

Our vision for the future city region 2070



Interconnected Responsible Balanced

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Towards 2070: a more balanced, resilient and interconnected London City Region

Five years ago, we published <u>London 2065</u>, a manifesto for the London City Region in which we argued for a joined-up approach to guide growth and infrastructure investment within and beyond the boundaries of the capital. We stand by the need for joined-up planning and delivery and the breadth of solutions we put forward. It is notable how the issues we drew out are more relevant now.

But the context has changed. The capital region has continued to drive the highest levels of growth in the UK. Until the coronavirus pandemic hit the global economy, the London 'megacity' region was also one of the fastest growing parts of Western Europe. Yet, that success has led to increasingly unbalanced growth; there are areas of both severe deprivation and of great wealth, and the overheated economy now means that the city — and increasingly the wider region — has become unaffordable for many.

Housing needs have not been met, transport infrastructure is at capacity and environmental resources are being sacrificed due to unbalanced land use planning. A higher than average level of public and private investment has flowed to Greater London to support growth because the returns in terms of value and outputs were so significant, though funding at similar levels has not followed to support those areas across the South East now experiencing pressure. Arguably, amidst this success, parts of the capital have been left behind and the prosperity of other regions and of the UK as a whole has been held back.

Our communities were badly shaken by coronavirus, but from the outset there has been a determination to use the recovery as a catalyst for change and emerge stronger as a more equitable society. The 'shock' of lockdowns and the adoption of new ways of working, as well as new priorities for businesses and Londoners alike, will influence how we reboot, to build back in a way that embraces opportunity but also makes us more resilient to the uncertainty that lies ahead.

Stimulus packages have supported the economy and new investment funding to back a green industrial revolution has been mobilised, but to make the most of these monies aligned decision-making processes across the city region is needed. Let's do this in a way that **creates sustainable legacies** and learns from the coronavirus pandemic.

So, the challenge for London is no longer to focus on being BIG, BOLD, and GLOBAL — three of the headlines of our London 2065 report. In an era of growing inequality, and to have a pro-active response to mitigating the impacts of climate change, we have reset those ambitions for London 2070. We need a city that is RESILIENT, RESPONSIBLE, BALANCED and INTERCONNECTED to reflect the evolving relationship between the capital and the towns and cities within the wider metropolitan area as well as the regions and nations of the UK, as we work together to achieve sustainable growth and meet ambitious net-zero carbon targets.

As the climate crisis intensifies, the concentration of growth in and surrounding London and the ability of the region to accommodate more in a sustainable way is under re-examination. The need to adapt to the effects of climate change and the national commitment to reduce carbon emissions to net zero also calls for a reassessment of how and where we grow, giving equal emphasis to environmental net gain and social considerations as we have done to the economy and productivity. Going one step further, we must also think hard about how to adopt circular economy principles into the way we design and build, and how we can rise to the huge challenge of retrofitting the region's legacy infrastructure.

Technology will provide some solutions. We are midway through an era of unprecedented technological development and the emerging digital economy will impact on all parts of the capital and how it operates, from the endless possibilities of artificial intelligence to renewable energies and new modes of transport. The London region will need to stay on top of these trends to remain an attractive, healthy and safe urban environment that draws talent and investment. The digital networks that kept us going through the coronavirus pandemic also accelerated the implementation of smart technologies, affecting everything from the way we live, work, travel and build.

Coronavirus has also sped up changes in other areas that might otherwise have taken decades to have a meaningful impact. This is particularly true concerning the way we work. Working from home has been tested at an international scale over a prolonged period and 'hybrid working' will be a major feature of our lives going forward. Working patterns and locations will change, triggering a comprehensive rethink of London's city centre economies, transport systems and initiating a renaissance of local high streets. It will also affect how we design homes and workspaces, as well as the physical and digital infrastructure that connect us.

The restrictions on movement associated with the pandemic also led to a re-evaluation of the value placed on public open space and the environment. To create attractive, healthy and safe places to live, our urban areas need to work more in tune with the natural environment in and around the city. This includes taking an integrated approach to managing the water cycle, enabling equitable access to high quality, biodiverse green infrastructure and adapting to the changing climate at the city and regional scale.

In this report, our 2070 vision starts with an overview of the three main challenges facing London today: inequality, the need for resilience, and connectivity. We then set out 10 big ideas for the future of the city region, covering economy, community, town centres, homes, healthcare, transport, energy and resources, food, water, and environment.

Whilst these ideas cannot be exhaustive, they highlight opportunities which should form part of a coordinated plan that can be progressed now for the long-term success of London and its city region. As with the *London 2065* manifesto, we deliberately set out to look beyond most policy makers' timelines in order to think beyond what has already been imagined.

If London is to retain its position as one of the most successful cities in the world, we need a wholesale evolution as to how we view 'success', and plan for the city's future where net-zero, social value and resilience principles are embedded in everything we do. To create a sustainable legacy for 2070, we need a joined-up approach that considers both London's relationship to its city region and its vulnerability within a changing world.

Challenges

Cities are constantly evolving — never more so than now. The London City Region is facing acute social, economic and environmental challenges caused by a combination of urgencies: recovery from the coronavirus pandemic, climate change mitigation and adaptation, and keeping pace with unprecedented technological change.

Today, the functional, economic and cultural city reaches well beyond the administrative boundaries of Greater London and the M25 and out into the Home Counties. In 2016, the London School of Economics coined the phrase The Greater Greater London (GGL) to describe this vast metropolitan region. Sitting within a 60-minute travel time radius from the centre of the city, the GGL is home to 20 million people and has complex commuting patterns, housing markets and reliance on the same natural resources, as illustrated in Figure 1. Building on our earlier *London 2065 Manifesto*, which was published in 2016, our focus in this report remains on this wider London City Region.

Historically, the challenges faced by the London City Region have originated from accelerated but unbalanced economic growth. Those challenges still remain, but have taken on a different hue since the pandemic: the adoption of new digital tools and travel habits suggest that there is a long-term and profound shift in the way we work and use our cities.

Our cities also need to adapt to the existential challenge of the climate emergency, with actions driven by formal declarations of governments and city mayors. London has not been built to deal with rising temperatures, unpredictable weather events and water scarcity. The city and its hinterland cannot ignore these issues, and the response must shape future development.

Crucially, these challenges can't be dealt with locally, or simply within Greater London. They require a joined-up approach to guide successful, resilient growth and infrastructure investment. Our recovery from the pandemic should be a catalyst to stimulate the adoption of new ways of living and working in this global metropolitan city region.

Yet, the acute challenges of redefining the city region post-pandemic and proactively addressing climate change are not being looked at holistically. The current decision-making system is not designed to optimise the potential of this highly-productive yet environmentally-stressed part of the UK.

In our London Manifesto 2065 we looked 50 years ahead, highlighting the lack of a joined-up, long-term approach to planning and investment, and suggested that the absence of an overarching spatial planning framework for the city region was making these greater-than-local issues with long term consequences difficult to address.

Five years on, now with a horizon of 2070, those challenges remain but have been amplified by profound technological, social and environmental priorities for action. The choices and bold moves we make today need to set in place a successful and resilient future for a London City Region which focuses on compact growth in the city and embraces the interconnected future of the wider metropolitan region.

In this introductory section we outline the key challenges facing this highly productive yet sometimes fragile city region that will impact future patterns of growth, development, protection and investment. Each of these challenges need to be addressed over the long term — which is why we have chosen a horizon of 2070. We focus on:

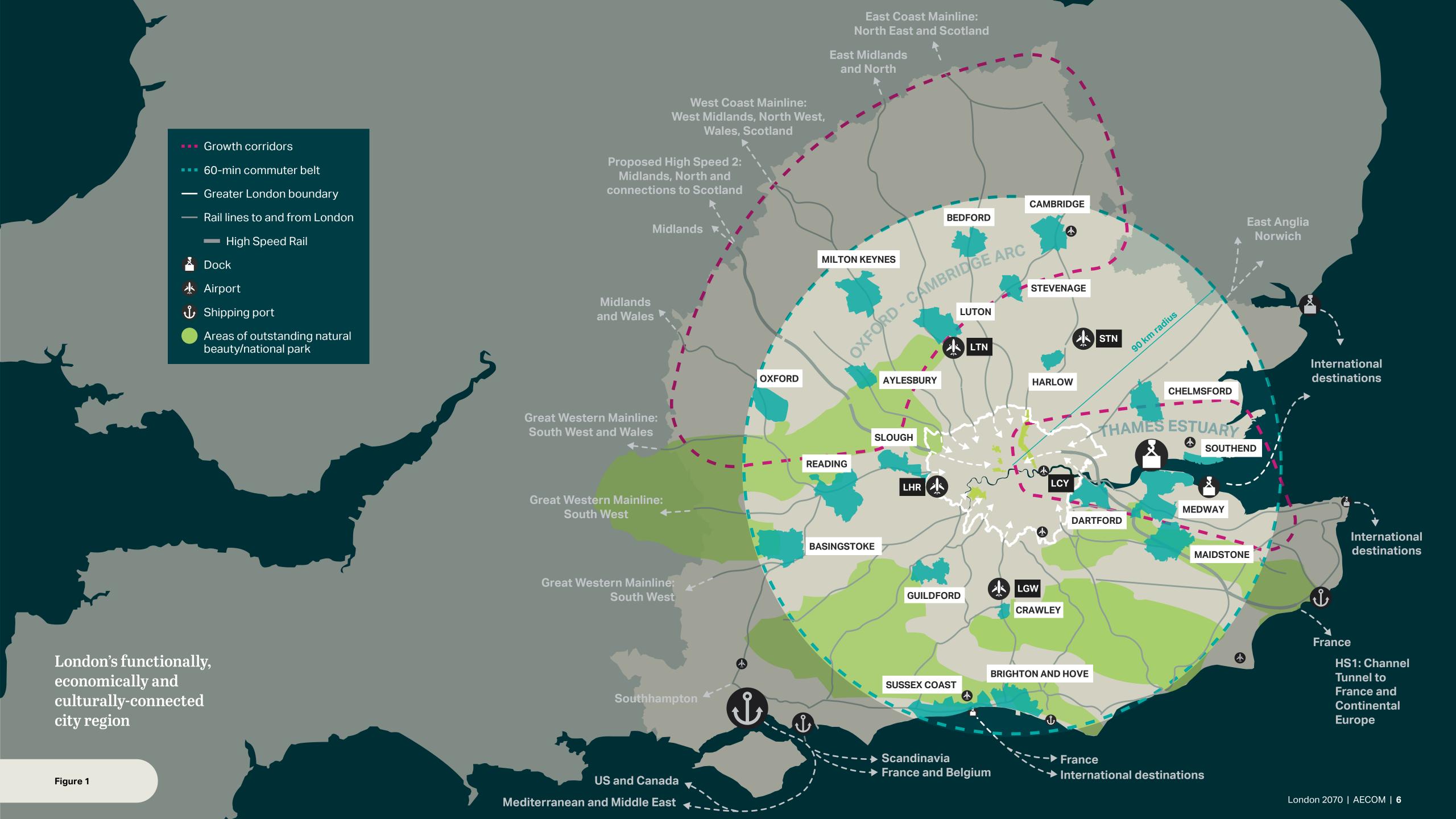
Inequality — both in the city region and between London and the rest of the UK

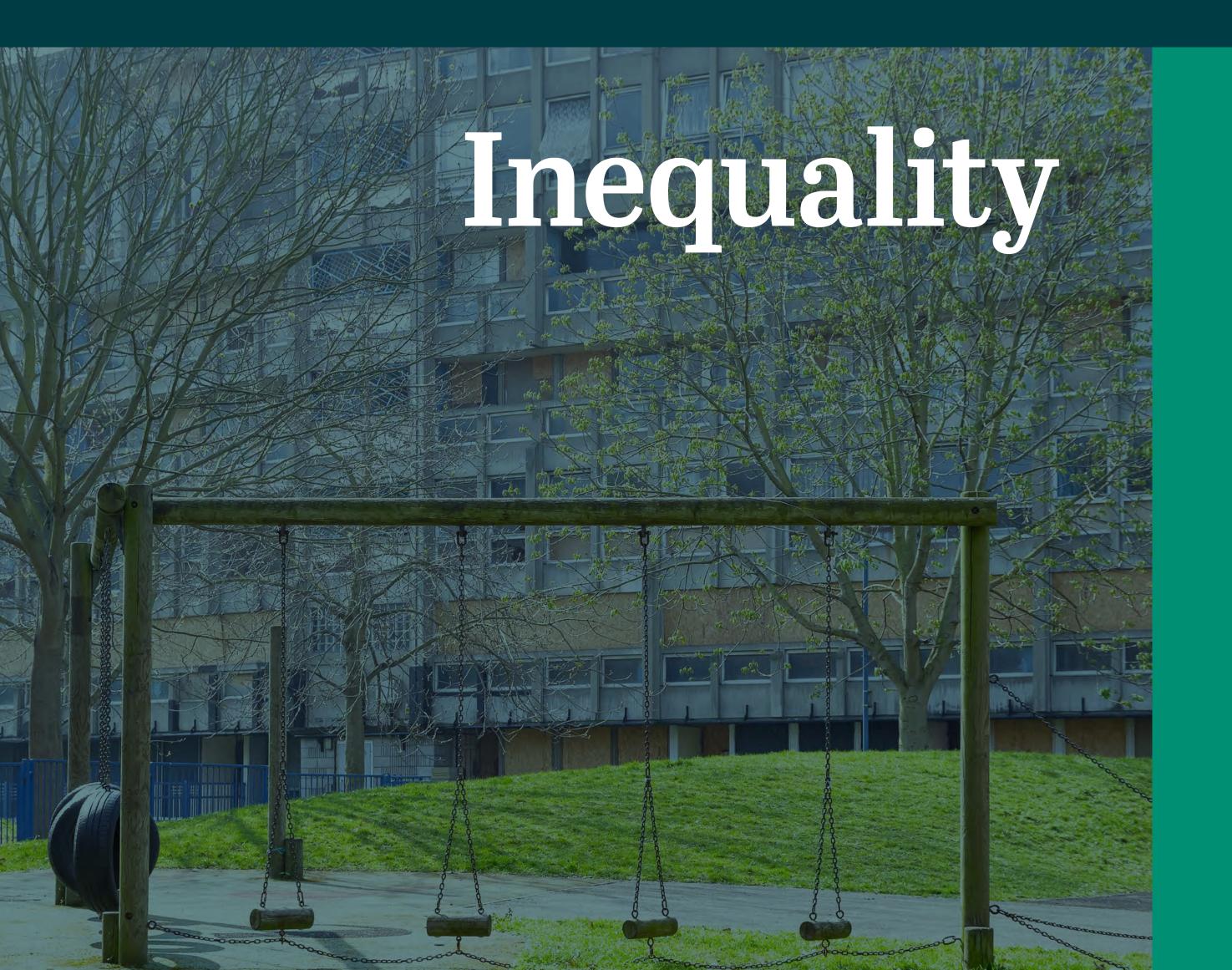
Resilience — and the capacity of the city to respond to, adapt, and recover from environmental and economic shocks

Connectivity — keeping ahead of rapidly changing technologies and travel patterns.

These challenges have informed the 10 Big Ideas we set out in the second part of this report that demonstrate our vision for a greater city region: an interconnected, balanced, resilient and responsible London 2070.

The 'Greater Greater London' coined by LSE
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London has been a centre for wealth, prosperity and culture for centuries. As with most metropolitan cities, wealth and poverty exist cheek by jowl.

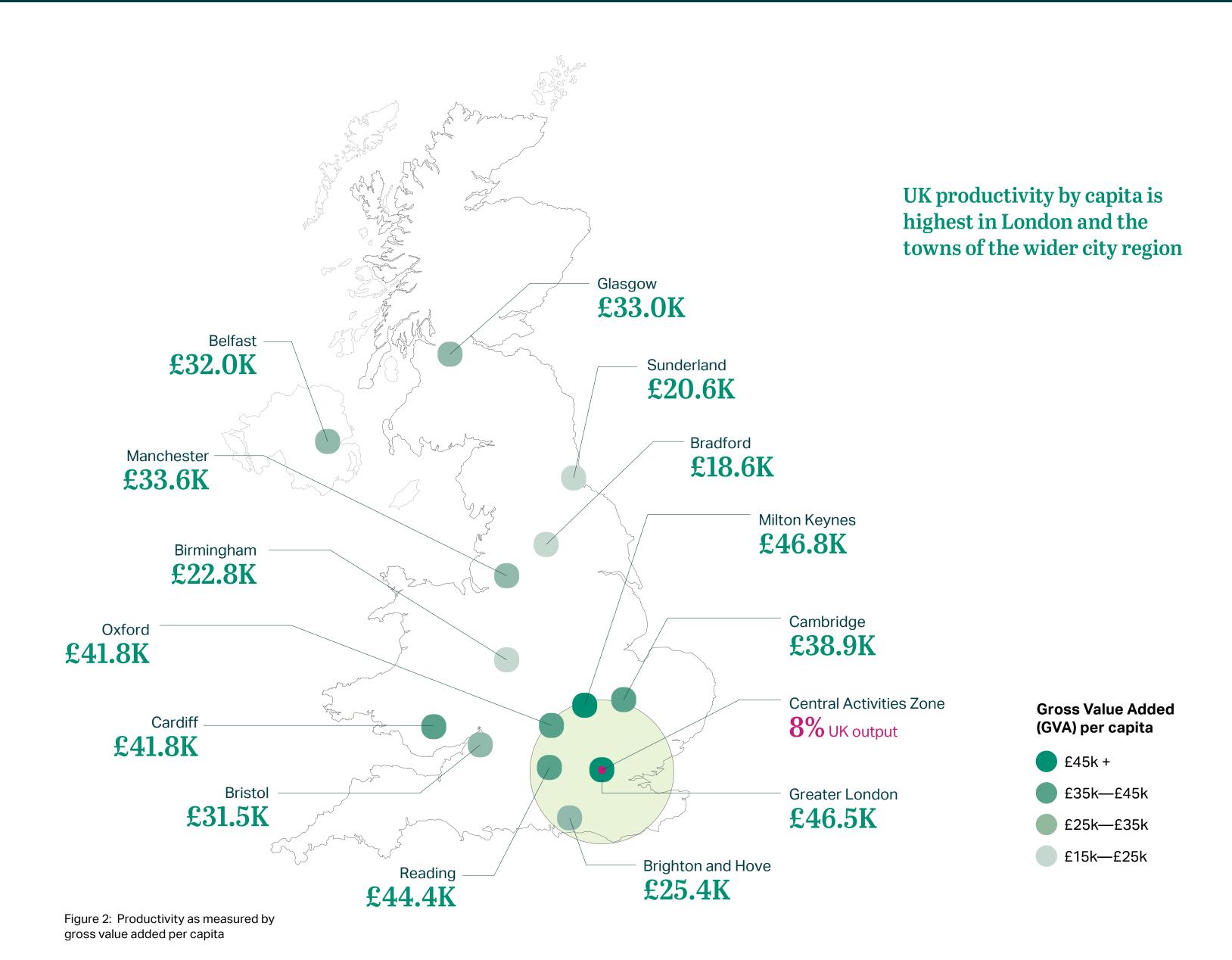
In recent decades this inequality has become entrenched as communities experience increasing levels of deprivation. Many people have been priced out of the city.

Nationally, the focus is on the disparities between London and other regions of the UK. These disparities are significant and structural; addressing them has led to a nationwide strategy of levelling up. 23

However, there are also profound inequalities within the London City Region that should not be overlooked in this national debate.

 Although over half of England's wealthiest communities are located within the capital and surrounding counties, pockets of relatively high deprivation can be found across the region. Across the UK, and no less so than within the generally prosperous and productive London and South East, inequalities are greater within regions than between regions. At the same time, the London City Region is a critical driver of the national economy.

- Before 2020 when its visitor and commuter-driven economy was heavily hit, London's internationally-recognised Central Activities Zone (CAZ) alone accounted for nearly eight per cent of the UK's output, with some of the highest productivity rates in the country. But, beyond the CAZ, there are pockets of deprivation across many communities in London particularly to the east of the centre and out into the Thames Estuary.
- The London and South East economy accounts
 for 40 per cent of national output and is the most
 productive part of the UK (illustrated in Figure 2).
 The region is home to many growing advanced industrial
 and knowledge economy clusters that thrive on a
 combination of world-class research universities, access
 to global markets via Heathrow and the region's other air
 and sea ports, as well as proximity to the City of London.
- This economic growth was supported by a greater per capita share of private and public investment compared to other parts of the country, which in turn fuelled further economic growth and investment, but also exacerbated intra- and inter-regional inequalities.
- This growth also contributed to an overheating of the regional economy, bringing with it critical affordability challenges measured by property-price-to-earnings ratio. The ratio has worsened due to the increase in employment opportunities combined with a shortfall in new homes. Across all of the London boroughs and much of the wider city region, home ownership and renting is less affordable for those on average incomes.





To balance growth effectively and make informed choices about priorities for infrastructure investment, we need to ensure transport and digital connectivity open opportunities to reduce inequality and offer wider opportunity within the capital.



Following the extended periods of lockdown, life in the suburbs and beyond became more attractive, leading to a movement away from the city and out to regional towns. If this trend continues, it may well change the dynamic of opportunities in London in the medium- to long-term as new high value employment opportunities emerge outside of the CAZ.

To balance growth effectively and make informed choices about priorities for infrastructure investment, we need to ensure transport and digital connectivity open opportunities to reduce inequality and offer wider opportunity within the capital. We also need to look beyond current administrative boundaries to understand how investment can benefit a wider metropolitan city region and the UK more widely.

Importantly, infrastructure investment should not be a zero sum game; more balanced investment priorities would lead to more balanced — and therefore more manageable — prosperity, and an overall increase in investment.

For the London City Region to achieve its regional economic ambitions, investment is also required in the Midlands and Northern English regions, as well as all areas of the UK: an interconnected and complementary UK economy that is more balanced could help reduce the impacts of previous overheating in the South East.

The inequality challenge has several dimensions. We expand on only a few here, to illustrate the issues.

The UK2070 Commission has investigated the deep-rooted inequalities across the UK.



Economic inequality

Prosperity in the capital and the relatively affluent home counties masks pockets of deprivation. London and the wider city region is home to some of the most deprived communities in England.

Most pronounced are parts of East London, in which the Office for National Statistics Index of Multiple Deprivation identifies

- Barking and Dagenham and Hackney as being within the 10 most deprived authorities in England, and
- Islington, Newham and Tower Hamlets within the top 32 most deprived areas nationally.

Much has been achieved through a focus on long-term regeneration programmes that address economic, social, health and educational issues — the work of the London Docklands Development Corporation, and the legacy of the London 2012 Olympic and Paralympic Games are high profile examples. While there has been a lot of progress, much remains to be achieved, although it is notable that only Newham, and Barking and Dagenham have been identified as Priority 1 areas for the government's 2021 Levelling Up Fund.

These issues are not confined to the urban city communities however, with inequality pronounced in

- peripheral coastal towns (in the Thames Estuary and into Essex but also further afield on the Sussex coast), and
- older industrial towns at the edge of London's sphere of impact (including Northampton, Peterborough, Corby, Kettering, and Wellingborough)

where connectivity to current and future economic drivers is weakest.

Furthermore around 40 per cent of residents within Greater London identify as having a Black, Asian or minority ethnic (BAME) background.

- When mapping the 20 per cent most deprived communities in London, 51 per cent of residents identify as coming from a BAME group. When mapping the 10 per cent most deprived communities the number of residents belonging to a BAME group rises to 58 per cent (as illustrated in Figure 3 overleaf).
- The economic implications of the coronavirus pandemic have also impacted most heavily on those in the least prosperous communities, with inequalities deepening.

Recent research by Centre for London has identified that mixed minority ethnic groups were most likely to have experienced a decline in income during the pandemic and that only 38 per cent of Black, African and Caribbean respondents had "enough to get by" compared to around 50 per cent of white respondents. ⁷

The impacts are, however, much wider than economic, reaching deep into health, wellbeing, community cohesion as well as skills, education and training. As we look to the future sustainable growth of London, these inequalities must be addressed so that all residents have equal access to educational and employment opportunities.

Without intervention, there's a risk that imbalances will become more pronounced. If the region is to function as a balanced economic ecosystem, we cannot allow vulnerable communities to drop further behind. 40%

of residents within Greater London identify as having a Black, Asian or minority ethnic (BAME) background.



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Inequality of public investment

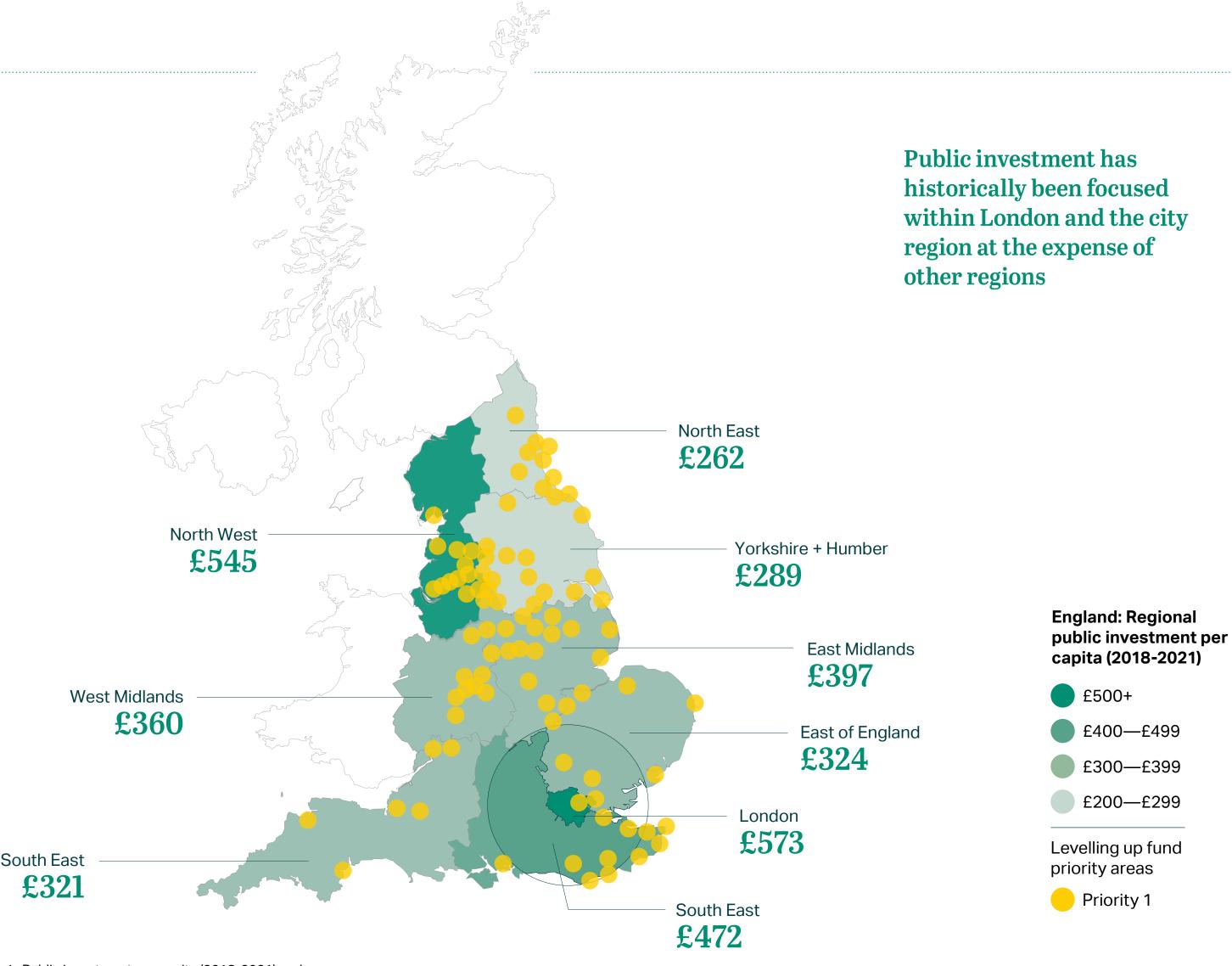
Historically, infrastructure investment has been imbalanced — supporting the strongest prospects for economic growth but not focusing on areas which need the investment to address growing inequality.

