

CLIMATE SMART
CITIES CHALLENGE

Bristol challenge brief



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Glossary

BEIS - UK Department of Business, Energy and Industrial Strategy

GWh - Gigawatt hours

EPC - Energy Performance Certificate

NHS - National Health Service

Biodiversity net gain: a habitat-based approach used to assess an area's value to wildlife. The metric uses habitat features to calculate a biodiversity value. Biodiversity net gain means a development or change in land management will positively contribute to the biodiversity on that site.

Brownfield: Previously developed land that is not currently in use.

Greenfield: Undeveloped land in an urban or rural area either used for agriculture or landscape design, or left to evolve naturally.

MMC: Modern methods of construction a process to produce more, better quality homes in less time. They aim to improve business efficiency, quality, customer satisfaction, environmental performance, sustainability and the predictability of delivery timescales.

Low carbon: For the purpose of this Challenge Brief, low carbon refers to housing that is aiming to produce as little carbon in its lifetime use and delivery as possible. To enable wider participation from innovators, we opt for the use of low carbon as opposed to narrowly defining of carbon emissions, which might restrict the opportunities for potential solutions.

Nature positive: Measured against a baseline prior to development, nature positive developments are ones that increase the health, abundance, diversity and resilience of species, populations and ecosystems

Foreword



A handwritten signature in black ink, appearing to read 'M. Rees'.

Marvin Rees
Mayor of Bristol

Bristol is a city at the forefront of the climate emergency. The first city in the United Kingdom to declare a climate emergency in 2018, Bristol has since committed to achieving net zero and carbon neutrality by 2030, supported by our One City Ecological and Climate Emergency strategies.

We are also a city facing a housing and affordability crisis, in which some of the most deprived areas in the country sit alongside some of the most prosperous. Building safe, affordable homes is the single biggest public policy intervention we can make to improve people's lives. With over 15,000 families on the housing waiting list, and over 800 in temporary accommodation, and population growth, now and for the future, Bristol needs quality, affordable, sustainable homes.

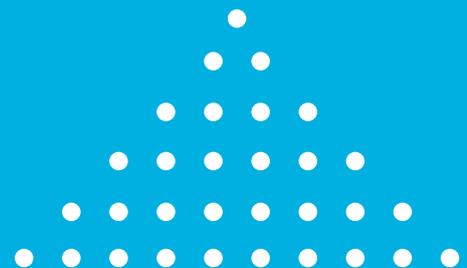
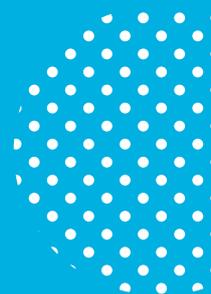
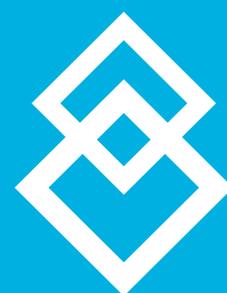
However, the built environment contributes to around 40% of the United Kingdom's total carbon footprint meaning that the agendas of these two challenges are often in conflict. There is a tension between the ability to tackle the climate and ecological emergencies and the ability to tackle the housing and affordability crisis and any solution must recognize and embrace the complexity of that relationship.

In this spirit, I am excited to be working with Nesta challenges, UN-Habitat, and global innovators on this project to present a challenge that does not shy away from the complexity of this issue and instead welcomes a conversation about solutions for the whole problem rather than parts of it.

This project is reflective of our commitment to innovation and to understanding how to balance the need to decarbonize the way we build houses in sustainable locations with the need to create genuinely affordable homes to combat social inequality. It is also reflective of the One City Approach in action, with stakeholders across the city collaborating to articulate both the challenge Bristol is facing and the solutions needed from global innovators. It is my hope that, in partnership with these international organizations, we will encourage a behavioural change in the way we develop and build homes and tackle this complex issue together as a city.

1.

Introduction



1.1 About the city of Bristol

Bristol is the largest city in the south-west of England, with a population of 449,300. It is characterized by Georgian architecture, street art, a thriving arts and culture scene and its independent spirit. A fast evolving and growing city, Bristol is home to a diverse and vibrant population who herald from 180 different countries of origin, practice 45 separate religions and speak 92 languages.

