting further market investment into infrastructure and businesses, to ensure Oxfordshire businesses grow with the grain of the market.

The Growth Hub

To bring high growth firms in to the innovation system, Oxfordshire will enhance the offer of the Growth Hub through ESIF investment, to enable it to deliver more support for businesses. The Growth Hub remit will expand to deliver more targeted support and advice to different types of businesses: from high-growth and high-potential firms to those with lower levels of productivity but substantial potential to improve. Working alongside partners Oxfordshire will develop improved, joined-up business support, including:

- establishing a *Scale-Up* Programme, to support breakthrough businesses to grow to scale faster. It will draw on successful global models to support innovators to transition from idea-creation to accessing funding and beginning to prototype and commercialise technology and innovation. This will also provide leadership and management training; and

Figure 9: Total Reported FDI Successes in Oxfordshire



- ▶ providing support to firms seeking to increase their productivity by adopting innovative business models and accessing management skills. This will focus on helping firms reach the prototyping and commercialising stage more quickly to capture value from innovation and ideation. It will be based on mentoring rather than training, building on successful university-based models such as the Creative Destruction Labs in Toronto. Where relevant, this will draw on insights from existing networks and mentoring schemes run by Be the Business and others.

Access to finance

To boost financial support for high-growth businesses, working with partners in the Oxford-Cambridge Arc, Oxfordshire will establish an *Oxfordshire Finance Hub* to support access to finance by providing advice and support in commerciality, business planning, Intellectual Property (IP) adoption and investment. The *Oxfordshire Finance Hub* will work closely with the *Oxfordshire Growth Hub* to provide finance advice and support to both breakthrough and cornerstone businesses. This will enable businesses to receive the support they need to accelerate IP adoption and investment in research and development.

Internationalisation

Oxfordshire will continue to strengthen its role as a destination for international trade and investment. Working with the Department for International Trade, Oxfordshire's *Internationalisation Delivery Plan* will be included as a chapter of the wider Arc Internationalisation Plan to maximise investment and trade opportunities, linked to key sectors and global locations.

Working with our partners in the Oxford-Cambridge Arc, Oxfordshire will develop a proposition to establish an investment case to attract Wealth Fund investment, complementing other UK funds, dedicated to improving infrastructure across the Oxfordshire innovation ecosystem.

This will help institutional investors to identify propositions with low risk, fast return and potential for global recognition. Oxfordshire will seek to prove that market funding can be effectively utilised to develop infrastructure solutions.

Business space

Oxfordshire will also support business growth through addressing the lack of business and innovation space. It will look to leverage planned developments which can offer the potential for creating a major business district of scale, as a new commercial hub. This will aim to meet the demand and interest of Fortune 500 and NASDAQ company R&D HQs to locate in the region.

Commitments

Ambition:

Oxfordshire as a powerhouse for commercialising transformative technologies

To drive progress towards achieving this priority, Oxfordshire will:

- ▶ Work alongside partners in the Oxford-Cambridge Arc as part of the wider drive to develop improved, joined-up business support, including:
 - establishing a Scale-Up Programme to support breakthrough businesses to grow to scale faster; and
 - providing support to firms seeking to improve their productivity by adopting innovative business models and accessing management skills.
- ▶ Establish an Oxfordshire Finance Hub to support access to finance by providing advice and support in commerciality, business planning, IP adoption and investment, which will work closely with the Growth Hub.
- ▶ Oxfordshire will diversify its investment strategy to attract the private investment to support the delivery the infrastructure identified in the Oxfordshire Infrastructure Strategy and other enablers

required for economic growth (including key technologies and innovation). This will provide the investment and funding necessary for infrastructure improvements and expanded business support for start-ups and scaling businesses.

- ▶ Support business growth through addressing the lack of business and innovation space, looking to leverage planned developments which can offer the potential for creating a major business district of scale as a new commercial hub.
- ▶ Establish an investment case to attract institutional investors complementing other UK funds, dedicated to improving infrastructure across the Oxfordshire innovation ecosystem and the Arc.

Working with local partners across the Arc Oxfordshire will also:

- ▶ Work with government, within existing budgets, to develop improved, joined-up business support for high-growth firms across the Arc, developing an Arc-wide offer to different kinds of business.
- ▶ Work with the British Business Bank to help SMEs in the Arc to access the finance they need to grow their businesses. Local partners across the Arc will also explore the existing landscape and any gaps in finance for businesses, as well as the establishment of an Arc-wide business angel network to better engage with early-stage investors.
- ▶ Work with government to develop a shared understanding of

market failures in creating new commercial premises within the Arc, bringing together a range of analysis already being undertaken locally, regionally, and nationally.

- ▶ Work with the Department for International Trade to encourage greater trade and inward investment, building on existing engagement at LEP level and including the development of an Oxford-Cambridge Arc *Internationalisation Delivery Plan*.

Government is working in partnership with Oxfordshire to support the delivery of this priority by:

- ▶ Providing £142.5m of Local Growth Funding to support local growth in Oxfordshire, which has invested in:
 - Centre for Applied Superconductivity - a new centre of innovation on the Harwell Campus and at the Culham Centre for Fusion Research Campus, supported by £4.5m Local Growth Fund investment; and
 - Disruptive Innovation for Space Centre which will provide access to equipment and expertise to help UK companies innovate and accelerate the development of new products and services, supported by £3m Local Growth Fund investment.
- ▶ Continuing to support the Oxfordshire Growth Hub to provide high quality business support across the county.
- ▶ Supporting the development of two Enterprise Zones at Didcot and Science Vale.

Places

The previous chapters, above, set out how the foundations of productivity will support businesses, universities, schools, colleges, research institutes and local authorities work to make Oxfordshire one of the world's best places to build an innovative business.

This final foundation illustrates how this will play out across the county.

As agreed as part of the Oxfordshire Housing and Growth Deal with government, the six Oxfordshire local authorities – Cherwell District Council, Oxford City Council, Oxfordshire County Council, South Oxfordshire District Council, Vale of White Horse District Council and West Oxfordshire District Council – have committed to producing a joint statutory spatial plan, known as the Oxfordshire Plan 2050.

This will provide an integrated strategic planning framework and evidence base to support sustainable growth across the county to 2050, including the planned delivery of new homes and economic development, and the anticipated supporting infrastructure needed.

Underpinning this spatial vision is:

- ▶ a polycentric network of innovation clusters: creating workplace and housing communities across the county which are innovative-by-design; and

- ▶ providing the enabling multi-level physical and digital connectivity that uses sustainable, multi-modal transport – within Oxfordshire connecting housing and growth locations; across the Oxford-Cambridge Arc by rail and road; and to the rest of the UK and beyond.

Figure 10 Identifies key assets in the Innovation Ecosystem underpinning this Local Industrial Strategy in more detail, comprising the three stages of Oxfordshire's business lifecycle (Ideation, Innovation, Commercialisation) set out in the Ideas chapter.