- According to research by the UK 2070 Commission, central and local government annual investment has been £573 per capita in Greater London and £472 per capita in the South East. By contrast, the North East and Yorkshire and the Humber have received about half of London's per capita investment (as illustrated in Figure 4).
- This historic approach to public investment has meant that at a regional scale, places outside London and parts of the South East have not seen the investment needed to address structural economic issues. Meanwhile growth in London and parts of the South East has been intense and led to often-hidden inequalities as people find it unaffordable to live in the city and wider areas of the region.

£573

Central and local government annual investment per capita in Greater London, according to research by the UK 2070 Commission. £262

Central and local government annual investment per capita in the North East, according to research by the UK 2070 Commission.



Recognising the interregional imbalances, government has placed a renewed focus on levelling-up investment and a recalibration of the criteria of the Green Book (guidance issued by HM Treasury on how to appraise public policies, programmes and projects). The Levelling Up Fund also seeks to invest public resources in places outside the generally prosperous city region, with only two London boroughs and seven city region authorities in the 123 first priority of places eligible to receive support and investment in the first round.

- While greater investment is being directed to regions across the UK, the approach still prolongs the issues that have plagued infrastructure investment for the past few decades and raises two key issues.
 - First, the fund is looking to local schemes within specific areas, and not the interconnectedness between boroughs or across the region. It also perpetuates the zero-sum approach to infrastructure investment with local authorities competing for a slice of the pie. London should continue to receive investment funding, but this investment funding should be spent on a city region level.
 - Secondly, the future is not just about levelling up.
 Other priorities that support balanced economic and housing growth must also be considered. 58 per cent of the government's identified local housing need is expected to be delivered in the region surrounding Greater London to support leading industrial growth sectors. How can the region meet these needs if infrastructure investment is channelled elsewhere?

- Increasing the levels of UK regional investment to match Greater London's historic levels will support the creation of a more balanced national economy, drawing out latent opportunity in England's regions, as advocated by many commentators.
 - However, this should not be at the expense of continuing investment in and around the capital.
 As a driver of the UK economy, London must thrive. Investment is needed to remodel existing aged infrastructure, reduce inequality in the region, and address the pressures of growth on local communities and the environment.
 - As part of national plan, this rebalancing of investment priorities across a wider metropolitan area is particularly important so that the region is well placed to manage the economic and population pressures that Greater London cannot handle

 in addition to accommodating already high levels of high-productivity locally-driven growth.

Government priorities and structure of the Levelling Up Fund will mean that the city region will likely receive less public investment and many of the local areas that have been left behind will continue to struggle. If we are to optimise the economic potential of the London City Region and not exacerbate existing affordability challenges thereby increasing the risk of leaving deprived communities further challenged, then regional investment in digital, transportation, environmental and social infrastructure is critical.



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Housing inequality

The lack of balance in London and the risks to the capital's future economic and community health are seen starkly when we look at the inequality in housing. London's housing market is increasingly not fit for purpose.

Over the last two decades, housing unaffordability has become most pronounced in London, driven largely by increasing house prices that do not match average wage growth. The Housing Affordability Property Price to Earnings Ratio (Figure 5) illustrates how impactful this issue is:

- In 2019, eight of the ten least affordable local authorities in England were in Greater London, with one in the surrounding South East.
- While the wider city region is more affordable than Greater London, 82 per cent of authorities have property-price-toearnings ratios above the national average.

82%

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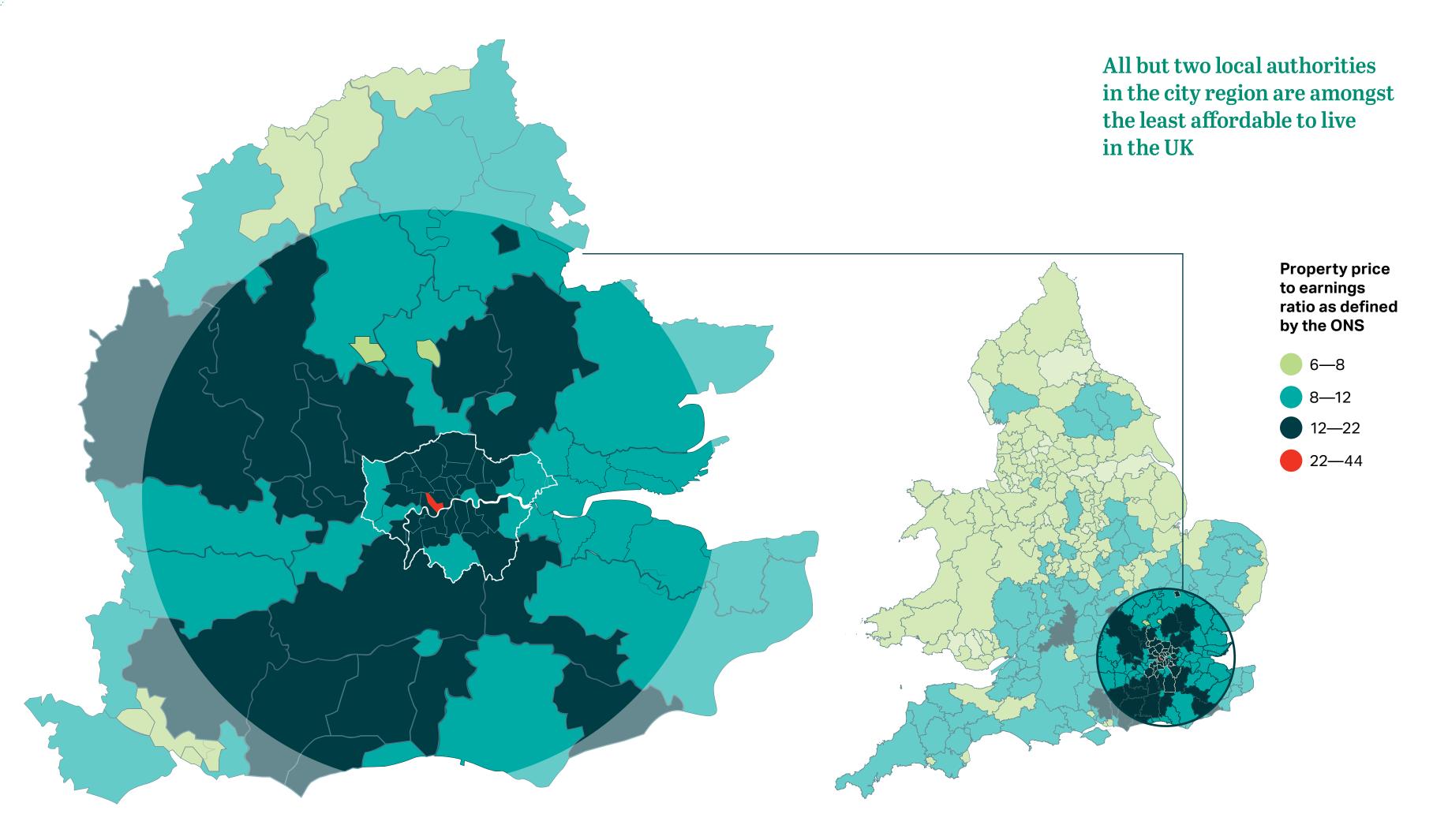


Figure 5: Housing affordability property-price-to-earning ratio as defined by the Office of National Statistics (ONS)

Whilst this pattern was disrupted in 2020, with a marked flight to the suburbs and to country towns with Londoners in search of more internal space and gardens during lockdowns, there are early signs that the established patterns are returning.

- Hampton's analysis ¹⁰ reveals that over 70,000 home moves were made by Londoners into the wider city region during 2020 and although the quantum of home moves is consistent with the pattern seen in recent years, the trend is for longer-distance moves, with the median jumping from 30 miles in 2019, to 40 miles out of the city (beyond the Green Belt) in late 2020.
- London sale and rental prices fell throughout 2020, with Zoopla reporting average rents dropping by five per cent in Greater London (in contrast to approximately two per cent growth in the rest of the UK).
- Into 2021, with the prospect of lockdowns lifting, footloose renters quickly began repopulating the city often choosing better homes than they would have previously been able to afford. ¹¹ This early marker suggests a business-as-usual approach will return as the development market recovers, and the pace and location of new housing will once again fall short of meeting identified need, reinforcing historic inequalities.

However, this period also resulted in falls in income for those most impacted by inequality. The real gap between the richest and poorest is opening even wider as access to decent housing remains limited for essential and key workers as well as those earning more than average. Where this continues to polarise, London — and increasingly the wider city region — will not be able to contribute fully to recovery and sustainable growth of the UK as the very employees who will fuel that growth will not be able to live within commuting distance of work. This remains an issue that demands intervention alongside the national levelling up agenda.



Inequality through a failing housing market

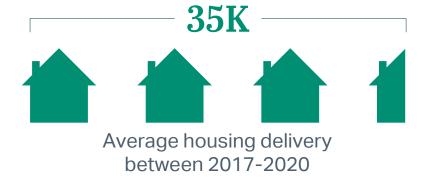
An unaffordable London is not a new phenomenon.

- Over decades, Greater London has consistently failed to meet its own housing targets, as well as its identified housing need.
- Progress has been made in recent years. 40,000 new homes were built in Greater London in 2019/20, 25 per cent of which were affordable.
- However, the goalposts have also moved. The 2021 London Plan has a target of 52,000 homes per year, but this figure is 21 per cent lower than the 66,000 per annum target estimated by City Hall in its Strategic Housing Market Assessment.
- The 2021 London Plan target is also 52 per cent below the government's housing need estimate of 93,500 homes per annum as per its standard method. 13 The government's emerging planning reforms will

make it easier to convert retail and commercial space to residential use thereby increasing delivery. While these reforms will likely change the opportunities and character of town centres, they are not necessarily accompanied by the tools to plan carefully for the longer term.

- With an average of 35,000 homes per annum built in the capital over the three years before the pandemic we could see potential unmet housing need of between 17,000 to 58,500 homes each year if this rate continues (Figure 6).
- The wider context is also important. The metropolitan region is also seen as a key location for housing delivery in the government's Standard Method. 58 per cent of the government's identified local housing need is expected to be delivered in London and the wider South East.

There is an equal expectation on London and the high-growth areas surrounding to capital to step up housing delivery. However, the region is not prepared.



London's lack of affordability is compounded by a failure to deliver enough homes annually to meet growing demand



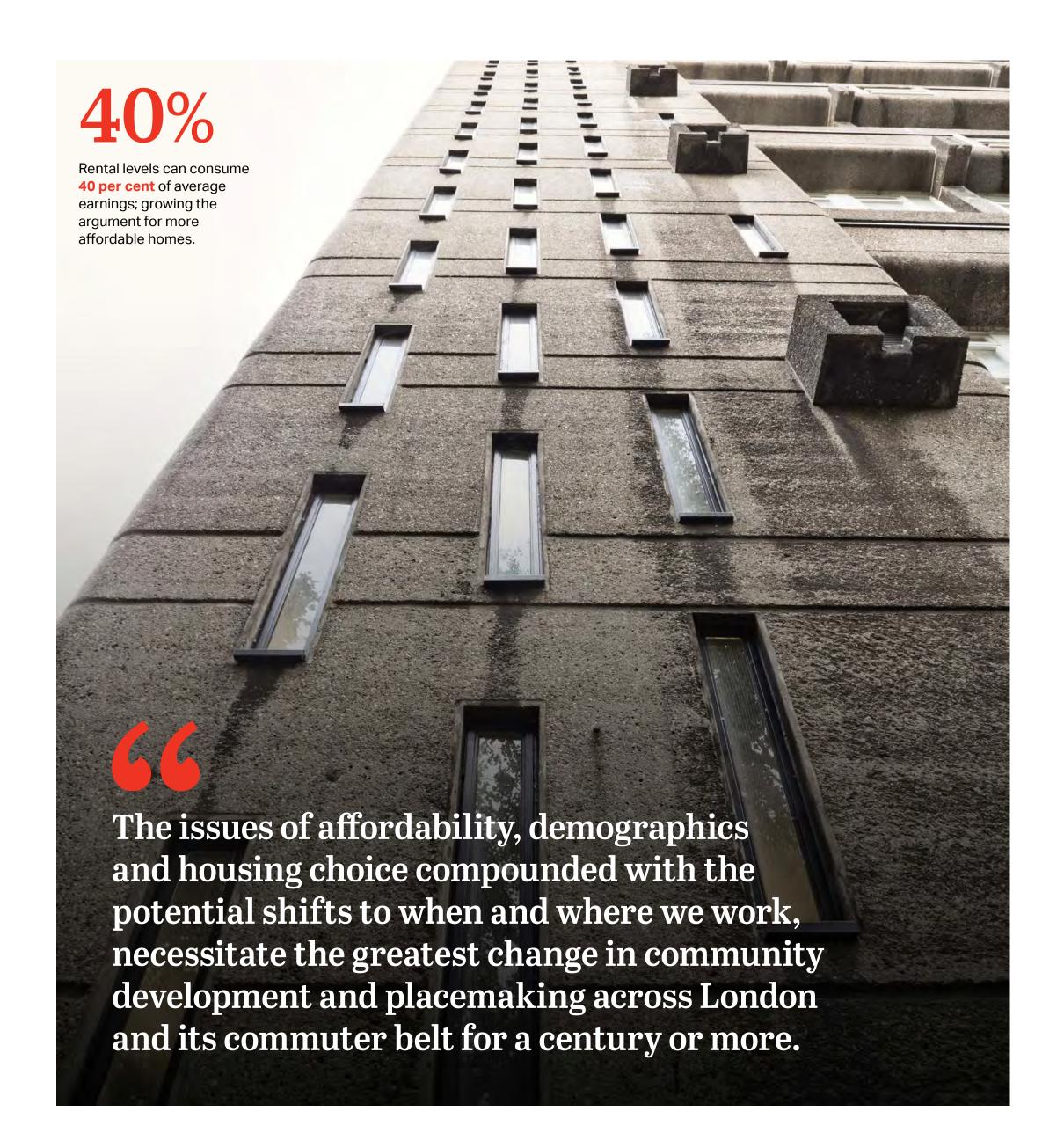




Figure 6: London's housing delivery shortfall

between 2017-2020

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Compounding existing affordability issues, the housing shortfall leads to a ripple effect, as citizens leave the capital for more affordable locations. While this exodus has the potential to support balanced national growth, it cannot be the solution: the capital still needs to attract essential workers — the very people that are going to drive the future economy of London and the high-growth sectors of the wider region but are least able to benefit from the rise of remote working — not to mention fresh talent. With unmet demand, Londoners still need homes.

Those frozen out of the possibility of homeownership will have an increasing reliance on long-term rental tenure options. This is particularly acute within Greater London, where house prices are as much as 15 times the average salary, and rental levels can consume 40 per cent of average earnings; growing the argument for more affordable homes, good quality rental options and a greater focus on complete community development encouraging renters to put down roots locally.

We should also consider the impact of a housing delivery shortfall on future travel patterns. Although it will take time for confidence and ridership on public transport to grow back following the pandemic, we are likely to see a return to long-distance commuting for at least a few days a week — supported by the advent of two- or three-day per week season tickets introduced by Great British Railways — for an increasing number of Londoners living in the wider metro region.

As ridership returns, there will be resultant pressures on already overstretched arterial transport infrastructure, as well as increased development pressure on valuable rural environmental assets at the urban margins. This should not be the pattern of future growth aspired to if we are to move to a lower-impact and net zero carbon city.

The housing issue is complex and has knock-on impacts across all aspects of planning for sustainable future growth. London authorities will need to work with their neighbours in the wider metropolitan region — and beyond. There is already a focus on accelerating delivery by unlocking land in the capital for new homes. Infrastructure investment again comes to the fore with mayoral programmes, with Homes England getting more involved in supporting delivery of London projects and the anticipation of a new home building fund from central government.

This effort must be accompanied by a more collaborative relationship between the capital and the wider city region to bring about a balanced polycentric urban structure, with infrastructure investments aligned with planned housing and economic growth.

It will also require more contentious conversations around the role of the Metropolitan Green Belt and how this may need to evolve looking to our horizon of 2070. Continuing to avoid the need for a strategic review of the designations around the capital is not tenable when the consequences are leading to urban growth patterns which often create unsustainable communities, threaten good quality agricultural land, as well as encouraging more long-distance commuting.

Without a strategic review, we will see a constrained housing supply and a failure to deliver enough homes. This will impact placemaking, quality of life and equality throughout the region. The issues of affordability, demographics and housing choice compounded with the potential shifts to when and where we work, necessitate the greatest change in community development and placemaking across London and its commuter belt for a century or more.



The capital region must be ready to respond to events that acutely impact the environment, economy and the health and wellbeing of its citizens.

From extreme weather events and the impacts of the pandemic to the onset of the Fourth Industrial Revolution (and the emergence of the Fifth), the frequency and unpredictability of shock events and growing systemic challenges is on the rise. The capital region needs to be more resilient to the effects of change. It must also be ready to respond to events that acutely impact the environment, economy and the health and wellbeing of its citizens.

London's transport, utility and social infrastructure has served us very well in the past. Some elements are now nearly two centuries old and are creaking at the seams. Often operating at or above capacity, they are expensive to maintain and difficult to upgrade.

Whilst newly-built cities come 'smart-ready', London is simultaneously adapting layers of essential infrastructure while constructing new landmark schemes such as Tideway and Crossrail. Given that the capital relies heavily on the reliability of its infrastructure systems and that the majority of the infrastructure it will call on in the next century is already in place, infrastructure adaptation is vital to ensure long-term resilience.

The resilience challenge is multi-dimensional.



Climate resilience

Climate change is the greatest challenge of our time and the London City Region must ensure its infrastructure is prepared.

The world remains locked into a degree of warming along with the associated impacts this brings. 4 As the climate shifts, the region is increasingly vulnerable to floods, extreme cold, windstorms and drought. By 2070 seasonal average temperatures could rise by as much as 5.4°C during the summer.

Hot spells expected once every four years in 2000 could become a yearly occurrence by 2070. London's infrastructure isn't built to cope with this. Much of the capital is founded on clay and intense temperature changes bring a risk of subsidence. Furthermore, much of our housing stock — predominantly reliant on fossil fuel sources of energy was built to retain heat.

Because of the number of variables involved, predicting the consequences of climate change is an ongoing challenge. However, the scale of the potential impact is such that we must make urban infrastructure more resilient and put in comprehensive plans to be prepared for and be able to adapt to expected threats, building on but also going beyond existing resilience planning.

The top-line challenge is to decarbonise our travel, workplaces and homes to meet national commitments to reach net zero by 2050 and mayoral commitments to achieve this by 2030, while the longer term challenge up to our 2070 horizon is to go beyond net zero and start to restore the climate by creating an environmental benefit by removing additional carbon dioxide from the atmosphere.

In the meantime, we must adjust every aspect of the city to the impacts of climate change on urban life, resources and the natural environment.

Building resilience to anticipate, absorb and recover from the effects of climate related events will require careful thought into how we live as individuals and society, how we value energy and resources, resulting in behavioural change. 15 Moreover, we need to rethink how we design and manage our city environments. Meeting this ongoing challenge is at the top of policy makers' agendas but success will require a shift in the way we manage future growth and a reassessment of what makes a successful, liveable city.

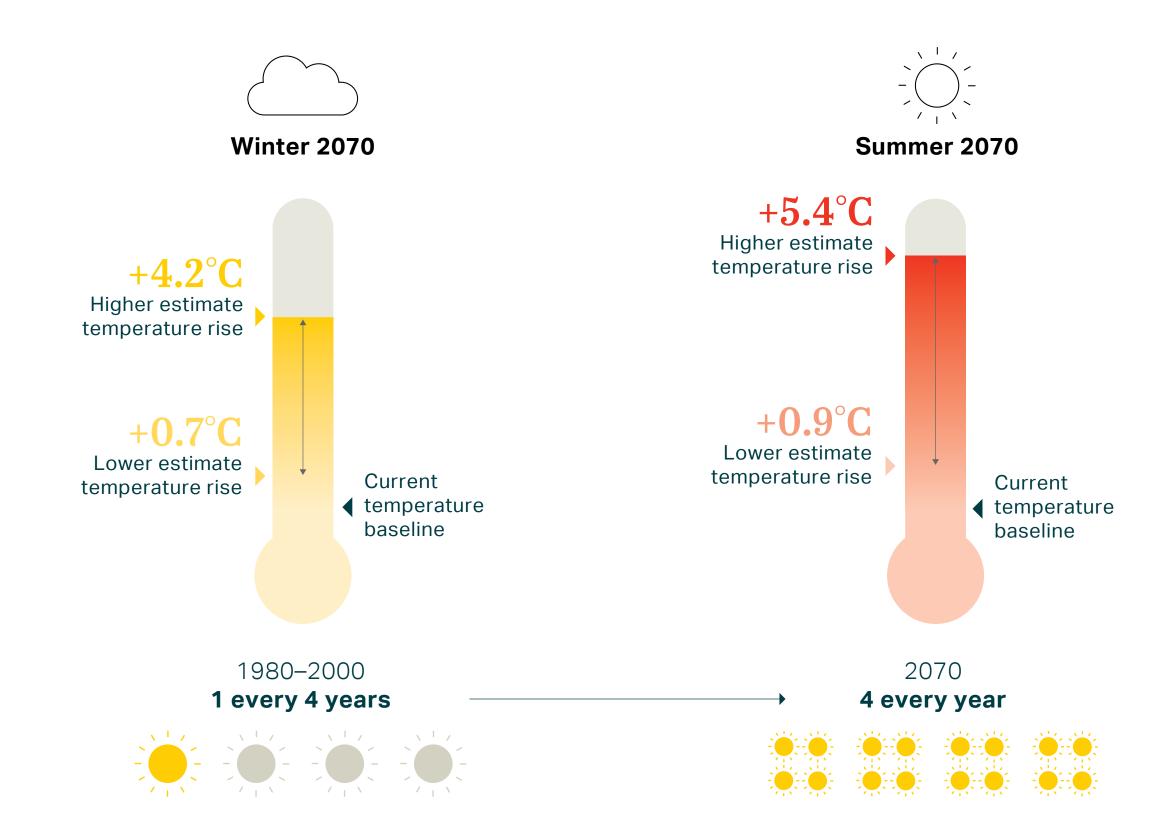


Figure 7: Projected winter/summer temperature increase and hot spells frequency by 2070

Water resilience

One critical element is water — a resource we can simultaneously have too much of, and too little. South East England is the most water scarce and densely-populated part of the country, and without significant changes to the way we use and value water, there will be severe water shortages in the future. Figure 8 (overleaf) highlights the challenges. On the one hand, the areas of central London, east London and the Thames Estuary are at risk of flooding and are dependent on flood defences to protect citizens. On the other hand, many of the denser developed parts of the city and region have less than 30 per cent water abstraction capacity, threatening future potable water supplies for existing homes and businesses as well as habitats and valuable environments. This shortage also challenges the capacity of the region to accommodate future growth.

Currently, urban areas rely on water abstracted from rivers and groundwater, but urban growth demands are steadily exhausting these sources and climate change is slowing down how fast they are replenished, reducing overall supply resilience. Increasingly, we will be reliant on water management, transfers and behavioural changes to meet the region's water needs.

Hot, dry summers and warm, wet winters will result in greater frequencies of both drought and flood events, which will threaten the natural and built environment.

Rising sea levels and dramatic tides are putting the Thames Barrier under increasing pressure. The possibility of a tidal surge — which could result in a catastrophic flood along the Thames Estuary, devastating coastal regions in Essex and Kent and large areas of central London — is influencing how we manage water and seek to grow the region on a fundamental level, particularly Thameside East London and the regeneration opportunities across Kent and Essex.