Bristol is one of the 10 Core Cities in the United Kingdom which contribute more than a quarter of the nation's economy and collectively house 20 million people. As a Core City, Bristol is well placed to affect change on the way people interact with the climate emergency, and to catalyse action regionally, nationally and internationally. Bristol is also home to [The One City Approach](#) and Bristol City Office. The office convenes an active network that brings together a huge range of public, private, voluntary and third sector partners which share an aim to make Bristol a fair, healthy, and sustainable city. This culture of collaboration provides the perfect context for citywide innovation.

Bristol City Council is a leading voice in the United Kingdom's authority-level response to the climate emergency. The city has pledged to be carbon neutral by 2030 and Bristol is a member of ICLEI Local Governments for Sustainability, Eurocities, the Global Parliament of Mayors, the Local Governments for Sustainability Network and C40. As a former European Green Capital, Bristol has made a name for itself internationally as a leading city on climate action. With support from Bristol's environment network, The Bristol Green Capital Partnership, Bristol is currently running a national lottery funded community climate programme to reach geographic and demographic communities that are traditionally overlooked in climate conversations.

1.2 Bristol's climate and housing challenge

Bristol, like many other large and complex cities is facing many major challenges including a climate emergency, an ecological emergency, a housing crisis, and a national construction skills shortage. In order to find a solution that will lead to thriving people and a thriving planet, they must be considered together.

Climate challenge

As well as being one of the first in the United Kingdom to declare a climate emergency, Bristol was the first to embed leadership of the New Green Deal in its Cabinet structure, and the first to review progress against the United Nations Sustainable Development Goals. The city was also the driver of a motion to the Local Government Association, which saw 435 councils declare a climate emergency. The overarching action ambition is to be a carbon-neutral and climate-resilient city by 2030.

Bristol has to date conducted 5 studies to establish the scale and nature of changes the city needs to reach net zero scope 1 and 2 emissions by 2030. The below summarizes the findings:

1. Studies 1 and 4 ascertained the baseline of current emissions in Bristol and found that direct energy use, transport and waste management emissions in the city totalled ~1,600 ktCO₂e in 2017. This baseline does not include the value chain emissions of these activities and does not cover land use, agriculture, and forestry, which are defined as scope 1 emissions sources. The studies identified that the evaluated direct emissions have decreased by 36% since 2005. However, to reach the city's target of a carbon neutral 2030, the rate of reduction will need to be 1.6 times that of the previously observed rate.

2. In Study 2, a study of business-related emissions in Bristol, it was found that scope 1, 2 and 3 emissions in 2016 totalled ~5,000 ktCO₂e. The study identified that approximately half of all Bristol business-related emissions originate in supply chain activities. As such, in order to reach the carbon neutral 2030 target, economies all over the world would need to decarbonize at the same speed as Bristol reduces its own direct emissions. This will be challenging, but significant attention must be paid to reducing the value chain emissions of economic activity in the city. Production (predominantly generation of energy), manufacturing, distribution and the provision of public services account for 82% of Bristol's business and economy footprint. Service-based sectors such as finance, real estate and consultancy account for much smaller proportions of the city's business emissions. Public services account for 14% of emissions, providing a great opportunity for public sector leadership.
3. Study 3 established that, in 2016, the household consumption of goods and services by residents of Bristol resulted in approximately 4,000 ktCO₂e of greenhouse gas emissions. This study takes into account the supply chain emissions of all goods and services consumed as well as any direct emissions associated with their consumption. The methodology followed is aligned with the assessment of business emissions. Of this footprint, energy consumption, personal vehicle use, and the production of food and drink account for the highest proportion of emissions at 27%, 20% and 14%, respectively.
4. In Bristol's preliminary climate resilience assessment, it was found that under a high emissions scenario, by 2080, Bristol could expect sea levels on Bristol's coastline to increase by up to 72 cm. Winter precipitation rate could increase by up to 48%. Summer maximum temperature is projected to increase by at least 9 degrees Celsius and, by 2080, summer precipitation rate in Bristol is projected to decrease by up to 68%.