Although different areas are capable of undertaking all stages of the business lifecycle, some will be more suited than others. The map shows a concentration of innovation from Begbroke to Harwell and Culham, distributing out from this central area to the rest of the ecosystem. It also shows an expansion of commercial activity across the region that can create employment and business growth where land is less constrained, rippling out across the Oxford-Cambridge Arc and the rest of the UK. This solution seeks to retain the natural landscape and living experience as a major Oxfordshire asset.

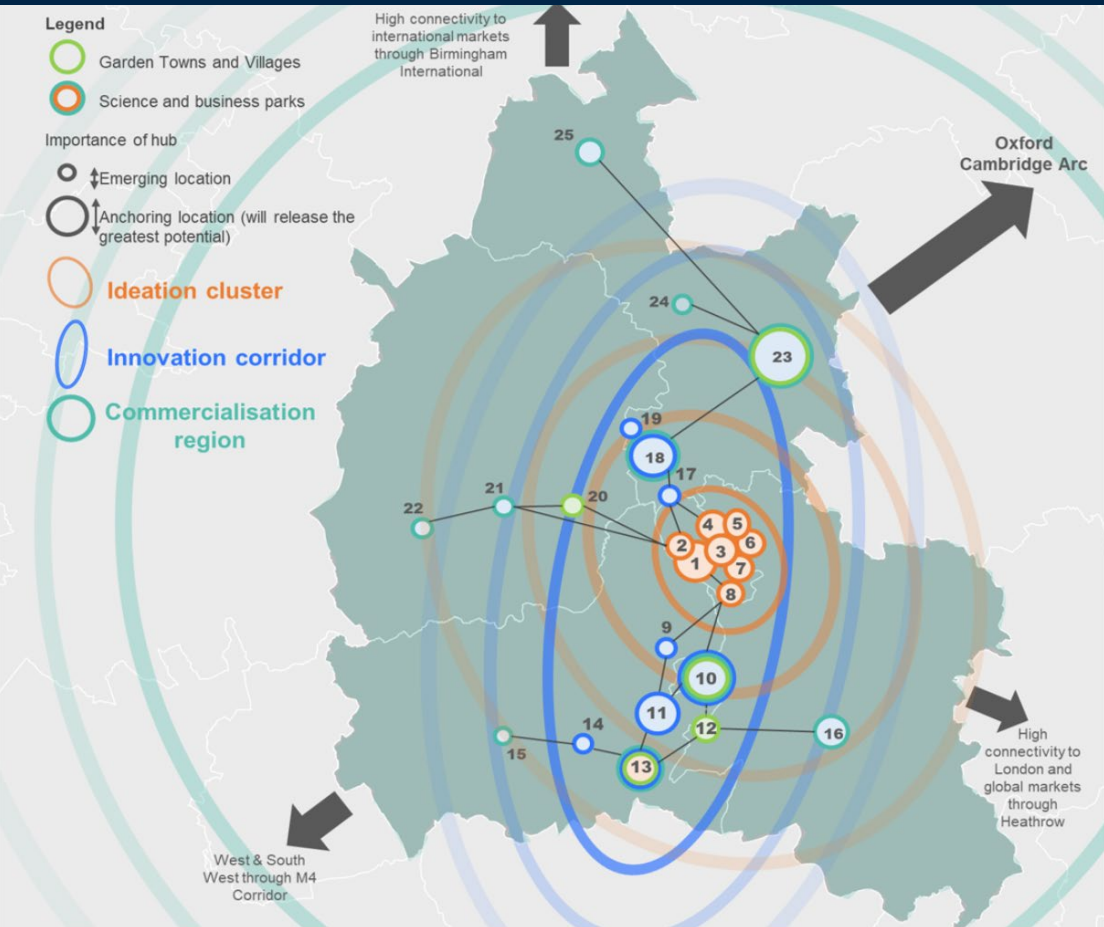


Ultimately, businesses will seek to locate near each other and where they feel they can best capture supply chain and agglomeration benefits.

Summary of 'Places' strengths and challenges

- ▶ Housing costs are around 50 per cent above the English median in four of Oxfordshire's five authorities. Affordability (the ratio of wages to housing) is higher than the south east average - despite relatively higher wages.
- ▶ Affordability has deteriorated with the ratio, on average, of 12:1, and rising to 17:1 in some parts of the county - the highest in the country.
- ▶ Output per head varies significantly across the county, with averages being highest in Oxford at £41,000, and lowest in West Oxfordshire at £27,000 - West Oxfordshire has the highest employment rate, at nearly 84 per cent.
- ▶ The county can be split between 'out-commuter' districts with relatively low paying in-district jobs, and 'in-commuter' districts facing high-value labour shortages.

Figure 10: Key locations within the innovation ecosystem



- | | | |
|---|---|---|
| 1. <u>Oxpens</u> , West End & Station Quarter | 10. Culham Science Centre | 18. Begbroke Science Park and Innovation Centre |
| 2. <u>Osney</u> Meads Innovation Quarter | 11. Milton Park | 19. Oxford Technology Park |
| 3. Oxford University | 12. Didcot Garden Town | 20. Oxfordshire Cotswold Garden Village |
| 4. Oxford Centre for Innovation | 13. Harwell Science and Innovation Campus | 21. Witney Business & Innovation Centre |
| 5. Oxford Brookes University | 14. Grove Technology Park | 22. Carterton & RAF Brize Norton |
| 6. Headington Hospital Quarter | 15. Defence Academy, Shrivenham | 23. Bicester Garden Town |
| 7. Oxford Business Park | 16. <u>Howbery</u> Business Park | 24. <u>Heford</u> Park |
| 8. Oxford Science Park | 17. Oxford North | 25. Banbury |
| 9. Quadrant, Abingdon Science Park | | |

Oxfordshire's communities

Oxfordshire already provides a high quality of life and healthy communities. Towns and villages across Oxfordshire are vibrant and distinctive, and Oxford is the highest ranking city in PwC's 2018 Good Growth for Cities Index, which measures cities in the UK against a range of indicators for economic success and wellbeing.

Oxfordshire's natural capital and cultural and heritage assets are uniquely rich and diverse, including three Areas of Outstanding Natural Beauty, seven Special Areas of Conservation, rivers and the canal, parks and other green spaces, as well as a range of world-class museums and libraries. These are important parts of what makes Oxfordshire a place where people want to live and businesses want to locate.