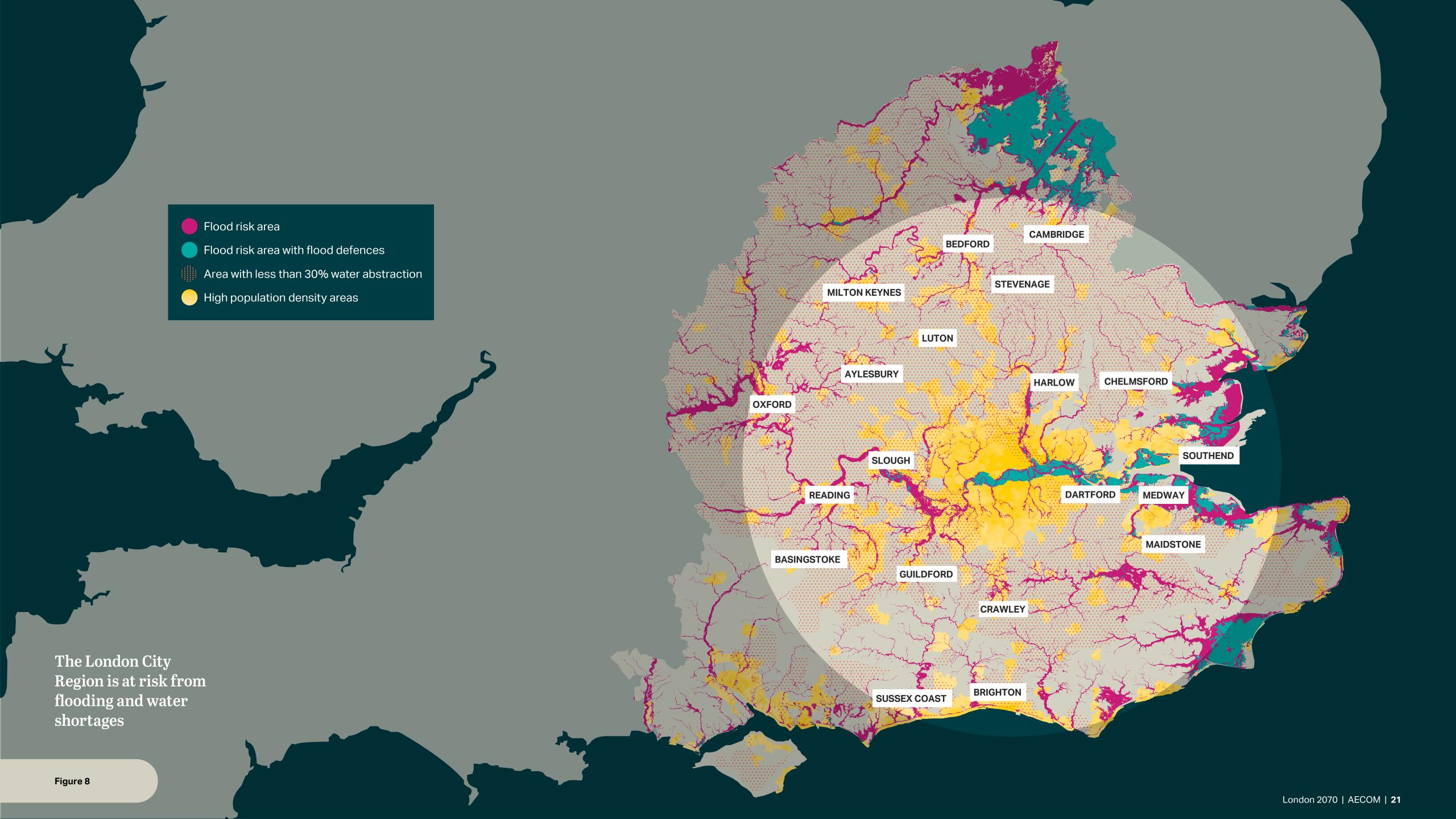
The issues are well understood. The Environment Agency Thames Estuary 2100 Plan, ¹⁶ which looks primarily at tidal flooding, highlights the challenge of climate change combined with aging defences. The plan suggests a flood management system which is adaptable, can be maintained and does not threaten the ecological balance of the Estuary, with an ongoing programme of local and Estuary-wide interventions for flood risk management to protect our urban and natural habitats and by 2070 — the horizon of our outlook — with one of the long-term options a second barrier at Long Reach, near Dartford.

But the solutions are not all driven by large-scale infrastructure investment. Demand for water will inevitably increase unless we radically revisit how we value this cheap and previously plentiful resource. Solutions start with learning to use less water and designing for scarcity: by finding ways to reuse what we have in local areas which should influence how new development is designed; by implementing innovative programmes to move water to the city region from other parts of the UK; and by accelerating investment in reservoirs and water treatment facilities to protect the environment and maintain supply needs all year round. Rising sea levels and dramatic tides

are putting the Thames Barrier

under increasing pressure.

Thames Estuary 2100 Plan, Environment Agency, 2012
London 2070 | AECOM | 20



Natural capital resilience

We must also re-evaluate our relationship with the natural environment. The scale of the challenge will require greater creativity in how we view and invest in the unbuilt and natural environments of the city region; in particular we will need to create incentives for investment and protection of the unbuilt environment for environmental enhancement, strategic biodiversity net gain and nature responsive solutions.

Of equal importance is an appreciation of the social value of accessible natural resources, green space and the public realm. As the stay-at-home requirements of the coronavirus pandemic put into stark relief, accessibility to green space is critical for citizens' health and wellbeing particularly for those living at density in the heart of the capital. Yet, as Figure 9 illustrates, in the last decade Greater London lost eight per cent of publicly accessible green space, with cities across the region also experiencing a three per cent decline.

Experience during 2020 demonstrated the need for long-term investment in public open space, on an equal footing to investment in housing or economic and infrastructure assets.

The starting point in valuing unbuilt land assets is to protect and manage better what we have. Tougher policies and visionary solutions are needed to better balance environmental, community and economic growth ambitions to underpin future sustainable growth.

To truly value green and blue infrastructure the city region needs a more-than-local approach. We need to connect individual initiatives such as the proposed South Essex Estuary Park, ¹⁷ with London National Park City, ¹⁸ the All London Green Grid (which is embedded in the 2021 London Plan 19) and complementary proposals across the region. A city region approach to investment in natural capital would allow us to look at the amenity value of this type of investment alongside the opportunities for transformative environmental and biodiversity net gain as well as the wider benefits related to climate change, water management, connectivity, and health and wellbeing.







As the stay-at-home requirements of the pandemic put into stark relief, accessibility to green space is critical to health and wellbeing, particularly for those living at density in the capital. Yet, Greater London has lost eight per cent of publicly accessible green space in the last decade, the most of any English city.





Figure 9: The decline in accessible green space in England's major cities



Economic resilience



The concept of resilience applies equally to economies as to environmental systems, as highlighted by the ongoing impacts of coronavirus. The capacity to resist shocks and to recover employment will be critical as the global economy readjusts and recovers from the pandemic and as the UK builds new trading relationships post-Brexit.

City streets fell silent across the country in the wake of national lockdowns. London's Central Activities Zone (CAZ) was hit particularly hard and demonstrated the vulnerability of the hospitality, culture, leisure, and retail sectors which make up nearly a quarter of the central London workforce.

In addition, centrally-located office workspace sat unoccupied for months leading major employers to consider downsizing HQ functions as lease breaks allow. Companies such as Google, major banks and professional services firms which underpin the CAZ economy all indicate that flexible working will continue beyond the pandemic. Furthermore, the UK's new trading relationship with the European Union will also mean a readjustment for the capital's financial sector.

Resilient to a rapidly changing economy

By 2070, most of the jobs we are familiar with today will be either obsolete or changed beyond recognition. Much has been written about the impacts of automation, digitalisation and the need to adapt to the Fourth Industrial Revolution. The same is true as we anticipate the imminent arrival of the Fifth Industrial Revolution that will bring augmented reality, big data, virtual reality, artificial intelligence and cryptocurrencies to our homes: in a marked divergence with previous shifts, these new technologies will disrupt every aspect of life, not just the workplace.

Disruptive technologies, automation and artificial intelligence are already changing our economy, lifestyle and the work environment. Jobs and businesses are becoming more agile, with employers looking for well-connected, flexible, collaborative and cost-effective locations.

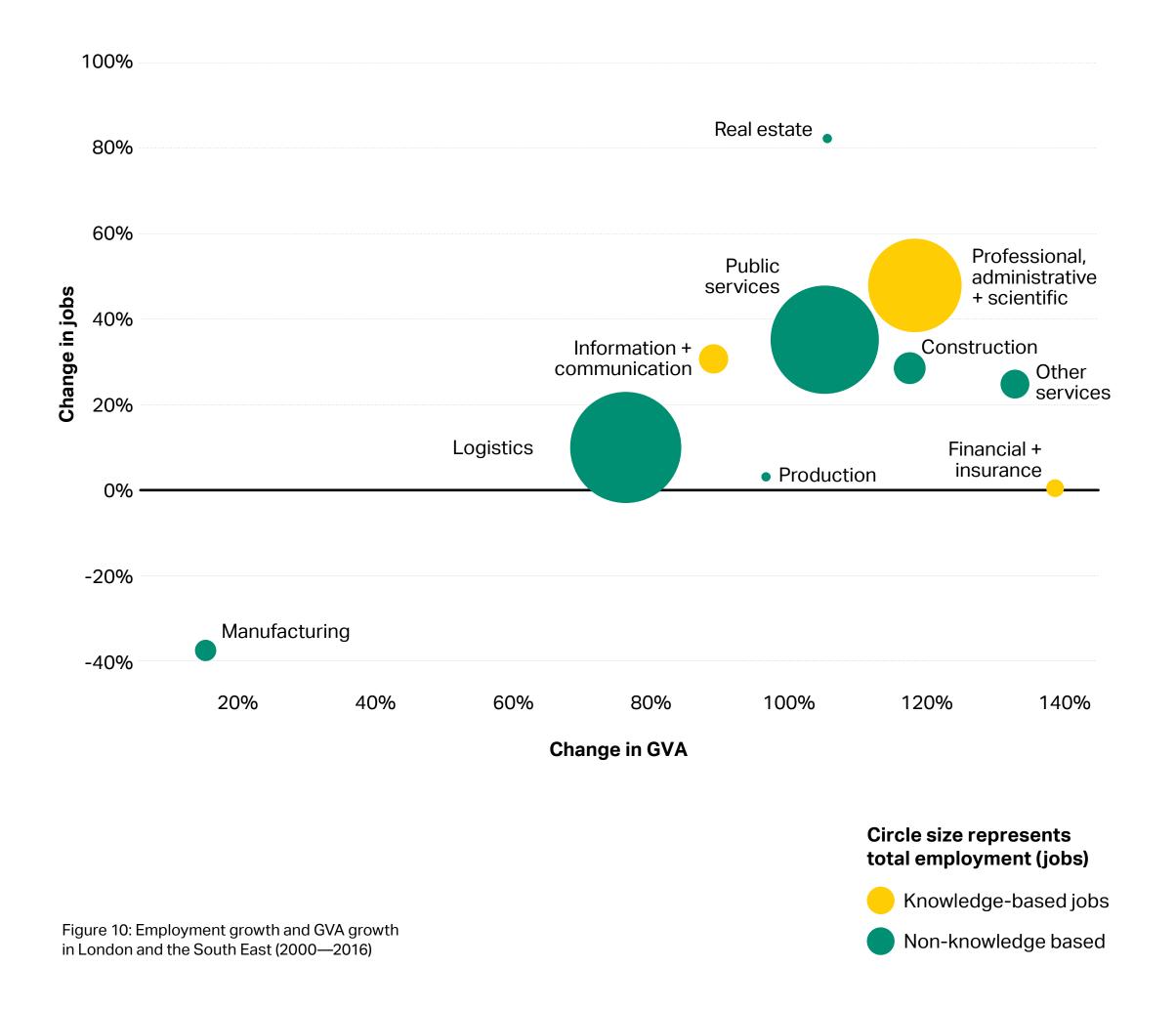
Some employees will have greater choice over when, where and how to work, with 5G (and the rapid arrival of future generations of digital communication technology) changing permanently the relationship between how we work and where we live.

Other employees will not have that choice. A third of jobs in London could become automated, and the impact will not be felt equally. Workers in low and medium-skilled professions are at highest risk, particularly those in manufacturing, distribution, construction, and some service-based sectors.

Growth of the London and the South East economy is already tied to sectors which are drawing on technology and knowledge-based employment (Figure 10).



Jobs and businesses are becoming more agile, with employers looking for well-connected, flexible, collaborative and cost-effective locations. Employment GVA growth in London and the city region is increasingly being driven by knowledge-based jobs, while those in manufacturing are being left behind.



One-third of London's jobs are in knowledge-based sectors, which may provide the opportunity for a stronger economic rebound, as we emerge from the pandemic



Knowledge-based jobs as percentage of total jobs by region

Nnowledge-based jobs Total jobs





The longer-term move to blended digital working practices along with the transition to the digital economy may impact the London area faster and more extensively than elsewhere.

The London City Region also has a higher proportion of jobs in knowledge-based sectors than the rest of the UK (Figure 11).

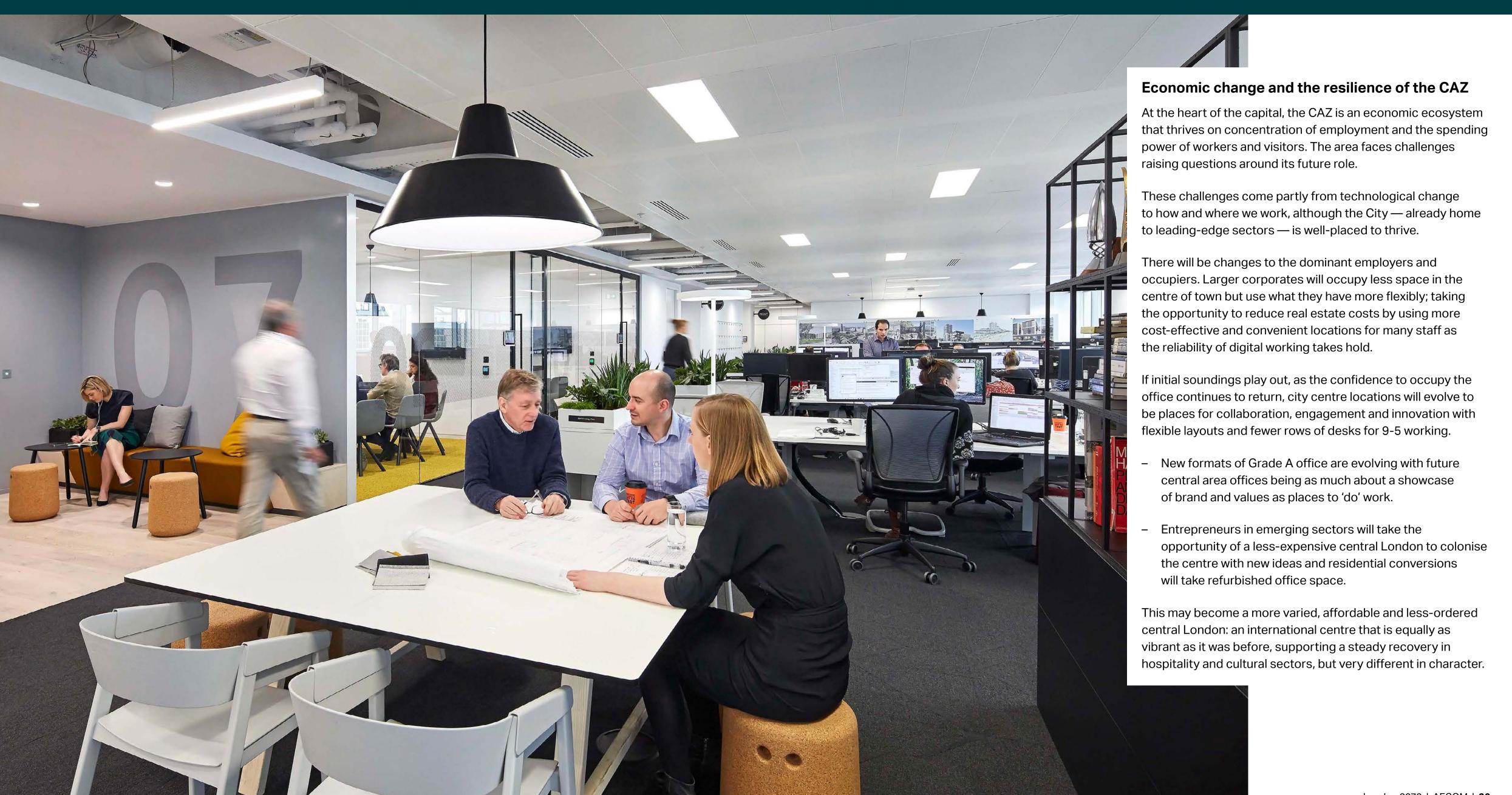
Notably, these jobs weathered the coronavirus restrictions comparatively well, with fewer employers utilising government furlough schemes, as employees adapted to working from home. This suggests that the longer-term move to blended digital working practices along with the transition to the digital economy may impact the London area faster and more extensively than elsewhere.

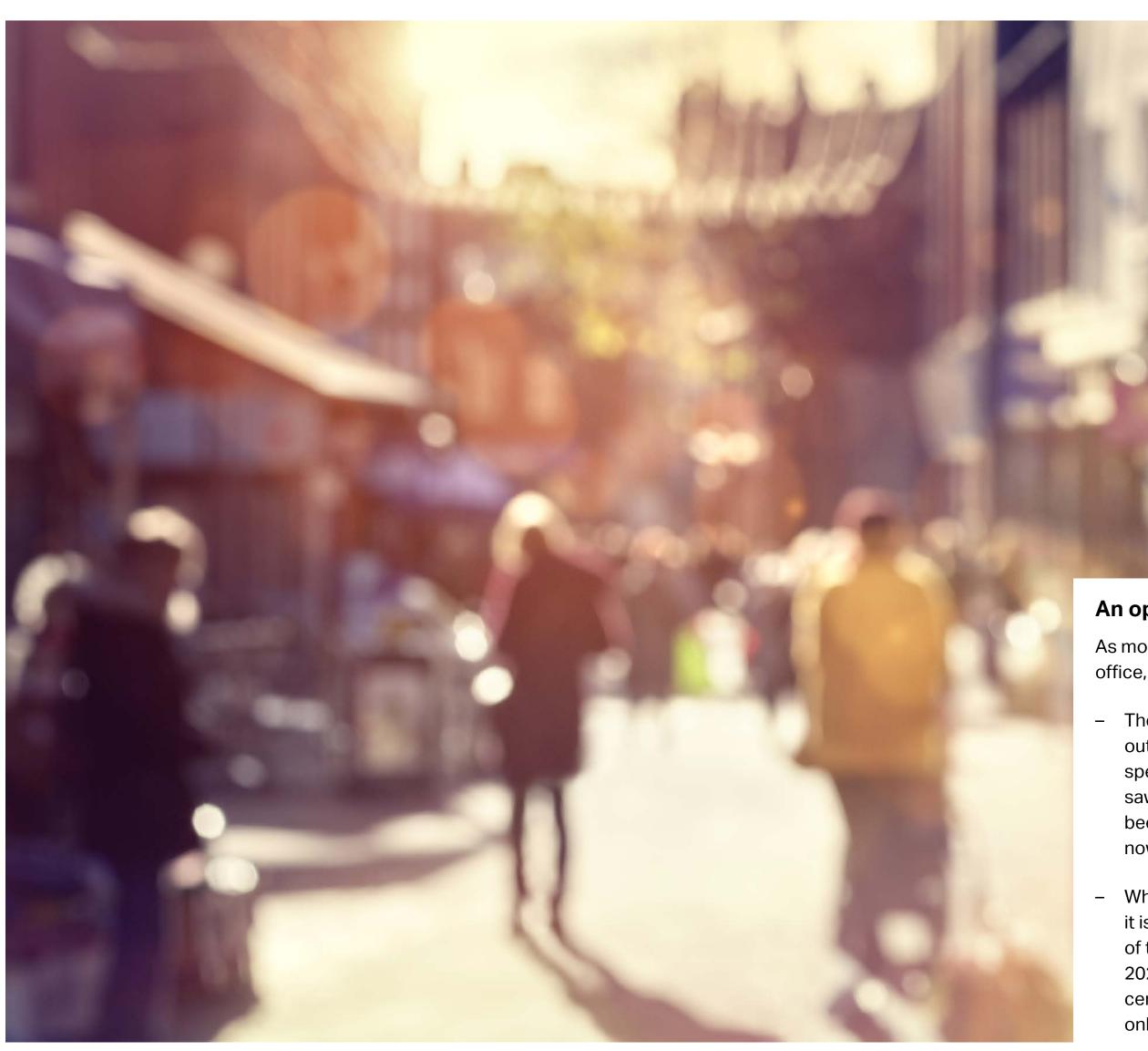
The challenge in the next 50 years will be to ensure the region remains attractive to investors and employers, hand in hand with the growth of the wider UK economy. Infrastructure and technology investments must be aimed at attracting and maintaining much-needed talent; evolving our electrical energy infrastructure to fuel technological change; developing new home typologies and adaptable remote co-working spaces, while enabling and re-skilling people to adapt to new ways of working.

In the coming decades — post the economic shocks of 2020 — the impacts will accelerate, fundamentally affecting the future of London. The medium- to long-term impacts are likely to vary significantly by geography with already disadvantaged communities — those drawn out in the earlier discussion on inequality — likely to take longer to recover and adapt. Necessitating ready access to training, development and transition into growth sectors such as life sciences and technology, where London already has a competitive advantage will be essential.

Figure 11: Knowledge-based jobs by region

London 2070 | AECOM | 25





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The 20-minute neighbourhood
— where every day needs can
be reached within a short walk
or cycle — has been heralded as
key to the future town centre.

An optimistic suburban renaissance?

As more of us work between home, transit, coffee shop and office, the role of suburban centres will also change.

- There are signs of a suburban renaissance, where smaller outer London town centres have seen overall increases in spending, whereas larger town centres such as Stratford saw sharp declines in 2020. These larger centres have also been dominated by multiple retailers — many of which have now permanently disappeared from the high street.
- While the pandemic has led to early signs of a renaissance, it is driven by stay-at-home orders with nearly 25 million of the UK adult population working from home through 2020 and early 2021 and spending locally in suburban centres and regional towns (notwithstanding that retail online sales increased by 50 per cent during 2020).

It remains to be seen if this renaissance will continue, or whether it is simply a blip on the radar, though there is potential to embrace this shift in the quest to build a more polycentric, resilient city region.

Reimagining the role of town centres away from the retail-dominant model of the last 40 years will be key if they are to regain their role as employment, social, entertainment and civic centres, and desirable places to live at the heart of balanced communities. The 20-minute neighbourhood — where every day needs can be reached within a short walk or cycle — has been heralded as key to the future town centre. However, this transition will involve radical shifts including wholescale repurposing of retail real estate, access to health and social services and the recalibration of the transport system and routes to reflect very different commuting patterns and destinations.

The economy and a resilient region

London's economy has thrived in recent years, but so have the related economies of the other key cities in the metropolitan region with highly-skilled, knowledge-based employment sectors that are often connected to research universities and innovation clusters. The towns within the Oxford to Cambridge Arc, all now form part of a wider metro region and, as commuting habits change, the impacts of housing and economic growth become more entwined. Looking ahead to 2070, it is important to consider this wider polycentric, interconnected metro region.

This connection of economic growth across the region brings wider agglomeration benefits, but it is also increasing tensions about where to accommodate future growth, particularly where the region struggles to match rapid employment growth with housing delivery which has lagged for decades.

- Those areas immediately outside the Metropolitan Green Belt face huge development pressure as Greater London's unmet housing demand pushes growth pressures well beyond the county boundary. The National Infrastructure Commission estimates the overspill demand into the Oxford to Cambridge Arc alone to be quarter of a million homes ²¹ into an area with its own, already high, locally-driven growth trajectories.
- land must remain the focus of urban policy, the reality is that across the region the pressure for growth gives rise to the perverse position where we protect poorerquality environments which are well-connected to the capital's transport network and system at the expense of often higher-grade agricultural land, quality landscapes and valuable environments which have less-developed social infrastructure and where car travel is the only viable transport choice. This is leading to an increasingly unsustainable pattern of regional growth.

 There are also challenges for coastal areas and older industrial towns. Already suffering high unemployment rates and greater deprivation, they continue to receive less investment, and lack a strategy for how these places can connect with the success of the region.

If the geography of employment shifts with corporate occupiers seeking less-expensive locations and Londoners continue the trend of moving to outer suburbs and well-connected regional towns with better value housing choices, then the spatial pattern of the future economy will result in an acceleration to a more polycentric city region. The new geography will also be serviced by a complex and deeper logistics and distribution network as shopping habits and just-in-time delivery expectations change. As new ways of working and living become more prevalent, traditional patterns of travel will shift. The breakdown in traditional commuting presents an opportunity to plan strategically for balanced growth — and a more resilient city region.

However, if a balanced pattern of growth is to be achieved between the City, the suburbs and the wider metropolitan city region then cooperation and careful planning are required. The failure to develop long term co-ordinated plans that cross administrative boundaries has meant that infrastructure is built as a reaction to housing or economic development. This piecemeal approach is not sustainable and does not adequately address the issues of accommodating growth in the right locations, puts pressure on natural resources, and leads to unsustainable travel patterns.

To balance and ensure a resilient economy, it is necessary to make better informed choices about infrastructure investment to drive growth that looks beyond current administrative boundaries of the capital.



As new ways of working and living become more prevalent, traditional patterns of travel will shift. The breakdown in traditional commuting presents an opportunity to plan strategically for balanced growth — and a more resilient city region.





London has long been at the heart of global travel and business networks, thriving on its connections to the talents and resources of the suburbs, towns and cities in its orbit, as well as to the rural hinterland and coast which envelope it.

The shock phase of the coronavirus pandemic highlighted the importance of a very different type of connectivity, where resilient digital connections became more important than physical proximity. Rebuilding in the 2020s will place equal value on the efficiency of the digital economy as place-based, face-to-face interaction.



Digital connectivity

Realising the benefits of reliable, high-speed digital connectivity has given businesses and individuals the freedom to locate in places other than established commercial centres.

- New neighbourhoods of the 2020s will have the opportunity to gain place-advantage by building in super-connectivity from the outset.
- And, peripheral towns with poor transport connections to cities could gain a new competitive advantage through investment in super-fast digital networks that would address some of the inequalities and imbalance of past growth patterns.
- Fast and resilient digital communication will be one of the central elements to economic success over the coming half century. Digital networks will be critical in adapting to changing workplace patterns, enabling individuals and businesses to benefit from technological progression and autonomous travel. Indeed, digital access is now as important as the supply of electricity or water.

However, as with all infrastructure, access to the fastest full-fibre broadband connections — today's gold standard connectivity — is limited in the city region.