To address these emission rates and the wider climate challenge, the Bristol One City Environment Board created the One City Climate Strategy, which sets out ten delivery key areas where climate action is needed to achieve the city's ambition of being carbon neutral and climate resilient by 2030.

Ecological challenge

In parallel to the climate emergency, Bristol was one of the first cities to declare an ecological emergency. Globally, 60% of wild invertebrates and up to 76% of insects have been lost since 1970. Currently, 1 in 8 bird species are threatened with global extinction, more than 40% of amphibian species, more than a third of all marine mammals and 41% of insect species. It is estimated that 20–30% of species may be at risk of extinction if the climate warms by an average of 1.5 degrees Celsius. In the United Kingdom there are 30 million fewer hedgehogs than in 1950, 44 million fewer nesting birds since the 1960s, and at least 15% of species are at risk of extinction. In Bristol, numbers of once common songbirds like swifts and starlings have dropped by more than 96%.

Bristol City Council and Bristol One City launched the [One City Ecological Emergency Strategy](#), which outlines four areas where action can be taken to address this challenge by the council and city partners. The strategy focuses on increasing space for nature, reducing pesticide use, combating water pollution and considering the city's wider ecological footprint: reducing consumption of products that undermine the health of wildlife and ecosystems. The council has also launched its own [Ecological Emergency Action Plan](#), detailing how it plans to tackle its own contributions to this emergency.

Bristol's wildlife, ecosystems and habitats are vitally important to its residents, as the loss of biodiversity affects lives in many ways; from the insects that pollinate food to the green spaces that enhance resident's health and well-being. The way housing is developed and built will have a large impact on Bristol's ability to deliver on its ecological emergency.

In order to halt and reverse declines in wildlife and to restore a healthy and natural environment, there needs to be a radical transformation of the way authorities manage the city and surrounding countryside.

Bristol needs quality and sustainable housing and improved transport infrastructure that is in line with our commitment to becoming a carbon neutral city by 2030. Meeting the city's needs whilst also responding to the ecological emergency will require difficult discussions and trade-offs. Moreover, the city must maintain a holistic approach to ensure that any new housing is nature positive from the outset.

Housing challenge

Bristol has over 15,000 individuals and families on the housing waiting list, and over 800 households in temporary accommodation. Bristol's figure for those households currently in temporary accommodation is the third highest in the core cities, and Bristol reported more than eight times as many households in Emergency Temporary Accommodation than WECA partners. More information is provided in section 5.

Another challenge is the shortage in construction skills. The rate of retirement for construction workers looks set to increase as 22 % of the workforce are over 50 years old, and 15 % are in their sixties. There is therefore an ageing workforce, and the pipeline of young people entering this sector is poor.

While it is clear that we need more homes, when we consider these challenges together it is also evident that the problem is complex and comprised of overlapping challenges. According to UK Green Buildings Council, the built environment contributes to around 40 % of the United Kingdom's total carbon footprint. Half of this is from energy used in buildings and infrastructure, and 28 % are embodied in the materials used in the construction of buildings.

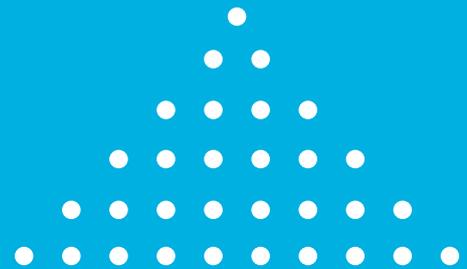
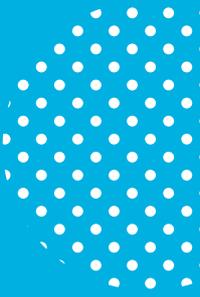
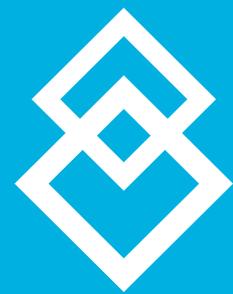
In addition, these challenges are often in tension with each other and appear to have competing agendas. However, with the right innovation it is possible to build new housing in a way that is good for people and the planet.



2.

