Future Homes

2019

DEMOS

Contents

DEM⊙S

Demos is a champion of people, ideas and democracy. We bring people together.

We bridge divides. We listen and we understand. We are practical about the problems we face, but endlessly optimistic and ambitious about our capacity, together, to overcome them.

At a crossroads in Britain's history, we need ideas for renewal, reconnection and the restoration of hope. Challenges from populism to climate change remain unsolved, and a technological revolution dawns, but the centre of politics has been intellectually paralysed. Demos will change that. We can counter the impossible promises of the political extremes, and challenge despair – by bringing to life an aspirational narrative about the future of Britain that is rooted in the hopes and ambitions of people from across our country.

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Acknowledgements

Executive summary

It is widely agreed Britain must build more homes. But less attention has been given to what homes we should be building and where they should be built. This means we risk repeating the mistakes of the post-war era: building homes and communities totally unfit for future generations, which must be pulled down decades later.

In doing so, we are setting ourselves up for the next housing crisis: a crisis of suitability and sustainability, not just supply. We hope to help Britain avert that crisis by setting out a vision for future-proof homes and communities. This report sets out to answer four distinct research questions:

1 What will Britain look like in 2040 and what challenges will it face?

2 What does the public want from housing?

3 What principles should guide the building of future homes and communities?

4 What policies can help ensure that housebuilding in Britain is future-proofed?

On **(1)**, we conducted and analysed a range of demographic, economic, technological and environmental forecasts to better understand the forces we expect to shape Britain in 2040. These must be considered if we are to begin building homes that help us respond to the challenges of tomorrow. Assuming significant action is not taken to counter their development, we expect the four following trends will be critical in shaping Britain in 2040:

- A rapidly ageing population increasingly affected by conditions such as loneliness, obesity and dementia.

- An urbanizing population, with growth concentrated in London and the South East.

- Increasingly unpredictable and extreme weather as a result of climate change.

- Growth in the use of smart and automated technologies in our homes, communities and workplaces. This could drive social isolation but may also help us respond to certain challenges, such as climate change.

On **(2)**, through a nationally representative poll conducted by Opinium with over 2,000 members of the public between 23–27 November 2018, we find the public are concerned that housebuilding today is not future-proof; more than a third think that the average home built today will not be fit for purpose in just thirty years' time. We found the public place a very high value on green space and access to public transport; these were the most important factors after both affordability and location when choosing a home and where to live. We also found interest in multigenerational living and cohousing, particularly among young people.

On research question (3), we set out ten principles that should guide the development of homes and communities. These are based on the findings of our polling exercise and a review of the academic and grey literature.

1 Adaptable for old age

2 Fit for multigenerational living

3 Cohoused where suitable

4 Ready for home workers

5 Linked to healthier, greener transport

6 Close to green space

7 Close to employment hotspots

8 Close to local amenities

9 Extreme weather and climate-proof

10 Secure and mindful

Our recommendations

On research question (4), we explored how to put these principles into action. To do so we drew on a range of policy levers, from building regulations to planning frameworks, tax incentives to permitted development rights. To ensure that the homes we build today are fit for tomorrow, we recommend that:

Recommendation 1:
The government should ensure its Future Homes Standard revives the scrapped Zero Carbon Homes standard, involves a commitment to a new green space standard and mandates Category 2 accessibility for new homes. The standard should help society respond to a wide range of challenges, including climate change, loneliness, obesity and an ageing society.

While we must build better new homes, only a fraction of 2040's housing stock is yet to be built. It is therefore vital we improve the standard of existing housing stock. To achieve this, we recommend that:

Recommendation 2:
The government should launch a Green Homes Fund supported by a state-backed Green Development Bank.

Recommendation 3:
The government should increase the maximum available Disabled Facilities Grant to £40,000 from £30,000.

Recommendation 4:
The government should require any home sold from 2025 to hold an E-rated Energy Performance Certificate.

Multigenerational living can reduce loneliness and ease the burdens of care for young and old. However, current government policy does little to encourage this living arrangement. To address this, we recommend that:

Recommendation 5:
Local authorities should offer multigenerational households (three or more generations) a 25 per cent council tax discount.

Recommendation 6:
Local authorities should abolish the single-person council tax discount for residents without dependents living in band E and above properties.

Recommendation 7:
The government should introduce permitted development rights for the conversion of garages into 'granny annexes'.

> **"Developments where residents share facilities such as green space or laundry facilities could address the significant increase in loneliness we expect to see in 2040."**

Cohousing communities – developments where residents share facilities such as green space or laundry facilities – could address the significant increase in loneliness we expect to see in 2040. To encourage the development of more cohousing we recommend that:

Recommendation 8:
Developments of over 200 dwellings should deliver 5 per cent of dwellings as cohousing.

Recommendation 9:
The government and local authorities should give prospective cohousing communities preferential access to public land.

Having considered how to future-proof home building, we now turn to ensuring communities are ready for 2040. We recommend that:

Recommendation 10:
The government should incorporate our Future Communities principles into the National Planning Policy Framework.

We need to build homes close to employment hubs and good public transport links. To encourage these developments, we recommend that:

Recommendation 11:
The government should reintroduce capital funding for local authorities to clean up contaminated brownfield sites.

Recommendation 12:
Local authorities meeting or exceeding their housebuilding targets should have the power to charge a levy on the development of greenfield sites.

Changing climate and extreme weather events are likely to pose a significant threat to housing in the future. This means we must consider where exactly we are building new homes:

Recommendation 13:
The government and local authorities should work together to designate a Risk Belt: land on which development is restricted because of its exposure to rising sea levels or threats from extreme weather events.

To ensure that risks associated with the development of new technologies are mitigated, we recommend that:

Recommendation 14:
Local authorities should be required to test the cyber-resilience of smart city infrastructure in their boroughs.

Recommendation 15:
The government and local authorities should establish a taskforce to integrate Connected and Autonomous Vehicles into public transport networks.

INTRODUCTION:

The next housing crisis?

The acknowledgement that Britain needs to build more houses serves as a rare unifying note in this politically fractious moment. But with a focus on 'how many', we have lost all sight of the equally important 'what' and 'where'.

This means we risk repeating the mistakes of the post-war era: building homes and communities unfit for future generations, which must be pulled down decades later. In doing so, we are setting ourselves up for the next housing crisis: a crisis of suitability and sustainability, not just supply. This report aspires to help Britain avert that crisis by setting out a vision for future-proof homes and communities.

Housing can be much more than a roof over our heads; it can help us solve the big challenges society faces. From climate change to an ageing population, loneliness to obesity, these challenges are of increasing intensity. Responding to them will require significant changes to the way we live, starting with the homes we inhabit.

Housing developments that encourage greater human interaction, such as cohousing, could be just what Britain needs in a time of rising social isolation and loneliness. Building homes suited to several generations living under a roof - multigenerational housing - could also offer an answer here. It must be asked whether it is sustainable to continue to build homes modelled on a single family living independently from older generations.

We must also build homes that are more adaptable to the changing needs of their inhabitants. As our population rapidly ages, these needs are likely to become more acute throughout time. Whilst this will require the provision of more specialist old-age housing for some, this just won't be suitable or desirable for everyone. That means junking the notion of the home as something fixed throughout time, building homes that can be easily modified.

Transitioning homes from consumers to producers of electricity - through the installation of solar panels, turbines and batteries - could play a critical role in helping us face up to the climate crisis.
This may also help us transition to a more decentralised energy network, bringing greater efficiency and security of supply. These are a handful of the ways in which today's model home must be radically rethought to rise to the big challenges that society faces.

The shape of our communities must change too. In our 'numbers game' approach to housebuilding we have forgotten how communities must promote human flourishing and wellbeing. In response to the grey and dour vision of place at times espoused by his fellow socialists, Tony Crosland wrote:

" [we must build] more pleasure gardens on the Battersea model, more murals and pictures in public places... statues in the centre of new housing estates, better designed new street lamps and telephone kiosks and so ad infinitum."[1]

Though it can appear lost in identikit housing developments devoid of green space, communal areas or joy, the notion that our built environment should be more than mere bricks and mortar should stand true today. Such concerns were shared by Stephen Taylor, a medical professional in the 1930s who remarked that the rise of suburban living had "allowed the slum which stunts the body to be replaced by the slum that stunts the mind."[2] Whilst this sounds overly judgemental eighty years on, one must agree that our communities would today be enriched by:

" ...establish[ing] on these estates social non-religious clubs catering to all possible interests. Under one roof one would like to see a swimming bath and gymnasium, a cafeteria, a day nursery, the public library, and reading, smoking and games rooms."[3]

Access to amenities and public services is also vital for community building. As described by a local parish councillor in Cranbourne - a housing development in Cambridgeshire - "you can't just plonk people into what was once a field and expect them to form a community."[4] Sadly, this point appears lost today with too many new housing developments located miles from shops, schools or sustainable transport; all vital for a sense of community in the places we live.

These are a flavour of the ideas that guide our principles for future-proof homes and communities, which we set out in greater detail later in this report. In some cases, this will require the rediscovery of old values, in others the forging of bold new doctrines. Together, these principles demand nothing short of a housebuilding revolution.

Cultural changes, combined with technological advancements, present an opportunity for government, businesses and communities to forge a new path. Whilst the challenge is great, it is one we must rise to if we are to create a housing sector fit for future generations.

- A rapidly ageing population increasingly affected by conditions such as loneliness, obesity and dementia.

- An urbanizing population, with growth concentrated in London and the South East.

- Increasingly unpredictable and extreme weather as a result of climate change.

- Growth in the use of smart and automated technologies in our homes, communities and workplaces. This could drive social isolation but may also help us to respond to certain challenges, such as climate change.

These trends will have significant implications for what homes should look like and inform our principles for future-proof homes and communities, which we outline in Chapter Three.

It is important to note that our forecasts are based on the presumption that the trends of recent decades are likely to continue and that other relevant factors do not change; they are ceteris paribus forecasts. Because recent trends relevant to home building have often moved in a negative direction (particularly climate change), an air of pessimism hangs over many of them. It is possible that the future will not follow our forecasts, and indeed in some instances we would hope that to be the case. However, if society does not address the relative lack of substantive action across many of the policy areas covered by our forecasts, we believe the likelihood of the forecasts becoming a reality is high.

Population

The UK population today stands at roughly 66.5 million, an increase of almost 10 million since 1980.[5] We expect this growth to continue, with the Office for National Statistics (ONS) forecasting that the UK's population will reach 72.7 million by 2040.[6]

This means that population density will continue to rise, placing significant pressure on an already strained housing stock. The UK's population density currently stands at roughly 272 people per square kilometre. By 2040 the ONS expects this to increase to approximately 303 people per square kilometre - roughly an 11 per cent increase. [7]

CHAPTER ONE:

Britain in 2040

This chapter presents a range of demographic, economic, technological and environmental forecasts. Whilst forecasting is inherently challenging - particularly across economic and technological variables - it is essential if we are to future-proof Britain's approach to housebuilding.

We provide forecasts to 2040 because long-term thinking is required to respond to the challenges that society faces both today and in the future. It also allows us to abstract out from short-term noise and focus on the long-term trends of most significance for housing.

We rely on official forecasts from statistical authorities for most variables, but we have produced our own forecasts where these were not readily available. Our forecasting framework sees the emergence of four key trends:

This is significant when the UK is already one of the most densely populated countries in Europe.[8]

Thanks to medical advancements and lifestyle improvements, people have been living longer in recent decades. Gains in life expectancy have slowed down in recent years but are expected to continue for both sexes. On the basis of ONS forecasts, we expect men to live to 83.3 years and women to 86.1 years in 2040, gaining 3.5 years and 2.8 years respectively.[9] Though male life expectancy is projected to continue to trail female life expectancy, the projections in the graph below show that gap is likely to narrow by 2040.

Figure 1: Estimated and projected period life expectation at birth, UK
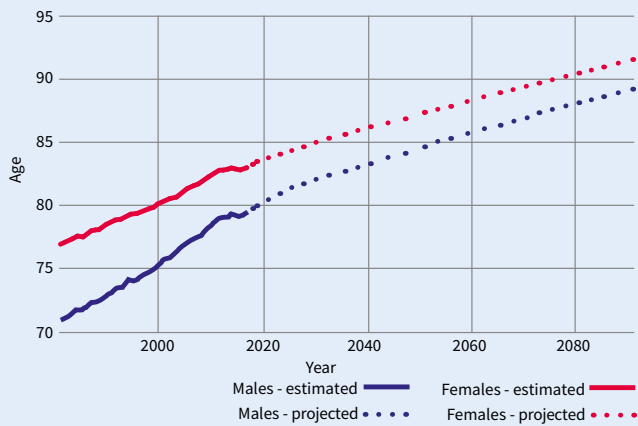
Source: ONS[10]

The age pyramids below show a stark change in the age distribution in 2040. The ONS expects to see an almost 80 per cent increase in the number of British residents aged 75 and over (coupled with a rise in the 60-74 bracket), and very little change in the number of people aged between 30 and 59.[11] This represents a remarkable increase in the dependency ratio: a large shift towards an elderly population, away from those of working age. The UK looks likely to lose the demographic dividends it once had.