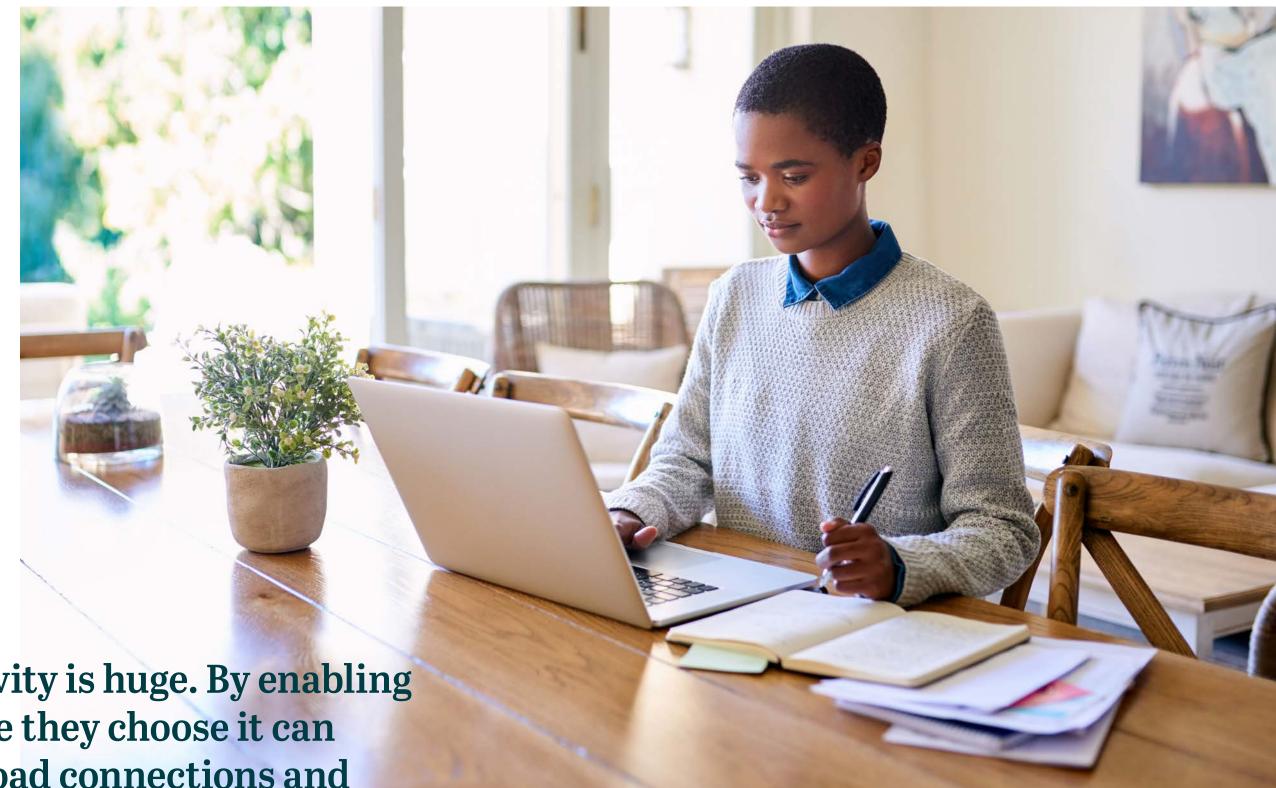
As Figure 12 illustrates only a quarter of the city and region has business quality connectivity.

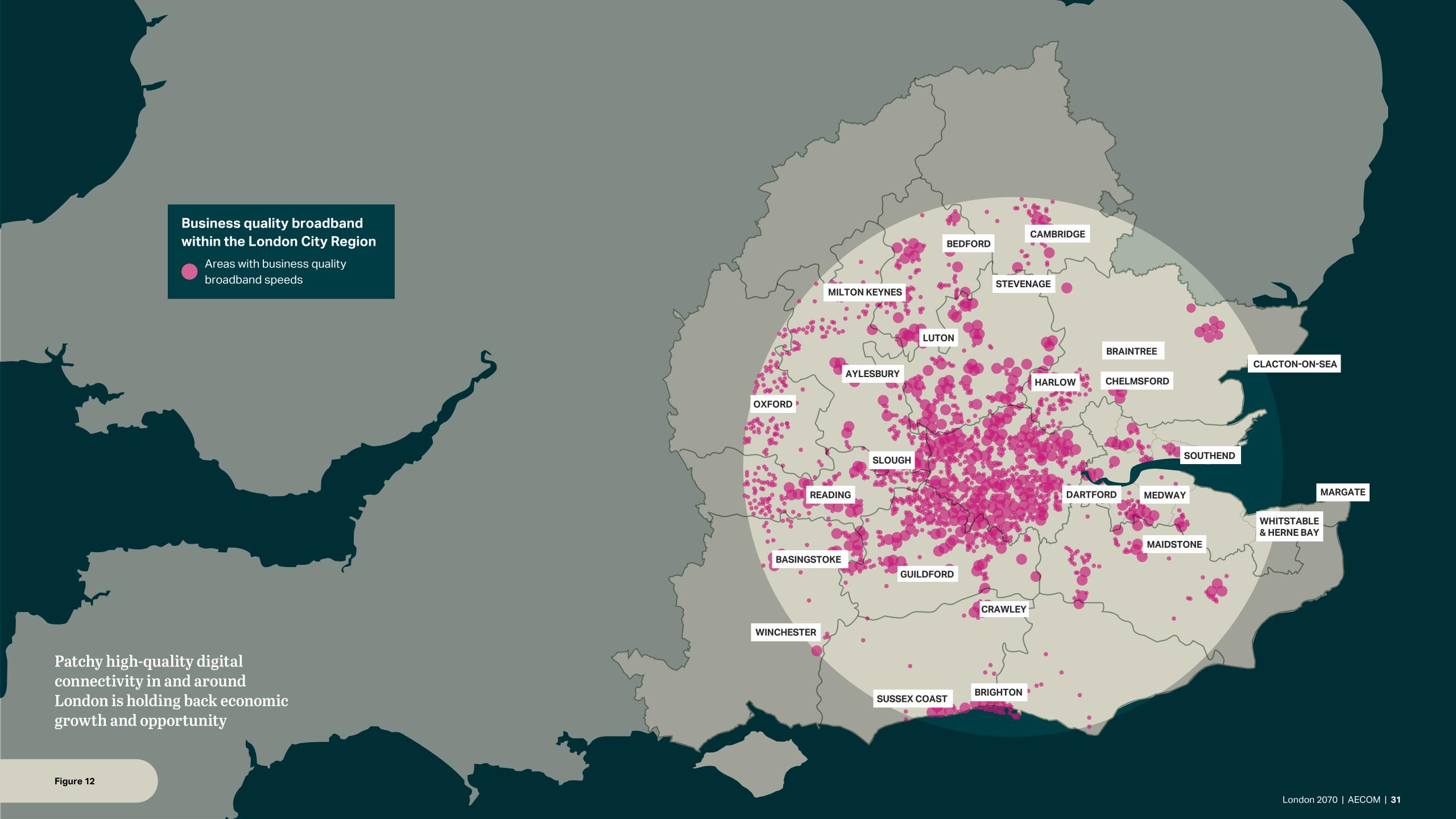
Many urban and rural areas — including parts of the economic powerhouses in the capital — lack the strategy for the successful roll-out of 5G let alone future generations of connectivity. Foresight is important, and the region should be prepared for dramatic shifts in next generation technologies occurring every few years.

The challenge is not only about investment and early adoption. It also involves reaching all communities, particularly those with great economic potential that are held back by patchy investment, and those in more peripheral areas where blisteringly fast digital connectivity could break traditional locational barriers to economic growth and social engagement. Coastal and former manufacturing towns set in attractive rural landscapes — targets for levelling up — could become just as digitally-connected as city centres, finding a new locational USP, with very a different but compelling quality of life offer.



The potential of digital connectivity is huge. By enabling people to work and live anywhere they choose it can reduce total reliance on rail or road connections and open up opportunities for economic growth with lower impact on natural resources.







Transport connectivity

Historically, the development of cities has been intertwined with the development of their transport systems.

The growth of London in particular can be charted by the adoption of new technologies and modes over the last two centuries.

For the London region to recover and reclaim its roles as a hub of economic activity, culture, and education, it will need public transport systems to be trusted by users and sustained economically; a significant challenge when future travel patterns and guaranteed fare-box revenues are uncertain.

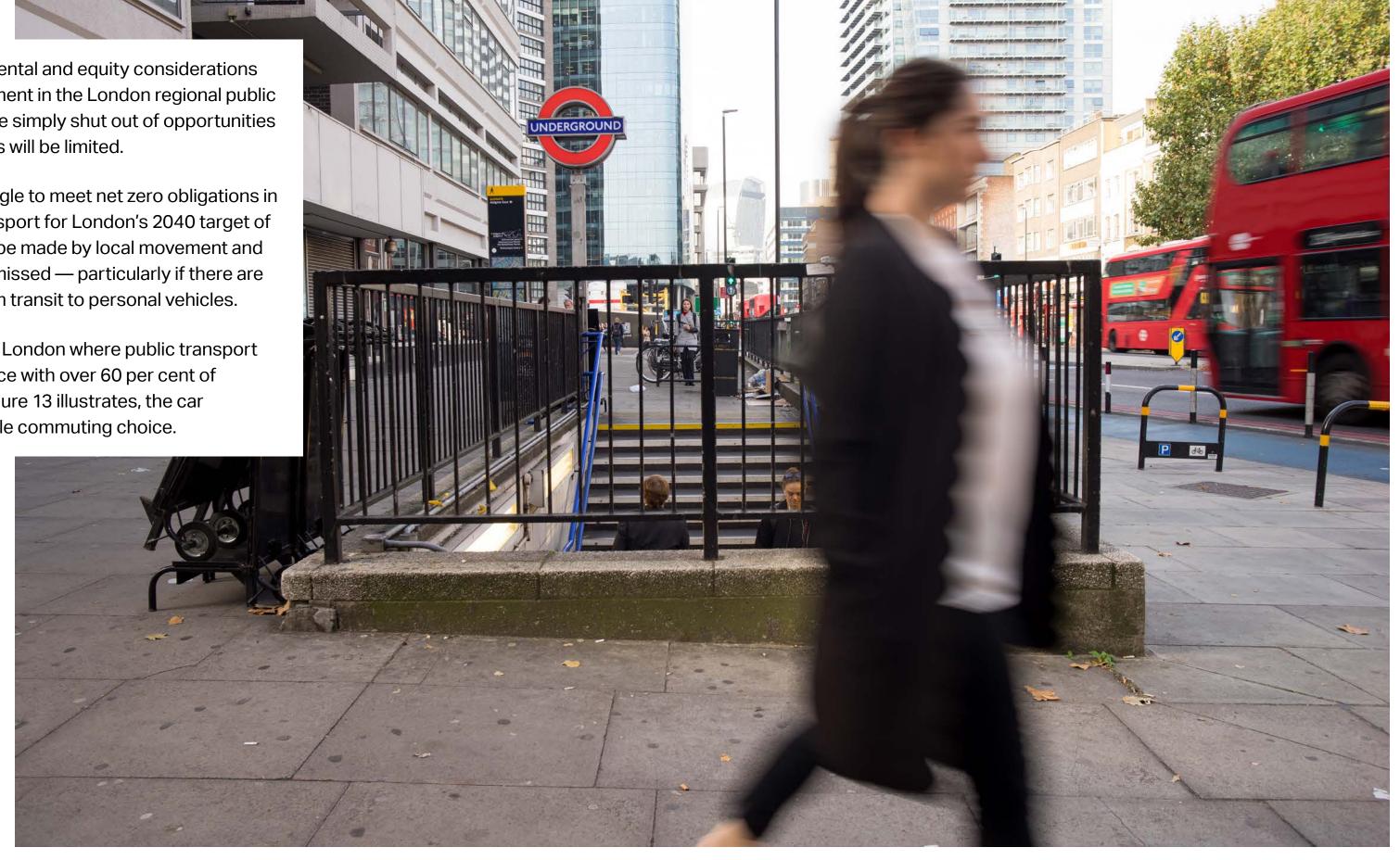
There are important environmental and equity considerations too. Without sustained investment in the London regional public transport network, many will be simply shut out of opportunities and employment opportunities will be limited.

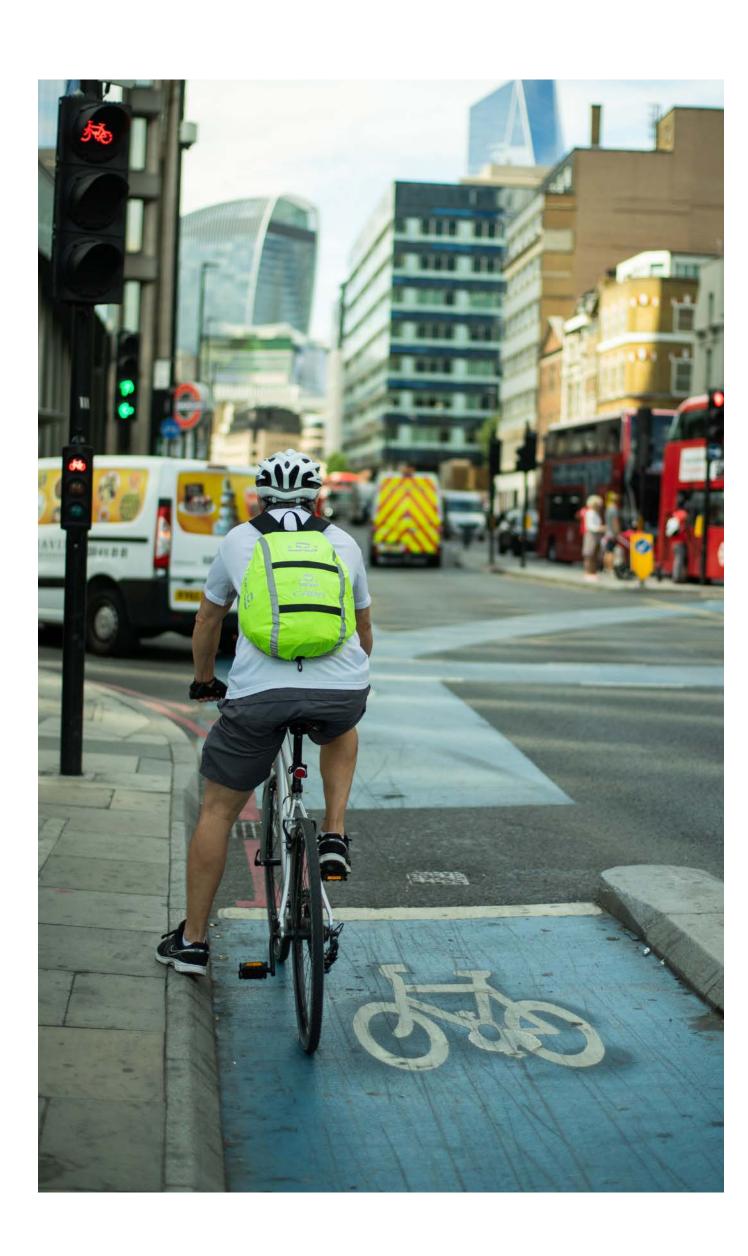
- Moreover, the UK will struggle to meet net zero obligations in the short term — and Transport for London's 2040 target of 80 per cent of journeys to be made by local movement and public transport could be missed — particularly if there are sustained mode shifts from transit to personal vehicles.

 Notably, it is only in central London where public transport is the dominant travel choice with over 60 per cent of journeys. Elsewhere, as Figure 13 illustrates, the car dominates as the only viable commuting choice.



Without sustained investment in the London regional public transport network, many will be simply shut out of opportunities and employment opportunities will be limited.





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For many reasons, Londoners need to get back on the tube, the train and the bus as well as embrace walking, cycling and innovative micro transport.

If the regional cities and towns, in particular the knowledge economy-driven arc between Oxford, Milton Keynes and Cambridge, or the regeneration opportunities of the Thames Estuary are to fulfil their potential to contribute to the economic growth of the UK, for this to be sustainable and responsive to the obligations to decarbonise, there is a need for a more complex and responsive intra-regional transport network to evolve.

If Greater London can push expectations by setting an ambition of 80 per cent of journeys to be by public transport or active modes to tackle carbon, congestion and air quality objectives, then similar ambitions need to be set elsewhere.

While the challenges are complex, inaction now could reshape demand for travel in unsustainable ways. For many reasons, Londoners need to get back on the tube, the train and the bus as well as embrace walking, cycling and innovative 'wheeled' micro transport.

The challenges are significant and tied to how we embrace the future.

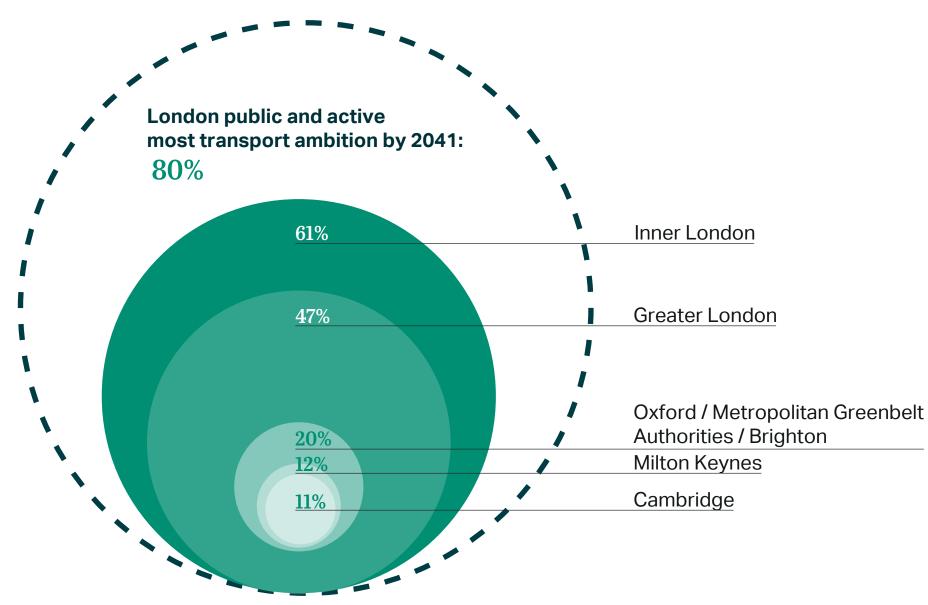


Figure 13: Public transport use as a percentage of total journeys made

Only in Inner London does public and active mode share comprise the greatest proportion of journeys. Too much of the city region is reliant on car-based transportation.

Flexible networks

The first is the challenge of network flexibility. Most public transport networks have focused on the journey from 'A to B', from home to work, and this has driven urban growth patterns, the suburbanisation of London's villages over the last 200 years and development of the connected metropolitan area.

Going forward, working from home or alternative work-hubs is expected to be more important, blended with face-to-face collaboration with colleagues based in different co-working locations.

- Consequently, traditional network routes, patterns and habits may not be so relevant in the future city.
 The relationship is likely to be less predictable and repetitive: more 'A to B to C to D' on different days of the week and at different times of day.
- As well as going to varied places at different times, the
 journeys will use different modes. All journeys are likely
 to start with walking or cycling on safe and efficient
 routes. Longer journeys are likely to use bus, tram, local
 rapid transit or demand-driven transport. And for the
 trips to the office, tube, light rail and regional rail will be
 needed together with walk, cycle or micro-transport
 to the destination.

So, the flexible network is not just needed from tracks and rails. We need a focus on a choice of routes in paths, cycleways, roads, guided busways on multi-model corridors and — importantly — seamless interchange between modes, with reliable real-time information for travellers faced with choices and wanting to make decisions based on speed, frequency or carbon impact or health and personal wellbeing.

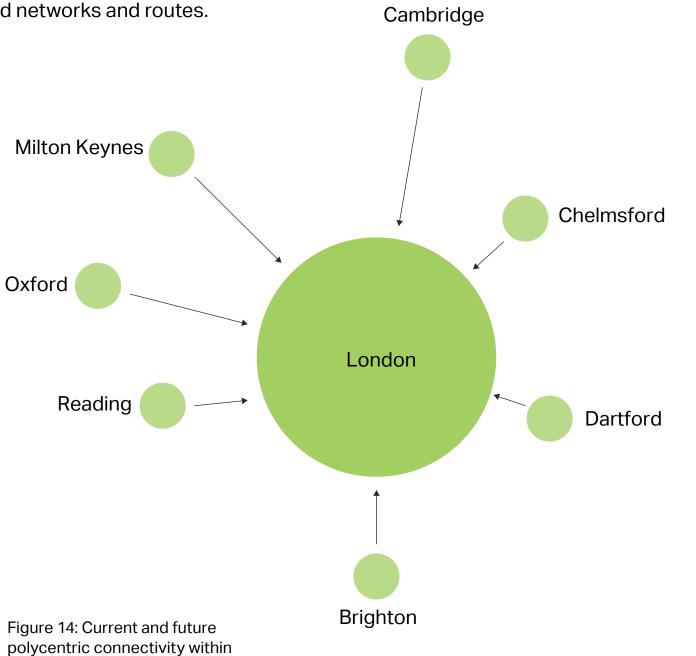
Additionally, if the peak hour is less important, this has major implications for transit scheduling that has traditionally been geared around the rush-hour commute and the ability to use the network capacity more flexibly throughout the day.

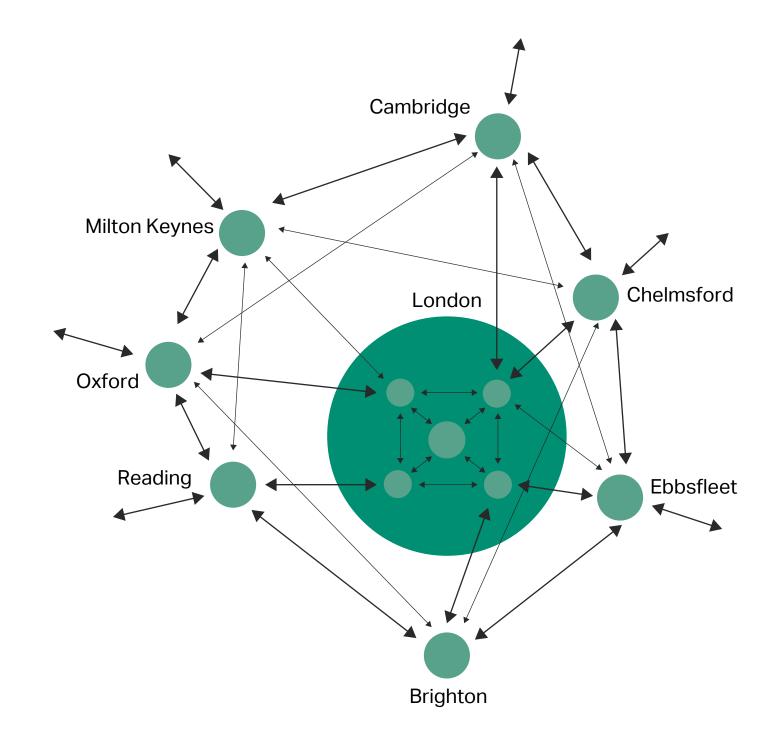
Making public transit affordable, accessible and reliable will require finding new ways to make our existing system more efficient, catering to different journey patterns at different times on different days. The destination may not always be the city centre if a more polycentric city emerges (Figure 14). This will drive a need for far more flexible transport networks with new nodes and connection points and a rethink of long-established networks and routes.

the London City Region



As a more polycentric city region emerges, this will drive a need for flexible transport networks and options that re-think how we move and where we move to.







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Arterial rail and road routes into and out of the capital dominate the transport network in the metropolitan region (as they do nationally), which has historically channelled growth into central London.

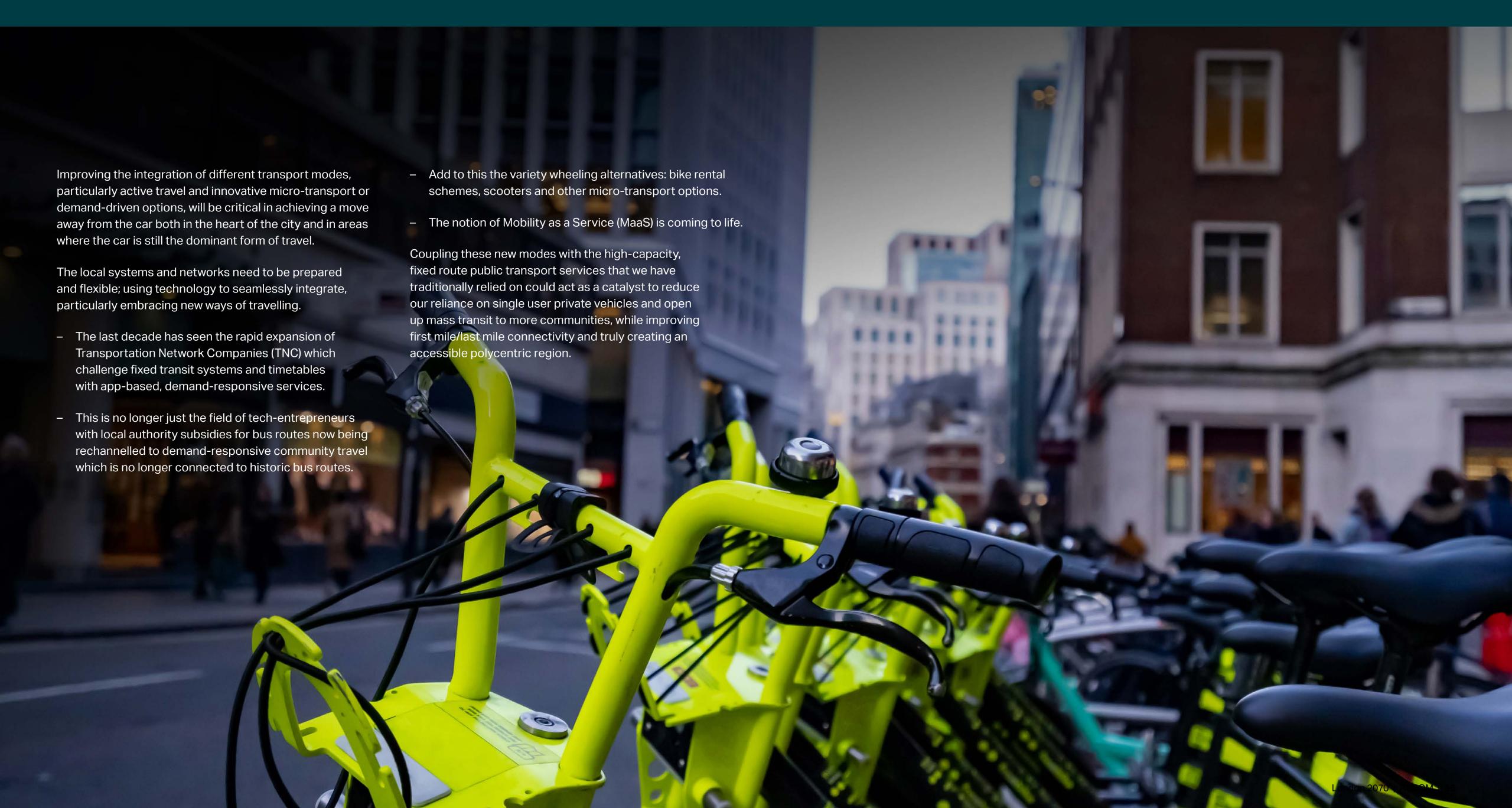
Regional connections

The complementary challenge is of regional connectivity. Arterial rail and road routes into and out of the capital dominate the transport network in the metropolitan region (as they do nationally), which has historically channelled growth into central London.