The challenge:

Creating a
financial model
for green and
affordable
housing



In the UK the technology is currently available for every new build to be carbon neutral, and for the retrofit of existing housing stock. The primary barrier to achieving this is cost. Low-carbon housing that is built to enhance and protect wildlife habitats are not financially viable for all stakeholders, nor are they enforced by regulation. So, a new financial model is required to attain the priorities of carbon neutrality and affordable housing.

During a recent meeting of focus groups with city stakeholders, developers confirmed cost as the main barrier to delivery of net zero and affordable housing. Development is led by capital cost and return, and there is a clear viability issue from the perspective of these stakeholders. Other barriers identified were the lack of expertise, the need for a new supply chain and a shortage of skills to implement the new technology. For financiers, cost was also identified as the main barrier, and the risk factor in financing new and unproven technology. Ecologists and environmental specialists echoed the same concerns as financiers and developers.

Given this context, it is clear that innovation is most needed in the model used to deliver housing by multiple stakeholders. The challenge is both in the collaboration required and the financial models and development appraisal mindset that currently costs, values and processes transactions based on immediate capital return.

Central to this is a question of value. New housing technologies can deliver sustainable housing quickly and of comparable quality to traditional construction. While the initial cost may be higher, these buildings are arguably better value in terms of lifetime cost, living costs to residents and cost to the planet. As mankind builds for the future, considering all the challenges, a new definition of value will be needed to support a new definition of viability. Bristol's [Social Value Policy](#) is a good start. It aims to ensure that social value principles are applied in a way that enables the City council to maximize economic, social, and environmental benefits for Bristol and its residents. In this policy, social impact is a term designed to demonstrate positive or negative outcomes to people and the planet. Social value, therefore, aims to move beyond making viability decisions based solely on financial cost or price.



However, to address the barrier of viability, it is necessary to take this concept of Social Value to the next level and to demonstrate how the quantification of Social Value can be improved. In addition, that process must address the issue of how to join the capital investment with the created value when they often exist in disparate relationships. In two of three focus groups, participants highlighted the social value calculator and the potential to harness the wider societal value of low carbon, sustainable homes to incentivize and encourage a holistic, outcomes-based approach by the public and private sector. In this way, the opportunity highlighted was for a value calculation that goes beyond maximizing profit.

Definition of affordability

"Affordable housing" is a specific term with specific meanings in specific contexts related to national and local policy for housing. It is important to understand the meaning and how it relates to the delivery of housing nationally and in Bristol, specifically.

Affordability is a technical term that is defined in national policy as "(i) social rented, (ii) affordable rented and (iii) intermediate housing, provided to eligible households whose needs are not met by the market." Who is eligible for these homes is determined by local incomes and local house prices. Affordable Housing is broken up into specific categories nationally presented here:

- Social Rented Housing (let by local authorities or social housing providers to those eligible for social rented housing). Social rent is prescribed under section 80 of the Housing and Regeneration Act 2008 within guideline target rents determined through the national rent regime. They are the lowest form of rent and tend to be lower than Local Housing Allowance – essentially sub-market rents set by the national rent regime.
- Affordable Rented Housing (let by local authorities or social housing providers to those eligible for social rented housing). Affordable rent can be set up to 80% of the local market rent.
- Intermediate Housing is homes for sale and rent provided at a cost above social rent, but below market levels subject to the criteria of the affordable housing definition. These can include shared ownership (shared ownership is a product that lets buyers purchase a share of a property (25% to 75%) and pay rent on the remaining share. It is intended as an intermediate tenancy for households which would not otherwise be able to afford homeownership or equity loans, other low-cost homes for sale and intermediate rent, but not affordable rented housing or social rent.

Bristol City Council's local policy

The council's affordable housing policies are set out in the Bristol Local Plan and have to be consistent with National Planning Policy. These policies require that all new developments must have a percentage of affordable housing according to the already stated definition. Specifically, development schemes of 15 dwellings and over are required to have 30% or 40% affordable housing (depending on their location), and development schemes of 10–14 dwellings are required to have 10% or 20% affordable housing.