Oxfordshire is a global destination with international reach. It is increasingly attractive to visitors across new markets, attracted to Oxfordshire by its considerable tourist offer including the City of Oxford, Bicester Village, the Cotswolds and Blenheim Palace. In 2017, the county welcomed nearly 30 million visitors, with many of these from international locations. The tourism and hospitality industry supports 10 per cent of all employment in Oxfordshire, contributing £2.17bn to the economy. Increased investment in areas such as high grade hotel stock and international conferencing facilities could boost this offer, complement Oxfordshire's global brand, and create more accessible, permanent jobs for the wider community

However, as Oxfordshire becomes an increasingly attractive place to live, work and visit, it has developed a number of challenges that are now restricting economic growth. The urban area of Oxford is contained within a tightly drawn Green Belt that prevents significant expansion around the city and limits housing supply. Flooding and other environmental issues limit the options for growth beyond existing boundaries. Local towns are able to ease housing pressure for the city but there are challenges in connecting these hubs to core economic activity located elsewhere in the country. A strategic approach to long-term planning is needed across Oxfordshire to coordinate housing growth and infrastructure investment - as set out in the Housing and Growth Deal.

This constrained housing supply is making Oxfordshire increasingly unaffordable, increasing the price of housing to buy and rent. The 2017 median house price in Oxfordshire is now 50 per cent higher than the English average. Oxfordshire also has a housing to income ratio of 12:1, which rises to 17:1 in some parts of the county. This has created a cost of living challenge for many residents, affecting the City of Oxford especially in the Index of Multiple Deprivation.

This is exacerbating the inequality within Oxfordshire, making the region less attractive to global top talent, and less able to retain recent graduates from our universities and provide affordable housing for key lower and middle-income workers upon which the economy depends. This lack of ability to attract and retain talent can also hinder business growth and restrict investment into the region.

Delivering the Vision

Ambitions for growth in the area mean that Oxfordshire can go further, pioneering new communities that integrate cutting-edge technologies into sustainable and attractive surroundings.

Working between local authorities, public service providers and private developers gives the region the opportunity to design a globally recognised sustainable, high quality, liveable place utilising new technologies and services developed in Oxfordshire. These will be designed in partnership with businesses and communities to tackle the four Grand Challenges set out in the Industrial Strategy.

To achieve this, Oxfordshire will work with industry partners to develop pioneer communities that act as living labs, preparing communities for technological and environmental change including the advent of connected and autonomous travel, all electric energy, smart homes and sustainable living.

These living labs, as illustrated below and in figure 11, will provide a platform for the region's world-leading science and technology clusters to work with local communities to see how their products work in practice and deliver new innovations in place shaping and sustainable communities.

Living Lab Building Blocks in Oxfordshire

The key building blocks for world leading Living Labs already exist in Oxfordshire with partners collaborating across local authorities, universities and local businesses, to deliver innovative projects that demonstrate the Living Lab concept. For example:

- ▶ A community of senior leaders across industry, academia and local public services who are recognised as market leaders in complementary disciplines, united by the opportunity that Living Labs present for the UK both to resolve national challenges and generate knowledge to build export markets.
- ▶ Pro-active community engagement enabling individuals to participate and feedback at all levels enabling local communities across the County to be part of the solution process.
- ▶ Fundamental and translational research taking place at the University's Hospitals and Science Parks underpinning the national effort across science and engineering in academia and industry. 20 per cent of the programmes at the Diamond and ISIS accelerator facilities focus on energy R&D and UKAEA on long

term energy solutions with its present focus on fusion and robotics.

- ▶ Accelerated product development for local companies in the Oxford, Harwell, Milton and Culham Science Parks across critical sectors, together with strategic partnerships with major companies including Siemens, Bosch, EDF Energy, Immunocore and BMW.
- ▶ The presence of future-ready innovation test beds pioneering and accelerating the creation of new solutions.
- ▶ Significant opportunities to accelerate public - private investment in R&D, supporting wider UK ambitions to increase R&D to 2.4 per cent of national GDP.
- ▶ Complementary infrastructure development through the Oxfordshire Housing & Growth Deal, integrated with the emerging transport strategy being developed by England's Economic Heartland and the spatial vision emerging for the Arc.
- ▶ Exploration by engaging all stakeholders, especially user communities, at an earlier stage of the co-creation process to discover emerging scenarios, usages, commercial models and behaviours through live scenarios in real or virtual environments.
- ▶ Experimentation that implements appropriate technological artefacts in vivo to benchmark live scenarios involving large number of users whilst, in parallel, collecting data for analysis.
- ▶ Evaluation that assesses innovative concepts as well as related technological artefacts in real-life situations through various dimensions such as socio-ergonomic, socio-cognitive and socio-economic aspects. It is the observation of what happens when technology confronts user value models that roots a Living Lab in real feedback rather than experimental learning.

Each living lab will bring together multidisciplinary, multi-sector teams and supply chains to collaborate to explore opportunities for:

- ▶ Co-creation of solutions by bringing together technology push and market-pull factors across a diverse range of viewpoints, constraints and knowledge levels to sustain the exploration of new scenarios, concepts, related potential products/services, business models and solutions.

Oxfordshire will work in the short-term to establish:

- ▶ A **Data and Mobility Living Lab**, including (but not limited to) at Culham Smart Village, West Oxfordshire, Oxford City and Didcot Garden Town. These will explore new solutions and technologies, such as autonomous vehicles and smart infrastructure to support improved connectivity and mobility across the ecosystem. They will explore the use of integrated transport services that reduce reliance on private vehicles, while promoting independent living and reducing congestion.

▶ **A Clean Growth Living Lab,** working with Oxford-Cambridge Arc partners at sites including Harwell, Bicester Garden Town and Culham Smart Village to pioneer new forms of locally generated low carbon energy technologies and solutions. Oxfordshire will work with partners to develop, evaluate and pilot innovative low-carbon energy technologies and solutions for new housing settlements and business locations including the development of off-grid and new fuel services. These labs will support Oxfordshire's commitment to a 50 per cent reduction in CO2 emissions by 2030 compared to 2008, and its wider vision for net zero emissions by 2050.

▶ **A Health and Wellbeing Living Lab,** linked to the Global Health and Life Sciences Quarter. This will provide pioneering resources and innovation, and support other life sciences hubs across the ecosystem, including Milton Park and Harwell, into health services within existing communities and the new Garden Towns, Garden Village and other settlements with a focus on delivering improved outcomes arising from an ageing society.

Harnessing Healthy Place Shaping

There is growing evidence that significant benefits for local people can be achieved through bringing together planning for housing, infrastructure and the economy with planning for residents' health and wellbeing. Integrating health and wellbeing into the growth agenda across Oxfordshire seeks to simultaneously improve productivity and workforce productivity and deliver better longer-term outcomes for people.

Local partners will work collaboratively with local healthcare providers to integrate the concept of Healthy Place Shaping into the Living Lab approach.

Case study: Bicester Healthy New Town

The Healthy New Town Programme at Bicester is a place-based prevention programme, using the opportunities presented by population growth to test innovations in the built environment, new models of care, and community activation to improve health and wellbeing. The aim is that Bicester becomes a place where healthy behaviour is easy, fun and affordable - where being active, eating healthy food, and being a good neighbour are part of normal daily life.

The programme has adopted a systems-based approach to delivering change, working closely with a wide range of partners including schools, businesses, health and care providers, the voluntary sector, housing developers and academic partners, with Cherwell District Council acting as the lead organisation.