London's sphere of influence and the functional city region now stretches well beyond the M25 with a peak of over 1.4 million commuter movements between Greater London and the home counties every pre-pandemic weekday. So, as we rebuild from the shock of 2020, this single point focus with a trip gravity towards the CAZ is not sustainable. New working and commuting patterns and the need to invest in intra-regional travel options to support high growth locations, may well mean that the working travel relationship between city and region changes for good.

Major urban areas need to connect with each other and their hinterlands rather than just with London.

- Priority should be given to realisation of mass transit systems in congested towns outside the capital such as Oxford and Cambridge and to high growth locations so that new community growth is limited to corridors where there are real alternatives to using private cars.
- Whilst HS2 transforms national inter-city routes it
 also frees up capacity of the West Coast and adjacent
 mainline railways for commuter and intra-regional travel.
 This is only part of the picture. More is needed. East West
 Rail, the proposed Heathrow Southern Railway and selected
 reopening of Beeching lines need prioritisation and
 better alignment with economic drivers and homebuilding objectives.
- And at the fine grain, local level these investments should also be complemented by a new focus on enhancing investment in the last leg of people's travels
 the so-called 'last mile'.



10 big ideas

In the last section, we discussed three shared challenges currently facing the London City Region: inequality, resilience and connectivity. In this section, we look to our horizon of 2070 and imagine how the region might function if these shared challenges were addressed in a joined-up way.

Experts and thought leaders within our business have contributed to ten big ideas, covering the topics of economy, community, town centres, homes, healthcare, transport, energy and resources, food, water and environment.

For each one, we set the context for our big idea by imagining the journey over the next five decades. We also include recommended action points to kick-start our journey towards a resilient, balanced, responsible and interconnected London.







Unlock growth potential through high performing economic clusters

Greater London and the metropolitan city region has led the UK and most of Europe in terms of productivity, recently contributing around half of national economic output 1 2 thanks to the high-value knowledge-based sectors that have clustered across the region.

Over the coming decades, the life sciences, advanced manufacturing and creative industries that have underpinned this economic growth will drive the UK's response to the Fourth Industrial Revolution, building on strengths in the capital and around the research university cities across the region. By 2070, we foresee a polycentric system of dispersed physical centres with global and local reach, nourished by virtual and physical spokes and networks. London's Central Activities Zone (CAZ) and the iconic city centres of the region will remain important destinations, but the opportunity exists to breathe new life into some of the left-behind places too.

The London Plan 2021, Chapter 2: Spatial Development Patterns

The 2021 London Plan sets out the Mayor's vision for planning and development in Greater London and although it embraces the need to grow capacity in the capital for economic growth and develop a "polycentric city" of connected economic centres, the primary focus remains on the Central Activities Zone (CAZ), its international role and reputation. Metropolitan centres in the capital are already starting to diversify — the arrival of University College London in Stratford, Imperial College in White City and the specialist cancer centre in Sutton all demonstrate knowledge-based sector growth in the wider city, although the connections go well beyond the GLA boundary.

In the coming decades, there is further potential to connect the complementary centres of excellence in advanced manufacturing, life sciences, and technology-based research and development that thrive in the cities across the region, many having universities and institutions which have equally strong international research reputations as those in the CAZ. Beyond networking events and individual connections, they tend to operate independently rather than as part of a joined-up system. Enabling these connections to work better will stimulate wider economic benefits supporting London's and UK growth.

In the years up to 2070, if economic and urban growth is to be balanced, then hotspots both within and beyond Greater London will play an important role. They include, but are not limited to, the government-recognised potential in the 'Golden Triangle' cities of London, Oxford, Milton Keynes and Cambridge as well as the Thames Estuary, Thames Valley and Hampshire-Solent. Successfully aligning infrastructure and considered housing growth will unlock potential as part of a polycentric network of cities and economies, avoiding overheating and unmanageable pressures in a region where natural resources are already overstretched.

With new digital capability and different ways of working, a polycentric cluster policy demands stronger relationships between the city and its region, boosting productivity by building linkages between neighbouring cities and towns that workers could plug into, both virtually and physically. This will be helped by government, regional local authorities, local enterprise partnerships and the Mayor of London addressing the challenge of breaking down regional silos and working constructively together, implementing stronger relationships and making better decisions collectively.

As we move forward with recovery and embracing a new digital economy this joined-up economic future is even more important. Already, before the pandemic, knowledge workers valued in cluster theory were already connecting remotely with their workplace, exchanging ideas on social media as much as they were in the staff canteen. But the stay-at-home requirements of 2020 made such practices ubiquitous. Driven by housing affordability, congested commutes and the resilience of digital networks, some activity has dispersed across the city region, and this trend is likely to continue post-coronavirus as new working patterns, particularly in the high-growth economic sectors, take hold.

This could lead to a more dispersed workforce and, as confidence returns to travel, there will be new pressures on transport and the environment. Both will need to be managed carefully to prevent an increase in car-based commuting and poorly-located housing growth undermining the drive to decarbonise.

Action points

Foster

stronger relationships at local and national levels to build linkages between neighbouring towns

Link

infrastructure investment, community development and economic strategies

Support

levelling up through an urban development strategy that ensures people have sustainable transport and virtual choices of how to get between varied work locations and home

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There is potential to connect the complementary centres of excellence in advanced manufacturing, life sciences, and technology-based research and development that thrive in the cities across the region.

MEETING THESE CHALLENGES

A more balanced and less-overheated growth strategy could also create new opportunities in previously unconnected places in the region; places too far from the centres of innovation and the opportunities of the knowledge economy that need to be the focus of intra-regional levelling up. From suburbs with poor transit connections in east and south London to peripheral coastal or former manufacturing towns at the edge of London's sphere of influence, there is potential to leverage investment in digital connectivity and join the wider prosperity of the most productive region in the country. Recent moves by financial institutions and corporates to more dispersed business location models suggest this is being driven by people as much as by real estate savings. Government plans to relocate civil servants out of Whitehall (mostly to towns across the Midlands and North of England but potentially also to locations within a one-hour rail journey time to Westminster) may also be the first step in a more decentralised model.

Adapting the opportunities from the already successful economic clusters gives us a very different platform for the coming decades. It requires:

- A joined-up strategy linking infrastructure investment, community development and economic strategy which promotes sustainable growth and enables the region to be more resilient to future shocks and changes.
- An integrated transportation and digital connection strategy that is flexible to changing technologies and economic hot spots — not just focused on the draw of today's international centres of excellence but also enabling new areas to grow.
- An urban development strategy that ensures people have sustainable transport and digital choices of how to get between varied work locations and home. This would actively minimise the use of the private car and promote the economic regeneration of physically-remote places where the potential is not currently being tapped to support levelling up.

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From suburbs with poor transit connections in east and south London to peripheral coastal or former manufacturing towns at the edge of London's sphere of influence, there is potential to leverage investment in digital connectivity and join the wider prosperity of the most productive region in the country.



By 2070, we foresee a polycentric system of dispersed physical centres with global and local reach, nourished by digital and physical spokes and networks.

2070: the big idea

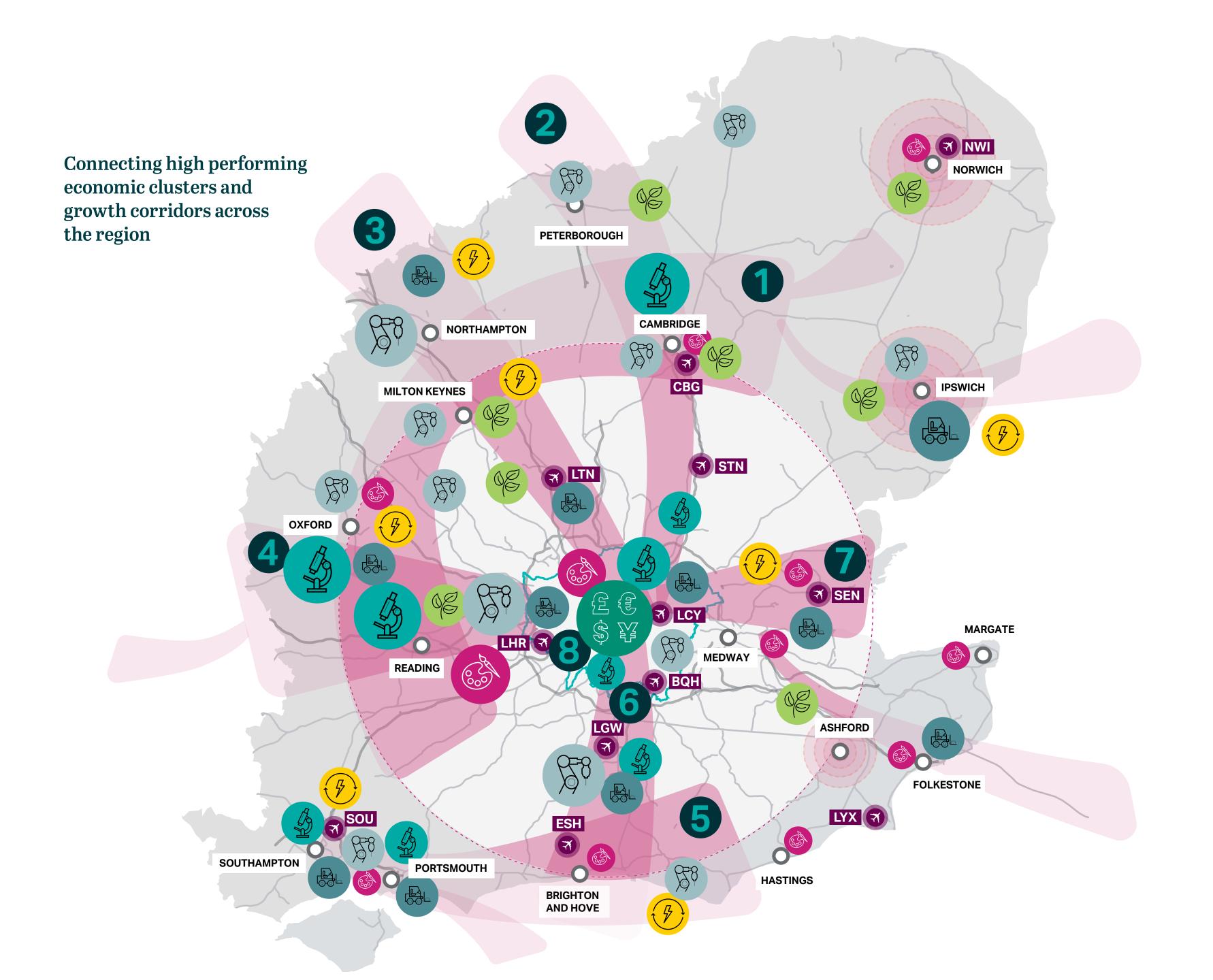
By 2070, London will remain a powerhouse of national and global economies, but it won't be as dominant; the capital will have carved out a new role for itself at the heart of an interconnected city region, and within a more balanced UK.

Building on supportive policies and existing investment that gave the region a head start, finance, life sciences, advanced manufacturing and creative industries will flourish. Furthermore, by 2070, new economic clusters linked to the **Fourth and Fifth Industrial Revolutions**, will develop across the country enabled by proactive devolved administrations and mayors — often working together for mutual benefits.

The multi-centric nature of cluster policy will have allowed new groups to collaborate and their technologies to collide. Innovation clusters will still have value, but collaboration will drive multiplier effects so that activity is no longer concentrated in a small number of cities. Agile digital and physical infrastructure connectivity as well as a focus on the quality of 'place' will enable this shift to happen.

The virtual parts of clusters will expand and contract, remotely engaging experts in new and evolving disciplines. A flexible supply of talent connected both digitally and with varied transport choices will ensure centres of excellence have access to the human resources needed to realise the full potential of this exceptional global region.

By 2070, if it is to reach its potential, the London City Region must be more economically and socially balanced, making better use of the breadth of economic assets, skills and investments. But it will be more complex to manage, and economic success will be dependent upon careful joined-up planning of communities, workplaces, town centres and future transport systems that minimises pressure on already scarce resources, water and valuable environments, strengthening the case for co-ordinated spatial, economic and infrastructure planning approach.



Key

---- Rail lines

Motorways

Inclusive growth corridors

1 Oxford-Milton Keynes-Cambridge Arc

2 London-Stansted-Cambridge Innovation Corridor

3 M1 motorway (national spine)

Heathrow — Greater Western corridor

5 M27 coastal corridor

6 Gatwick Diamond

7 Thames Estuary

8 Central London

Major settlements

Airports

Regional growth areas

--- 60-min commuter belt

Priority economic clusters

Advanced manufacruring

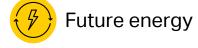
Life sciences

Creative industries

Future logistics

Agri-tech

Financial services (London)





There is much debate about how acute London's housing shortage is, but whichever way the figures are calculated, many more homes are needed in the city and its metropolitan region. With an average of 35,000 homes per annum built in the capital over the three years before the pandemic we could see potential unmet housing need of between 17,000 to 58,500 homes per annum if this rate continues. As well as placing immense pressure on land resources and environmental capital, the consistent shortfall in building sufficient new homes in sustainable places is putting significant strain on aging transport, utility and social infrastructure, while making large parts of the city region unaffordable for many. As part of a focus on rebalancing the economy, an innovative approach to urban growth in London and its city region is essential.

The re-use of previously developed land through the Brownfield First policy, reinforced in the National Planning Policy Framework, and the Garden Towns & Villages programme goes some way to support the delivery of the government's national target of 300,000 homes a year.

Added to this, more adventurous ideas for adapting existing settlements are also a major part of the solution, with scope for regeneration and sensitive intensification. This must come with a new focus on local, 'last-mile' public and active transport options, social infrastructure and enhancements to urban green space that considers the way the pandemic has changed how we access services (both virtually and a new-found appreciation of face-to-face interaction). In particular, the 20th century generation of new towns still need completion. Seventy-five years after the designation of the first wave, some are looking tired. Strategic expansion combined with town and local centre regeneration and much needed investment in local public transport networks are already very much part of the long-term aspirations for places such as Milton Keynes, Stevenage, Crawley, Harlow and Basingstoke so they continue to drive significant community and economic growth in and around London.

However, even though capacity in existing towns is expected to flex (as the demands on the use of built space changes partly because of the pandemic) the delivery required from brownfield land is limited.

Consequently, a new programme of well-designed, netzero carbon communities is needed; places which embrace the ambitions of the 20th century New Town programme and the Garden City movement but are carefully designed for the challenges of tomorrow.

21st century new communities must be located more thoughtfully than many in the recent past. They must be located alongside future economic growth clusters so that homes and jobs are planned together. In addition, they must be well-connected with complementary and competing towns with integrated mobility hubs at their heart to embed public and active travel from the outset. Proposals for strategic environmental and biodiversity net gain both within the community and in their rural surroundings will be integral to their location and design. These requirements require a more-than-local approach to wider than local planning and should include a comprehensive review of the Metropolitan Green Belt, new regional spatial plans and a joining up of local industrial strategies with local plans and infrastructure investment in towns — challenged in the National Infrastructure Commission's town study remit launched in March 2021.

homes per annum built on average in the capital

over the three years

before the pandemic.

potential annual unmet housing need if this rate continues.

Action points

Locate

new communities alongside future economic growth clusters, aligning with transport investments and environmental assessment

Design

with flexible principles which build-in long-term sustainability from the outset

......

Prepare

building local skills and capacity for governance and stewardship

MEETING THESE CHALLENGES

Critically, to ensure sustainability targets are achievable, these new places need to be of a scale to support thriving community, civic and transport infrastructure. The priority should be on building larger settlements with upwards of 10,000 homes, creating a programme of new towns — modelled on the scale, distinctiveness and community focus of successful, traditional communities — incorporating a mix of homes, densities, employment choices and environmental assets to support a high quality of life and economic success.

Building these communities at scale will allow for the protection of sensitive environments, linking development with economic clusters and aligning new settlement projects to nationally important infrastructure investment. As part of a national programme to balance growth, target areas around the capital must include the places where economic opportunity and infrastructure investment intersect: the Crossrail corridor and out to Ebbsfleet, the Oxford-Milton Keynes-Cambridge sub-region served by East West Rail and six mainline routes, as well as locations along the West Coast Main Line — using the capacity released by delivery of HS2.

Within Greater London, strategic opportunity areas such as Thamesmead in the south-east and Meridian Water in the north should be planned as new City Villages in their own right, where local facilities and employment as well as their individual character are as important as the transport connections.

The biggest challenge will be in aligning local and wider needs, particularly as the best locations for strategic new growth often straddle local authority boundaries. Special-purpose bodies including properly resourced New Town Development Corporations are needed to oversee delivery of long-term delivery goals, design quality as well as streamlining consents and infrastructure delivery. Empowered development corporations should also bring powers and coordination to support master developer consortia in delivery of these larger, ambitious schemes.

Starting immediately, we also need to develop and invest in the institutional capacity to design, deliver and manage these new communities covering: the skills and resources to programme manage complex, large-scale multi-generational projects; the urban and carbon-efficient design skills to translate ambitions to places that mature successfully and citizens will value; and also invest in governance capacity for local councillors and stakeholders whose support is important in effecting positive change.



2070: the big idea

By 2070, we need to have made great progress in addressing the housing challenge with a more balanced approach to economic and urban growth.

Established in the 2020s for a society that will be beyond net zero in 2070, a programme of Mark 2 Garden Communities and City Villages will be maturing. Evolving the Garden Communities programme, these new or expanded settlements will correspond to clusters of economic growth built on ambitious Garden City Principles to create places of enduring quality and choice, transforming the opportunities for people to live healthy and productive lives.

They will be physically and digitally connected to each other, to regional cities and to the capital, yet be of a scale that offers residents access to their essential needs, within a 15-minute sustainable transport radius.

At the heart of Mark 2 Garden Communities and City Villages will be reinvented town centres; 'civic hubs' acting as marketplaces to exchange ideas and innovation that are supported by a variety of co-working settings enabled by physical and digital connectivity. These will not just be centres for locally sourced goods, but hubs that are designed as inclusive places for communities to meet and connect.

They will offer housing variety and community infrastructure for a wide variety of households, affordable for the young and close to employment opportunities, as well as meeting the support needs of older citizens to enable households to put down roots.

This balance would go hand in hand with the workplace revolution which will affect more of the population involved in knowledge-based sectors over time. As the future of work concept evolves, we may see research-led spin outs from universities and science parks become the inspiration behind some new generation Garden Communities or city villages, agglomerating knowledge-based communities and connected with employees further afield, building on the sectors and technologies that will help shape the UK's future: life sciences, digital and creative industries, clean energy, fintech, and defence and security innovations.

Designed for biodiversity net gain, sustainable transport and with future flexibility built in, the new Mark 2 Garden Communities and City Villages will become climate positive, meaning the combined operational energy demands of the structures and those who live in them adding to the energy balance. These new communities will also take a step further, consciously contributing to a circular economy where embodied carbon and resource use is minimised.

Connected to their hinterlands, the Mark 2 Garden
Communities and City Villages will have their own unique local
magnets, destinations known for their specialist services
or distinctive products trading with neighbouring centres.
They will also connect with a reinvented central London,
offering the innovation, collaboration and extraordinary
experience that only a global city can offer. They will also
have a positive relationship with their unbuilt environments,
with direct access to open space, surrounded by productive,
environmentally enhanced and protected landscapes.

At the heart of Mark 2 Garden
Communities and City Villages will
be reinvented town centres; 'civic hubs'
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and innovation that are supported by
a variety of co-working settings enabled
by physical and digital connectivity.
These will not just be centres for locally
sourced goods, but hubs that are designed
as inclusive places for communities
to meet and connect.

BEYOND 2070



SETTING THE CONTEXT



ESTABLISH RATIONALE

- Meet strategic housing aspirations
- Support the economic future of the City Region
- Create resilient and sustainable legacies for future generations
- Value human and natural capital equally



CONDITIONS FOR SUCCESS



WELL-PLANNED FOR TOMORROW

- Informed by a regional plan
- Early engagement
- Integrated and agile masterplans
- Infrastructure delivery plan and funding



PRECONDITIONS FOR DELIVERY

- Fair land value capture approach and infrastructure funding by patient investors
- Programmatic approach with success criteria to see the whole picture
- Empowered and properly resourced development corporations and authorities to coordinate delivery
- Invest in catalytic projects to establish placemaking and environmental principles



INGREDIENTS OF A RESILIENT MK2 GARDEN COMMUNITY



PREPARE FOR CLIMATE POSITIVE

- Net-zero carbon
- Circular economy step change
- Support circular economy goals



NATURAL CAPITAL

- Relationship between town and rural hinterland
- Integrated urban greening and blue infrastructure
- Food production and delivery
- Plan for strategic environmental net gain



CONNECTED

- Connected with neighbouring places
- Build in 'last mile' transit from outset
- Demand-responsive transport choices
- Ubiquitous digital connectivity



PRODUCTIVE ECONOMY

- Proximity to economic powerhouses
- Co-working spaces for hybrid workers
- Affordable SME and innovator space



COMPLETE SOCIAL INTFRASTRUCTURE

- Invest in schools and lifelong learning
- Health and Wellbeing Hives
- Critical mass to support varied and viable services



21ST CENTURY TOWN CENTRE

- Integrated Mobility Interchange
- Civic Hub: a popular place to meet and engage
- Heart of walkable 20 min neighbourhoods



INTUITIVE INFRASTRUCTUE

- Design to minimise use of water
- Discrete local logistics and delivery networks
- Promotion of Mobility as a Service



HOMES FOR ALL

- Affordable, lifetime homes
- Characterful and quality design
- Adaptable spaces meeting multiple activities



SECURING THE FUTURE



LONG TERM OPERATIONAL PRINCIPLES: **CREATING PLACES TO PUT DOWN ROOTS**

- Governance and stewardship of the vision and programme
- Don't be formulaic
- Build community capacity amongst pioneers and neighbours
- Collaborative co-design, self and custom build
- Reinvesting value growth in future communities

MK2 Garden Communities: a 30-50 year urban development programme





Reimagining town centres as local civic hubs

Town centres and high streets have traditionally been a focus of urban life, whether as the essence of London's city of villages, in a Metroland suburb, or at the heart of a market or regional town. As they weather the revolution in retail, these places will return to a more traditional balance of activities meeting community needs and reflective of their locality. Many saw a quiet resurgence through the pandemic, even as city centres and London's Central Activities Zone were heavily hit.

By 2070, the most successful town centres will be those that carve a role as the central fixture of civic cohesion, with a far smaller but varied retail offer supplemented by a range of local and value-added services, living choices and high-quality streets and public places. Typically, they will have spaces that allow people to work and connect with colleagues or interact socially accommodating the corporate and government workers who have relocated due to the rise in hybrid working practices. Importantly, town centres will function as integrated mobility hubs for local, city and regional transport networks so that urban villages, towns and suburbs reap the benefits from wider functional and cultural agglomeration.

The decline of the high street and its dominant retail function is well documented. But far from diminishing in importance, we see resurgent town centres taking on a new role as civic destinations, places where communities come alive, rather than just shopping centres. This shift will be enabled by the changes in the way we are choosing to live and work that have been accelerated by coronavirus, many of which are here to stay.

Post pandemic, remote-working, advanced digital tools and localised workspaces will become part of an employee's toolkit. Technological advancement and the continual rise of a gig economy will enable more people (and require some) to work anywhere — reinforcing the notion that work is something you do rather than a place you go. Corporate and government employers who can, will take the opportunities to live and work in a more balanced way and in very different environments. In response, employers will seize on this shift as an opportunity to manage real estate costs, looking to more cost-effective locations in suburbs and towns across the region while still maintaining a presence in city centres.

Soon, two of the main reasons we leave the comforts of home — to earn a living and to forage for stuff — won't be as necessary. In a future where we're able to connect via artificial intelligence and augmented reality from our personal devices, where goods can be delivered by drone or robot

at the click of a button, we are likely to need to travel less but will still want to travel, both into the heart of the city for work and entertainment, but also to our town centres, more so than we do today.

Place will still be relevant, but interaction will change:

- We will not lock ourselves behind closed doors. Our needs
 as humans to physically interact, and the needs of business
 to innovate, will power our desire to get out from domestic
 work settings. We will use our local centres more frequently
 at lunchtimes and for social and leisure activities after work.
- Journeys are likely to have varied destinations with fewer linear trips from suburb to city. Although less frequent, longer-distance commutes will be reserved for important creative engagement, linking with wider markets, for culture and entertainment or to enjoy the experiences that only an international city can offer. Such journeys will become a choice and not a chore and this will redefine the roles of city centres, while reinforcing the need for good travel connections between the town centres within the city region.

The acceleration of digital working will continue to enable a degree of freedom from traditional locational ties. In most cases a physical base will still be needed, and major employers will look to cost-effective and productive workspaces in

regional centres, reserving city-centre locations for showcase headquarters. For the most people-centric organisations the city centre will also remain important to attract the best human talent. But it is clear that London's suburban centres and town centres across the city region may well see a resurgence in commercial offering after decades of decline.

Moving forward, our local town centres will become more important than they have been for decades but faced with a decline in multiple retailing they will need to restructure:

- Forward-looking towns will create the conditions to grow their own, value-added jobs. Local co-working and development space will also build the local economy and create value, promoting locally-driven multiplier employment in shops, bars and cafés.
- Proactive authorities will work hand-in-hand with retail investors to set new visions for their centres with smaller, contiguous shopping cores that are distinctive, attractive and viable for the future. Creative repurposing of former retail and commercial real estate outside these cores

 for new typologies of homes, flexible workspace, entertainment or public service buildings is the next step.
 For this to be an attractive package however, there must also be investment in streets and public realm as well as 'guaranteed everywhere' high speed digital connectivity.

Action points

Create

the conditions to grow value-added jobs

Consider

creative repurposing of former retail and commercial real estate

Invest

in better travel connections between the town centres within the city region, not just in and out of London

MEETING THESE CHALLENGES

Environmental initiatives

Social and civic priorities

Local drivers of economic vitality

Town centres are complex places at the heart of communities and will be the focus as we create successful 20-minute **neighbourhoods**. In the coming decades, as we spend more time working locally, then the town centres and high streets will become more important, for everyone. Crucially, they will house the delivery points — such as the Health and Wellbeing Hives described in the Healthcare section — for many public and voluntary services keeping the vulnerable, isolated, old, and young connected with wider society. As an increasing amount of day-to-day living is conducted in cyber-space, they will play a crucial role in addressing inequality and building balanced communities.