Alongside this, [the Affordable Housing Practice Note](#) lays out how the council is helping to fast track planning applications that prioritize affordable housing. The practice note details a threshold approach which introduces greater flexibility in applying the council's tenure requirements for affordable housing provided that certain conditions are met. Planning applications for sites located in Bristol's inner west and inner east zones will have a fast-track route for processing applications if they are prepared to offer at least 20% on-site affordable housing. Alongside this, in some circumstances the council will accept 100% affordable rent as an alternative to 77% social rented and 23% intermediate affordable housing.

In Bristol, two types of affordable housing are prioritized: social rented housing and shared ownership as defined within Intermediate Housing. These priorities are based on evidence of the local need.

However, there is a recognition that within this challenge the concept of affordable housing is welcome to tackle market failure at all levels of the market. The challenge therefore, is in offering more scope for the viability challenge and in ensuring that healthy and balanced communities are being built.

Housing in Bristol will need to comply and work within planning policy that stipulates 30 % or 40 % affordable housing (as was defined above). Additionally, to address market failure within that wider definition of affordable housing provides a welcome opportunity to ensure social justice and addressing poverty remain key levers in tackling the climate emergency.

A good example in Bristol of that mixed tenure model is Elderberry Walk which was featured by the World Economic Forum in their research "[10 ways cities are tackling the global affordable housing crisis.](#)"

In that wider national context, the Government defines affordable housing as social rented, affordable rented and intermediate housing, provided to eligible households whose needs are not met by the market. Eligibility is determined with regard to local incomes and local house prices.

Affordable housing should include provisions to remain at an affordable price for future eligible households or for the subsidy to be recycled for alternative affordable housing provision.

2.1 Three challenges: zero carbon homes, nature positive developments and decent housing for all

Local policy documents including the One City Ecological Emergency Strategy, and the One City Climate Strategy outline strategic goals that highlight the priority of Bristol to protect and develop its wildlife ecosystems, and to achieve the ambition to be carbon neutral by 2030. The action that is needed is multi-faceted and complex, and with regards to buildings, includes the ambition to retrofit and construct buildings to become carbon neutral and resilient to a changing climate while also providing a net biodiversity gain.

One of the big housing challenges is how to turn brownfield sites into sites of biodiversity net gain. These sites are typically more expensive and more complex to develop. However, they provide the opportunity to increase biodiversity in the city by bringing new ecological diversity to former brownfield areas. This added value is rarely included in the development appraisal but is vital if the city is to utilize, fully, the space it has available for housing and nature.

Similarly, The Bristol One City Homes and Communities goals recognize the social inequalities that arise because of the housing crisis, and aim for everybody in Bristol to be able to live in a home that they can afford, and which is secure and warm by 2050. These social inequalities are also mirrored in environmental inequalities with many marginalized communities facing challenges in accessing nature.

These challenges go hand in hand as the city works towards innovative solutions.

2.2 The challenge that needs to be solved: our challenge statement

The challenge: Bristol - currently facing a climate emergency and a housing crisis - aims to develop 24,000 new affordable homes by 2050. Yet a standard new home will produce some 150 tons of CO2 in the 25 years after it is built. How can the city develop and scale new ways of delivering affordable and carbon-neutral housing?

Call to action: The city is looking for innovative business models, services, and products that can help shape a new housing development appraisal and a financing model that enables the development of affordable, zero-carbon new homes in the city starting in 2023.

Successful proposals should demonstrate they can contribute to the design of an innovative development and financing model for the construction of new homes on urban brownfield sites in Bristol. The homes should be zero carbon, demonstrate a biodiversity net gain, commercially viable, evidence best value and meet Bristol's high standards of community engagement in the planning process.

Bristol is open to a variety of approaches, but the most competitive solutions are likely to focus on one or more of the following:

- Planning and design
- Financing and investment
- Housing and construction or manufacturing
- Social value quantification

The ultimate aspiration is that this model for new builds can be later tested and applied for retrofitting of the city's existing building stock, a vital component of reaching its net zero carbon target.

For example:

- Cold homes currently cost the National Health Service £1.36 billion a year in hospital and primary care. Is it possible to quantify this saving and inject it into the initial cost of the warm building?
- Building sustainable homes creates value in energy savings for the resident, but this financial benefit is disconnected from the original investor or developer. Is there a way to do this differently?
- Could we rethink models of tenure, finding new ways for people to acquire homes or taking land value out of the equation?