The programme aims to improve both the physical and mental health of everyone in Bicester - the existing community as well as those moving to the town - by enabling residents to adopt healthy behaviours.

Businesses have been actively engaged in promoting healthy workplaces, introducing evidence-based workplace interventions aimed at improving the health and wellbeing of employees. Tailored guidance has been offered to businesses on how best to support employees to improve health and ultimately improve productivity. Good local work opportunities that enable residents to choose active travel and to work in healthy workplaces are supporting the development of Bicester as a thriving community - a place where people want to live and work.

Figure 11: Living Lab ‘Life Cycle’



Case study: Culham Future Development

The announcement of the new Thames River crossing between Didcot and Culham is a significant investment in South Oxfordshire that is designed to relieve the A34 west of Abingdon and Oxford; link the major centres of high tech employment growth at Harwell, Milton Park and Culham; relieve local congestion south of Abingdon; enable housing development at Didcot and Culham; crystallise the western end of the Oxford-Cambridge Arc and, in time, connect seamlessly to CrossRail, Heathrow and the City of London.

This investment in infrastructure also underpins two globally attractive Living Lab opportunities. The first builds on the Connected and Autonomous Vehicle (CAV) work being conducted around Oxford and centred on the UKAEA's RACE facility at Culham. Oxfordshire proposes establishing a CAV service between Culham and Harwell via Culham Railway Station, Didcot Parkway and Milton Park. In parallel with using existing rural roads, this CAV service would also use the new road and bridge. New CAV Test Bed facilities at RACE provide an ideal location for the 'CAV Depot' along with the multi-disciplinary teams who would want to develop the service exploring all aspects from user requirements and real use, experience and pricing; insurance and regulation; integration of many stakeholders including technology developers, councils and highways agencies,

local employers and investors.

Furthermore the 3,500 new housing settlement identified in the South Oxfordshire Local Plan adjacent to Culham Railway Station would be well served by the new road and also the Didcot-Oxford mainline railway and the underutilised Culham Railway Station. This new settlement, which for now is being called Culham Science Village, provides a rare opportunity to explore digital-enabled living by building an inclusive all age connected-community; shared mobility ownership and first-mile-last-mile intermodal transport; integrated data services including a community data trust; drone and autonomous vehicle delivery services linking local retail and community facilities with larger hubs in Oxford and Didcot/Reading; digital health/ GP services; integrated education with the adjacent European School; off grid energy, water, recycling and sewerage. These Living Labs will leverage the Housing Infrastructure Fund investment by resolving local congestion issues, building high-need housing as well as attracting multi-national attention and investment. Companies including Siemens, EDF, Bosch, Williams, Oxbotica, Arrival, Amey, Telefonica, Nominet would join UKAEA, University of Oxford and Oxford Brookes University in creating a world-class cluster building on the huge depth of scientific capability and capacity.

Commitments

Ambition:

Capitalising on innovation and infrastructure investments, Oxfordshire will become a 'polycentric network of innovation clusters'. This will be based on exemplar new housing communities, linked to innovation parks and assets throughout the county and country.

To drive progress towards achieving this priority, Oxfordshire will:

- ▶ Work with industry partners to develop pioneer communities that act as living labs, preparing communities for technological and environmental change including the advent of connected and autonomous travel, all electric energy, smart homes and sustainable living. This will include:
 - a Data and Mobility Living Lab, including Culham Smart Village, West Oxfordshire, Oxford City and Didcot Garden Town;
 - a Clean Growth Living Lab, including Harwell, Bicester Garden Town and Culham Smart Village; and
 - a Health and Wellbeing Living Lab, linked to the Global Health and Life Sciences Quarter.
- ▶ Work with local healthcare providers to adopt the principles of Healthy Place Shaping as part of the development of Living Labs across Oxfordshire.

Working with local partners across the Arc Oxfordshire will also:

- ▶ Consider ways to contribute towards the government's Clean Growth Grand Challenge mission to at least halve the energy use of new buildings by 2030, supporting the Arc's wider ambition to create clean, energy efficient and sustainable communities for all.
- ▶ Ensure that the environment in the Arc is left in a better state for future generations:
 - embodying England's 25 Year Environment Plan which sets out our comprehensive approach to improving landscapes and habitats, and the aspiration to move to a policy of net environmental gain in future;
 - engaging with government to co-design a local natural capital planning approach for the Arc, ensuring that the wider work on productivity is aligned;
 - using intelligent and sensitive design in new housing and infrastructure developments; and
 - considering ways to maximise environmental expertise across the Arc and to empower the business community to champion and support the Arc's natural assets.

Government is working in partnership with Oxfordshire to support the delivery of this priority by:

To drive progress towards achieving this priority, Oxfordshire will:

- ▶ Investing in the Oxfordshire Housing and Growth Deal, committing to deliver up to 100,000 homes by 2031, with up to £215m of investment, including £60m for affordable houses and £150m over five years for infrastructure.
- ▶ Investing £218m of Housing Infrastructure Fund in Didcot Garden Town, to support up to 13,411 new homes, alongside over £500m of further investment from Homes England since 2010.
- ▶ Providing £142.5m of Local Growth Funding to support local growth in Oxfordshire, which has invested in, for example, Oxford North, a package to improve transport in the north of the city and enable the Oxford North development which will provide business and research space and new homes, with £5.9m Local Growth Funding.
- ▶ Recognising significant natural capital assets across the county, including three Areas of Outstanding Natural Beauty, seven Special Areas of Conversations, world-class museums and libraries.



Priorities across the Oxford-Cambridge Arc

This Local Industrial Strategy has started to set out how shared priorities for Oxfordshire fit with a wider range of activity being taken forward locally, regionally and nationally.

The Oxford-Cambridge Arc cuts across boundaries and affects each of the four areas in the Arc in similar ways. These offer government and local partners the opportunity to act at scale with a consistent approach across the Arc and, as with the preceding local priorities, they can be structured around the foundations of productivity.

- ▶ **Ideas** - Innovation, including the Future of Mobility.
- ▶ **People** - Skills.
- ▶ **Infrastructure** - Energy and Digital.
- ▶ **Business environment.**
- ▶ **Places** - including Environment.

Local partners will work together collaboratively across all of these Foundations to ensure that the implementation of the four Local Industrial Strategies maximises the economic potential of the wider Arc region as a whole.

Ideas

The Arc has unrivalled science and technology capabilities - from the renowned research centres in Oxford and Cambridge, to their surrounding technology campuses such as Harwell, and commercial testbeds in the 'Connected Core' of the Arc. Bringing these many assets together at scale would create a driver of growth and innovation for the UK.

However, the Arc is not yet a single innovation ecosystem and has potential to drive greater economic growth and productivity: more can be done to connect its numerous assets in a manner which demonstrably adds value. Achieving this will involve both building existing strengths such as life sciences and providing the best environment possible for the emergence of disruptive technologies. The prize is higher R&D investment in support of the Industrial Strategy's 2.4 per cent R&D target, UK leadership in transformative technologies, and a continued post-EU Exit future as a global centre for science, research and innovation.