Successful centres of the future will be those that take bold steps now to collaborate, coordinate, and align objectives between investors, agencies and neighbourhood aspirations. As the pace of change accelerates, they must continue to be agile, responding to evolving employment, retail, community and travel patterns.

Successful centres of the future will be those that take bold steps now to collaborate, coordinate, and align objectives between investors, agencies and neighbourhood aspirations.

The future town centre

- Repurposed urban resources

- Distinctive identity

- Heart of the 20-min neighbourhood

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- Connected internally and externally
- Meeting and going beyond net-zero carbon targets

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- Supporting the Circular Economy

Civic hub

A civic hub with adaptable space for the community to come together with support facilities and workspaces.

Housing

Integrated mobility hub

Located at the heart of local active travel and enabling regional 'mesh' transport connectivity.

Connectivity

Seamless digital connectivity in homes and workplaces with smart urban systems and transport.

Workshops

Employment, manufacture and innovation workshops at the heart of a local economic strategy.

Schools and lifelong learning

Schools, training, digital lifelong learning clustered in the town centre.

Co-working spaces

A choice of co-working settings, booked by the day by entrepreneurs and corporates with super-digital connectivity.

Health and wellbeing hives

Complementing at-home remote diagnosis and treatment. Connecting to specialist regional Medi-Hives.

Sport and recreation

Accessible by all ages and abilities form essential part of local wellbeing.

Parks and urban greening

Rediscovery of civic town parks and gardens for public health and recreation. Green and blue networks advancing environmental net gain and valuing natural capital.

Hospitality

Local hospitality meeting community needs and character. Locally owned and operated.

Varied, affordable, and flexible climate-positive homes for

those who need the greatest access to town centre facilities.

Entertainment

Distinctive entertainment. Attracting visitors to town and adding an evening economy to the local job strategy.

Experience stores

Showrooms and small experience stores for multiple retailers. "Try before you click" shopping.

Speciality retail

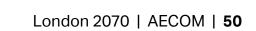
Meeting varied retail choice needs. Day to day staples mixed with distinctive speciality stores.

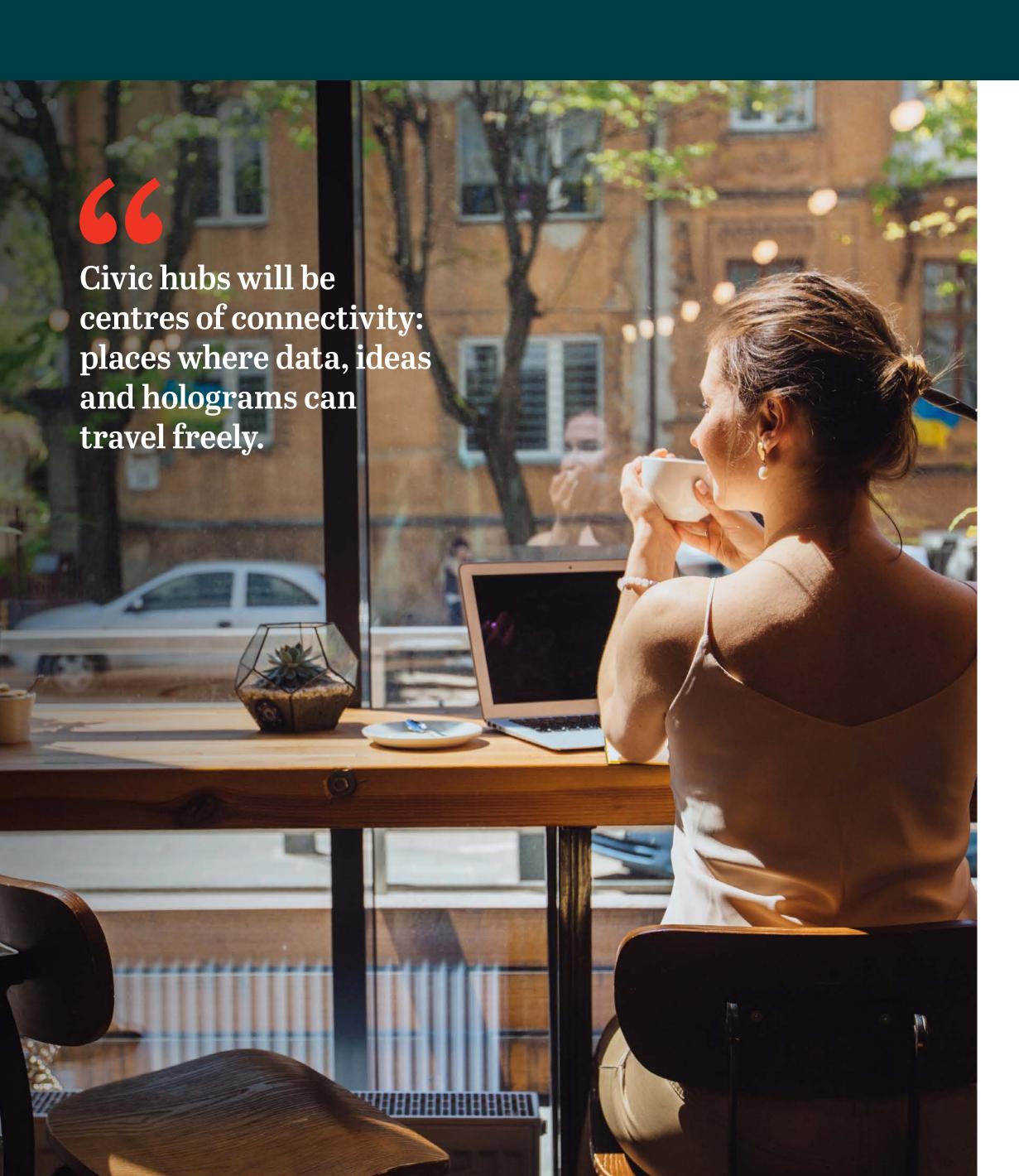
Local produce

Revitalised markets offering value and choice. Produce sourced from local community gardens and hydroponic farms.

High quality public urban realm and streets

Enabling safe and easy active travel, accessible public transport, and designed for autonomous vehicles. Promoting green and biodiverse environment.





2070: the big idea

By 2070, our urban life will be more reliant on a network of places in a polycentric city and region. Interactions will be both digital and physical, and local communities and regional towns will become more important as economic centres. Importantly, places will have a distinctive offer; the days of 'cookie-cutter' high streets populated with identical shops and facilities are long gone. Instead, local characteristics will be celebrated, and places known for individual specialisms.

A large part of the workplace will be virtualised and dispersed Many face-to-face or production jobs will be automated and new roles we have not yet envisioned will have been created, particularly from the innovation and advanced industrial clusters already prevalent across London's city region. Workers will have a digital twin and connect to virtual conference rooms or remote production centres through avatars and holograms.

However, in-person 'water-cooler-moments', innovation, personal development and client engagement will still be needed in city centre showcase offices but often delivered locally in digitally enabled co-working space on the high street.

Retail will have re-emerged in new forms. Although everyday staples and quirky difficult-to-source goods may be delivered direct to homes, the desire to shop and meet others will not have disappeared. Access to locally produced, locally grown or crafted products will be physical. Shopping and entertainment will still play an important role, clustering around transport hubs and drawing on a regional audience, as they do today. Sorely missed local markets of the past will have seen a resurgence — and so will the social engagement around them.

In 50 years, this range of activities will be anchored by the 'civic hub' at the heart of the reimagined town centre. Ranging in size from a corner shop-cum-café on a suburban parade to a landmark building in a metropolitan centre or market town, they will emerge from the concept of the '20-minute neighbourhood'. Civic hubs will be right at the heart of re-awakened local economies and will be catalysts for balanced growth throughout the city and the wider region.

Either buildings or public spaces, civic hubs will be designed to be flexible, serving a lifetime of needs and transforming at different times in the day. Combining workspace with leisure and retail with multi-generational appeal, they will offer a range of activities from the same adaptable space — but smart design will create a sense of unique place for each. Working parents will be able to drop their kids off at an after-school club then grab a coffee and a workspace. Their hologram might tele-transport to the other side of the world, returning in time for human-to-human pick up.

Crucially, the civic hubs will be centres of connectivity: places where data, ideas and holograms can travel freely giving contributors the opportunity to work with colleagues and collaborators. Agile employers will rent desk spaces by the day, using the civic hub network to provide high quality remote bases for staff. The marketplace of a town centre will not only be for shopping, but also for the trade of ideas and innovations both physically and digitally.

In many cases, civic hubs will emerge from existing built assets as we will be making carbon-sensitive decisions around the adaptation and reuse of our town centres.



Many spaces will be transformed from repurposed suburban retail centres and department stores to tired commercial blocks, back street car-repair shops, market halls and great Victorian libraries. Furthermore, as we switch to connected automated vehicles, spaces once occupied by parked cars will be liberated, creating opportunities for expansion or for new green spaces.

By 2070, civic hubs will also be super transit nodes; these integrated mobility hubs will be at the centre of local sustainable transport networks comprising both walking and cycling but also local rapid transit systems. Historic travel patterns which traditionally radiated from city centres

will be replaced by a regional 'mesh' transport network that connects the civic hubs within the evolving polycentric cities and urban regions. Connectivity is particularly important in the capital and large towns where networks of civic hubs will work together, each specialising in more-than-local activity.

At the heart of local communities, civic hubs will make town centres desirable places to live and invest. New models of institutional or community ownership and management will emerge with investors holding multiple opportunities within a portfolio, allowing people and employers to buy, or rent a slot in time and move seamlessly between locations as their lives dictate.

By 2070, civic hubs will be super transit nodes; these integrated mobility hubs will be at the centre of local sustainable transport networks comprising both walking and cycling but also local rapid transit systems.





A new standard for carbon-conscious, resilient homes

To meet the challenges of climate change, population growth, ageing, and economic inequality, we need a step change in the way homes are designed and delivered. Achieving carbon neutrality is the first step, itself a massive challenge of setting new performance ambitions and retrofitting the existing housing stock. But we need to go much further; stepping up a gear in delivery of more sustainable homes as part of movement to a waste-free circular economy to reduce consumption over the long term.

By 2070, the homes we build today must still be relevant. They must be built to last, serving future as well as current generations without the need for expensive retrofitting or in-built lifetime costs. Flexibility will be key. Homes must be adaptable typologies, suitable for a range of future uses and tenures. We also need to consider the whole aspect of dwellings, including the transport choices they confer on occupants as well as access to green space and community facilities. For a continued carbon-conscious attitude, we will need a new standard for homes that encompasses these principles.

The performance of all homes, both old and new, has a big role to play in meeting Greater London's commitment to be a <u>net zero carbon city by 2030</u>. Given that we need to build 92,000 new homes per year to meet identified local housing need on top of retrofitting the city region's 7.5 million existing homes, ¹ this is probably the biggest urban challenge we face.

Borrowing from the energy efficiency achievements in the repurposing and retrofitting of commercial buildings, the London Energy Transformation Initiative (LETI) Climate Emergency Design Guide is setting out the journey to a net zero carbon future for the built environment — including the existing housing stock. Post 2050, to achieve climate positive solutions, we must go beyond this.

The technology exists — and is improving and becoming more cost effective — but legislative and funding regimes lag and are hindering implementation. For example, the Royal Institute of British Architects' (RIBA) 'RetroFirst' campaign, which champions the reuse of buildings, has highlighted the long-running problem of a 20 per cent VAT levy on refurbishment as opposed to zero to five per cent on new build. We are not yet offering the right incentives.

To accelerate the change and adoption of carbon free technologies, a successor to the Green Homes Grant will need to be developed to meet the ambitions outlined in the government's Ten Point Plan for a Green Industrial Revolution. In addition, the tax system relating to homes needs reform, so that it works to reward those who build energy efficient homes, or reuse and repurpose existing stock to make it operationally carbon-free. Tax and Stamp Duty rules based around Energy Performance Certificates (EPC), and energysaving initiatives using tariffs and payable credits, should financially incentivise those who use renewable energy to heat their own homes or export it to heat others. We may even see a change to local Council Tax rules so that it becomes linked to resource efficiency and behaviours such as recycling and minimizing waste. We may even see rewards for resource efficient behaviour through Council Tax reductions. Existing commercial building allowances need to be extended to include private residential property, but greater rewards for good behaviour will be required.

Private investment will also have an important role to play. We envisage a significant increase in impact investing, where socially aware investors select companies, organisations and funds aimed at generating measurable, beneficial social or environmental impact.

Public awareness is growing. Campaigns such as
The Design Council's 'A Public Vision for the Home of 2030',
which highlights issues around inclusivity, equity, wellbeing and
carbon and energy efficiency, are likely to influence housing
developers and investors to deliver low-carbon lifestyles and
more flexible home ownership models. This awareness has
been amplified by the impacts of coronavirus in 2020 and 2021,
where those confined to small and inflexible spaces during
lockdowns questioned the quality of homes in which they live.

Repurposing, incentives and peer pressure will only take us so far in our quest to create better communities, however. What we need above all is an evolution in building design whereby the design becomes the enabler for net carbon neutral and climate positive homes, and an enabler for inclusivity and social change.

Action points

Incentivise

the refurbishment and reuse of existing of existing residential building stock to meet net carbon zero standards borrowing from the energy efficiency achievements in the repurposing and retrofitting of commercial buildings

Create

new tax incentives to accelerate the adoption of carbon free technologies

Adopt

forward thinking standards for flexible and climate positive homes now

92k

We need to build 92,000 new homes per year to meet identified local housing need on top of retrofitting the city region's 7.5 million existing homes.

20%

The RIBA 'RetroFirst' campaign, which champions the reuse of buildings has highlighted the long-running problem of a 20 per cent VAT levy on refurbishment as opposed to zero to five per cent on new build.

2011 Census via NOMIS

MEETING THESE CHALLENGES



2070: the big idea

With intelligent and outcome-focused design, we will go beyond net-zero emission targets to create homes that underpin more balanced communities — homes that focus on wellness, energy efficiency, social interaction and affordability. To get there, we will need a new standard for homes, going further than the government's Future Homes Standard, informing emerging local design codes and space standards, as well as reinforcing the need to develop real 'lifetime homes' for a new generation of needs. >



With intelligent and outcome-focused design, we will go beyond net-zero emission targets to create homes that underpin more balanced communities.

By 2070, a standard for new homes will embrace six principles:

1/ Climate positive energy systems

This is the starting point. During construction, embodied carbon levels will be minimised through the use of biocomposite and locally-sourced building materials as well as prefabricated elements. All new homes will be connected to a decarbonised grid and will feature heat recovery, solar energy and water recovery systems as standard so that they operate as climate positive, feeding surplus energy back into well-established local energy networks.

2 / Al-enabled

By 2070, day-to-day lifestyles will be dependent on the intuitive support from artificial intelligence (AI) assistants embedded into the fabric of our homes connected to wearables which understand our lifestyles and manage our environmental impacts. Flexible and blended working will be the norm in the Fifth Industrial Revolution; the importance of the knowledge economy to the London City Region means every new home will have high-speed digital connections alongside dedicated spaces to work or study. Whether for quiet concentration or for virtual communication between holographic avatars, these spaces will be sound proofed so that family members are not disturbed. Careful design will also allow the rooms to feel like different spaces depending on their usage.

3/ Flexibility

By 2070 we will have rethought what we currently expect of homes, adapting typologies and uses to meet a more flexible (and sometimes blurred) private and working roles. The key will be design spaces where employees are not constantly 'on duty', designed with flexi-use rooms that efficiently adapt for a range of uses and occupiers — from the quiet work cabin to the children's playroom or a gym.

The needs of a household also change over time. Intelligent design and modular construction should accommodate change to avoid the need for expensive retrofitting, structural adaptations or rebuilding. Linked to this, homes should be capable of accommodating varying tenures including multigenerational- and co-living, as well as access to scalable care services to support an aging population.

4/ Wellbeing

Urban living should not mean there are compromises to privacy, or access to healthy spaces. Future homes — at all densities — will include light and airy private spaces particularly important if we are spending more time at home and need time to think or space to disconnect from virtual life. Some will also offer shared communal spaces for neighbours to meet and engage — whether in high density city schemes or on suburban streets.

As the pandemic made clear, access to high quality open space is important for physical and mental wellbeing — particularly in inner urban areas — provision will be part of the carbon neutral response where nature-based solutions are applied to create further blue and green spaces within the city region.

5/ Connected globally and locally

Each home will form part of a connected complete neighbourhood whether part of an established City Village or a Mark 2 Garden Community, 21st Century New Town apartment building. Homes will be part of places which support health and wellbeing through proximity to civic hubs, shops, employment opportunities, parks and recreation facilities, schools, and reliable transport choices. Residents and consumer demands and requirements will be captured by smart technologies to help city managers, developers and owners understand what communities and individual householders require.

In addition, travel options will be convenient, so that we can still enjoy the benefits of economic, functional and cultural agglomeration. The allure of London's international city centres will continue to attract many, just as they do today — so long as it's not a drag to get there.

Importantly, by 2070, there will be no more commuter dormitories, and in preparation no new urban home should be built without access to local facilities and to sustainable transport modes. A retrofitting plan is needed to ensure currently isolated housing estates are also connected into a network of **20-minute neighbourhood** at the heart of cohesive communities.

6/ Affordable

By 2070 we will have shifted how we consider housing and home ownership. There will be new methods of guardianship, both renting and types of ownership, providing for a more equitable, agile life that is aligned with working and living demands. There will be more flexibility in our use of the housing stock with multiple tenure options. Sustainable affordability will be a key demand, enabled through new methods of construction and materials and reducing day to day and better anticipating lifetime maintenance costs so that homes that appear to be affordable at the outset are not encumbered with high levels of ongoing charges.

With these principles underpinning a new standard, the design, location and ownership of homes can support wider urban resilience. The new standard will ensure that homes and the people who inhabit them create environmental benefit. Furthermore, community cohesion will be paramount. By 2070, we will have built on lessons learnt from the pandemic, and we will embrace the whole aspect of our homes as a building block of a balanced, resilient and interconnected city.

66

With these principles underpinning a new standard, the design, location and ownership of homes can support wider urban resilience.



Technology is constantly changing the working methodologies of doctors and surgeons. 3D imaging and laser technologies are facilitating less invasive, successful treatments while implantable medical devices can automatically monitor and regulate a raft of health conditions. Doctors can now work remotely and even perform robotic surgery.

The coronavirus pandemic caused a shift to remote diagnosis and treatments, and this will accelerate the development and adoption of technology-led healthcare as we move forward. There are many positives to this, though the challenges of how best to deliver local and personal patient care as well as targeting provision to reduce health inequalities will need to be addressed. We anticipate that this technology-led approach will lead to a rethink of healthcare real estate strategies and will also stretch health and social care services to consider how and where healthcare is delivered, particularly as changing demographics will mean there are more older people to look after.

Gradually, we expect that the cost of healthcare delivery from added demands of an aging population will be tempered by a preventative-led approach, informed by studies such as one published by the **Journal of Epidemiology & Community** Health (2017) which showed for every £1 invested in public health there is an average £14 saving in future healthcare costs. In the near future, wearable devices will transmit data from implants providing frontline care and advice in the home through AI-led algorithms. Secure data will be shared via the cloud to enable personalised genomic-led prevention and treatment to tackle the increasing prevalence of chronic **conditions**. Government has already set out its ambitions to create the most advanced genomic healthcare system in the world by 2030 1 which will be stimulated by the work underway in the innovative economic clusters across London and the region's research university cities.

Successive digital strategies to join up health and care data, along with the Centre for Digital Built Britain (National Digital Twin Programme) proposals for London's Healthcare Infrastructure (LHI), are already informing the **OneLondon**

approach, which aims to ensure clinicians across the capital have access to patient information at the point of care.

This will be extended to the wider city region, and nationally.

But, the move to a future healthcare approach is not solely about treating physical health. Increasing the use of technology and automation must not sacrifice healthcare's important role in supporting individual and community wellbeing or the resilience of public health services, including the ability to tackle future pandemics through local action.

We also anticipate a renewed focus on mental health, accompanied by a workstyle evolution, as flexible working and a reduced-hours working week become the norm. In Japan, Microsoft has seen a 40 per cent increase in productivity after switching to a four-day working week, while Sweden and Finland are planning similar moves. Cutting the working week would enhance wellbeing and free up more time for self-development and community-centred activities such as volunteering, mentoring and providing extended social care — all part of rebalancing our lives with a greater focus on civic purpose and shared community responsibility.

Action points

Embrace

the acceleration to telemedicine

Invest

in technology-led healthcare to improve disease prevention

Re-evaluate

healthcare real estate strategies

1 Genome UK; The future of healthcare (2020)

The Department of Health's Digital Strategy: Leading the Culture Change in Health and Care (2012), and the government's Digital Strategy (2013)

MEETING THESE CHALLENGES

£1

For every £1 invested in public health there is an average saving of £14 in future healthcare costs.

40%

In Japan, Microsoft has seen a 40 per cent increase in productivity after switching to a four-day working week.



2070: the big idea

By 2070 the innovations and application of technologies developed in the health-tech clusters of the city and region will have had a profound effect on the delivery of healthcare services. With widespread adoption of genomic-led treatments that lessen the day-to-day demands on the system, healthcare real estate shrinks as delivery is liberated from place-specific constraints. Instead, the focus evolves into person-centric, preventative care supported by secure data sharing through the region's highly-developed digital connectivity.

The early elimination of diseases will mean that people simply will not need to interact with the system as much as they once did, most notably in the types of facilities that deliver reactive acute care, such as hospitals.

Underpinning this model of care, the healthcare system will be organised around health management in the home supported by a network of connected smart 'hives', so-called because they take inspiration from the community and support offered by beehives. Hives serve a number of functions related to the ongoing survival of the colony and the success of the hive is entirely dependent on the coordinated actions of individuals working together. In a similar way, healthcare hives will draw together healthcare professionals and community volunteers to meet local needs. In 2070, our integrated care system will comprise three strands: health management in the home, community-based Health and Wellbeing Hives (H&W Hives), and regional Medi-Hives, centres of excellence for acute and chronic conditions.

 In fifty years, telemedicine will be the norm, with diagnostics and examination coming to the patient rather than the reverse. Low-cost drones will securely distribute medication and in-home diagnostic equipment will allow community healthcare professionals to focus on personal care and engagement. With the majority of primary healthcare delivered in the home, community-based H&W Hives will be at the heart of personalised delivery when light-touch, generic patient intervention is required, dealing with all non-emergency acute care, also providing mindfulness, self-care advice and mental health treatment. Located in 'civic hubs' in repurposed buildings on local high streets, the H&W Hives will be highly valued by the communities that they serve. For many, the H&W Hives will be a short walk away or easily accessible by autonomous pods. The H&W Hives will be further supported by diagnostics vehicles carrying compact technical equipment which will be able to make hyper-local journeys within local communities.

By 2070, understanding around early years development in relation to wellbeing and mental health will be well-developed. People suffering mental health issues will receive preventative care early and further support in the community, with acute centres for those who need them. For the elderly and vulnerable, the H&W Hives will also provide the essential human connection that will address isolation to balance technology-led care.

Medi-Hives will be regional centres of excellence. Combining white and dark space, the Medi-Hives will house specialist science, treatment and manufacturing facilities, undertaking the growth and regeneration of nerves, limbs and organs. They will also offer personalised and regenerative medicine based around a patient's genome, act as trauma centres and support the coordinated response to future pandemics. For those in need of greater support and treatments, flying ambulances will extend their reach.

Significantly, this model of care will play a vital role in improving the quality of life of London's thriving population of centenarians enabling them to play an active part in the city region's vibrant culture and economy.

Building on knowledge from work undertaken at the Pears Maudsley Centre by South London and Maudsley NHS FT and Institute of Psychiatry, Psychology & Neuroscience (KCL).



London's urban transport system has been 200 years in the making – even the Tube map shapes the character of the city for visitors and citizens alike. Over the next five decades, the public transport system will continue to contribute to life for Londoners, continuing to support employment creation and underpinning London's urban competitiveness.

However, the coronavirus pandemic, on-going innovation and the emergence of 'transport disruptors' have tested the resilience of our transport networks and challenged long-term operational models, but has also opened eyes to new ways of communication and enthusiasm to use different options for moving around the city — particularly where the journey to work is no longer the defining driver.

The pandemic lockdowns have demonstrated that we can rely on digital networks for many everyday tasks, reducing the need to travel for multiple purposes; although we will still want to travel for personal contact, to undertake complex tasks, to foster innovation and nurture talent, to develop business and personal relationships as well as for specialist and unique experiences that are best made face-to-face.

In the coming decades, the region's citizens will want the flexibility of choosing where to work and how to travel or whether to rely on increasingly advanced and robust technology solutions instead and not travel at all. The effects of climate change will likely influence those decisions as journeys may become more uncomfortably hot or disrupted due to flooding. For this level of flexibility to become a reality, both digital and transport strategies will need to be developed as an integrated communications system to create multi-channel urban connectivity.

The economies of agglomeration have long relied on physical proximity to markets and talented employees. In and around London this has meant locations with express rail or tube access or connected to global markets by proximity to Heathrow have thrived. In tomorrow's world of the Fourth and Fifth Industrial Revolutions there will still be value in physical connectivity, although how data and ideas travel on strong digital networks will be just as relevant in fostering economic growth. The challenge will be to ensure there is affordable access to physical and digital networks so that all communities benefit.

This digital shift is as relevant for transport provision as it is for the economy as a whole. In the near future, the 'internet of things' will be universal (estimates suggest 43 billion connected devices by 2023) and artificial intelligence will process the collected data to inform the seamless alignment and full integration of travel networks and journey management.

As the economy builds back there will be significant impacts for London's commercial city centres and ridership of the transport networks which support them. Five-days-per-week, peak-time commuting will no longer be the norm for many commuters across London and the connected metropolitan South East, already recognised by Great British Railways through introduction of flexible season tickets. Whilst the shifts in commuting will change how city centres are used, they will remain firmly at the heart of the economy and cultural life once rebuilt.

Action points

Target

investment carefully to update the existing network and infrastructure

Focus

on local integrated mobility hubs to support new 20-minute neighbourhoods and 'last mile' transport in suburbs and towns of the region

Integrate

the publicly-owned and maintained networks and systems with new transport innovations to offer a customer-centric seamless future transport system

66

All places will view transport and digital connectivity as equal in the future.