Figure 2: Age forecasts, UK
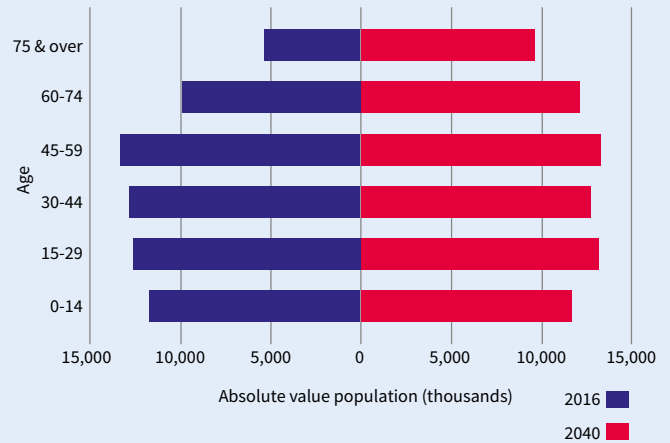
Source: ONS[12]

These changes will have important implications for the nation's health. One of the most important shifts we expect to see is a significant increase in the number of people suffering from dementia, with the total number of individuals diagnosed with the disease projected to rise by just under one million by 2040.[13] As we have become better at treating other illnesses such as cancer, many more of us will be living with, and dying from, dementia.

Other health conditions will affect wider swathes of the population. The percentage of the population categorised as obese is projected to rise following significant increases in recent years. Based on recent trends in the rising prevalence of adult obesity, we estimate around one in three adults will be obese in 2040; a roughly 25 per cent increase in the proportion of adults with obesity compared to today.[14]

We also expect loneliness to be a major health issue in 2040. Loneliness is regularly associated in studies with a 26 per cent increase in mortality[15] and an increased likelihood of suffering other harmful diseases such as dementia, heart disease, and depression.[16] ONS data shows that nearly one in five adults report feeling lonely "often/always" or "some of the time."[17]

1 in 5
adults affected
by loneliness

26%
increase in mortality rate
due to loneliness

Age UK claim loneliness disproportionately affects the elderly, estimating that there are around 1.2 million chronically lonely elderly people.[18] However, the ONS find that younger adults (aged 16-24) are more likely to feel lonely "often/always" than any other age group. They also identify several groups that are most at risk for the worst effects of loneliness: older widowed residents with long-term health conditions; single, middle-aged people with health conditions; and young renters with a poor sense of community ties.[19]

Though the proportion of the elderly population who report they are "often lonely" has remained steady over the past ten years (about 7.5 per cent on average), Age UK predict that the overall ageing of the English population will coincide with a rise in the total number of lonely adults over 50. Assuming the 7.5 per cent average rate holds steady among those over the age of 50, this could result in the number of often lonely over-50-year-olds rising from an estimated 1.4 million in 2016/17 to 2.1 million by 2030/31.[20]

3.2 million
total number of lonely adults
over the age of 50 by 2040

Homes and places

After decades of decline, average household size began to level out in the early 1990s and has stayed roughly constant since then. However, in recent years there has been a slight uptick in average household size, likely driven by a rise in the number of young people living with their parents.

Figure 3: Average household size, England and Wales
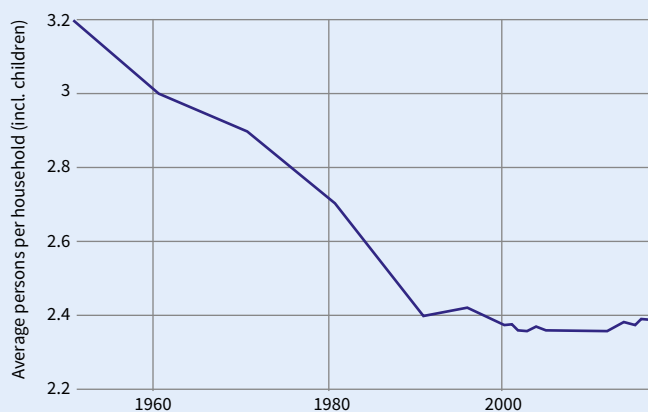
Source: ONS[22]

This could be due to high housing costs and stagnant wages, which are likely to particularly affect the young. The chart below demonstrates these changes, with nearly 46 per cent of young adults aged 15-34 expected to be living with their parents by 2040, a figure that includes school, college and university students. Stripping out most of that cohort by looking at those aged 20-34, we estimate an increase from 26 per cent of young adults living with their parents in 2017 to more than 33 per cent by 2040.

Figure 4: Estimated and projected proportion of young adults living with parents, UK

15 to 34 - estimated ▬▬▬ 20 to 34 - estimated ▬▬▬
15 to 34 - projected • • • 20 to 34 - projected • • •
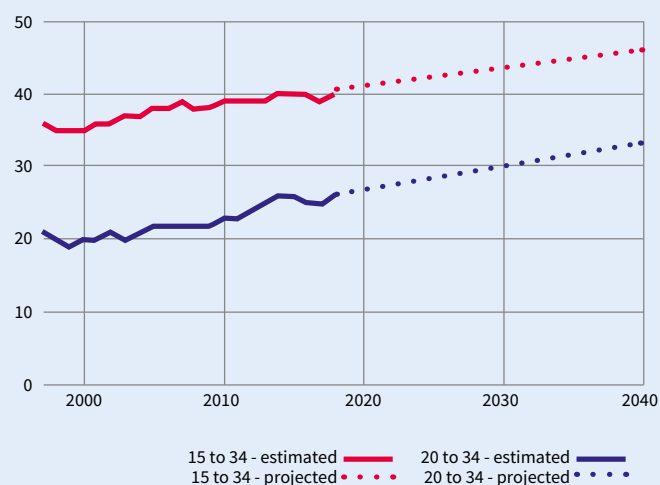
Source: ONS data, Demos forecasts[23]

We expect population growth to be spread unevenly across the UK. Reflecting current disparities, England's total population growth from 2016 to 2040 is expected to far outpace that of the other UK nations.[24] England will see a growth rate of 12 per cent whilst the Welsh population – the slowest growing UK nation – will grow by just over 4 per cent. England is by far already the most densely populated region of the UK, with 427 people per square kilometre compared to just 70 people per square kilometre in Scotland, 138 people in Northern Ireland and 151 people in Wales.[25]

>33%
of young adults aged 20-34 expected
to be living with parents by 2040

Figure 5: Projected population change 2016 to 2040, UK

Source: ONS[26]

Figure 6: Projected regional population change 2016-2041, England
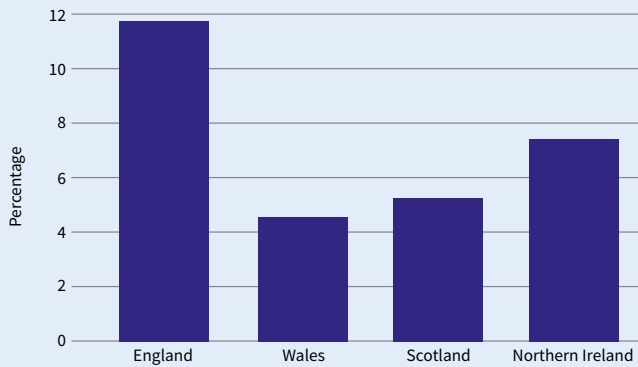
Source: ONS[30]

Within England we expect to see London and the South East's populations to continue to grow the most, growing more than all other English regions. We expect to see the lowest rates of population growth in the North East, North West and Yorkshire & the Humber.[27] The ONS forecast that London's high population growth rate will not be driven by migration - London's high net international migration is expected to be matched by a relatively high level of outward domestic migration - but by the high birth rate of its population.[28] On the contrary, the bulk of the North East's growth rate will be driven by migration due to its lower birth rate.[29]

Again, this will likely make already densely populated regions even more populated, with London - by far the most densely populated region of England today - seeing the lion's share of population growth.[31]

Furthermore, the UK population is expected to become more urbanised, with population growth in major and small cities far outstripping the rate in small towns and rural areas. Using World Bank data, we predict a sharp increase in the proportion of the population residing in urban areas from an estimated 83.1 per cent in 2017 to 89.5 per cent by 2040.[32] Our projection is supported by a 2014 UN report, which predicts that the UK's urbanisation rate would reach at least 89 per cent by 2050.[33]

Environment

The 2018 Intergovernmental Panel on Climate Change Report predicts dire worldwide consequences if drastic global measures are not taken to reduce emissions by 2030.[34] Though the precise impact of climate change will be contingent upon the actions we take in the next twenty years to mitigate its worse effects, more severe and frequent heatwaves, flooding and water stress are highly likely in the UK.[35 36] These will pose major threats to UK housing by 2040, with serious consequences for the types of homes we must build.

Heatwaves above 30°C are expected to become the norm during UK summers, with the number of heat deaths projected to double from around 2,000 per year to 4,000 by the 2050s.[37] Summers will be 24 per cent drier by 2080, according to Forestry Commission forecasts.[38] Heatwaves will place an extra burden on British residential care homes, hospitals and public transport, many of which aren't equipped with sufficient indoor air conditioners, fans or other cooling and ventilation measures.[39] Today, there are approximately 2,000 heat-related deaths in the UK per year; this is projected to rise to around 7,000 per year by 2050.[40]

Cities will feel the effects of heat waves most acutely. This is due to the urban heat island effect in which an urban area is considerably warmer than the rural areas surrounding it. This is especially important as the rate of urbanisation increases and populations increasingly cluster in smaller tracts of urban land.[41] Indeed, London could see temperatures soaring as high as 48°C on its warmest summer days.[42]

As a result of climate change our winters will also be 23 per cent wetter by 2080 and the number of heavy rain days over most of the UK in lowland areas will increase by a factor of 2-3.5 in winter and 1-2 by the 2080s.[43] The Environment Agency warned earlier this year that intense flooding is set to become more frequent as our climate changes.

> **There have been 17 record breaking rainfall months or seasons since 1911, and 9 of these have occurred since 2000.**[44]

In the summer of 2012, following a lengthy drought, almost 8000 homes were flooded across the country after intense rainfall and the winter of 2013/2014 - the wettest on record - saw 11,000 homes flooded.[45] These floods wrought billions of pounds in property damage, disruptions to key telecom services, and temporary loss of access to drinking water and electricity for hundreds of thousands of people.[46]

Many areas across England are also at risk from tidal surge, fluvial or groundwater flooding. The Environment Agency has identified coastal areas in Cornwall, Kent, Sussex and East coast areas such as Peterborough, Hull and Great Yarmouth as the most at risk from tidal surge flooding from the sea. Fluvial (river or stream) flood-risk areas are more diverse, but some of the most at-risk areas include Somerset, riverside areas of Kent, Essex and Lincolnshire, whilst the urban areas of Peterborough and Hull are especially at risk from both fluvial flooding and tidal surges. As seen in the 2015/16 floods, areas of Cumbria are particularly at risk from groundwater flooding, in addition to floodplains in Merseyside, Buckinghamshire, Wiltshire, Yorkshire and parts of Lincolnshire.[47]

31-44cm
rise in sea level expected around UK coast by 2095

Coastal areas of the UK will also be threatened by rising sea levels. Since records began in the 19th century global sea levels have risen by approximately 20cm, with the rate of change in the last 20-30 years considerably higher than the 20th century average.[48] The government expects a sea level rise of 31-44 cm to occur around the UK coast by 2095.[49]

Economy and technology

It is important to consider the impact of economic and technological changes on homes and communities come 2040. We expect to see the rate of technological development increasing, manifesting itself in changes such as the rise of the 'smart' home and the rollout of driverless cars.

These changes could drive greater isolation and loneliness, but they could also benefit society. For example, driverless cars could lower the number of accidents on our roads, reducing congestion and providing mobility solutions to people currently unable to drive.

1. Flexible working

Britain has seen a flexible working revolution in recent decades and there is good evidence that workers value increased flexibility. A majority (57 per cent) of UK workers say that the availability of flexible working is important to them.[50] This proportion has grown over time and we expect this preference to only increase as younger generations value flexibility more highly. For example, 92 per cent of Generation Y - those born between 1980 and 2000 - identify flexible working as a top priority when choosing where to work, a higher proportion than for older generations.[51]

57%
of UK workers say that the availability of flexible working is important to them

92%
of Generation Y - those born between 1980 and 2000 - identify flexible working as a top priority when choosing where to work

It appears there are three main trends driving the rise in flexible working.[52]

1 First, **technological advances** - such as advances in communications and internet infrastructure - have reduced the need for office-based working.

2 Second, **globalization** has led to an increase in the dispersal of companies across the world, often across different time zones.

3 Finally, the **rise of knowledge work** - which again cuts the need for ties to working at a particular location - has further fuelled the rise of flexible working.

The increase in the UK's informal care economy is also likely to have had an impact.

Previous Demos research has estimated that the number of informal carers in the UK has increased by 35 per cent since 2001.[53] In other research, we found caring responsibilities are the second most cited reason for choosing self-employment, a form of work often associated with flexible working.[54]

Given the expansion of informal care provided in recent decades, we have good reason to believe caring duties could be pushing people towards more flexible working practices.

Because we have little reason to believe that these trends will stall within the next twenty years, we consider it likely that there will be greater flexible working come 2040. This could lead to greater social isolation as the scope for workplace interactions is reduced by an increasingly atomized form of working. However, it could give workers a better work-life balance and more opportunities for working parents to spend time with their children.