In order to achieve this, Arc partners will work with government, UK Research and Innovation and others on the following priorities:

- ▶ Harnessing the collective strength of the Arc's research base will be essential. The new Arc Universities Group will act as the focal point for cross-Arc collaboration on science and research, identifying and delivering joint R&D projects and providing a pipeline of talent to knowledge-intensive businesses.
- ▶ The Arc will strengthen its ability for businesses to commercialise ideas coming out of its universities and others. Key to this will be a network of 'Living Laboratories' that both trial technologies linked to new developments across the Arc and help address the Grand Challenges, developed by industry and local partners across the Arc. Arc partners will also use assets such as Harwell, Silverstone and Cranfield to establish new networks that support the convergence of technologies across sectors and seek to develop emerging districts such as West Cambridge.
- ▶ Finally, the Arc will seek to grow its role as a global research and innovation hub, acting as a UK magnet for international talent, R&D, FDI and research collaborations. The LEPs and MCA will work with the Department for International Trade, the Arc Universities Group and others to channel foreign investment in the assets and projects that will make the biggest impact on Arc-wide and UK growth.

As outlined earlier, the Arc's R&D strengths also makes it well placed to address the Future of Mobility Grand Challenge, with many assets such as Culham, Cranfield, Millbrook and Silverstone playing an important role in developing and testing new transport technologies.

To achieve this, government will work with the LEPs within the Arc and other local partners, including England's Economic Heartland, to:

- ▶ utilise the considerable R&D assets within the Arc to meet the Future of Mobility Grand Challenge and government's Road to Zero strategy. This will put the UK at the forefront of the design and manufacturing of zero emission vehicles, supporting government's commitment to end the sale of new conventional petrol and diesel cars and vans by 2040;
- ▶ build on the Arc's existing role as a testbed for new transport technologies, such as automated vehicles and drones, working with HMG and Zenzic to competitively access existing research and development support, and scoping further opportunities to trial mobility services within the Arc; and
- ▶ support local authorities within the Arc, as set out in the Future of Mobility Urban Strategy, by providing guidance on design and planning to ensure new communities are designed and built to enable new approaches to mobility.

People

The Arc is starting from a strong position with a well-functioning labour market - across the Arc employment is high compared to national averages and education attainment rates are generally good. The Arc is home to many world-leading higher education institutions that drive the knowledge rich economy.

It is vital that the Arc continues to build on this solid foundation in order for all people and communities across the Arc to have access to these opportunities and businesses have access to the workforce they need to meet future ambitions.

Businesses across the Arc consistently cite attracting and retaining a sufficiently skilled workforce as a particular challenge. Through the newly established Skills Advisory Panels, LEPs will bring local employers and skills providers together to understand current and future skills needs and put in place activity to address these local challenges. Through these Panels the four LEPs and government will work together to understand the challenges that businesses across the Arc face in securing the workforce they need to meet their future ambitions.

Whilst recognising the strong overall employment position of the Arc, it is also essential that work to drive growth across the region considers how best to address inequalities and challenges certain groups face in accessing and progressing in the labour market. Delivering transformational growth necessarily requires actions to support the key growth sectors identified in the economic context chapter above. But doing so in an inclusive and sustainable way will also require all partners to consider how best to: encourage good quality employment across the whole economy; support progression for those in low pay and low skilled employment and, support workers to stay in employment when they are at risk of losing their jobs due to issues such as age, health or automation.

To do this the LEPs will continue to build on the well-established relationships with local partners to address these deep-rooted challenges. This will include ongoing engagement with Jobcentre Plus, local education providers and community organisations.

Across the Arc, through Skills Advisory Panels, the LEPs will work with government to:

- ▶ Review labour market intelligence across the Arc, to gain a better understanding of how skills provision is currently delivered and funding utilised. This will include working closely with the Department for Education through local Skills Advisory Panels and providers across the Arc to consider how local provision supports the ambitions set out throughout these strategies.
- ▶ Work with local employers to increase apprenticeship uptake across the Arc, supporting employers to maximise their Apprenticeship Levy contributions and drive social mobility.
- ▶ Work with local employers to support the effective role out of T levels and utilise local labour market intelligence to work with providers to consider how the local T level offer will support local businesses.
- ▶ Coordinate the work of Skills Advisory Panels to bring together training providers from across the Arc, with a view to establishing an Arc-wide skills marketplace. This will build on the LEPs' positive working relationships with the Careers and Enterprise Company and other careers services, and work to improve provision across the Arc. This will utilise the evidence provided by each Skills Advisory Panel, connecting businesses with regional and national skills providers and people with targeted support including apprenticeships, STEM skills, T levels,

technical and degree apprenticeships.

There will also be continued collaboration across the higher education sectors through the Arc Universities Group to ensure alignment between the higher education offer and the emerging needs of breakthrough businesses, including top quality leadership and management training supported by the business school network.

Infrastructure

The Arc as a whole is already experiencing infrastructure constraints - especially in energy, transportation, water and housing. Realising shared ambitions around economic and community growth will require the development of the right infrastructure to meet the needs of existing and new communities, supporting the economy of the Arc and championing the UK's global competitiveness.

As well as getting the basics right, there is the opportunity for a step-change in connectivity. Government and Arc partners are working to deliver East-West Rail and the proposed Expressway which are central to enabling the long-term housing and business growth ambitions within the Arc. However, greater connectivity will not be fully delivered without the challenge of the 'first-mile-last-mile' being addressed. The Arc suffers from significant congestion which local partners are looking to address through innovations such as the proposed Cambridge Autonomous Metro and Luton DART (Direct Air Rail Transit).

The LEPs have already produced local energy strategies, documenting the energy needs of their local areas. These will be the starting point to consider the energy needs of the Arc as a whole; drawing in new evidence, joining up local energy strategy delivery and using the opportunities created through the growth of the Oxford-Cambridge Arc as a catalyst for a transformation of energy generation, distribution and use across the Arc.

Digital and data coverage in the Arc is good relative to much of the UK – with world-leading infrastructure in some of the region's specialist facilities – though it remains patchy, especially in rural areas. This holds back growth given the opportunities for knowledge-intensive home-working and 5G-enabled innovations in the rural economy throughout the Arc.

The area's natural capital and environmental infrastructure underpins and supports the local economy, offering flood protection and providing clean water and natural spaces. The changing climate will affect existing infrastructure resilience and future infrastructure needs, requiring us to create climate resilient places and infrastructure. In addition, the Arc presents a unique opportunity to deliver flood risk and water management through strategic activity across local authority and LEP boundaries.