MEETING THESE CHALLENGES

In what we describe as the 'Central Experience Zone', city centres will remain attractors of talent and excitement as much as leisure and cultural destinations. The ease of journeys to and seamless travel within city centres, using varied modes, and by many more individuals, has to be the focus moving forward.

Furthermore, places both in the city and at the periphery that were previously less well-connected by traditional transport may become attractive economic hotspots because of super digital connectivity. This would enable the levelling-up of communities that have been isolated from economic drivers for decades, balancing out access to opportunity. All places will view transport and digital connectivity as equal in the future.

Whilst the future city will be full and thriving, the labour pool will be very different and transport use will change significantly over the coming decades.

- More people, but less-frequent commuting. London will still rely on commuters, but patterns will change. There will be a rebalancing of ridership, with a wider cross-section of people accessing the city centres, but individuals travelling less frequently and at different times throughout the day, and at weekends.
- Varied destinations. With a rise in suburban offices and close-to-home co-working spaces, travel destinations will become more varied and won't always align with historic travel corridors. Leisure and retail trips will be just as important as travel to work. As a result, an urban 'mesh' of travel options will develop around the use of shared vehicles, demand-responsive Mobility-as-a-Service (MaaS) as well as connected and autonomous vehicles (CAVs) geared around shorter and sub-regional trips.

A polycentric city and region. Digital working will change the relationship between work location and distance. In the coming decades, those hybrid working households in search of access to more open space and larger, moreaffordable properties will have the flexibility to move further from their office base to places which are already home to the fastest growing, technology-led economic sectors.

As a result, the city will have a wider functional area, where economic and cultural connections will become broader and more complex as a polycentric region.

Travellers for work and leisure are as likely to want to criss-cross between regional towns as much as A to B into the capital, making planning transport systems, networks and investments more complex and requiring effective coordination of planning transport, land use and national economic objectives.

A focus on local and 'last mile' travel. Currently, central
London is the only place where public transport is the
dominant travel choice (for journeys to work and for leisure).
Many places – including suburbs and major towns around
London – do not have adequate mass public transport or
a 'last mile' alternative to the private car. In the coming
decades, emphasis must be placed on enabling sustainable
travel options in places where, currently, they do not exist.

The success of a blended-working economic model will depend on users having viable transport choices. However, the greater challenge will be to ensure that new technologies and the flexibility offered by demand-responsive modes serve currently-excluded communities, those in roles which are not locationally 'footloose' or where jobs may be automated, with affordable transport access to opportunities across the city and wider region.

National connectivity is also central to a sustainable future. Rapid travel connections combined with distance-agnostic digital connectivity are making regional towns and UK cities attractive business locations for many firms. To ensure that the high-growth sectors of the region's economy are fully part of that future success, London and its city region must be strongly connected to the UK's economic drivers and powerhouses. HS2 and a decarbonised rail network are at the centre of that future national strategy, as are reimagined highways for automated vehicles and logistics corridors as the backbone of national and international trade. Of the investment available for transport, based on new sustainable long-term funding models that also bring equitable access to transport choices, a large proportion will need to be dedicated to maintaining the existing network and updating two centuries of infrastructure investment so that it is relevant for a city faced with unprecedented economic and social change.

As we shift away from the public sector being the predominant provider and manager of mass transport systems to the multi-channel future which will include privately-led innovations and dynamic MaaS (which to date relied on publicly-maintained streets), the investment available for new capital projects and modes will need to be carefully targeted. Moving forward, the public sector's role as the regulator and aggregator of data and dynamic timetabling of multiple providers activities will become more important in providing a seamless travel experience for the user.



Travel destinations will become more varied and won't always align with established travel corridors. As a result, an urban 'mesh' of travel options will develop around the use of shared vehicles, demand-responsive Mobility-as-a-Service (MaaS) as well as connected and autonomous vehicles (CAVs) geared around shorter and sub-regional trips.

Sustainable funding of a system where there is less reliance on peak hour travel, where future forecasts are less certain and where there is a multiplicity of providers is the existential challenge. Access charges and rethinking the metrics of pricing structures which prioritise health and wellbeing, carbon impacts and air quality, enabling equitable access to work opportunities, or wear and tear on the public funded network, all need to be considered. Options may also include communities crowd-funding and developing their own active travel networks that are subsidised or free at the point of use. The aggregation and management of urban data will unlock potential for new funding models to be developed as Al also begins to make the consumer's travel decisions intuitive and automated – not just for public transport in the centre of London but planned and integrated more widely across the region.

With this turbulence, we must not lose sight that transport is already a key enabler to urban decarbonisation and the 2020s will see significant adoption of electric vehicle (EV) technologies, as well as hydrogen for logistics, leading to lower emissions. In addition to the emergence of new forms of 'wheeling' mobility such as e-scooters and e-bikes, the pandemic has led to a huge increase in cycling infrastructure and active streets through the London Mayor's Streetscape programme.

We don't quite know how the recovery and long-term future growth will play out, but we do know there is the need for an agile transport network that is able to benefit from economic and technological disruptors. There is an opportunity for London to reinforce its progress as a global leader in carbon neutral and technologically-enabled transport networks.



Sustainable funding of a system where there is less reliance on peak hour travel, where future forecasts are less certain and where there is a multiplicity of providers is the existential challenge.

By 2070, a journey will be a choice rather than a necessity.

2070: the big idea

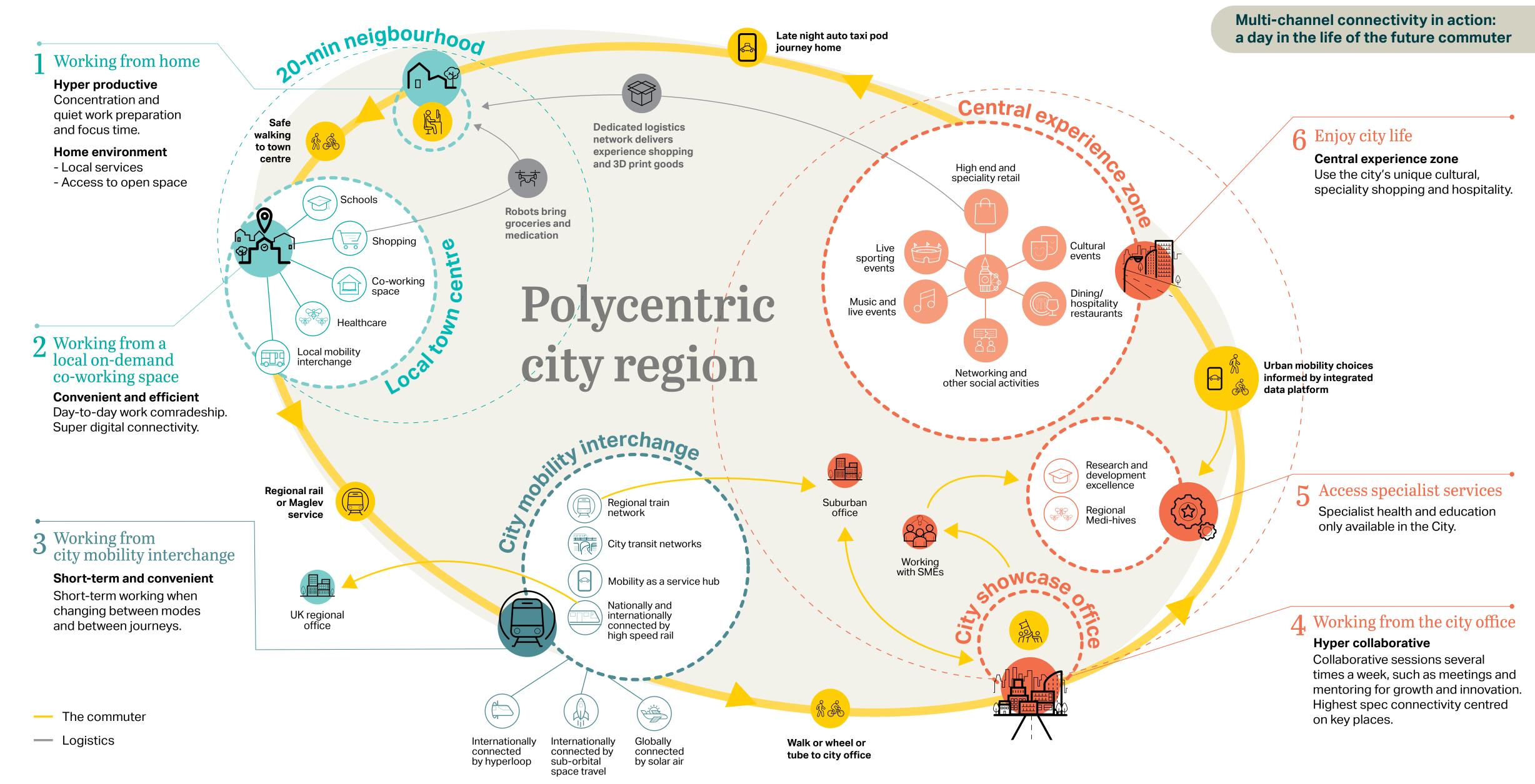
By 2070, a journey will be a choice rather than a necessity. Every decision about how, when and if to travel will be informed by balancing whether an immersive virtual engagement is more efficient or whether a journey is needed. Artificial Intelligence (AI) will harness real-time data of all travel and digital choices for the customer but also, importantly, for transport agencies which will rapidly become the coordinator, integrator and regulator of multiple physical and digital mobility channels. Wholly digital platforms will give transport planners the ability to align mobility needs and options for all of society, offering a better service to those previously held back by issues of affordability, connectivity and accessibility. The value of all modes of transport will be measured against how they deliver equitable 'good growth', contribute to the resilience of the city, or against future recognised metrics such as today's United Nations Sustainable Development Goals.

In the heart of the city, the transport system will have adapted with new modes and technologies adding to the rich mix of carbon-free travel choices able to reach multiple destinations. That choice will have extended to the suburbs and to the connected regional towns where citizens will no longer rely on private cars but where there are 'last mile' mass transit options focused on local integrated mobility hubs at the heart of 20-minute neighbourhoods so that local employment, training and services are

readily accessible. With a greater number of people each commuting a few days per week, with flattened peaks and potentially different travel destinations every day, the coordination and integration of travel modes is essential.

More resilient 'mesh' transport networks will have evolved (modelled on mesh wi-fi), as we plan for less A-B travel and build on the agility offered by on-demand, CAV and shared modes which meet demands for multiple destination choices. Passenger services will be dynamic, with Al anticipating demand, rather than being timetabled based on (what will become) outdated, predictable travel patterns. And, this transport investment transformation must go hand in hand with universal development of the digital networks (which by 2070 that will be well beyond 5G) on which its operation will increasingly rely.

The result will be seamless for the user — who will be living a multi-location, part-physical, part-digital life — wherever they are in the city, in the suburbs or in an increasingly polycentric city region. By 2070, the reality of travel in and around London will not be a choice between any one mode or type of destination but will be multi-channel connectivity as illustrated in our hypothetical 'day in the life' of a future commuter, which can be found overleaf.



Multi-channel connectivity in action: a day in the life of the future commuter



Working from home

Our worker's day may start working from home, focused on quiet work and preparation; talking with colleagues in Asia, who are at the end of their working day — relying on super-reliable, fast digital connections.

In the background, their Artificial Intelligence (AI) digital-twin is already intuitively developing solutions to the challenges our worker started to scope out over breakfast that morning. They chat through the best options using interpretive Virtual Reality — including the plan for today's travel and work.

Our worker steps out, walking or wheeling to the town centre, at the heart of their '20-minute neighbourhood', through river parkland and on safe and attractive streets. Former petrol filling stations and car parks have been repurposed to become new parks, and since the adoption of Connected Autonomous Vehicles (CAV), street parking has given way to parklets where people stop to rest and eat, and areas of planting around local sustainable urban drainage.

After accompanying the children to the local school, they visit their parents who now live in specialist aged-housing close to the town's facilities, manage a quick visit to the herbivorous butcher to choose the best plant-based steaks for tomorrow's dinner, and have a wellbeing appointment at the local health and wellbeing hive with the doctor (which follows a check-up at home by a remote-sensing avatar medic which has recommended a preventative face-to-face consultation).



Working from a local on-demand co-working space

Our worker then heads to one of the town's co-working spaces for meetings with colleagues based nearby. Renting space close to workers' homes by the hour is more effective for their employer who is charged directly by the collaborative platform that works with property owners and local authorities to make space available to employees. The space booking was made intuitively; accurately predicting the arrival time and needs. Meanwhile, shopping and medicines are delivered home by local, automated delivery robots from a consolidated delivery centre.

Adjacent to the co-working space is the local mobility interchange, where high quality town rapid mass transit, MaaS and active travel all cluster to make integrated local travel choices easy for the traveller. The transit options are managed and integrated by the coalescence of real-time data, which not only predicts future demand but assesses the best options to meet personal health goals, making all steps of the commuter's journey smooth, predictable and integrated.

Today, our worker checks their personalised travel itinerary before stepping aboard regional maglev transit (which has strong and reliable digital connectivity enabling them to catch up with the news, how the children are getting on at school, and prepare for the rest of the day).



Working from city mobility interchange

They alight at the city mobility interchange. On other days our worker may stay here for a while and touch down at working and wellbeing lounges while they wait for:

- a high-speed rail trip to their firm's regional office bases (which are less than an hour away); or
- to pick up a vertical take-off and landing vehicle for an inter-urban 'hop', or connect with the European hyperloop network or to the airport for a solar air flight; or
- to the national space-port (for a sub-orbital, hyper-sonic intercontinental journey to visit their family in Australia).

Today, they head across town to their city office.

Their personalised itinerary tells them that a hire scooter is the quickest mode, but that walking would be the healthiest. Complete streets boasting wide pavements, pedestrian and wheeling priority in a car-free city centre and covered colonnades on newly tree-lined city boulevards make this a safe and comfortable walk in all weathers.

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Our worker steps out, walking or wheeling to the town centre, at the heart of their '20-minute neighbourhood', through river parkland and on safe and attractive streets.

Multi-channel connectivity in action: a day in the life of the future commuter



Working from the city office

Our worker has not been to the city office for nearly two weeks but is heading in today for a critical meeting with a customer in the holographic immersion suite at the firm's global showcase office in the heart of London. They also take the opportunity to check-in with junior colleagues for personal reverse-mentoring sessions which help career development for the worker and their team.



5 Access specialist services

This meeting is followed up by a workshop with one of London's internationally recognised university research institutes and an SME that shares the office space and with whom they are innovating new products. Here is the best place to access specialist services and unique talents.



6 Enjoy city live

And finally, having come to town, they leave the office and step out to enjoy city life. This time — advised by their integrated day planner — they travel by the new Tube on the ten-minute journey to the heart of the Central Experience Zone:

- for a drink with colleagues (taking in an iconic view of sunset over the River Thames); or
- dinner with friends who live on the opposite side of the city region (at a restaurant of a cuisine that is typical of one of London's distinctive communities); or
- to visit speciality retail stores of the West End (where purchases are sourced or 3D-printed and delivered home that evening via the region's dedicated logistics grid which uses much less energy and enables streets and highways to be less congested); or
- to watch a sporting event (the last regional heat to decide the finalists of a national competition before the final is played in Birmingham — the location away from London being closest to most supporters); or
- to see a performance by their favourite band (which is only hosting one night in the UK on this tour, and tickets were like gold-dust).

These experiences are not available in every locality or town but are particular to London. These entertainment and cultural assets are supported by the city's interconnectivity and transport choices, and underpinned by the diversity and global reach of London.

After that day, an on-demand MaaS autonomous taxi pod is already and waiting for our commuter. Using automated dynamic routing, choosing to use streets, waterways or by air, it transports our worker directly home quickly and safely.

As for tomorrow, our worker thinks they might work from home all day.



Our worker has not been to the city office for nearly two weeks but is heading in today for a critical meeting with a customer in the holographic immersion suite at the firm's global showcase office in the heart of London.



To meet the government's net-zero carbon commitments, local as well as national policies and action plans are in place. The UK Committee for Climate Change ¹ is setting out the detailed pathway of how to deliver a net-zero UK by 2050; however, experts recognise that to do it, we need to move from a "walk to a sprint". ²

Many politicians and authorities across the region
— including the Mayor of London and leaders in Reading,
Southend, Milton Keynes, Oxford and Brighton amongst
others — have promised a more aggressive target of 2030.

To lead the way, these leaders and national government will need specific place-based plans and solutions: as it stands, current policy and progress will not get us there. 3

The main focus to date has been to accelerate a transition to renewable energy in combination with energy efficiency measures. To speed up the process, the way we use cities and how they are designed — or redesigned — needs to change up to and beyond 2050.

On the consumption side:

- Vehicles powered by hydrocarbons will be phased out in favour of electric, while haulage, freight and major transit systems will likely use hydrogen or biogas. Human behaviour also needs to change to more sustainable modes of transport and away from private car ownership.
- To reduce emissions related to the heating and cooling of homes and offices, buildings need to be retrofitted a huge challenge for the region that needs to be addressed.
- Going forward, new building designs and technologies will be needed to ensure that all newly built homes are futureproofed with low carbon heating and world-leading levels of energy efficiency, building on proposed changes laid out in the government's Future Homes Standard.

Not everything can be carbon neutral in design or use, however:

 Tall apartment buildings will remain, though the opportunities for on-site renewable energy generation will be limited. It may be necessary to offset emissions by financing their reduction elsewhere.

- Cherished historic buildings will need sensitive refurbishment.
- Natural gas will be phased out from new development by 2025 but will take far longer to be removed as the primary heating source in the region's existing housing stock — but in time will be replaced by electricity, biogas, hydrogen or efficient heat pumps.

On the production side,

- In line with greater renewable energy production, the efficient distribution and — importantly — storage of renewably generated energy must improve both at the macro level, but at local levels too.
- Rooftops on many buildings must be widely used either for renewables such as solar power or to encourage biodiversity, and we will be asking our urban green space to work harder as sources of energy, biodiversity and amenity.
- In addition, natural stores of energy such as the tidal River
 Thames and the deep chalk aquifers to the north of London in the Chilterns and the Downs to the south are tapped more consistently and efficiently for the energy they hold.

Action points

Future-proof

all newly built homes with low carbon heating and world-leading levels of energy efficiency

Start climate

positive planning in larger-scale Urban Villages and Garden Communities

Implement

circular economy approaches from today, to reap benefits in the future



troughs, as well as a shake-up of electricity markets. 5 This interlink between data and energy becomes the mechanism for energy trading, with smart grids the enabler.

Energy trading manifests in different ways from widespread capture of waste heat from industrial processes and **sewage effluent** to peer-to-peer energy trading systems. The latter approach will connect those with surplus energy to those who need it — instantly and without lengthy commercial agreements. Operated by Al using 5G data, the peer-to-peer system instantly deducts the cost from the user's account and credits the producer. When not required, energy is stored in a virtual environment similar to the way data is currently stored in the cloud.

the challenge of minimising emissions and resource use during production remains. Initiatives begun in the 2020s 6 to prioritise a circular economy approach ⁷ — an economic system that aims at minimising waste and making the most of resources — will begin to mature.

Once the London City Region achieves operational net carbon neutrality, and we have substantially completed the transition to renewable energy by removing fossil fuel use from the city and making our infrastructure and built environment efficient and resilient, the next step is to make the London City Region net climate positive. Planning and building in a circular economy becomes the next frontier.



The interlink between data and energy becomes the mechanism for energy trading, with smart grids acting as the enabler.

2070: the big idea

By 2070, the London City Region will have taken steps to becoming a regenerative built environment, one that — as a whole — gives more than it takes. As the grid is fully decarbonised, focus has moved away from energy transition to minimising embodied carbon in buildings and infrastructure, and waste becomes a valuable commodity to be traded and conserved.

The circular economy will define all aspects of our built environment and infrastructure, and will become a driver for local authority co-operation across the city region. Policy has developed over time in step with significant eco-innovations, leading to a transformation in the way that buildings and places are designed, operated, and remade, going well beyond energy efficiency to tackle the broader urban ecosystem.

Much stricter regulations and standards concerning building efficiency will be the norm. Buildings will be retained, refitted and refurbished wherever possible. Where the business and carbon case has been made to build from scratch, low-carbon, locally-sourced materials will be used alongside prefabricated elements that can be disassembled and reused after use. Designs will be optimised to reduce redundancy and waste. By 2070, engineers and architects will be fluent in zero carbon construction working with bio-composite building materials made from agricultural by-products and reclaimed steel on a day-to-day basis.

Instead of thinking of individual structures, we will think in terms of whole systems, mapping resource flows and determining how waste from one system becomes a resource for another. Urban mining will be standard practice, rather than mining for raw materials. So-called waste energy from multiple sources — heat, noise and light — will be captured and converted to be reused elsewhere. Furthermore, commercial and legislative approaches will be geared towards the comprehensive energy makeup of areas — or eco-districts — rather than individual buildings. This cross-boundary thinking will extend rapidly to more considered city planning that incentivises sectors to link up. As an example, energy will be extracted from the huge amounts of heat emitted by the data centres that will support the region's future technology networks. Local authorities, developers and data centre owners will collaborate to build data centres close to the urban and suburban areas that they serve (rather than in remote locations) and the energy will be fed into well-established local energy networks.

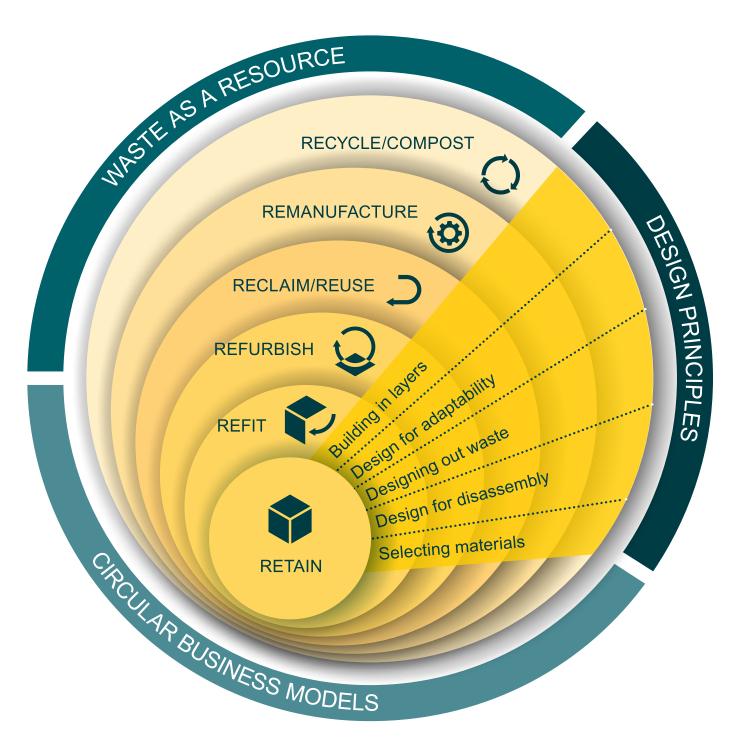
By 2070, we will no longer think of buildings as consumers of resources. They will contribute to and renew nature through a whole-system approach to design. Pioneering work — such as the water-efficient composting toilets in Seattle's Bullitt Center,— is developed to such an extent that buildings are no longer viewed as inert, but are alive with biotech that produces energy, purifies the air and even repairs itself.

As a result, residential and commercial buildings will work harder. This is as much the result of years of retrofitting to improve performance and reduce energy demand, particularly in older housing stock and legacy infrastructure, as ensuring that those parts of the built environment that can become climate positive overcompensate for the historic and older elements that we will struggle to adapt.

Furthermore, placemakers and urban planners will use nature-based solutions (NBS) to create a regenerative city environment. From using plants to reduce overheating in homes to extracting heat <u>from onsite SUDs on new developments</u>, NBS will complement the restoration of London's green-blue urban spine furthering the implementation of London's National Park City status.

The net-zero carbon agenda of the early 21st century has contributed to a radical shift in the evolution of the interconnected city region. By 2070, London has the potential to become more resilient, responsible and balanced than at any point in its entire 2,000-year history. Net climate positivity may well be in reach.

Circular economy principles for buildings





By 2070, the London City Region is taking its first steps to becoming a regenerative built environment, one that — as a whole — gives more than it takes.



Pay farmers for social good

The transformation of farming and agricultural land within and around our urban areas will be pivotal in creating a more resilient, balanced and carbon neutral city region in the future. As the urban population grows and increasing demands are placed on food production and green space, we need to use agricultural land far more efficiently and thoughtfully.

Revaluing natural capital as a high-value asset for community benefit in future environmental and land use planning policy — paying farmers for social and environmental good — would encourage agricultural land to be used for multiple purposes with co-benefits.

Land use in and around the capital is already highly contested. This is only set to increase in the future because of competing sustainability, urban growth and economic drivers, particularly in the busiest, most dense cities within the region.

To respond to the planetary climate emergency, new growth must be carbon neutral. Whilst much can be done in building design, carbon neutrality won't always be possible on a single piece of land. Large-scale regeneration schemes or new settlement proposals may need to look for strategic locations to offer net environmental gains. The options will need to include nature-based solutions to complement sustainable placemaking and economic growth, renewable energy generation and carbon sequestration, or ecological restoration for biodiversity net gain.

Partnerships between developers, local authorities and agricultural landowners will be needed to allow off-site mitigation at scale, often in different local authority areas with multiple schemes coming together to enhance the quality of strategic environmental sites, set aside for adaptation.

We need to strike a new balance between the city and its urban hinterland. Both rely on each other, but after nearly two centuries of prioritising urban economic growth over the city's natural environment, the relationship needs a reset — with regulatory encouragement. Rehabilitating our city region rural landscape will support biodiversity and natural capital net gain, although the results will take decades to achieve.

To kick start action, radical change is needed with a series of catalytic moves that go well beyond mitigating the effects of new urban growth.

First, there are significant areas of land, much of it in the Metropolitan Green Belt, currently often in low intensity semi-agricultural uses (horticulture). When these spaces are next to built-up areas, the land would be better used for local food production, supplying local towns and the city's markets. As well as reducing food miles, such a shift would help communities connect with their locality and understand the relationship between urban and rural lives. Secondly, the perception that green, natural-looking land is ecologically-well needs to change. The UK has the poorest biodiversity in Europe and this particularly true in the areas surrounding London and the regional cities. Agricultural waste, pesticides, fertilisers and muck-spreading are degrading our soils and polluting our waterways, resulting in ecological breakdown. This needs to change to allow nature-based solutions to mitigate urban impacts, at least partially.