"Given the expansion of informal care provided in recent decades, we have good reason to believe caring duties could be pushing people towards more flexible working practices."

2. Automation

Job automation is another important economic trend to consider when looking to 2040. It is argued that changes in previously unconnected fields such as "artificial intelligence, robotics, nanotechnology, 3D printing and genetics and biotechnology are all building on and amplifying one another", leading to rapid and large-scale automation of jobs across sectors.[55]

As illustrated in the following table, there are a wide variety of estimates of the impact of automation on the labour market. These differences are often due to different forecast methodologies and the fact that some assessments are time-bound. This is important because the scale of labour market disruption caused by automation is likely to be highly dependent on how quickly these changes are felt.

Table: Estimates of the impact of automation on the labour market

Organisation	Automation projection
Frey and Osborne[56]	**35%** of UK jobs are at a high risk of disappearing altogether as a result of automation in the next two decades
PWC[57]	**30%** of UK jobs are susceptible to automation from robotics and AI by 2030s, though the nature of jobs will change in many cases instead of disappearing
OECD[58]	**10%** of UK jobs are at high risk of automation
Andy Haldane Bank of England[59]	**15 million** UK jobs could be at risk of automation
Future Advocacy[60]	At least **20%** of UK jobs are at risk of automation

However, despite this variation we can say with reasonable confidence that automation will begin to play an increasingly significant role in the workplace. Whether that is by changing the type of roles available or by creating entirely new industries, it is clear we could be on the precipice of a major change to traditional forms of work.

It is important to note similar fears have been expressed throughout history, notably during the Industrial Revolution, in the late 1930s and after World War II.[61] Whilst certain workers and industries did experience some disruption during these periods of economic change, "in the long run, such fears were not realised" and employment continued to grow despite significant labour-displacing innovations such as the rise of the automobile and the advent of electricity.[62]

Notwithstanding the need for caution when considering such forecasts, it is useful to ask what wider societal impact automation could have. Depending on the precise economic implications, automation could leave large numbers of people out of work. This would have a wide range of implications for the home, including whether it needs to be suited to people spending more time there instead of the workplace.

However, as noted above, the impact of this will by and large depend on the speed at which automation takes place. If it happens slowly enough for labour markets to respond, its disruptive impact may be limited. There is good reason to believe that we could be over-estimating the speed at which these changes take place. As the economist Robert Gordon has argued, it can take a substantial amount of time for the full economic impact of an innovation to take shape; "for the first two industrial revolutions, the incremental follow-up process lasted at least 100 years." [63]

Automation could also increase social isolation and loneliness. This could arise if automation leads to fewer people working, given that the workplace offers an opportunity to socialise and chat face-to-face with others. The nature of work may also change, with robot-assisted employees increasingly working independently from other colleagues.[64] Furthermore, if retail and transport jobs are replaced by robots, the number of face-to-face interactions in our daily lives may decrease.

> ❝ However, automation and other advances in technology could enrich people's lives. ❞

For example, with an ageing population and increasing demands for care - but a falling share of the population in work - advances in robotics could be considerable in improving and supplementing the provision of care. Japan has long made use of robotics to help care for its rapidly ageing population; one example is a robotic seal, Paro, designed to be used for therapeutic play with elderly people with conditions such as dementia.[65] The UK is also making progress in this area, with the University of Bedfordshire and Middlesex University London developing the world's first culturally aware robots to assist with elder care.[66]

Automation could also add to pressure for housing in cities. This is because, according to most estimates, the sectors at greatest risk of automation are least likely to be found in cities. This is likely to build on the

changes in recent decades towards a more 'intangible economy' in which businesses favour investment in human capital over physical capital, with human capital clustering in a relatively small number of outward-facing metropolitan cities.[67] Indeed, whereas about 80 per cent of business value was recently accounted for by physical assets such as plants or equipment, about 85 per cent of corporate value is now accounted for by intangibles.[68]

Across a range of analyses, there is broad agreement that knowledge-heavy parts of the UK such as London and the South East will be least affected by automation.[69] In a study of the local authorities (LAs) least likely to be affected by automation, Localis found that nine out of 10 of the LAs least likely to be affected were in London.[70] The Centre for Cities argues that 18 per cent of jobs are under threat in cities in the South of England, compared to 23 per cent in cities in the rest of the country.[71] IPPR found that 39 per cent of jobs in London have a high potential to be automated, compared to 48 per cent in the North East and 47 per cent in Yorkshire and Humberside and the West Midlands.[72]

This is because these regions specialise in knowledge-intensive industries with less 'automatability'. For example, in the UK, the creative industries are located in a 'single hub' model centred in London and the South East.[73] These industries are much more likely to be 'future-proof' resistant to technological changes such as machine learning and mobile robotics.[74]

> ❝ In contrast, it is widely judged that manufacturing jobs are most at risk of automation and these are more likely to be found outside of London and the South East. ❞

3. Connected and Autonomous Vehicles (CAVs)

Whilst the Chancellor has pledged that driverless cars will be on British roads by 2021, most expect widespread take up to occur later than this.[75] The London Assembly Transport Committee, for example, recently took evidence from a wide range of experts who agreed that widespread take up is not likely to take place until 2030 onwards.[76] Professor Natasha Merat of the University of Leeds argues that because of issues around "acceptability, trust, uptake, affordability, infrastructure availability, connectivity", widespread take up will not occur until 2030 - 2040.[77]

Nonetheless, the government has signalled its intent to accelerate the development of automated vehicles. In February 2019, the government announced that they will be developing a process to support the advanced trials of automated vehicles[78] and have strengthened the guidelines outlined in the code of practice for their testing. Safe and transparent trialling is vital for the development of CAVs and indicate a clear pledge by the government to place the UK at the forefront of CAV testing.

" It is generally agreed that connected and autonomous vehicles (CAVs) will make our roads safer. "

According to World Health Organisation (WHO) statistics, there were 1.25 million road traffic deaths globally in 2013 and at least 90 per cent of these crashes were at least in part caused by human error.[79] Road traffic crashes are a leading cause of death among young people and are the main cause of death for those aged between 15 and 29.

There are a range of different scenarios for the introduction of CAVs forecast in literature. The International Association of Public Transport (UITP) has set out three varying possibilities. Autonomous vehicles could bring about massive reductions in congestion in built up areas "if autonomous vehicles are introduced in fleets of shared autonomous vehicles of different sizes" and, importantly, integrated into traditional public transport networks.[80] This would involve the employment of autonomous vehicles as 'robo-taxis' and minibuses, driving down car ownership through car sharing schemes.

This would likely dramatically reduce traffic on our roads because, as MIT research has shown, it would be possible to take 80 per cent of cars off our roads whilst still being possible to transport every passenger to their destination at the time they need to be there.[81]

However, the UITP also describe an alternative scenario in which shared fleets of autonomous vehicles compete with traditional public transport systems for passengers.[82]

This would deliver better mobility - including drastically improved mobility for those that do not own a car - and would result in street reclaiming as there would likely be fewer parked cars. However, it would result in more traffic and be less efficient - small vehicles would be undercutting larger buses or trains, for example.

In a worst-case scenario, existing vehicles are replaced one-for-one by autonomous vehicles leaving no effect on overall levels of car ownership.[83] This would not free up any of the space associated with declining levels of car ownership and would likely lead to more traffic as the car becomes an even more attractive mode of transport.

Which of the above scenarios prevails will depend on the policy landscape in which CAVs develop. The priority the government has placed in the policy area of automated vehicles suggests early reasons to be optimistic. The Department for Transport's 2018 Road Traffic Forecast highlighted that even small changes to car occupancy levels could have a significant impact on road traffic demand and identified "the potential for CAVs to create behavioural change leading to ride sharing" as a key focus of research for the near future.[84]

4. Smart homes and cities

Much has been made of the 'Internet of Things', a term used to describe a network of internet-enabled devices which speak to one another and collect data about their use. This technology is developing quickly across a wide range of sectors, from housing to healthcare, doorbells to dustbin collection.

In 2017 there were approximately 8.4 billion 'Internet of Things' devices worldwide and this figure is projected to grow to 30 billion by 2020.[85] These trends have contributed to the rise of the so-called smart home, which Demos noted back in 2007 could "form the building blocks of a pervasive computing environment."[86]

8.4 billion
"Internet of Things" devices worldwide

YouGov polling has shown that close to a quarter of Britons - 23 per cent - own one or more smart home devices (excluding smart meters).[87] Smart home devices considered included smart lighting, smart security, smart speakers and smart thermostats. The most popular smart device remains smart speakers - these are owned by 11 per cent of the British population. These are closely followed by smart thermostats (6 per cent), smart lighting (5 per cent) and smart security (3 per cent).

The use of robotics in the home is also likely to rise considerably. One in ten US homes will have a robot housekeeper by 2020 according to some forecasts.[88] Futurologist Dr Ian Pearson predicts that by 2050, fabrics used in the home will have the ability to change appearance, patterns and textures enabled by 'smart yarns', allowing furnishings "to adapt to our body shapes to make us perfectly comfy".[89] Cooking in the home could be carried out by robots and a combination of 3D printers that will be able to produce food quicker than takeaways.[90] Smart contact lenses may allow for instantaneous daily re-decorating.[91]

The Internet of Things is also likely to change the shape of the communities we live in with the rise of smart cities. The government defines smart cities as a dynamic process by which cities become more "liveable" and resilient by bringing together hard infrastructure, social capital and digital technologies.[92] IBM considers smart cities to be cities that make "optimal use of all the interconnected information available today to better understand and control

its operations and optimize the use of limited resources."[93] More simply, the British Standards Initiative defines smart cities as "the effective integration of physical, digital and human systems in the built environment to deliver a sustainable, prosperous and inclusive future for its citizens."[94]

Arup estimates that the international market for 'smart' urban systems - transport, energy, healthcare, water and waste - will be worth $400 billion by 2020[95] and that the UK should aim to secure 10 per cent of this.[96] This will likely affect all aspects of our conception of the city and there are examples from around the world of these systems already being put in place.

During the Olympic Games in 2012, London's intelligent road management system played a vital role in keeping traffic moving.[97] Intelligent bins in the Netherlands can inform trash collectors when they need to be collected.[98] University of Texas at Austin researchers claim that in a world of autonomous vehicles, we may be able to do away with traffic lights altogether.[99] 'Autonomous intersection management' technology would allow vehicles to 'talk' to one another, creating safer and highly efficient road junctions. This would remove the need for traffic lights, freeing up valuable road space, and would also mean more efficient energy consumption, reducing energy emissions.

Bus stops in Manchester will allow passengers to 'check in' to inform bus operators that they would like to travel, reducing wait times and boosting efficiency.[100] Bristol's Citizen Sensing project utilises data sensors to give local citizens the tools they need to better understand their city and make positive changes for good.[101] The project has initially identified poor housing as a major concern for local residents and has piloted the use of locally-built sensors to record data on damp in homes.[102]

These examples demonstrate the pace at which technology is increasingly changing our urban environment, change which we expect to continue into 2040. However, such changes are not a foregone conclusion and will depend on the policy environment in which they are shaped and the extent to which democratic processes are able to affect the pace of change.

CHAPTER TWO:

Public voice

In the previous chapter we considered the economic, social and demographic trends that will shape Britain's housing needs in 2040. It is vitally important, though, that we also consider what the public wants from new homes. This is because we must build homes people want to live in; otherwise we risk having to tear them down a few decades after construction. Furthermore, housing has been seen as something that is done to people, not something done by people. To turn this around, housing design must consider what the public think, feel and want from their homes and communities.

That's why this chapter sets out the results of a new, nationally representative poll with over 2,000 members of the public conducted by Opinium between 23–27 November 2018. This allows us to assess the attitudes towards housing at a statistically significant societal level, something Demos has always felt an essential part of the policy making process.

In summary, the key findings from our polling exercise are:

■ The public are concerned homes built today are not future-proof, with more than a third (34 per cent) thinking that the average home built today will not be fit for purpose in thirty years' time.

■ The same proportion (34 per cent) would not consider living in a new housing development, which they often view as too small and with too many building defects.

■ The most important feature when choosing a home to rent or buy after affordability and location is green space, with 43 per cent of respondents choosing this.

■ The most important factor when choosing where to live other than affordability is public transport links, with 39 per cent of respondents describing this as important.

■ 31 per cent of people would consider having their parents move in with them and 29 per cent would not.

■ Under a quarter (23 per cent) would consider living in a cohousing development with shared facilities, though this figure rises considerably among young people and those from an ethnic minority background.

Original polling evidence

Perhaps our most important finding from the polling exercise is that more than a third (34 per cent) of those surveyed do not think the average new home built today will be fit for purpose in thirty years' time. This underlines the urgent need to overhaul our current approach to housebuilding.

Figure 7: Q10. Thinking about an average new home built today, do you believe it would be fit for purpose in 30 years' time?
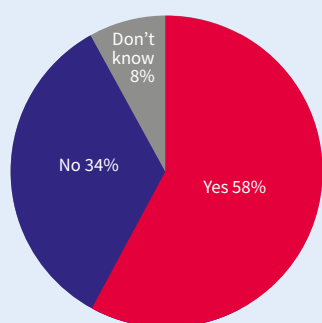
Source: Opinium for Demos

This could explain why a similar proportion of respondents (34 per cent) would not consider living in a new housing development. This too is of significant concern. If Britain aims to build several hundred thousand new homes a year, many of them will be located in new housing developments. This means we could be building thousands of homes that people simply do not want to live in.