The growth anticipated across the Arc gives us a chance to test innovative approaches to: improving digital and data connectivity; minimising energy demand and increasing energy supply; and addressing the Grand Challenges. The scale of growth also offers the chance to explore new ways of coordinating and funding the delivery of new infrastructure across the Arc. To seize these opportunities, the Arc Local Industrial Strategies announce that:

- ▶ local partners will collaborate with Department for Transport, Highways England, East-West Rail Company and England's Economic Heartland to expand the economic benefits of planned strategic transport links, improvements to the Major Roads network and the first-mile-last-mile connections across the Arc;
- ▶ government and local partners will conduct a review of recent evidence work at local, regional and national-level, to develop a shared evidence base for the current and future energy needs of the Arc. This could provide opportunities to test new energy policies or approaches within the Arc;
- ▶ government and local partners will work to identify and diffuse best practice on digital infrastructure planning in the Arc and explore opportunities to align new transport infrastructure with digital infrastructure in the Arc. This will aim to support industry to accelerate the roll-out of full fibre networks, enabling accelerated growth of 5G technologies across the Arc;

- ▶ local partners will work to standardise public data where possible - such as through the opportunity created by local government unitarisation in Buckinghamshire and Northamptonshire - and with support from government policy experts, to ensure that the opportunities to collect and capitalise on data are utilised. This will be done with a view to addressing Grand Challenges around the Future of Mobility, the Ageing Society, and Clean Growth.
- ▶ Government and local partners will work together across the wider Oxford-Cambridge Arc to explore proposals for new approaches to funding infrastructure, as set out in government's response to National Infrastructure Commission Report at Autumn Statement 2018.

Business environment

The Arc is home to a dynamic business base and a range of high-growth and innovative firms. However, businesses across the Arc still encounter barriers to growth, particularly in accessing the support they need to scale-up rapidly, securing the right finance and access to the right commercial premises to start and grow.

The Arc's collective ambition is to become a world-leading ecosystem for high-growth businesses: with an environment that enables them to commercialise technologies, grow to scale, and export.

Central to the Arc's approach will be developing a Global Growth Network of internationally-focused businesses, scale-ups and sectoral clusters. Together, this will foster a breakthrough growth region and a driver for the UK economy.

Partners across the Arc will work with government and others across the following priorities:

- ▶ local partners will work with government, within existing budgets, to develop improved, joined-up business support for high-growth firms across the Arc. Central to this will be a network of the four Growth Hubs across the Arc, who will work and with existing support programmes to develop an Arc-wide offer to different kinds of business. They will profile the firms that can deliver the biggest shift in growth, productivity and exports in places, diagnosing barriers to growth in the firm's capacity to innovate and increase productivity. As part of this, Arc partners will identify new ways to establish peer-to-peer networks linking firms within and between sectoral clusters;
- ▶ local partners and the British Business Bank will work together to help SMEs in the Arc to access the finance they need to grow their businesses. Local partners across the Arc will also explore the existing landscape and any gaps in finance for businesses, as well as the establishment of an Arc-wide business angel network to better engage with early-stage investors;

- ▶ local partners will work with government to develop a shared understanding of market failures in creating new commercial premises within the Arc. This will bring together a range of analysis already being undertaken locally, regionally, and nationally. This will ensure that the right premises are planned for, prioritised locally within any bids for future government funding, and built;
- ▶ finally, partners across the Arc will work with the Department for International Trade to encourage greater trade and inward investment. This will build on existing engagement at LEP level and include the development of an Oxford-Cambridge Arc *Internationalisation Delivery Plan* and inward investment group. However, much more needs to be done if the Arc is to reach its potential as a global player able to compete with innovation-growth zones like Seoul, Helsinki, San Francisco and Toronto. This will include an Arc presence at MIPIM Cannes in March 2020 and an updated capital investment led Oxford-Cambridge Arc Brochure and Investment Prospectus which identifies investable opportunities. Work will also continue to better integrate Arc sector propositions into the Department for International Trade's sector and market priority campaigns, linking the Arc's key sectors into the ten highest potential export and inward investment markets to drive Arc growth globally. This will involve

analysis of available data on success across the Arc by sector and market. Each of the partners will work with the Department for International Trade to develop a LEP-level 'chapter' for the *Internationalisation Delivery Plan*, based on the priorities and assets set out in their Local Industrial Strategy.

Places

Taken as a whole, this package of Arc-wide interventions, which sits alongside existing interventions being progressed by government and local partners, will support sustainable growth across the region, benefitting its residents, communities, businesses and the country more widely. Delivering transformational growth in this way will create opportunities across the Arc - spreading the benefits both to its prosperous centres and its more deprived communities, and across its urban and rural areas.

Doing so will require a holistic approach and partnership working with government and industry, to achieve growth and improve place-making, developing sustainable, resilient and culturally vibrant communities. This aims to provide a high quality of life for residents - now and in the future. The scale of growth envisaged across the Arc also offers the opportunity to plan for and build exemplar developments with high design standards; places where people want to live and work.

Heating and powering buildings accounts for 40 per cent of the total energy usage in the UK.

By making new communities within the Arc more energy efficient and embracing smart technologies, energy demand and household bills can be cut, and economic growth boosted while meeting the country's targets for carbon reduction.

Conserving and enhancing the natural environment is at the heart of ambitions for the Arc; growth offers an opportunity for environmental enhancement, in turn driving productivity and innovative place making. Government and local partners have agreed to embed 'natural capital' thinking throughout the approach to the Arc; harnessing nature to adapt to climate change, manage flood risk and deliver broader benefits to businesses and communities.

Working through existing partnerships, government and partners across the Arc will:

- ▶ consider ways to contribute towards the government's Clean Growth Grand Challenge mission to at least halve the energy use of new buildings by 2030, supporting the Arc's wider ambition to create clean, energy efficient and sustainable communities for all.

As the national Industrial Strategy set out, we will work not just to preserve, but to enhance our natural capital – the air, water, soil and ecosystems that support all forms of life – since this is an essential basis for economic growth and productivity over the long term. To ensure that the environment in the Arc is left in a better state for future generations, local partners and government agree that:

- ▶ England's 25 Year Environment Plan sets out our comprehensive approach to improving landscapes and habitats, and the aspiration to move to a policy of net environmental gain in future. The policy for the Arc should embody this approach in line with national policy, so local partners will work with government to explore opportunities for local delivery of the Plan within the Arc, including considering issues such as climate resilience, water management and biodiversity net gain;
- ▶ local partners will also engage with government to co-design a local natural capital planning approach for the Arc, ensuring that the wider work on productivity is aligned;
- ▶ intelligent and sensitive design should be used in new housing and infrastructure developments to create or enhance habitats in line with national policy; and
- ▶ government and the LEPs will also consider (i) ways to maximise environmental expertise across the Arc, creating opportunities to share best practice across public and private sectors; and (ii) how to empower the business community to champion and support the Arc's natural assets, working together to attract and retain the skilled workforce of the future.

Delivering for communities, businesses and the UK

This Strategy will deliver inclusive growth in Oxfordshire, improving sustainability, productivity, prosperity and quality of life. This is not limited to Oxfordshire: it will also deliver transformative growth for the rest of the country.