Finally, looking not too far into the future, we expect technology to transform food production. Lab grown synthetic meat and vegetables will become mainstream. Non-animal based, ethical forms of meat and produce production will be possible in the city. Vertical farming, where local food labs are created under cities, is likely to play a part in the drive for urban resilience and contribute to reducing carbon dioxide in the atmosphere, and as a continued trend towards reduced-meat and meat-free diets. This may free up current agricultural land to create habitats that deliver a net biodiversity gain and a range of ecosystem services.

Action points

Consider

more uses for areas of low intensity semiagricultural use adjacent to built-up areas for local food production and to support overall sustainable urban growth

Rewild

areas of agricultural land for which farmers are compensated contributing to environmental and biodiversity net gain

Promote

and invest in vertical farming and food production technology such as technology to reduce the carbon footprint of food production, and bring agriculture to the heart of the city



Agri-Tech. The rich soils and university research institutes are already innovating agricultural practices driving sustainable living. By 2070, the main push will have come from the revaluing of our natural capital as a resource for nature and for society — including repurposing of agricultural land and indeed all inefficient green space into high-value assets for community benefit. The rewilding of agricultural land will provide a range of ecosystem services, including climate regulation, soil and water quality improvement, flood management, recreation space, air quality improvements, bio-diversity net gain and

The drive towards sustainable practices will go hand in hand with reducing food miles and switching to locally-sourced food. By 2070, despite population growth, we envisage the amount of land required for farming will be greatly reduced as farmers become more productive. Farms will be focused on local needs, with the remainder of our underutilised green areas repurposed into fully functioning ecosystems designed to maximise biodiversity and environmental net gain for which farmers are compensated.

By 2070 mindsets will have changed. We will have re-struck the relationship between town and country. Green spaces will be seen as crucial parts of the city infrastructure, with Greater London working in partnership with the rest of its city region.



By 2070, the main push will have come from the revaluing of our natural capital as a resource for nature and for society — including repurposing of agricultural land and indeed all inefficient green space into high-value assets for community benefit.



The journey to 2070

Water companies that have responsibilities which cross
Greater London and the wider region are preparing plans to
address water shortages and interruptions in supply across
different catchments, but we need to step up measures to
ensure the city region has a more resilient water supply.
Part of the solution is to reduce water leakage faster by
meeting the more challenging targets set by industry
regulator Ofwat. We must also improve how water is sourced,
transferred and used including more water efficient design
of homes and commercial properties.

Great effort is being placed on the building of strategic water resource partnerships, where new reservoirs and infrastructure will enable water trading and water transfer across regional boundaries and catchment areas. For example, the planned transfer of water from the River Severn to the Thames catchment will bring much needed water to the South East and Greater London. Similarly, Portsmouth Water will transfer water to neighbouring Southern Water, which covers Kent, Sussex, Hampshire and the Isle of Wight.

Each water company is building a regional water supply grid to make their supply more resilient. The next step is to interlink these grids so that water can be channelled from northern England, where there is more rainfall, to the drought-threatened South-East via pipeline and water courses.

This challenge also calls for joined up decision-making across catchments. The new communities and industrial clusters envisaged for the London City Region in the next 50 years will need strategic infrastructure enhancements as part of their long-term planning. However, catchments, water company areas and government administrative boundaries rarely align. Hence the need for joined up strategic decision-making to plan the supply and use of this critical utility.

At the same time, more effort is needed in the re-use and recycling of water. In the UK, homes and businesses currently operate single wastewater systems that make water efficiency harder to achieve. To capture grey water from sinks, showers and washing machines for toilet flushing and irrigation, housing design must evolve to include two systems, for which regulatory incentives are needed. It's already being delivered as part of exemplar schemes. All new towns, communities and major regeneration schemes should require microgrids and self-contained systems to be builtin that could also serve energy and food-growing needs. Rainwater harvesting and grey water recycling should be mandated in all new developments. This will help to achieve carbon neutral development in densely populated areas and reduce wastewater costs. Moreover, using water locally will remove it from the sewer network, enabling flood risk to be better managed.

As a by-product of the evolution in transport usage, there will be a reduction of private car parking on streets creating space, some of which could be used to store water locally, particularly where there is currently a shortfall. As well as being an ecological resource, these sustainable drainage systems (SuDS) will serve to beautify and cool the city.

As SuDS become larger and more prominent features, they will have a wider positive impact on society. Embracing high quality SuDS features will not only provide biodiversity and wildlife benefits but also create attractive streetscape features, encouraging healthier lifestyles and wellbeing. The heat within them and grey water <u>will be used to heat homes</u> and help reduce urban heat effects.

By itself, however, adding to water supply and distribution won't be enough. For a sustainable approach to water, cultural change is needed. The stakes are high: unless potable water is valued as a precious asset, water shortages could put the health of habitats and the environment at risk, and put the brakes on growth.

Action points

Interlink

to make efficient use of national water resources, combined with a change is behaviours to reduce overall water usage, through creative water charging regimes

Redesign

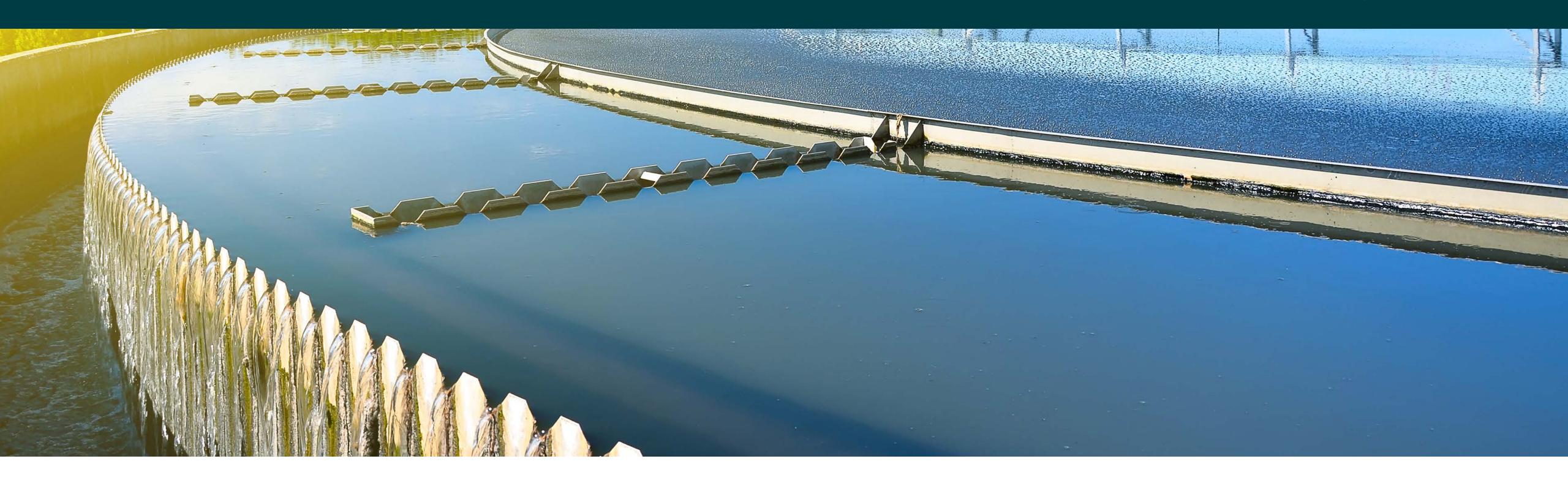
urban street parking and car parks freed up from the move to CAVs as a network of sustainable drainage and water management

Recognise

green and blue infrastructure as the focus of new communities from the outset of their design

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The stakes are high: unless potable water is valued as a precious asset, water shortages could put the health of habitats and the environment at risk, and put the brakes on growth.



2070: the big idea

By 2070, water will no longer be seen as a freely (or at least very cheaply) available public resource. To encourage appreciation of every drop, water will be re-cast as a valuable urban and public health asset.

The introduction of derivatives linked to the price of water has been hailed as a potential way of managing the future impacts of climate change. Although its relative abundance — compared to commodities such as gold — means potable water is unlikely ever to be traded as a major commodity, water will be valued differently in 2070. Whilst it isn't traded globally like carbon credits because its usage is highly localised, local trading schemes will be commonplace.

Such schemes will focus on making users aware of the 'value' of water as a scarce resource, curtailing unnecessary use and reducing wastage through better awareness. In a similar way to the carbon scheme by allocating credits, heavy users also work with neighbours or public authorities who have high demands for irrigation or other grey water supplies to promote recycling and reuse, and ensure clean water remains affordable and available to all.



To encourage appreciation of every drop, water will be re-cast as a valuable urban and public health asset.



The journey to 2070

Large parts of urban London are sterile with wall-to-wall concrete, but the next chapter in the urban development will be more responsive to the environment and communities of the city. The government's **Building Better**, **Building Beautiful Commission** promotes the importance of beauty in new urban developments and neighbourhoods. Nature-based solutions — interventions to restore and sustainably manage natural systems, integrating them with otherwise hard infrastructure — will be an important part of efforts to create great new city environments with significant wellbeing and biodiversity benefits.

The city's underlying natural environments and topography often hide rivers and water courses — indeed a number of London's placenames derive from the hidden rivers beneath the streets. This 'blue network' needs to be rediscovered so that it can be a valuable part of adapting our urban environments to the effects of climate change.

In a model that should be at the heart of approaches in other city region towns and cities — and should underpin the design of new communities — the GLA is already well advanced in developing policy in this area, most notably through the <u>All London Green Grid (ALGG)</u>. The ALGG is an

all-embracing green infrastructure approach that values green and blue spaces, which includes opening culverts and naturalising river channels. The next step looks to incorporate an Urban Greening Factor (UBF) requirement on future development. The UBF will place high value on the incorporation of species-rich greenspace, wetland and open water in all major schemes in the capital. This new requirement will present an opportunity to revive those natural assets which have been hidden by two centuries of urbanisation. Over time, we anticipate that this will shape a new vision for London.

With a new value placed on access to and the quality of urban green and blue space, there is an opportunity to repurpose and reclaim parts of our cities for nature but also to promote the long-term resilience of the city in face of urban heating and water shortages. Urban streets now dominated by parking could give way to tree-lined avenues as autonomous vehicles and active travel become the norm. Likewise, spaces once used to house car parks and petrol filling stations could become parks and wooded glades for rest, carbon capture, flood mitigation, cooling and better air quality. With more space for walking, cycling and outdoor pursuits, the streets of London would be transformed into healthy spaces.

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Introducing nature back into the city in the form of urban forests and uncovered rivers throws up endless possibilities.

Action points

Explore

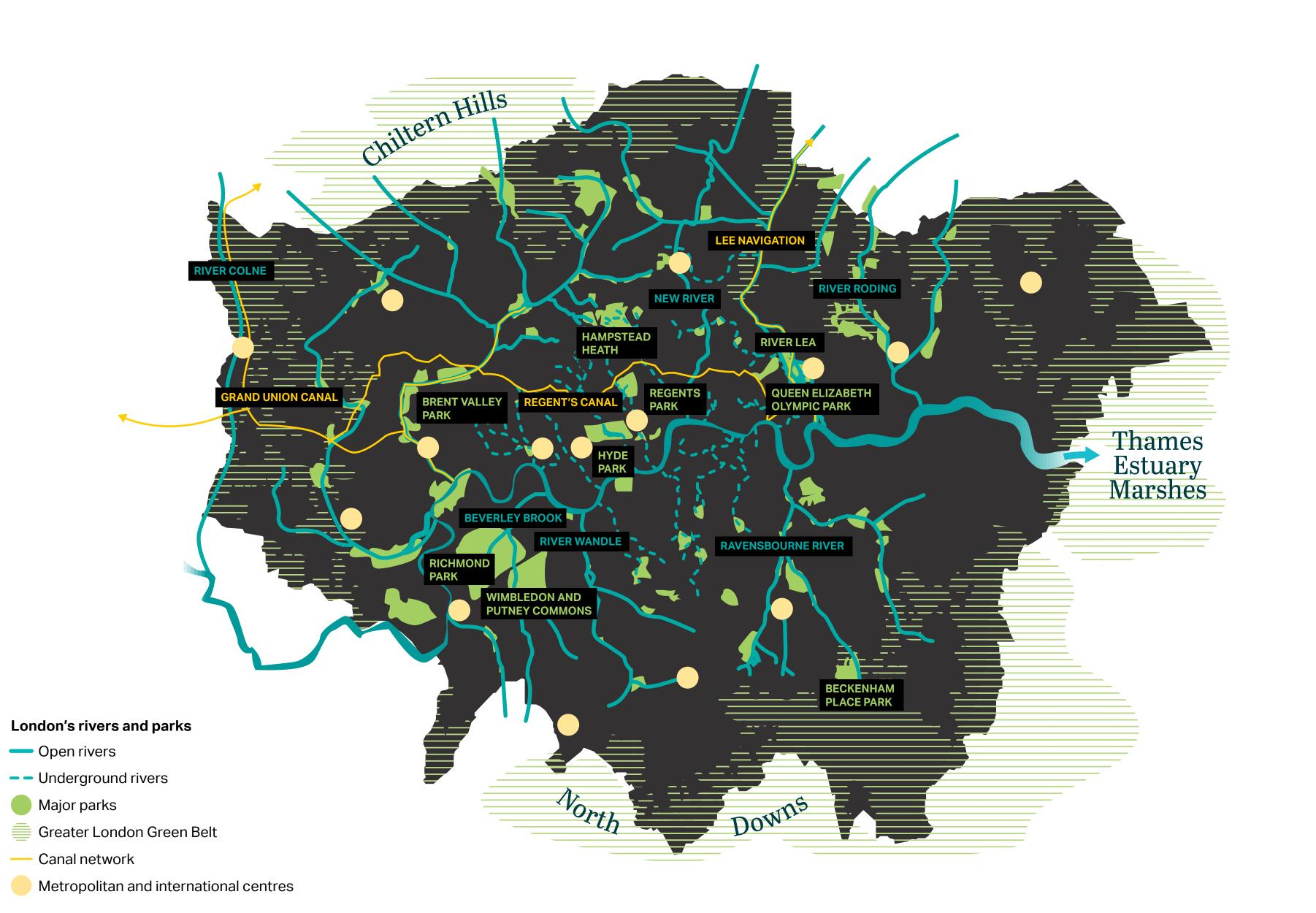
the possibility of reviving hidden rivers on new developments and place urban water systems at the heart of green infrastructure planning

Look at

the River Lea/Queen Elizabeth Olympic Park case study as an example of best practice

Focus on

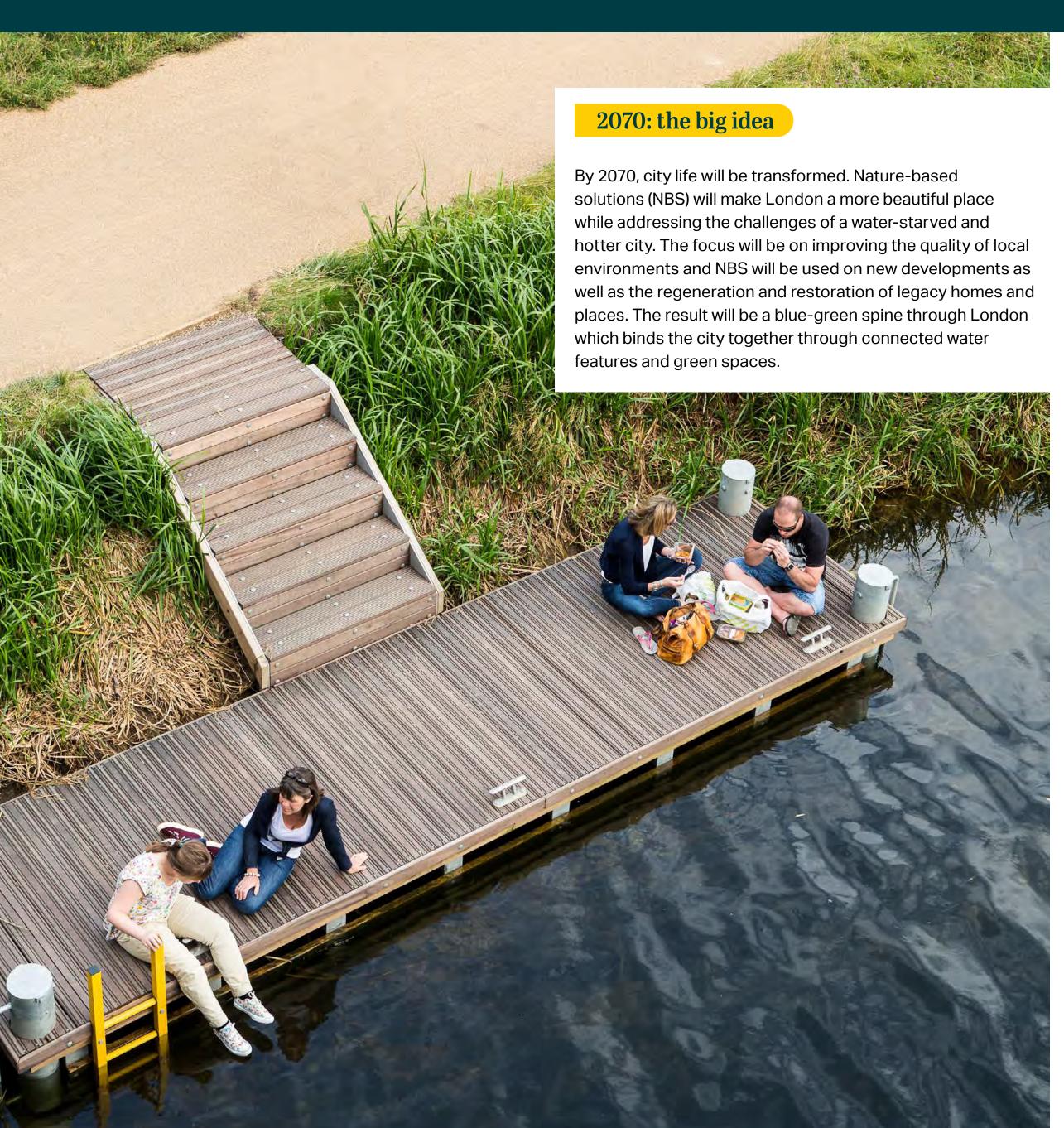
Brent, Ravensbourne, Tyburn, Stamford Brook and Effra rivers to unlock potential in London



In the future decades, new possibilities will also be created from completion of the Thames Tideway Tunnel and other investments to make the system more resilient. These new super sewers will help improve the water quality of the river system that had become part of London's Victorian wastewater system; channelled or culverted parts of the river network could become neighbourhood assets once again. According to the Financial Times, 400 of London's 400 miles of river network have been restored since 2009, and 60 more miles of waterway that run through public parks and urban regeneration schemes could be restored cost effectively in the coming years to be part of the public green space network, adding to biodiversity and supporting the cooling of the over-heating city. The rediscovery of the River Lea through the Queen Elizabeth Olympic Park is the most striking and high profile of these rehabilitation schemes — there's a huge opportunity to apply the same principles elsewhere in the city region.

miles of river network have been restored since 2009.

more miles of waterway that run through public parks and urban regeneration schemes could be restored in the coming years.



The successful implementation of London's blue-green urban spine will depend on multiple stakeholders coming on board. It will begin small with individual schemes and initiatives to get momentum going.

London's forgotten rivers will be resurrected helping cool the city and providing corridors for wildlife, as well as a peaceful and pleasant environment for walking and cycling routes. Those that follow streets or run under existing public open space have been liberated from their previous use as sewers or culverted flood protection following the completion of the Thames Tideway Tunnel.

Parts of rivers — such as the Brent, Ravensbourne, Tyburn, Stamford Brook and Effra — have been brought back to the surface. Really imaginative solutions will also realise the potential of upper reaches of the Fleet as London updates historic waste and stormwater infrastructure.

New developments will be orientated to face these once forgotten waterways reconnecting the city with its environment. The new blue network will also create new economic and recreational value across the city particularly in the suburbs and towns bringing added distinctiveness and identity to these areas.

The rediscovery of the city's blue networks will be a key element in the ongoing implementation of London's role as the UK's first National Park City. However, the impact will flow well beyond the Greater London boundary. By 2070, we envisage a network of green routeways flowing into the city along river courses will connect London with its peri-urban hinterland. Through a wider city region approach to environmental and biodiversity net-gain, the villages of London will once again be connected not just by roads and rail but also by natural networks.

Introducing nature back into the city in the form of urban forests and uncovered rivers throws up endless possibilities, and new ways of making land productive: from growing food to carbon capture and wellness activities. It is essential if we are to create a resilient, balanced and responsible London City Region of the future.

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London's forgotten rivers will be resurrected helping cool the city and providing corridors for wildlife, as well as a peaceful and pleasant environment for walking and cycling routes.

Our 2070 concept



Our concept of the London City Region in 2070

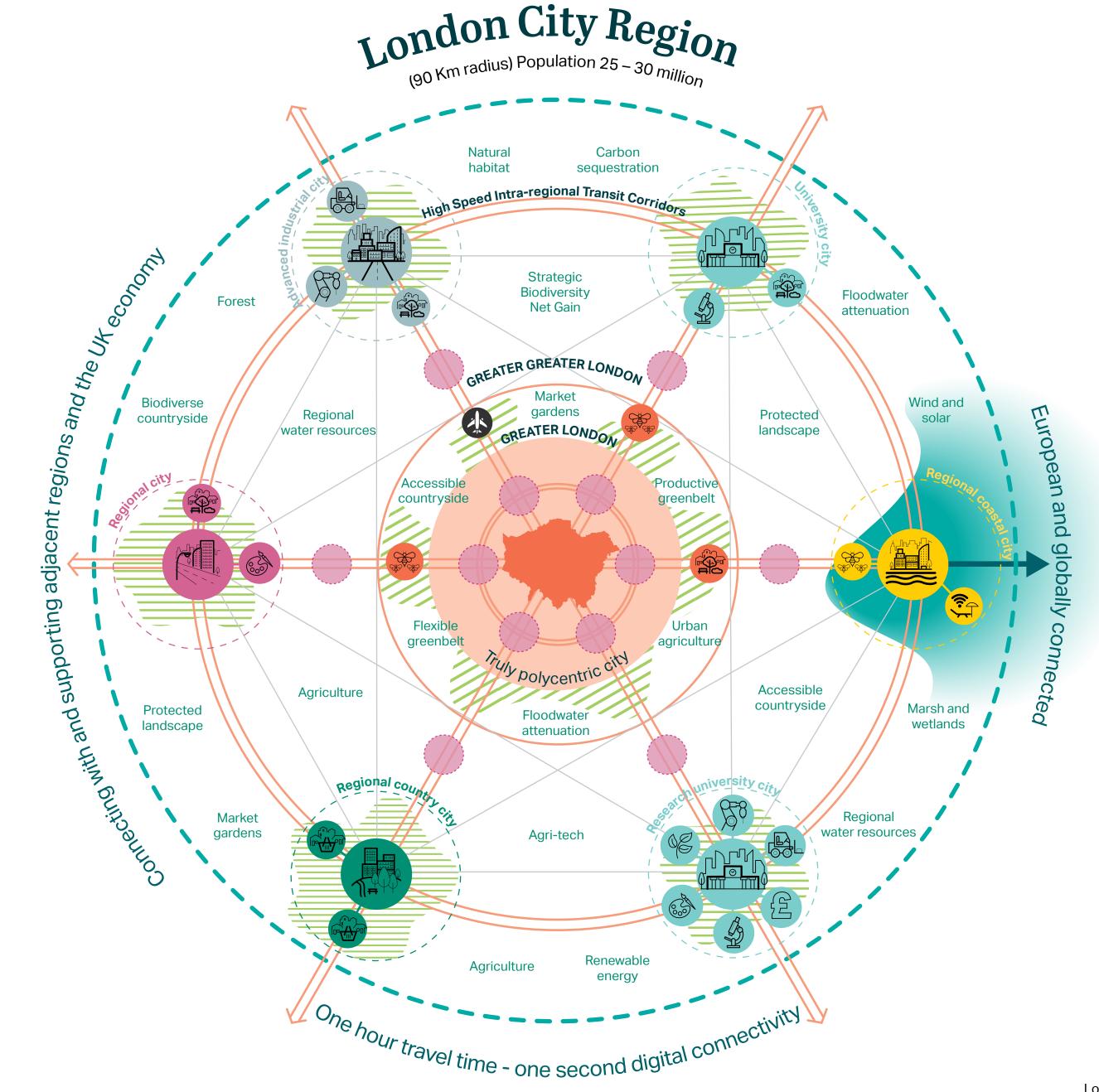
In the coming decades, growth in and around London will need to be carefully planned and coordinated if the region it is to continue to be a powerhouse of a thriving UK economy. With inspiration drawn from **Ebenezer Howard**, we've brought together the ten big ideas and set out a concept of the London City Region in 2070, one that will ensure we can sustain a resilient, interconnected, responsible and balanced region.

Our concept of the London City Region in 2070

In 2070 Greater London will remain the economic, cultural and social engine of the region with 'Central Experience Zones' at its core, but better balance can be achieved by also building on the assets and opportunities of the thriving cities and towns within the region, complemented by a generation of 21st century new communities as a polycentric economic model evolves.

This model is underpinned by development of a regional connectivity network which integrates existing transit, the variety of future mobility modes and digital networks with housing, economic and environmental priorities. This 'multi-channel' connectivity will be essential to enable each suburb, town and city, and each citizen, to benefit from London's opportunities.

And, to meet net-zero carbon targets, and to move towards net climate positivity, we must place the value of natural capital at the heart of future decision making. The unbuilt city holds the key to reducing energy and water use, to providing locally-sourced food, meeting our environmental net gain and biodiversity responsibilities and protecting the health of our cities by naturally attenuating flood waters or as a valuable resource for recreation and wellbeing.



Acknowledgements

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Andrew leads AECOM's Cities programmes across the UK and Europe. From strategic city planning, connecting urban growth to infrastructure investment, and masterplanning new places to live and work, Andrew works with teams across the business to deliver solutions to some of society's most complex urban challenges. He is passionate about addressing challenges our cities face including inequality, resilience and connectivity, and in particular, ensuring the long-term success of London and its city region following the coronavirus pandemic.



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Joseph is a Principal Planner within AECOM's Town Planning team and has led and contributed to a wide range of projects that encompass masterplanning, development management, infrastructure planning, resilience and regional planning in the UK and abroad. Most recently, Joseph has led the research for the development of the London 2070 report, which has included identifying key social, economic and environmental challenges facing the London city region. Joseph was also a key author of AECOM's London 2065 report.

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