We explored the reasons for an unwillingness to live in new housing developments.

- The belief that these **developments are too small and crowded** (54 per cent) was the most common reason chosen by respondents.

- Followed by **homes not being properly constructed with long snag lists** (43 per cent).

- And **not being built to last** (39 per cent). It was also clear that the public perceive new housing developments as **lacking access to local services and amenities,** with 29 per cent saying they would not like to live in a new housing development because they are often far from local services such as shops, pharmacies or gyms.

- New housing developments were also perceived by 17 per cent of respondents to have **poor transport links**.

54%

believed that new housing developments are too small and crowded

Figure 8: Q6. Why would you not want to live in a new housing development?
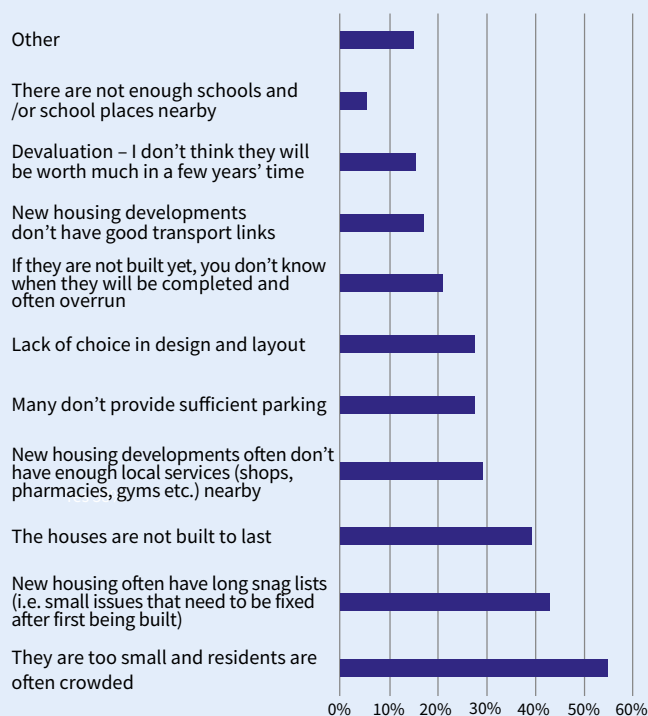
Source: Opinium for Demos

We also examined the most important features of a home when buying or renting other than affordability, asking respondents to choose their five most important features from a closed list. Unsurprisingly, location was the most commonly listed feature, with 56 per cent of respondents including this in their response. This was followed by green space, which 43 per cent of respondents listed as an important feature.

56%

of buyers chose home location as being the most important factor after affordability

With respect to environmental factors - something that we expect to become increasingly important come 2040 as we saw in Chapter One - 24 per cent of respondents thought whether the home was exposed to flooding or subsidence was important, with 20 per cent considering energy efficiency and eco-friendliness important.

Figure 9: Q8. What are the most important features of a home when you are buying or renting a new property, other than affordability?
Please select up to 5 features.

Feature	%
Other	
Access to working spaces for adults or children	
When the house was built	
How easy it is to adapt or extend my home to different needs	
Elderly or disabled accessibility (e.g. what type of stairs)	
How attractive the exterior of my home is	
Quality of bathroom facilities	
Garage or other storage space	
How attractive the interior of my home is	
Overall floor space	
Energy efficiency and eco-friendliness	
The type of heating system used in the house	
The amount of sunlight that gets into the flat / house	
Whether the house is exposed to risk of flooding or subsidence	
Driveway or other vehicle parking facilities	
The security of the house	
Number of bedrooms	
Size of the rooms	
Garden or other green space	
The location / neighbourhood	

Source: Opinium for Demos

We also explored what lies behind decisions about where to live, asking respondents to choose the three most important factors in making their decision other than affordability. Public transport was the most important factor among our respondents, with 39 per cent stating this as a factor in their decision, rising to 50 per cent among the over 55s. This was closely followed by who your neighbours are (34 per cent) and access to parks and green spaces (33 per cent).

39%
of new home buyers believed public transport is important

34%
of new home buyers believed who your neighbours were is important

We also saw that living close to work is valued highly:

- 31 per cent stated that **ease of commute to work is an important factor in choosing where to live;** a preference rising to 45 per cent among those aged 16-34 and 43 per cent among those aged 35-55.

- Preferences relating to **local service provision and amenities** were important too. 27 per cent stated that **proximity to hospitals and doctors was important**.

- 18 per cent said **access to leisure facilities and amenities**, and 15 per cent said **proximity to local schools** were also important.

Figure 10: Q7. When choosing somewhere to live, aside from cost, what would you say the three most important factors for you are?

| Factor	%
Other	
Restaurants and cafes	
Local job opportunities	
Proximity to local schools	
Leisure facilities and amenities (e.g. gym, shops)	
Local broadband speed	
Proximity to hospitals / doctors	
Ease of commute to your work	
Availability of parking	
Access to parks and green spaces	
Who your neighbours are	
Public transport links	

Source: Opinium for Demos

We also examined what type of settlement people would most like to live in. The most popular choice was overwhelmingly in a town or village. Just 11 per cent of respondents stated that they would like to live on the outskirts of a small town or village, the second least popular choice of seven options. This is important when we consider that many new housing developments in Britain today are located on the edges of towns and villages.

It is useful to consider the public's perception of living arrangements which may provide an alternative to the traditional single family household unit that dominates British society today. This includes multigenerational living arrangements in which multiple generations of a family live under one roof.

- Just 21 per cent would **consider moving in with their children in old age**, though this rises to 31 per cent among 18-34 year olds and 32 per cent among those from an ethnic minority background.

- However, 31 per cent would **consider having their parents move in with them**.

- This is more than those that **would not consider it** (29 per cent), which rises to half of 18-45 year olds (50 per cent) and 54 per cent among those from an ethnic minority background.

It is perhaps unsurprising that we are more receptive to the idea of multigenerational households when it does not require that we move home. The division in preferences here may also be explained by a sense of obligation to other family members. Children may feel obliged to let their elderly parents move in with them but may be worried about imposing similar burdens on their children when they enter old age.
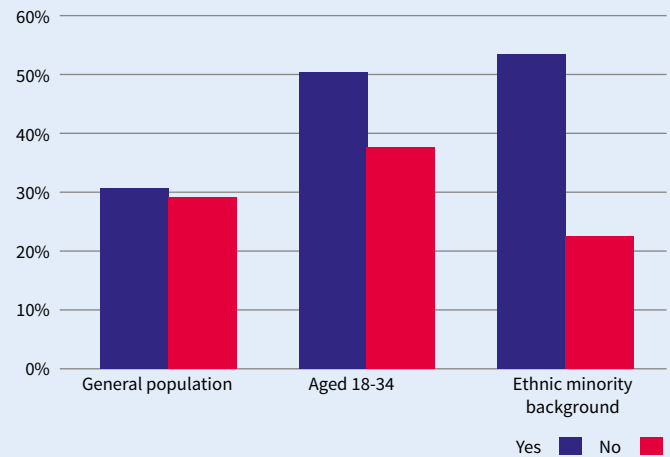
Figure 11: Q12. Thinking about your old age, would you consider moving in to live with your children?

Yes ■ No ■
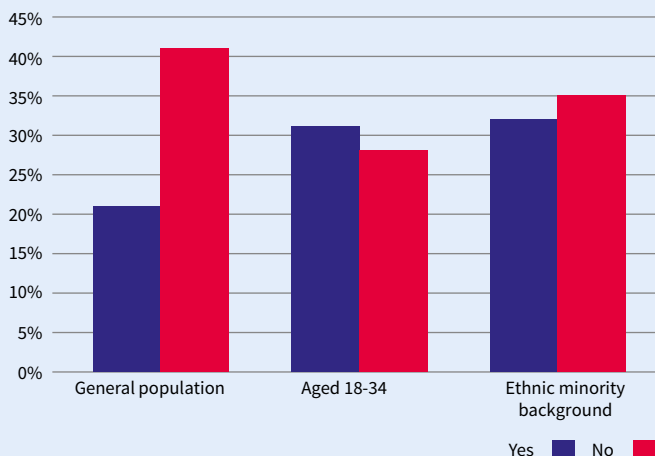
Source: Opinium for Demos

" We are more receptive to the idea of multigenerational households when it does not require that we move home. "

Figure 12: Q13. And thinking about your parents, would you consider them moving in to live with you?

Yes ■ No ■

Source: Opinium for Demos

However, despite significant interest in multigenerational living there is clear evidence from our polling that the public does not think our homes currently encourage this living arrangement. Roughly two thirds of respondents thought that typical new homes do not give enough space to care for an elderly relative (67 per cent) or have enough space for multiple generations to live in (66 per cent).

We also tested the public's views on cohousing, where residents make use of shared facilities such as gardens or kitchens. Perhaps unsurprisingly, given this is a relatively rare living phenomenon in Britain today.

- Fewer than a quarter of respondents (23 per cent) said they **would consider living in such a community**.

- 57 per cent saying that they **wouldn't consider it**.

- However, the proportion of respondents that would consider cohousing living rises to 37 per cent among 18-34-year-olds and 39 per cent among respondents from an ethnic minority background.

In summary, future homes and communities should reflect the following principles:

1   **Adaptable for old age**

2   **Fit for multigenerational living**

3   **Cohoused where suitable**

4   **Ready for home workers**

5   **Linked to healthier, greener transport**

6   **Close to green space**

7   **Close to employment hotspots**

8   **Close to local amenities**

9   **Extreme weather and climate-proof**

10   **Secure and mindful**

1. Adaptable for old age

In Chapter One we saw the number of British residents over the age of 75 will increase by 80 per cent by 2040. This remarkable change will have wide ranging implications for the homes and communities we build. For example, we must build more specialist older housing to free up homes for younger generations[103] and improve older people's health and wellbeing.[104]

However, little progress has been made on getting the elderly into purpose-built retirement housing; 93 per cent of older people live in mainstream housing today.[105] This may be because just 33 per cent of those over the age of 60 wish to downsize, as previous Demos research found.[106] As one elderly person posted on an online forum of the Housing, Communities and Local Government Select Committee in the House of Commons:

> **❝ I do not plan on ever moving from my home – I lived here with my late husband who had Alzheimer's and died 8 years ago at home […] I love my patio garden – although I drive – I have shops and a bus stop easily within walking distance. People say why don't I move somewhere smaller but I love my home and think that is a good enough reason to stay where I am.❞**[107]

CHAPTER THREE:

Principles for future homes and communities

In this chapter we set out ten principles to govern our approach to building future homes and communities. Our principles are closely informed by the four major trends identified in Chapter One and the public's view of housing as outlined in Chapter Two. They are also informed by a review of the academic and grey literature concerning future housing and communities.

So, whilst continuing to develop more specialist elderly housing, we must also consider the role that home adaptations can play in housing an increasingly elderly population. As Powell et al note in an extensive review of the effectiveness of home adaptations, "there is strong evidence that minor home adaptations are an effective and cost-effective intervention for preventing falls and injuries, improving performance of everyday activities and improving mental health."[108] With respect to major adaptations, though these have been less extensively studied, "the evidence shows that they can also support people in achieving these outcomes in some circumstances."[109]

Adaptations also appear a worthwhile investment for the state. Work to mitigate the hazards associated with falls on stairs among elderly households would cost around £290 million, but would confer a benefit to society of around £470 million.[110] That means this investment has a payback period of less than eight months.[111] In addition, the average cost of making such adjustments is considerably lower than the cost of residential care: the value of the average Disabled Facilities Grant (funding for home adaptations) is £7,000 whereas the average residential care cost per person is £29,000 per year.[112] However, it is important to note that this does not represent a direct cost to the state and does not consider any of the potentially positive externalities that may arise from residential care.

£29,000
average residential care cost per person per year

A wide range of adaptations can be made to the home to accommodate old age. Stair lifts and handrails can help the elderly get up and down stairs more easily.[113] Bathroom adaptations such as easy access showers and shower frames can prevent falls. Ramps and handrails can remove the need for steps to a front door. We saw in Chapter One that we expect there to be one million more people with dementia in 2040. This will likely require the installation of alarm systems and sensors to ensure people are kept safe.

All of the above adaptations can be made much more easily to a home that has been built on the presumption that such adaptations may have to be made. Walls can be strengthened in areas - such as bathrooms or toilets - that are likely to require hand rails. Stairs can be built to accommodate stair lifts. Doors can be made wide enough for wheelchairs or mobility scooters.

> **Making certain adaptations to mainstream homes - including widening doors and installing ramps and lifts - was extremely difficult to do retrospectively.[114] This underlines the importance of ensuring we build homes ready for these changes.**

Building homes that the elderly can safely and healthily inhabit for longer may also benefit a neighbourhood's sense of community. Homes are not islands; they are inhabited by residents who often play a vital role in their local community. When visiting New Earswick, a community built by Joseph Rowntree in York in the early 20th century, Michael Young found the length of time that people had lived there was crucial for establishing a strong sense of community; "they had lived there long enough to put down roots".[115] This is particularly important when we saw in Chapter One that Britain in 2040 could be blighted by widespread social isolation and loneliness.