For Oxfordshire's communities

Improved productivity will lead to better jobs, higher wages and increased prosperity for Oxfordshire's residents, ensuring growth is inclusive, so that it brings benefits to all residents across Oxfordshire.

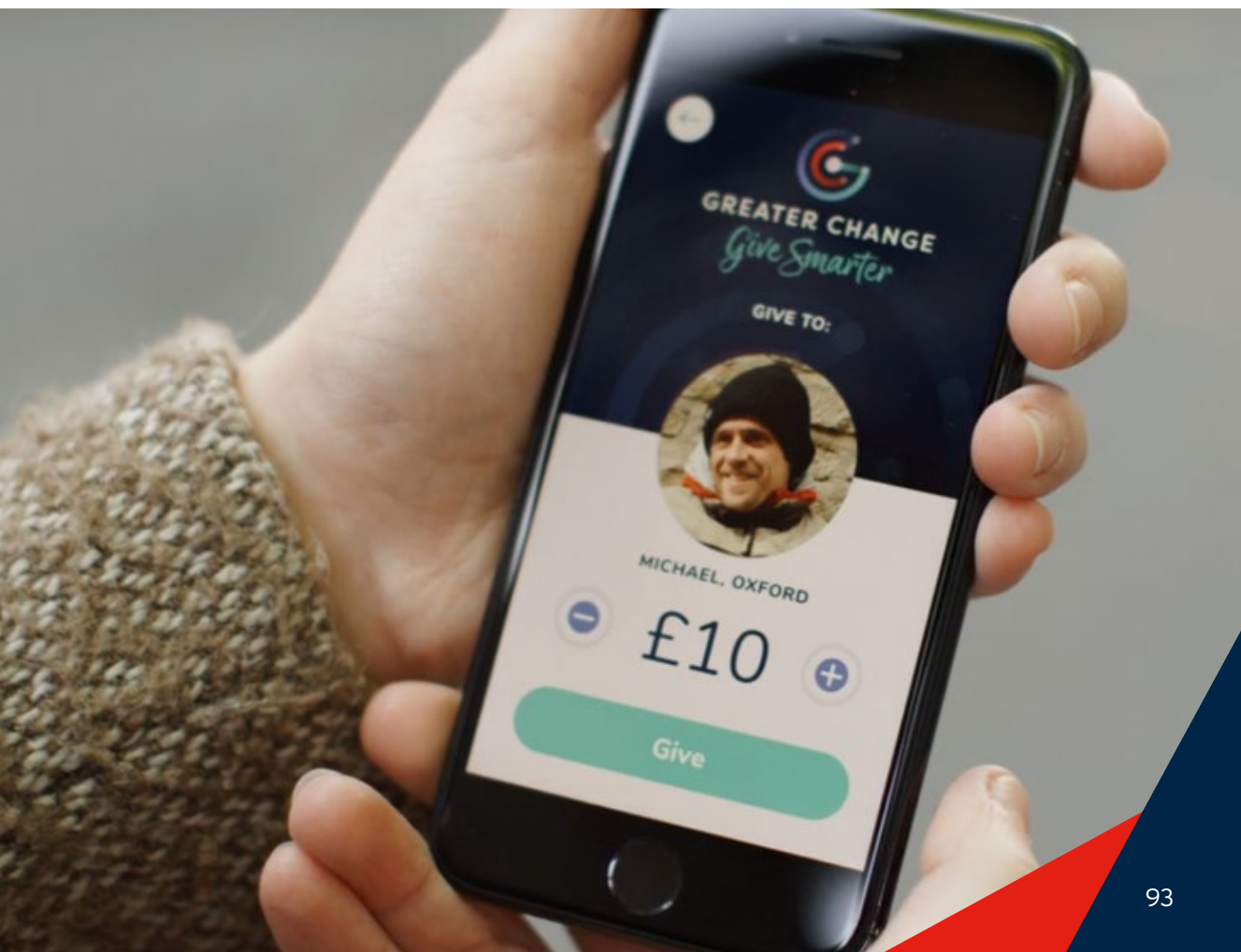
- ▶ As communities become more technology-enabled, they will be enabled to improve health and wellbeing as well as quality of life. Travel will be safer and smoother; the environment cleaner; digital health technologies will improve health outcomes and better meet the needs of an ageing society, delivering better more efficient public services.
- ▶ Improved infrastructure and connectivity will make Oxfordshire a more accessible and better place to live. The infrastructure improvements we want to deliver will improve physical and digital connectivity. Reduction in congestion and travel times will improve quality of life for people and communities.

- ▶ An improved skills and education programme will make Oxfordshire a place of opportunity for all residents, creating more pathways to provide young people and local communities with the skills needed to access new employment opportunities. Opportunities for re-skilling and upskilling will ensure everyone is able to engage with the economy as it grows.
- ▶ Oxfordshire will be a more affordable, sustainable and inclusive place to live, reducing the levels of deprivation and marginalisation from the economy. Building on the Housing and Growth Deal and Local Plans we will deliver well-designed additional affordable housing, reducing the cost of living challenge in the county. This will ensure a healthier, more sustainable Oxfordshire for future generations.

Case study: Greater Change

Greater Change is an Oxford-based start-up. It is a social enterprise aimed at providing financial support to those who are homeless, providing a way for them to fund long-term savings goals. People who are homeless work with a support worker to agree a target purchase and budget for this. Members of the public then fund the goals of individual people directly through the Greater Change app and website, and money is sent directly to a charity that commits

to buying the target purchase. It enables giving in a cashless society, increases the pool of potential givers, and provides those who are 'street homeless' with a safe way of saving. So far, Greater Change has raised over £10k and supported twenty people to achieve their long-term savings goal. Greater Change has now received confirmation of scale up funding and will use this to expand its services to more areas across the UK.



For Oxfordshire's businesses:

- ▶ Oxfordshire's businesses will be supported to integrate technology and innovation to increase their productivity and profitability.
- ▶ New investment will create new opportunities for Oxfordshire's businesses - to compete internationally, and better commercialise and capture value from innovations. Oxfordshire's strong global proposition will bring new investment into Oxfordshire's businesses, supporting them from innovation through to commercialisation and international distribution.
- ▶ A better connected innovation ecosystem, with seamless digital and physical connectivity, will help businesses operate more smoothly and make it easier for employees to travel across Oxfordshire. Better connectivity and more affordable housing will improve Oxfordshire's quality of life for residents and its attractiveness as a location, to attract top talent and encourage talent to stay.
- ▶ Improved skills provision at all levels in Oxfordshire will create a more skilled labour market, aligned to industry needs, for Oxfordshire's businesses to recruit from. Developing new apprenticeship and career pathways, including for technical and vocational training, will provide new opportunities for residents and help provide businesses with the specific skill sets they need to succeed. It will also help increase the number of graduates who choose to stay and live and work in Oxfordshire.
- ▶ Increased public and private R&D spending will support businesses to continue the research and innovation necessary to compete globally. The Oxfordshire Local Industrial Strategy will help the UK Government deliver on its commitment to work with industry to boost spending on R&D to 2.4 per cent of GDP by 2027, championing cross-sector collaboration and innovation.
- ▶ Businesses will have an important role in solving challenges and creating benefits for the local population that will in turn support their own needs. Both breakthrough and high potential businesses will benefit from new investment opportunities, technological adoption and innovation uptake. Both types of businesses will have a critical role to play in innovating to solve local and UK-wide challenges, developing solutions that benefit local communities.