2.1 million
"often lonely" adults over the age of 50 projected by 2030/31

2. Fit for multigenerational living

After decades of decline the average household size bottomed out in the early 1990s, with a slight uptick in recent years. Indeed, the number of multi-family households saw a bigger increase than any other type of household in recent years.[116] According to the ONS, this has been driven by the 2008-2009 financial crisis and changes in cultural preferences.[117]

This marks a significant break from the longstanding cultural preference for a nuclear family living independently from other generations; a preference that has been dominant since the end of the Second World War and has led to reduced intergenerational contact within families.[118] Whilst today's shift towards multigenerational households may be driven in part by economic hardship, this living arrangement can bring a wide range of benefits.

Loneliness will be a problem of significant proportions by 2040, with the number of often lonely adults over the age of 50 rising from an estimated 1.4 million in 2016/17 to 2.1 million by 2030/31.[119] In a review of the relevant literature we found evidence to suggest that greater contact with family members may be good for elderly physical and mental health, and could help tackle loneliness.

Intergenerational exchanges between adult children and older parents in the form of co-residence appears to have a positive impact on the mental health of older parents.[120] Furthermore, elderly people that provide no care for their grandchildren are significantly more likely to feel lonely and sad than those that do.[121] The negative health effects of a lower socioeconomic status also appear more acute for elderly people with less frequent contact with their children than those with daily contact.[122]

Multigenerational living may also help the elderly to stay integrated in society, allowing them to continue to make meaningful contributions and giving them a renewed sense of self-worth.[123] It may also prevent or delay the timing at which they move to more expensive specialist housing because of the range of benefits - "community spirit, sense of family and practical assistance" - they receive through multigenerational living.[124]

There may also be significant benefits for younger generations. Living with relatives may allow them to access better quality housing than they would otherwise be able to.[125] They may improve their communication skills with the elderly which could help their career prospects.[126]

Multigenerational living may also help meet the UK's rapidly growing social care needs. As shown by Demos in The Carers' Covenant, the demand for informal carers has risen considerably in recent years and is expected to continue to grow; a shift that will demand major societal changes.[127] Whilst many of us will be healthier for longer we are also likely to require greater assistance from others. This is because the proportion of people facing difficulty with at least one activity of daily living increases from about 16 per cent at age 65 to around half of us at age 85.[128] Once we reach our late 80s one in three of us will have difficulty undertaking five or more daily activities unaided.[129]

> " **Whilst there is a need for more state provision and financial support for social care, families in certain circumstances may also be able to help meet this need.** "

However, current household formation in the UK may not be conducive to this. As the former Health Secretary Jeremy Hunt argued in 2015, only 16 per cent of older people live with their children in the UK.[130] This is much lower than in Italy (39 per cent), China (40 per cent) and Japan (65 per cent); if we are to better meet the needs of our ageing society, this proportion may need to rise. Multigenerational living could also help meet increasing demands for childcare. This is because grandparents - or other elderly relatives - may be more easily able to assist with the care of young children. Indeed, there is some evidence this is already happening: in 2001 over 140,000 children and young people in England were living with kinship carers, and 44 per cent of these were grandparents.[131] This may be driven by the rise of the 'active third agers': those aged between 60 and 74 who stay healthy and active, playing a larger role in childcare than was possible for previous generations.

Greater multigenerational living could also begin to address emerging intergenerational divisions and tension. This could be driven by the fact that rural areas are growing older and urban areas younger.[132] This trend is mirrored within large cities; older and younger people sort themselves into different neighbourhoods, according to research from the Intergenerational Foundation.[133] These trends are of significant concern. They may stoke intergenerational tensions and divisions in society, fostering conflict over the division of scarce resources, such as who gains from benefits and who pays what taxes.[134] However, as Holland argues, "by interacting more and getting to know someone of a different age, mutual respect and trust can develop."[135]

It is clear to us that multigenerational living could provide a wide range of benefits to Britain in 2040. Unfortunately though, the UK today has made little progress in developing this sector compared to other countries. As Professor Sarah Harper of the Oxford University Institute of Population Ageing describes:

❝ Our housing market is not geared up for the multigenerational living we used to have. The kind of housing we are building is hopeless for multigenerational living - small and box-like.[136] ❞

As a result, the Royal Institute of British Architects (RIBA) argues that readying our housing market for widespread multigenerational living will require nothing less than a reinvention of the family home.[137] Multigenerational homes of the future will easily accommodate extended families living in the same home; their defining characteristics will be "shared facilities and flexible accommodation".[138]

This is achieved through the use of internal subdivisions and external extensions which "reflect experiments and innovation with both communal and private spaces."[139] They also describe how changes to the home may be often "ad-hoc or temporary to suit very specific needs. Families are able to expand or remain within the same location rather than moving on, or 'up' the housing market ladder."[140]

Scottish firm NRGStyle have designed a home specifically for multigenerational living. The house is designed around a steel frame structure which can be easily modified. This creates a flexible layout which can be easily adapted in the future, allowing the house to function in a number of different ways.[141]

Adapting existing homes for multigenerational living could also begin to break the stalemate of the housing crisis. This occurs because elderly people may 'under-occupy' their homes, potentially restricting the availability of housing for younger generations. Therefore, multigenerational housing is a policy which breaks the 'zero-sum game' on housing, as both generations benefit.[142]

In our polling exercise we saw that more people would consider letting their parents move in with them than would not (31 per cent versus 29 per cent), suggesting nascent support for multigenerational living among the British public. However, we also saw a clear recognition that homes today are not suitable for this living arrangement: two thirds of respondents thought that typical new homes do not give enough space to care for an elderly relative (67 per cent) or have enough space for multiple generations to live in (66 per cent).

3. Cohoused where suitable

We saw in Chapter One that the UK is likely to be face a loneliness epidemic in 2040. We also saw that there will be as many as 2 million people suffering from dementia in 2050. Our highly individualised approach to housing could be a barrier to mounting an effective response to these challenges.

But it was not always this way. As the director of Create Streets, Nicholas Boys Smith describes, communal living is "as old as homo sapiens… tribal man lived communally. Medieval villages rotated land communally. Feudal vassals in their lord's castle lived communally. Monks lived communally. The seventeenth century coffee house was communal."[143] Cohousing communities - clusters of private or rented homes centred on communal facilities which are used collectively by residents - could be a modern return to these roots. As the UK Cohousing Network describe, the focus of activities in cohousing communities is often around food with community food production or a shared house for eating meals.[144] Forms of joint, consensual decision making are often used to organise labour needed for the upkeep of communal facilities. Bringing people together in this manner and increasing social interaction may help us to respond to the loneliness epidemic.

> **"Cohousing is likely to bring a range of health benefits, particularly to older residents. This has long been recognised in Denmark, Sweden and the Netherlands, where governments have encouraged the development of cohousing communities for the elderly."**

This is because they can help keep the elderly physically and mentally healthier for longer, in turn leading to lower demand for health and social care services.[145] In communities where neighbours better look out for each other, demand for beds in hospitals is reduced as short-term illnesses can be addressed in the community.[146] However it is important to note large scale quantitative studies of the long term health benefits are still largely unavailable. As the UK Cohousing Network note, advocates of the model need to get better at evidencing its benefits.[147]

Cohousing communities may also deliver environmental benefits, important when considering the significant environmental challenges seen in Chapter One. Cohousing can mean "a return to a sustainable model of living", with neighbours participating in recycling and composting, sharing and consuming fewer resources, living in homes that are small, clustered and, as a result, highly energy efficient".[148] Cohousing schemes are often underpinned by an "environmental consciousness" that "often goes hand-in-hand with the increased social sustainability of living in cohousing".[149] For example, cohousing communities may be good opportunities for promoting car free zones, which can reduce emissions as making streets safer places for local residents;[150] their ability to encourage "participatory, democratic and grassroots action" to deliver reductions in carbon emissions is well-established.[151] By boosting the local self-determination of residents to take control of their energy usage and how food is grown we can change the way those residents make decisions which have knock-on effects for the environment.

Despite its considerable benefits, the UK has built relatively few cohousing developments. Previous Demos research has indicated that the UK's first cohousing scheme was set up in 1980 and the UK Cohousing network today has 19 active members with established communities. In contrast, there are around 600 established cohousing communities in Germany, with Denmark and Swedish social housing providers long offering cohousing.[152]

This lack of progress might be due to multigenerational living no longer being a well-established cultural norm. As a representative from the UK Cohousing Network has described, "the trend that has persisted for a long time is of individualism, a consumerist approach to neighbourhood and services."[153] However, our polling exercise does find some appetite for cohousing living arrangements, with roughly a quarter of respondents (23 per cent) saying that they would consider living in a community that makes use of shared facilities such as kitchens and gardens. However, the proportion of respondents that would consider cohousing living rises to 37 per cent among 18-34 year olds, suggesting we might expect demand for this form of living to grow in the future.

"Cohousing can mean a return to a sustainable model of living."

4. Ready for home workers

In recent decades the British economy has seen a significant increase in flexible working; we expect this trend to continue to 2040. As a result, it is important to consider how we may need to adapt our current model of homes and communities.

This is particularly relevant when those working from home today might be doing so in a way that is detrimental to their mental or physical health.

> **In polling conducted by AXA of 3,000 UK residents, only a third (29 per cent) of people said they work in a dedicated office at home, while another third (33 per cent) work in their living rooms and 15 per cent in their bedrooms.**[154]

Furthermore, the new flexible working army have higher technological requirements from their home. This is because, as one home worker remarked, "when you are at home you are at the mercy of the technology."[155] Broadband must be fast and reliable throughout the whole house. Phone signal too must be of a consistently high quality.

Those that work from home may also be losing out on workplace interaction and socialising, which in turn could impact their mental health. A study of Acas employees in the UK found that social isolation was associated with those working from home.[156] Employees reported missing the emotional support from colleagues that they got in the office and missed the informal contact.[157]

These findings are supported in studies from around the world. Argentinian home-workers ranked having 'less interaction with friends' (62 per cent) and 'being more isolated' (36 per cent) as the two main disadvantages of home working.[158] 42 per cent of Italian managers view home working as a serious threat to worker's wellbeing arising from a lack of social interaction and loneliness.[159]

As a result, we must consider how the communities that homes are in can tackle this potential isolation. Equipping new housing developments with meeting spaces that can be used by those working from home is one potential solution. This would allow home workers to meet and chat to others, reducing the isolation that can come from independent working.

5. Healthier, greener transport

Responding to the obesity epidemic will require building homes and communities that encourage the use of healthier modes of transport. This must start by building homes with fewer garages and parking spaces. We saw in Chapter One how driverless cars might be widely used by 2040 and, if policy frameworks are designed appropriately, could reduce the need for private car ownership, further reducing the need for garages and parking spaces. Indeed, a garage was found to be the feature that US millennials would be most willing to sacrifice in order to live in their ideal neighbourhood; preferences that may become more mainstream as that generation ages.[160]

Homes should also be located in a built environment that encourages greener, healthier modes of transport. Whilst this can take a variety of shapes, cycle lanes and footpaths should be in abundance because there is extensive evidence that cycling[161] and walking[162] can have a major impact upon reducing obesity. Researchers at the University of Minnesota have described how the rise of driverless cars may mean that roads can be narrower than they currently need to be, freeing space for cycle lanes and footpaths.[163]

Good, well-designed pathways and pavements are also vital for elderly people's mobility; evidence suggests that paths that are easy to walk on without obstacles are vital in older people's use of neighbourhood spaces.[164] This is particularly important when we consider the sharp increase in the size of the elderly population that we expect to see in the years to 2040. Furthermore, research by the Joseph Rowntree Foundation has found that networks of pathways and cycle routes can bolster social connections in mixed-tenure housing estates; countering the increase in loneliness we expect to see in 2040.[165]

Communities in 2040 must provide better access to major public transport hubs and be located nearer to them. Even if popular, cheap driverless taxis are abundant, it will still be more energy efficient - and therefore better for the environment - to use public transport.

> **" Any new homes must have easy transport links to access major transport hubs if they are not located near them. Major new housing developments would ideally be served by new bus and railway stations. "**

Unfortunately, these principles do not appear to be embodied in the design and planning of transport for new homes today. In a comprehensive study of new developments in England, almost all new estates were found to be car-based with few cycle paths or even pavements; "the sheer amount of area given over to road access, driveways and parking was astonishing", leaving little space for alternative modes of transport.[166]

6. Green spaces

New homes and communities must provide more green space. This will help to combat the rising tides of both obesity and isolation: improving people's health whilst bringing them closer together.

There is good evidence to support the claim that living near green spaces encourages residents to exercise more frequently. Studies have shown that those living within one mile of a park are four times more likely to visit the park once a week or more than those that lived further away.[167] They also did on average 38 per cent more exercise than those living further away from the park.[168]

Green spaces may also deliver health benefits through their promotion of healthy eating. If they are designed with gardens that provide opportunities for growing fruit and vegetables, they can encourage local residents to eat healthier food.[169]

> **"Beyond health benefits, there is also reason to believe that green and public spaces can help tackle social isolation. A study of the impact of greenery on a local community found that more social interaction was observed in green spaces than barren spaces, providing "systematic evidence that trees and grass help create vital neighbourhood spaces".""[170]**

The authors go on to note that local authorities should take it seriously given that "an act so simple as planting a few trees in an otherwise barren neighbourhood could have such pervasive consequences... clearly the goal should be nature at every doorstep."[171]

These findings are supported by a study examining two public housing developments in Chicago. The study found that natural landscaping encouraged greater use of outdoor areas by residents and that spaces with trees attracted large, more diverse groups of people.[172] As Kuo et al argue in a separate study, because the formation of neighbourhood social ties can depend on informal socialising which happens in public spaces, the presence of trees and grass supports common space use and, in turn, social contact and strengthening of neighbourhood ties.[173]

7. Close to employment hotspots

It is important to also consider where we want new homes and communities to be built. Building homes near to economic hubs is both good for our health and good for the environment. But too often we fail to do this.

Despite the overall number of commuting journeys decreasing from 8.5 billion to 7.9 billion from 1995/97 to 2013/14, the length and distance of these journeys has increased throughout this period.[174] This is influenced no doubt by our failure to build enough new homes near employment hotspots.

In an analysis of the location of new housing developments, Transport for New Homes found that too often proximity to jobs isn't a consideration in the building of new homes. Because the government requires high targets for housebuilding in comparatively rural areas - and because greenfield sites may be more attractive for development than urban brownfield as they are cheaper to develop - too many housing developments are built far from places of work.[175] As they set out, "pepper-potting large new housing estates into the countryside requires long

commutes and late returns home"; as a result, "family life suffers."[176] When more than half (56 per cent) of all commuting journeys are made as a car driver,[177] this is also of great environmental concern.

56%
of all commuting journeys in England are made as a car driver

" **Furthermore, when people live near their workplace, they are more likely to use a greener or healthier mode of transport.** "

This makes intuitive sense: it is much easier to cycle or walk to work if we live nearby. Workplaces have been intermingled with homes on the Poundbury estate in Dorset - there are around 2,000 jobs located on the estate.[178] This is likely to help explain why 32 per cent of its residents walk to work, a considerably higher proportion in comparison to other developments.[179]

There is also good evidence to suggest long commutes are bad for our health. A study of 34,000 UK workers conducted by Cambridge University found that those with longer commutes were 21 per cent more likely to be obese.[180] Given we expect obesity to affect one third of UK adults in 2040, this is of significant concern. British workers with longer commutes also experience considerably worse physical and mental health indicators across a range of other outcomes.[181] They are likely to suffer from depression, 12 per cent more likely to report work-related stress and 46 per cent more likely to get fewer than seven hours of sleep each night.[182]

21%
more likely to be obese if daily commute is long

8. Close to local amenities and public services

We expect the UK in 2040 to be experiencing higher levels of loneliness and social atomization. Because a sense of community is created "at the school gates; the pub or the coffee shop… even that most unlikely place, the shopping mall", the establishment of these institutions in our neighbourhoods can be a powerful bulwark against these forces.[183]

This view is supported by a comprehensive study of the development of New Towns created from 1946 onwards which notes that 'social infrastructure' such as shops, playgrounds or sports facilities played a key role in creating a sense of community.[184] Furthermore, in those New Towns where these facilities were already established, the local community came together more readily.[185]

The provision of educational facilities was of particular importance in the New Towns, especially given that many of the new arrivals were families with young children that had been "uprooted" from other schools. [186] Therefore, those in charge of the development of the New Towns strived to ensure that there was one primary school within each neighbourhood; where this wasn't achieved the integration of communities was hindered.[187]

The Joseph Rowntree Foundation have highlighted that most social mixing across social groups in mixed income communities takes place between children. Contact "in nurseries, playgroups, schools and in public spaces… provide opportunities for adults to meet and form relationships" and as a result, "children provide a common group and shared interest between people."[188]

> **"It is clear that the provision of educational facilities can play a vital role in bringing a local community together."**

Communities suffer when developments are built without the provision of education. In the new settlement of Cambourne in Cambridgeshire it took longer than expected for the provision of community and commercial facilities to be established. This led to the appearance of 'New Town blues' among its residents, initially detected in the New Towns built across England in the post-war period.[189] The mental and physical effects were deemed so serious that the Cambridgeshire Primary Care Trust investigated, finding that "planning for the hard infrastructure alone would never build a community" and that there was a need for "designing facilitated activities to meet the needs of future citizens… if they were to take part in, and join together, with other households to build a strong and cohesive community."[190]

9. Extreme weather and climate proof

A changing climate is likely to be a major challenge for the UK in 2040. We must make changes to our homes to ensure they are more environmentally friendly and to prepare them for more extreme weather seen as a result of climate change.

Ensuring new homes are more energy efficient will be vital if the UK is to meet its energy reduction targets. Britain has the oldest housing stock of any EU member state; roughly 38 per cent of its homes built before 1946.[191] This means they require more energy than homes in other countries and we therefore spend more on our energy bills. In an analysis conducted by the Association for Energy Conservation, which compared Britain with 12 other EU member states with similar income levels and climate, Britain had the worst levels of fuel poverty due to high energy costs and homes being in a poor state of repair.[192] It is no surprise then that homes account for 28 per cent of the UK's total energy consumption.[193]

Whilst we must build new homes to higher energy efficiency standards, there is also a vital need for retrofitting existing stock given around 70-80 per cent of 2040s buildings are already standing today.[194] A wide range of actions can be taken to improve the energy efficiency of homes, many of which can be made at a low cost. Walls can be insulated and windows replaced with frames which better keep heat in.[195] Newer appliances can be purchased, many of which are already more efficient as a result of strengthened EU regulations. Whilst many 'low hanging fruit' energy-efficiency adaptations have been made in recent years in response to government incentives, numerous opportunities still remain to make further improvements.[196]

We will see considerable changes in weather patterns as a result of climate change and this is likely to demand adaptations to existing homes. We saw in Chapter One that winters will be 23 per cent wetter and summers 24 per cent drier by 2080. We also saw that the number of heavy rain days will increase by a factor of 2-3.5 in winter and 1-2 in the summer by the 2080s.[197] This will have significant implications for the homes we need to be building.

A backwards response to hotter summers would be widespread installation of air conditioning units. These consume a large amount of energy and would likely lead to hotter cities. A better option is to build homes with passive cooling measures which use natural processes for heating or cooling: radiation, conduction or convection, without the use of electrical devices.[198] British homes are often built with windows that are designed to keep heat in. Whilst this is a good thing in winter it means that they can get excruciatingly hot in summer. Shutters or reflective blinds can be an effect way of addressing this.[199]

Green roofs can help mitigate the impact of storms and heavy downpours by reducing the amount of storm water runoff. During the summer period a green roof can retain between 70 - 80 per cent of rainfall runoff.[200] Green roofs can also reduce Urban Heat Island effects - the increased temperature of a built-up area in comparison to surrounding rural areas. Modelling undertaken by the New York Heat Island Initiative found that providing 50 per cent green roof cover within the city could lead to a 0.1 - 0.8°C reduction in surface temperature.[201] This could make our sweltering cities much more liveable.

> **"It is also vital to consider how climate change will affect where we should be building new homes. As outlined by the Committee on Climate Change, one of the main risks facing the UK from climate changes is large increases in flooding."[202]**

This means we must build away from those areas that are at the highest risk of flooding.

We also saw in Chapter One that rising sea levels pose a specific threat and this needs to be countered. The government expects that a sea level rise of 31-44cm will occur around the UK coast by 2095.[203] Because an estimated 30 per cent of the population of England and Wales live within 10km of the coast, this will place considerable pressure on these communities.[204] Low lying parts of southern and eastern England are most at risk and we may need to consider building away from these places if we are to minimise the UK's exposure to rising sea levels.[205]

Technological advances may also help us to build more environmentally friendly homes. We are likely to see a considerable rise in the number of domestic wind turbines and solar panels, with Bloomberg's 2016 Energy Outlook expecting the costs of these to fall significantly and for them to be the most economic form of energy generation from the 2030s onwards.[206]

Furthermore, we are likely to see a substantial increase in the efficiency of home energy storage devices and falls in their cost. Crucially, such developments will likely enable domestic renewable energy generation technologies - such as wind turbines or solar panels - to be effective all the time. This could remove the traditional energy production industry's last great advantage over renewables, "opening the door to 100 per cent renewable energy supply."[207]

This might be accompanied by a move away from Britain's centralised energy system, in which a handful of large power stations provide the nation's energy via a national grid. Increased renewable energy generation and digitization - in which small power generators such as solar panels or combined power plants are situated close to consumers - are already leading to a decentralisation of the energy network, and this trend looks only set to continue.

A decentralised energy system could provide local communities with greater security of supply. As the Carbon Trust note, the 2003 US-Canada energy black out affected around 50 million people and cost the economy approximately $6.4 billion.[208] Moving away from a centralised energy system should reduce the chance of these events occurring. In addition, because decentralised energy systems go hand in hand with sources of renewable energy generation, they are likely to promote these sources over others. Finally, decentralised energy systems are likely to be more efficient because they reduce the degree of transmission loss.[209] This could further reduce our energy requirements.

10. Secure and mindful

Smart technologies are likely to be commonplace in our homes, communities and workplaces in 2040. When we know how easy it can be to hack smart devices, this raises a number of risks. Just 15 per cent of smart home devices use software or applications to protect them from cyberattacks, a proportion that will surely need to rise if future homes are to be secure.[210]

15%

of smart home devices use software or applications to protect them from cyberattacks

The cyber security threat to digital infrastructure in our cities looks even greater. Interconnected devices will capture considerable amounts of data "relating to all forms of privacy and drastically expand the volume, range and granularity of the data being generated about people and places".[211] As with 'Internet of Things' devices in the home, many of smart cities sensors are insecure and tested for cyber security risks infrequently. Furthermore, because of the interconnected nature of smart cities - which "utilize complex, networked assembly of ICT infrastructure to manage various services" - compromising one device means it is possible to compromise the entire network[212]; "in a classic weakest-link scenario, one seemingly innocuous connected device, when hacked and injected with malware, could potentially open up an array of other devices to penetration, causing cascading damage throughout the entire infrastructure."[213]

> " The rise of the smart home will also have important implications for designing homes which promote our wellbeing. "

If the vision of futurologist Dr Ian Pearson seen in Chapter One comes to life – in which almost every aspect of our home is in some way digitised and connected to the internet - then for the good of our mental health, we may need to access in our homes to 'mindful' spaces which allow a full 'digital switch off'.

These are important considerations and represent challenges that home designers have not had to consider in the past.

In total we make 15 recommendations across eight policy themes:

New home standards

Location

Retrofitting existing homes

Future communities

Multigenerational living

Climate change and extreme weather

Cohousing

Technology

CHAPTER FOUR:

A policy platform for future homes and communities

The previous chapter examined our principles for future homes and communities. This chapter looks at making these principles a reality.

In doing so we draw on a range of policy levers, from building regulations to planning frameworks, tax incentives to permitted development rights. Our recommendations concern both new and existing homes: rising to the challenges of tomorrow requires significant retrofitting of existing stock, along with improving the design of new homes.

We recognise some of our recommendations could result in higher construction costs for housebuilders, which may lead to higher house prices. However, we believe our proposals can still be justified on two grounds.

First, we believe that this simply may be a price worth paying when the alternative is building homes completely unfit for purpose come 2040. The cost to society of having to tear down these homes would be enormous in both economic and emotional terms; a far greater long-term cost than any short-term costs as a result of our recommendations.

Second, the price of land – not of construction – is often a very significant factor in the building of homes. Because of this, any increase in construction costs as a result of our recommendations could be compensated through additional measures to reduce Britain's over-inflated land prices. Though it is beyond the scope of this report, we believe policies like a land value tax could be effective mechanisms for achieving this.

New home standards

Recommendation 1:

The government should ensure its Future Homes Standard revives the scrapped Zero Carbon Homes standard, involves a commitment to a new green space standard and mandates Category 2 accessibility for new homes. The standard should help society respond to a wide range of challenges, including climate change, loneliness, obesity and an ageing society.

We welcome the Chancellor's announcement in the Spring Statement that the government will introduce a Future Homes Standard by 2025. The standard aims to ensure homes are "future-proofed with low carbon heating and world-leading levels of energy efficiency".[214]

Whilst this represents a good starting point, we think there is an opportunity for the standard to go further. We recommend that the standard includes that homes are also:

Built to a Zero Carbon Homes standard

In 2013 the government announced a commitment to delivering zero carbon homes, though this target was scrapped in 2016. Despite this, the Mayor of London has confirmed that he will be proceeding with the target in the capital.[215]

The standard had three key components:

1 The home's fabric must meet the Fabric Energy Efficiency Standard.

2 CO_2 emissions must be less than or equal to the Carbon Compliance limit established for zero carbon homes.

3 Any remaining CO_2 emissions must be reduced to zero, potentially through offsite carbon offsetting measures.[216]

Not only do zero carbon homes deliver substantial energy savings for consumers, they are likely to be vital for meeting national carbon reduction targets.

A Zero Carbon Homes standard was proposed in part because the housing market fails to deliver enough energy efficient homes. This may be because energy efficiency is still a relatively low priority for consumers, often unwilling to pay higher prices for more energy efficient homes.[217] This means the 'market signal' to build more energy efficient homes may not be strong enough for developers.[218] By mandating that homes are built to a Zero Carbon Homes standard, this obstacle is avoided.