For the country

- ▶ Innovation and technological developments in Oxfordshire will deliver benefits and new supply chain opportunities across the UK. Oxfordshire's strengths in transformative technologies already have spill over benefits for the rest of the UK
- ▶ Industries and businesses across the UK will benefit from increased access to international investment. Oxfordshire's internationalisation strategy and development of global networks with other global innovation ecosystems will draw attention to the UK from the international investor community. Oxfordshire will become a centre of excellence for international investment in transformative technologies for the UK, channelling investment into key industries across the UK.
- ▶ Oxfordshire can increase its contribution to the UK exchequer and continue to drive the UK's economic growth. Oxfordshire is already a net contributor to the exchequer. Improving productivity and generating transformative growth in Oxfordshire will increase Oxfordshire's total contribution to the UK economy.
- ▶ Oxfordshire's strengths in transformative technologies will be applied to develop solutions to the UK's Grand Challenges that can then be used across the UK. Oxfordshire is a centre of innovation in technologies that are shaping our futures. Innovation in these technologies can be applied and tested in Oxfordshire to develop solutions to some of the biggest challenges that are facing the UK, including clean growth, our ageing society, mobility and artificial intelligence. These solutions can then be used across the UK and internationally, solving real-world problems and improving lives.

Implementation and evaluation

This Local Industrial Strategy will set the direction for Oxfordshire's economy. Built upon solid foundations of clear evidence, it highlights where Oxfordshire and government will work together to maximise key strengths and tackle major challenges.

Governance

At the local level, the OxLEP Board will lead the implementation of this Local Industrial Strategy through its existing governance and delivery structures, embedding the Strategy's priorities into its annual Delivery Plan and wider programme of activity. OxLEP will also work closely through the Oxfordshire Growth Board to ensure the ambitions of the LIS are fully aligned with wider growth aspirations, as set out in the Oxfordshire Housing and Growth Deal. The Cities and Local Growth Unit will work with OxLEP to engage government in delivery at the local level as necessary.

At a regional level, the three LEPs and MCA, supported by the Ministry of Housing, Communities and Local Government Oxford-Cambridge Unit and Cities and Local Growth Unit, will collaborate through the Productivity Group of the wider Oxford-Cambridge Arc governance arrangements to deliver the shared Arc-level commitments, set out in all four Local Industrial Strategies for the Arc. This work will report to the Arc Leader's Board, ensuring this workstream is aligned to shared work

on place-making, connectivity and the environment, as well as central government's national governance structures, including the Local Industrial Strategy Implementation Board and the cross-Whitehall Oxford-Cambridge Arc inter-departmental board and Arc advisory group.

Funding

This Local Industrial Strategy does not include any new spending commitments outside of existing budgets. Instead, it will inform the strategic use of local funding streams and, where relevant, spending and decisions at the national level and provide a catalyst for UK and international investment from the private sector. It will also help Oxfordshire decide on its approach to maximising the long-term impact of the new UK Shared Prosperity Fund once its details and priorities are announced at Spending Review. These and other components will inform and underpin an Investment Prospectus to be developed by local partners allowing both the public and private investors to understand how they can invest in the region to achieve Oxfordshire's economic potential.

To demonstrate progress towards the long-term vision set out by this Local Industrial Strategy, the Strategy contains a number of specific actions. Where these actions are locally led, these will be drawn from local budgets which exist for those purposes with the objective of leveraging private investment and other resources; where actions are shared between Oxfordshire and government, they will be funded from existing local and departmental budgets, with funding allocated for those specific purposes.

This Strategy does not represent all the priorities and action being developed in Oxfordshire. As detailed in this Strategy, Oxfordshire will regularly review the latest evidence to continue designing the most effective approaches and interventions to be at the forefront of the future UK economy. This Strategy sets out long-term ambitions and will continue to evolve as the economy changes.

Oxfordshire will comply with all of the monitoring and evaluation requirements of each particular funding source, in addition to the wider requirement to monitoring the implementation of the Local Industrial Strategy as a whole.

Monitoring Outcomes

As well as setting out specific short-term actions, this Local Industrial Strategy has also set out Oxfordshire's long-term aspirations and the specific outcomes local partners are aiming to achieve. These will help guide future action and evaluate progress.

By 2040, Oxfordshire will aim to have secured:

- ▶ its position as a globally leading innovation ecosystem in pioneering transformative technologies which are powered by dynamic and successful businesses in highly integrated science and technology clusters, delivering international market leadership for the UK and creating growth and supply chain opportunities in Oxfordshire and across the country;
- ▶ a dynamic approach to growth which is inclusive and ensures that all communities across Oxfordshire have access to and benefit from the new employment opportunities and prosperity generated by a world-leading innovation ecosystem;
- ▶ recognition as a location which harnesses the dynamic potential of its science and technological innovation for the benefit of local residents, business and improved public services and an exemplar for contemporary living and design which delivers sustainable and flourishing communities;

- ▶ an employment and skills system which responds to local demand and harnesses business leadership to drive social mobility across Oxfordshire, creating pathways into employment and new careers opportunities into the global innovation ecosystem; and
- ▶ recognition as a location supporting progress towards carbon neutrality in a way that improves quality of life for residents, minimises the productivity impact on current businesses and maximises commercial opportunities across Oxfordshire.

In order to ensure the opportunities in this Local Industrial Strategy are met, Oxfordshire will monitor the progress of the outlined commitments by developing a local Implementation Plan setting out clear milestones, deliverables and timings for the actions set out in this strategy.

Evaluation

The government is committed to devolution where there is a strong evidence-base, robust governance and delivery track-record in place. Robust evaluation is an essential element of demonstrating the effective use of existing public funding.

Oxfordshire proposes that progress in meeting the area's Local Industrial Strategy ambitions is monitored through a two-pronged framework. First, there will be a set of SMART LEP deliverables, which will be measured and reported on as part of the LEP's Annual Delivery Plan. Second, there will be a set of wider economic indicators, which the LEP can track and report on, and which will – if deviating from projected trajectories – serve as a prompt for discussions with the OxLEP Board, Programme Sub-Group, government and other stakeholders around possible corrective action. It will examine opportunities to embed evaluation into programmes and policies where possible. The LEP will also continue to assess the latest evidence on 'what works' for interventions, in collaboration with independent experts.

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