It is important to consider the costs associated with implementing this standard. In 2016 the estimated additional average cost of building a home to a zero carbon standard was £3,000-£8,000.[219] Evaluating who bears these costs is complex and depends on whether the developer is able to pass the costs forward on to the consumer or back to the landowner through lower payments for land. Because demand for energy efficiency seems low, as set above, it seems likely that it would be difficult for housebuilders to pass these costs onto consumers. It therefore seems likely that they will be pushed back onto landowners, meaning lower prices for land are paid. This, in turn, could impact the amount of land that becomes available for housebuilding.[220]

However, any potential negative impact on housing supply could be mitigated by measures to boost consumer demand for energy efficiency improvements. This includes requiring estate agents to advertise energy efficiency ratings of homes more transparently, allowing potential purchasers to make easy comparisons.[221]

Built to a new green space standard

In our polling exercise we saw the public highly value access to green space, with this being the most important feature when choosing a home after affordability and location. There is also good reason to believe that living near green space brings a wide range of health and social benefits. Evidence suggests that living near green spaces encourages residents to exercise more frequently.[222] Studies have also found that there is more social interaction in green spaces than barren ones.[223] Because green space can improve people's health and reduce social isolation, we should be doing all we can to encourage its creation.

To achieve this, the government should introduce a nationally prescribed green space standard for all new homes. This would designate the amount of green space that should be provided for a new dwelling in proportion to floor space. For homes this could be provided through private gardens; for flats or apartment blocks it could be delivered through communal and/or roof gardens, as appropriate.

In setting a floorspace to green space ratio, policy makers should consult extensively with housebuilders to ensure the requirement is stretching but deliverable.

Built to a Category 2 accessibility standard

There are three relevant government standards for accessible housing:

Category 1 - visitable dwellings;

Category 2 - accessible and adaptable dwellings;

Category 3 - wheelchair user dwellings.

All new homes must be built to a Category 1 standard, requiring level access, sufficiently wide doorways and a toilet on the ground floor level, among other requirements.

However, Habinteg Housing Association state Category 1 is "not sufficiently accessible for most older and disabled people and it is only 'visitable' in the loosest sense."[224] As a result, to accommodate an increasingly elderly population there is clearly a need to build homes to a higher level of accessibility.

Homes built to standards beyond Category 1 are designed to be ready for adaptations in areas of the home where they are likely to be needed. Julia Park of Levitt Bernstein argues that building homes to a Category 2 standard would not be "particularly astonishing to look at, but all those little moves added together mean that day-to-day life would be very much easier."[225]

And whilst there has been some improvement in the number of homes built to Category 1 standards, we know that too few homes are being built to a Category 2 standard. An FOI by Habinteg revealed that just 8 per cent of local authorities had planning policies in place to build to Category 2 standards, a number which falls to just 3 per cent once London councils are excluded

(the London Plan already requires that all new homes are built to a Category 2 standard).[226]

Therefore, building regulations should be amended to upgrade the minimum level of accessibility required to Category 2 from Category 1. We recognise that there are additional benefits to building homes to a Category 3 standard and government should aim to increase standards to this level at a later date.

The government should also ensure that the Future Homes Standard requires homes to be:

1. Fit for multigenerational living either through their adaptability or space for expansion.

2. Built with the 'home-worker' in mind, providing space for home offices.

3. Designed where possible with innovative energy storage and energy generation facilities.

4. Fit to withstand extreme weather conditions seen as a result of climate change.

5. Built with climate change-mitigating features such as green roofs.

6. Built with 'mindful' spaces to enable a 'digital switch off'.

7. Designed with internal control centres to ensure that 'smart' home devices can collectively be taken 'off grid' if necessary.

Retrofitting existing homes

While it is important we build better new homes, only a fraction of our 2040 housing is yet to be built. It is therefore vital we improve the standard of existing housing stock.

Recommendation 2:
The government should launch a Green Homes Fund supported by a state-backed Green Development Bank.

With 38 per cent of homes built before 1946, the UK has the oldest housing stock of any EU country.[227] Given that buildings are responsible for almost a quarter of all UK carbon emissions, modernising our old housing stock will be essential to meet our national carbon reduction targets.[228]

But we know that this is not happening quickly enough. Despite steady improvement since the 1990s, there has been no improvement in the average energy efficiency of homes since 2015.[229]

To address this, the government should launch a Green Homes Fund for efficiency improvements and other environmentally-friendly changes to the home through the provision of low cost, long-term finance to households.

Importantly, it would offer more generous financial terms than the government's old Green Deal, which provided finance for home energy efficiency improvements in the UK between 2013 and 2015. The old Green Deal's high rate of interest (7.9 per cent - 10 per cent)[230] may have deterred households; just 14,000 participated in the scheme.[231]

In comparison, Germany's energy efficiency schemes offer annual interest rates between 1-4 per cent an offer that millions have taken up.[232]

To offer German-level interest rates to British consumers, there may be a need for a new, government-backed financial institution. Allowing this institution (a Green Development Bank) to issue bonds backed by the government would give it access to favourable borrowing rates on the capital markets. A similar arrangement in Germany allows its development bank – the KfW – to borrow cheaply and to provide long-term, low cost loans to households (see box below).

The bank's remit should go beyond energy efficiency. As the cost of domestic wind turbines and solar panels is expected to fall – with experts expecting them to be the most economic form of energy generation from the 2030s[233] – the bank should provide finance for their installation in homes. This could open the door to a significant decentralisation of our energy system which, among other benefits, offers the potential for much greater security of supply for local communities[234] and greater efficiency because of less transmission loss.[235]

Germany's Green Homes Revolution

German households can access long-term, low interest loans to fund energy efficiency refurbishments of existing buildings and to encourage higher standards in new builds.[236]

Loans are provided by the state-owned KfW development bank, with direct subsidies available to households making improvements above minimum required standards.[237] 80 per cent of the KfW's shares are owned by the Federal Government, with the remaining 20 per cent owned by federal states.

The KfW has financed home improvements since launching the CO2 Reduction programme in 1990, offering low cost finance to households in East Germany.[238] The programmes have gone through various iterations and the Energy Efficient Rehabilitation Programme and Energy Efficient Construction Programme focus on existing stock and new homes respectively.[239] These programmes are intended to be energy neutral: if the proposed works meet the standards of an approved energy assessor, access to KfW finance is granted. In 2011 the rate of interest was fixed at 1 per cent for 10 years.[240]

Typical works financed through the KfW funding streams include loft, floor and wall insulation, window replacement and refurbishment, ventilation installation and heating systems replacement.[241] These programmes are available to anyone with sufficient credit scores and are not restricted to certain groups.

With its liabilities backed by the German Government, the KfW enjoys an AAA credit rating, allowing it to borrow cheaply from capital markets.[242] As a result, it can lend at very low rates of interest to German households. The KfW also receives direct subsidies from the German government to further reduce interest rates for the bank and to provide additional funding.[243]

Households do not borrow directly from the KfW. Instead, the KfW lends to commercial banks who in turn lend to individuals, bearing the risk of default.[244] They also have responsibility for carrying out credit and eligibility checks on the household. To cover these costs, commercial banks can levy an additional interest rate on household borrowing, though this is capped at 0.75 per cent per annum.[245] As well as ensuring that the KfW is not exposed to the risk of default on the loans, it also reduces competition concerns about KfW's activity 'crowding out' the activity of commercial lenders.

Since 2007 the KfW has assisted over 4 million homes to make energy efficiency improvements through the distribution of €100 billion worth of loans.[246] The measures of the current programmes are helping to reduce carbon emissions by almost 9 million tonnes per year.[247] The ongoing contribution of the federal government to the various programmes through direct subsidies stands at around €2 billion per year.
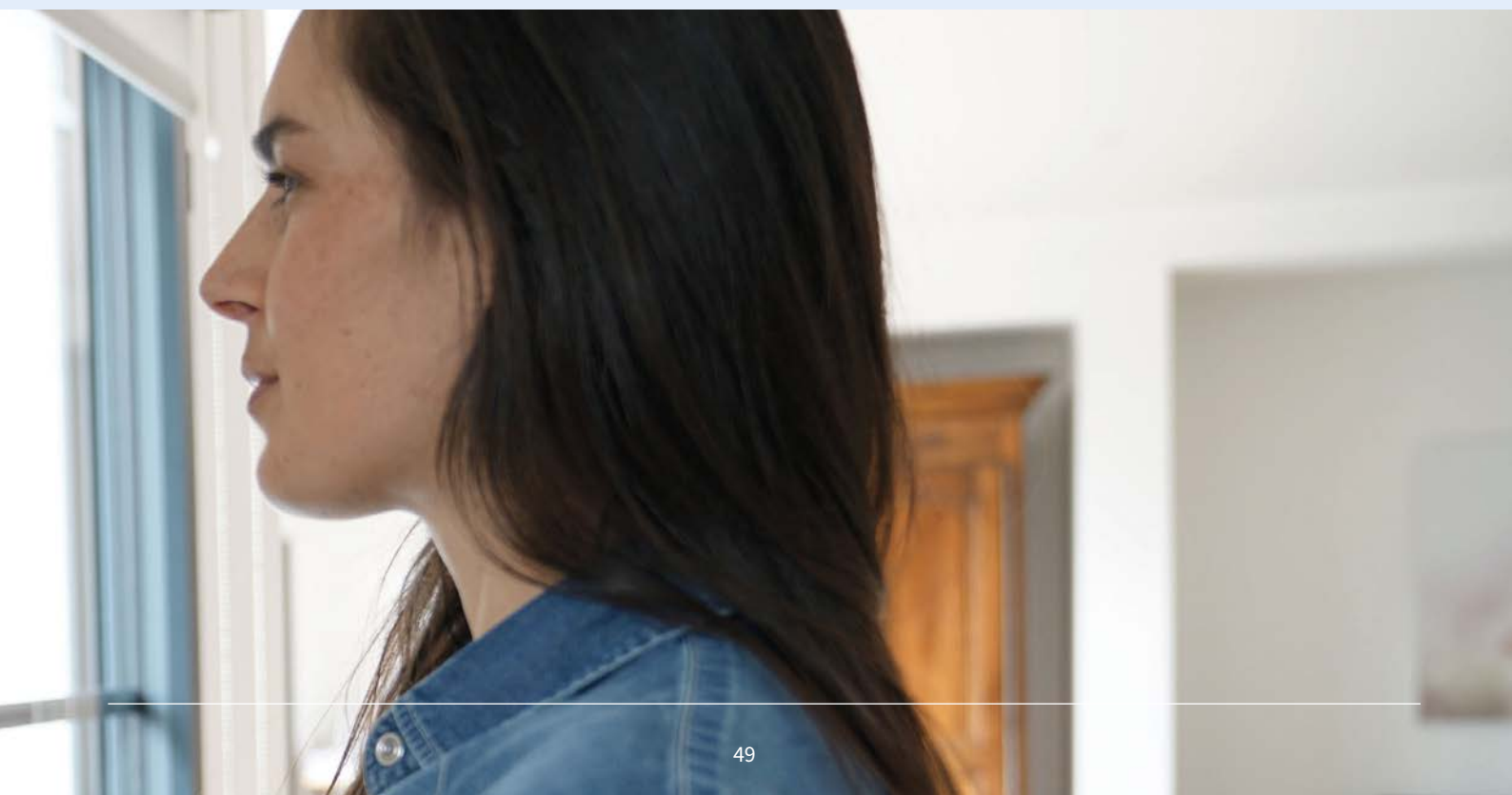
Recommendation 3:
The government should increase the maximum available Disabled Facilities Grant to £40,000 from £30,000.

Home adaptations can play a vital role in helping our ageing population to live independently. It also makes financial sense: adaptations are likely to be significantly less costly than treating a fall in hospital or placing an elderly person in a residential home.

The Disabled Facilities Grant helps individuals with disabilities make adaptations to their home up to the value of £30,000. The grant helps around 40,000 people a year make adaptations to their homes, with almost three quarters (71 per cent) of grants going to people aged over 60.[248] The amount of grant available is means-tested.

Whilst the amount of overall central government funding for the Disabled Facilities Grant has increased in recent years, the maximum value of the grant has not increased since 2008. This means its maximum available value has fallen in real terms by an estimated 32 per cent since 2008.[249] This is likely to have significantly affected the amount of support on offer to those seeking adaptations to their homes.

To address this, the government should increase the maximum grant available by roughly a third to £40,000, adjusting for its loss of real value since 2008.[250] We estimate this would cost the government around £17 million annually, a spending commitment that could be met through the reallocation of departmental resources.

1/3
amount by which the Disabled Facilities Grant should increase

71%
of grants go to people aged over 60

Recommendation 4:
The government should require any home sold from 2025 to hold an E-rated Energy Performance Certificate.

Rental properties in England are required to hold an E-rated Energy Performance Certificate (EPC). This requirement should be extended to the owner-occupied sector, so that any home sold must hold at least an E-rated Energy Performance Certificate.

Because an EPC assessment is already required by law each time a home is sold, a framework already exists for implementing this policy. We recommend introducing this requirement from 2025 to ensure anyone wishing to sell their home has sufficient time to make the necessary adjustments.

We recognise this policy could encourage large numbers of people to sell their homes before the introduction of new requirements in 2025. However, this is no bad thing. Britain faces a housing supply crisis as well as one of quality, and a large increase in housing supply could bring down property prices.

"...only a fraction of our 2040 housing is yet to be built. It is therefore vital we improve the standard of existing housing stock."

Multigenerational living

We saw in Chapter Three a range of health, societal and economic benefits to multigenerational living. Multigenerational living can reduce loneliness and ease the burdens of care for both the young and old; vitally important against the backdrop of a rapidly ageing population. However, current government policy does little to encourage this living arrangement. Indeed, policies such as the single person council tax discount may actively discourage it. We set out several measures to address this below.

In our polling exercise we saw that more people would consider letting their parents move in with them than would not consider it (31 per cent versus 29 per cent), suggesting nascent support for multigenerational living among the British public. Despite this, there is good evidence that the public does not think housing today encourages this. Roughly two thirds of respondents in our polling exercise thought that typical new homes do not give enough space to care for an elderly relative (67 per cent) or have enough space for multiple generations to live in (66 per cent).

67%
think new builds don't have enough space to care for elderly relatives

Recommendation 5:
Local authorities should offer multigenerational households (three or more generations) a 25% council tax discount.

In Singapore tax discounts are available to those that move in with or move to live near other family members.[251] Inspired by this, the government should introduce a 25 per cent council tax discount for multigenerational households to encourage their greater formation. This could also address the under-occupation of housing by the elderly, freeing up much needed housing stock.

Given there are around 400,000 three generation households in the UK, we estimate that this would reduce the UK's total council tax receipts by a minimum of £175 million per year; in reality the figure will be higher as there will be households of more than

three generations that will also benefit from the discount.[252] Abolition of the single person council tax discount for certain properties and the introduction of a greenfield levy could be used by some local authorities to make up for any shortfall in tax revenues seen as a result of this policy.

400,000
three generation households in the UK

31%
would consider their parents moving in

Recommendation 6:
Local authorities should abolish the single-person council tax discount for residents without dependents living in band E and above properties.

Properties with just one adult resident over the age of 18 are eligible for a 25 per cent council tax discount in England and Wales. If we believe there is a considerable public good in encouraging people to live together, we must question the basis for a discount which may discourage the formation of larger household sizes.

However, we recognise outright abolition of the discount could represent a challenge for those on low

incomes. As a result, we recommend removing the discount only for properties in council tax bands E and above; roughly the top fifth of England's housing market.[253] Furthermore, anyone with a dependent under the age of 18 should continue to be entitled to the discount. Based on Local Government Association analysis, we estimate that abolition of this discount could save local authorities around £200 million per year.[254]

Recommendation 7:
The government should introduce permitted development rights for the conversion of garages into 'granny annexes'.

Lack of space is a major barrier to multigenerational living for many families. Indeed, in our polling exercise we find two thirds of respondents (66 per cent) do not think typical new homes have enough space for multiple generations to live in. Allowing households to make best use of existing space through conversions could address this.

Connected and Autonomous Vehicles (CAVs) may reduce the need for privately-owned vehicles. As a result, targeting garages for conversion into 'granny annexes' seems a sensible place to begin.

Furthermore, it could unlock a significant amount of space; more than half (54 per cent) of owner-occupied homes in England have a garage.[255]

However, planning permission is sometimes required for the conversion of outer building and garages into living spaces. Permitted development rights for those wishing to turn garages into granny annexes would give legal clarity to those interested in making this change, hopefully increasing the number of conversions.

Cohousing

Cohousing communities - in which residents share facilities such as green space or laundry facilities - could address the significant increase in loneliness we expect to see come 2040. We have also seen earlier in this report how the UK has few cohousing communities established in comparison to other countries. We should therefore consider what policy makers can do to address this.

Furthermore, whilst we saw in our polling exercise that a majority of the public would not consider cohousing (57 per cent), just under a quarter would (23 per cent); a significant proportion when awareness of cohousing is likely to be low in the UK and is a form of housing not suitable for everyone. In addition, the proportion that would consider living in a cohousing community rises to 37 per cent among 18-34 year olds, suggesting future generations may be considerably more interested in this style of living.

Recommendation 8:
Developments of over 200 dwellings should deliver 5% of dwellings as cohousing.

The success of developing cohousing in Denmark and the Netherlands has demonstrated the importance of clear policy direction from central government.[256] To provide this direction, the National Planning Policy Framework (NPPF) should reserve 5 per cent of dwellings on sites of over 200 dwellings for cohousing. This would operate similarly to the NPPF's current requirement that 10 per cent of the homes on major developments should be affordable.[257]

Recommendation 9:
The government and local authorities should give prospective cohousing communities preferential access to public land.

A major barrier to the development of cohousing communities is the availability and cost of suitable land. It took the pioneering elderly women's cohousing project Older Women's Cohousing (OWCH) in North London 13 years to find a suitable site; a testament to the group's perseverance but something that would likely deter others.[258]

This barrier is navigated in Germany by state and local authorities providing baugruppen - cohousing communities or self-builders - preferential access to public land. Local authorities may also install sustainable infrastructure before the land is handed over to the cohousing community or self-builders to make the plot easier to develop.

Inspired by this practice, the Ministry of Housing, Communities and Local Government should require local authorities to give prospective cohousing communities preferential access to public land.[259] This could be achieved by requiring local authorities to maintain registers of prospective cohousing communities, who are then offered the opportunity to purchase land at a favourable price before developers.

57%
wouldn't consider cohousing

23%
would consider cohousing

Future Communities

Having considered how to future-proof home building, we now turn to ensuring communities are ready for 2040.

Recommendation 10:

The government should incorporate our principles for future communities into the National Planning Policy Framework.

The government should ensure that the National Planning Policy Framework (NPPF) reflects the principles of future communities set out in Chapter Three. These include that communities should:

■ Encourage healthy, green modes of transport and reduced car usage.

■ Provide spaces for home workers to meet up and interact with others.

■ Provide easy access to green spaces.

■ Provide easy access to local amenities like shops and vital public services like schools.

■ Ensure that any 'smart city' technology in the community is secure and regularly tested for resilience.

■ Encourage decentralised energy systems, including community energy schemes.

These principles reflect the public's preferences as seen in our polling exercise. Public transport links were the most important factor in choosing where to live, other than affordability, with 39 per cent of respondents viewing these as important. Access to parks and green spaces were chosen by 33 per cent of respondents and the ease of commute chosen by 31 per cent.

Local service provision was also an important consideration, with hospitals and doctors (27 per cent), leisure facilities and amenities (18 per cent), and proximity to local schools (15 per cent) all chosen as key factors.

Location

We saw in Chapter Three there is a very strong case for encouraging housing developments close to employment hubs and good public transport links. However, planning policy often encourages developments on greenfield sites at the edges of towns and cities, places often poorly served by public transport links and away from jobs.

Our national polling exercise suggested building homes in these locations is unpopular: only 11 per cent of the public wish to live on the outskirts of a small city or a large town. As a result, policy makers may need to examine what can be done to encourage more brownfield housing development in existing urban areas.

Recommendation 11:
The government should reintroduce capital funding for local authorities to clean up contaminated brownfield sites.

The high cost of development is a well-known barrier to building homes on brownfield sites. This is because brownfield sites are often contaminated by past industrial activities, requiring costly clean ups to make the sites suitable for living.

An estimated 300,000 hectares of land in the UK is affected in some way by contamination,[260] likely limiting the availability of brownfield land for housing development.[261] To address this, the Department of Environment, Farming and Rural Affairs should reverse its decision to remove access to capital funding for local authorities to undertake clean ups of these sites, a decision recently criticised by MPs sitting on the Environmental Audit Committee.[262]

only 11%
of people want to live on the outskirts of a small town or village

300,000
hectares of land is contaminated

Recommendation 12:
Local authorities meeting or exceeding their housebuilding targets should have the power to charge a levy on the development of greenfield sites.

A levy on greenfield housing developments would make brownfield developments more attractive vis a vis greenfield sites. This should encourage housing development near to city and town centres, helping citizens to lead healthier and more sustainable lives. Its proceeds could help local authorities address some of the problems caused by out-of-town housing developments, such as a lack of public transport or local amenity provision.

We recognise a greenfield levy could reduce the profitability of certain housing sites and, as a result, reduce housing supply. To lower the risk of this occurring, the option of levying a greenfield levy should only be open to those local authorities that are meeting or exceeding current housebuilding targets.

We estimate a levy of £95 per square metre - equal to the average Community Infrastructure Levy (CIL) in England - on all greenfield development in 2017 in local authorities meeting their housebuilding targets would have raised £640 million.[263] This shows that a greenfield levy has the potential to raise significant sums of money, though local authorities should not be forced to implement the levy and should be in charge of setting its rate.

> **❝ There is a very strong case for encouraging housing developments close to employment hubs and good public transport links. ❞**

Climate change & extreme weather

We saw in Chapter Three that a changing climate and extreme weather events are likely to pose a significant threat to housing in the future.

Recommendation 13:
The government and local authorities should work together to designate a Risk Belt: land which development is restricted on because of its exposure to rising sea levels or threats from extreme weather events.

Too many new homes are built in locations exposed to extreme weather events and rising sea levels. For example, 9 per cent of new dwellings built in 2015-16 were in high flood risk areas and 11 per cent of all homes built since 2000 have been in flood risk areas.[264]

To address this, Government and local authorities should work together to identify land on which housebuilding and other development should be restricted. This would include requiring that any housing developments on the Risk Belt are able to withstand worst-case scenario weather events.

9%
of new builds in 2015-16 are in high flood risk areas

11%
of all homes built since 2000 are in flood risk areas

Technology

Recommendation 14:
Local authorities should be required to test the cyber-resilience of smart city infrastructure in their boroughs.

We expect to see a proliferation of smart city devices in our communities over the next few decades and many of these are likely to be vulnerable to cyber-attacks. To develop the cyber resilience of our burgeoning smart city infrastructure, a new duty should be placed on local authorities to regularly assess the resilience of strategically-important smart city devices in their boroughs.

Recommendation 15:
The government and local authorities should establish a taskforce to integrate Connected and Autonomous Vehicles into public transport networks.

We saw in Chapter One that we expect there to be a significant rise in the number of Connected and Autonomous Vehicles (CAVs) on our roads by 2040. We also saw that the way in which these vehicles interact with existing public transport networks will have a significant impact upon whether they make a good or a bad difference to our roads and communities. For example, if they are not properly integrated there is a real risk they could lead to an undercutting of public transport systems and significantly more traffic on our roads.

To ensure this scenario is avoided the Department of Transport should establish a taskforce working with local authorities to encourage them to draw up plans for the integration of CAVs into existing transport networks. This should involve experts from across the globe and ensure plans are drawn up as soon as possible.

Appendices

Policy costings summary

Spending measures

Measure	Estimated annual spend
Increasing the maximum available Disabled Facilities Grant to £40,000	£17 million
Multigenerational household council tax discount	£175 million (min)
Total	£192 million (min)

Tax measures

Measure	Estimated annual yield
Allowing local authorities to levy a greenfield levy	£640 million (max)
Abolition of single person council tax discount for Band E and above residents, without any dependents under the age of 18	£200 million
Total	£840 million (max)

Spending methodology

Recommendation 3
The government should increase the maximum available Disabled Facilities Grant to £40,000 from £30,000.

5 per cent of Disabled Facilities Grants are currently made for the maximum possible value, £30,000.[265] Given 33,922 grants were completed in 2014-15,[266] this equates to roughly 1700 individual grants.

Paying these grants at £40,000 instead of £30,000 implies additional spending commitments of roughly £17 million per annum.

Recommendation 5
Local authorities should offer multigenerational households (three or more generations) a 25 per cent council tax discount.

The ONS estimate that there are 413,000 multigenerational (three generations) households in the UK in 2013.[267]

The average council tax bill for England in 2018/19 is £1,671.[268] Assuming a similar level is paid in the whole of the UK, we estimate multigenerational households pay roughly £690 million council tax annually. Therefore, giving all three generational households a 25 per cent discount would cost roughly £175 million per annum. Because there are some households with more than three generations living in them, the total cost of giving all multigenerational households a council tax discount will be higher than this figure.

Recommendation 6
Local authorities should abolish the single-person council tax discount for residents without dependents living in band E and above properties.

The Local Government Association estimate that the single person council tax discount for residents in properties rated Band E and above was costing local authorities around £200 million per year. [269] This forms the basis of our estimated yield for local authorities as a result of our recommendation.

It is important to note, though, that because our recommendation ensures that those with dependents under the age of 18 are not affected, the total number of households in scope of this change is lower than that considered in the LGA analysis. However, we expect this hit to yield to be more than outweighed by the fact that council tax receipts are greater now than in 2014 when the Local Government Association conducted its analysis.

Recommendation 12
Local authorities meeting or exceeding their housebuilding targets should have the power to charge a levy on the development of greenfield sites.

3,332 hectares of greenfield land were developed for housing in 2017.[270]

A £95 per m^2 levy on this development - a rate equivalent to the average Community Infrastructure Levy across English local authorities[271] - would have raised an estimated £3.2 billion.

However, because a greenfield levy would only be an option available to those local authorities meeting their housebuilding targets, this figure must be revised down. Analysis from housebuilder Project Etopia suggests that just 75 of England's local authorities are meeting their housebuilding targets - around one fifth of all councils.[272] Therefore, we estimate that the greenfield levy's annual revenue could be up to £640 million.

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