2.3 Ingredients to solve the challenge

We understand that solving this challenge will require a high level of collaboration from multiple stakeholders. It will also require real world test beds and pilots to allow for learning what works and what does not in order to de-risk and find scalable, replicable solutions.

The kind of ingredients include the following, which is not exhaustive nor is one collaboration expected to deliver everything:

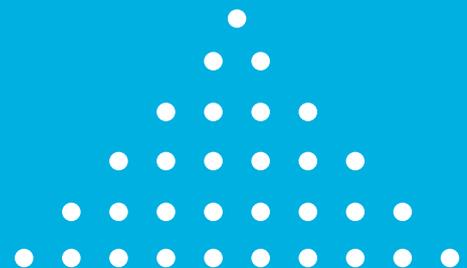
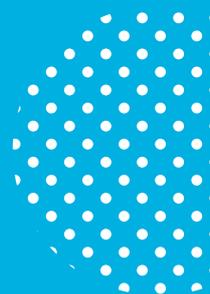
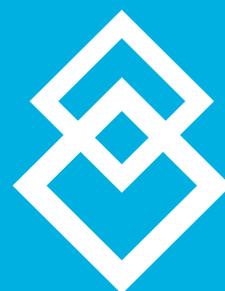
- Homes that are low carbon
- Homes that are affordable (in Bristol this predominantly refers to homes for social rent. This is the preferred option and an area of significant market failure)
- Biodiversity net gain is achieved
- Decarbonized energy solutions are used
- A commitment is shown to quality places that support resilient communities
- Innovative build solutions are engaged
- Finance models are creatively approached:
 - Build, develop and showcase a model by which you can build and fund this housing in a commercially viable way. The city is interested in unlocking local capital as a way to increase community agency, but this is not a prerequisite
 - Design a new development appraisal methodology around a particular housing solution that rethinks the development appraisal model currently used by local authorities and broadens the focus from "capital return" to a more outcomes focused measure of best value instead which can be adopted by public bodies within the context of public procurement and public law.

Other considerations:

- A finance model and value approach that helps capture the value of brownfield development (more complex and higher cost) vs greenfield (cheaper and lower cost).
- A better understanding of how improved health measures and green measures can be captured and modelled in that value proposition and finance model
- Local empowerment and local engagement through unlocking local finance models that can offer that different value proposition.
- The power of aggregation and ESG funding that can align with social value and social housing to create longer term value.
- How can we support the maturing of social value measures for its credibility and application?

3.

Carbon emissions characteristics



3.1 Total emissions in the city

The latest report carried out by consultants Arup shows that in 2016 Bristol's total greenhouse gas emissions were 5,280 kt CO₂e. The report also states that this puts Bristol in line with the national average based on its population size.

By sector the emissions are broken down as follows:

- Production (includes mining, agriculture, power generation, water and wastewater services) 35.9%
- Distribution (includes wholesale and retail trade-based activities, transport of people and goods by all modes transport and accommodation, and food and beverage service activities) 16.66%
- Manufacturing (includes all food, drink, building materials, machinery, textiles, chemicals, fuels, vehicles and electronic products consumed within Bristol) 14.97%
- Public services (includes public administration, defence, education, health care, residential care and social work activities) 14.15%
- Construction 7.59%
- Professional 3.70%
- Information 2.07%
- Finance 2.20%
- Other services 1.41%
- Real estate 1.36%

According to data from BEIS per capita emissions were 3.6t. Its data also shows that since 2005 historical trends in citywide emissions have been declining fairly steadily.

Alternative emissions reports can be seen in the graphs presented in figures 1,2 and 3, which are taken from the [UK Gov. data*](#). These data show the local authority and regional carbon dioxide emissions statistics from 2005 to 2018.

Bristol's emissions statistic is shown in figures 1,2 and 3.

- The methodology used for these statistics is different to the methodology used in the report that the city commissioned and that was carried out by Arup. The Arup report may well be a more accurate reflection of the city's total carbon emissions. However, it only considered 2016 whereas the graphs below, which are taken from central government information, are useful in that they show the rate of change over time.

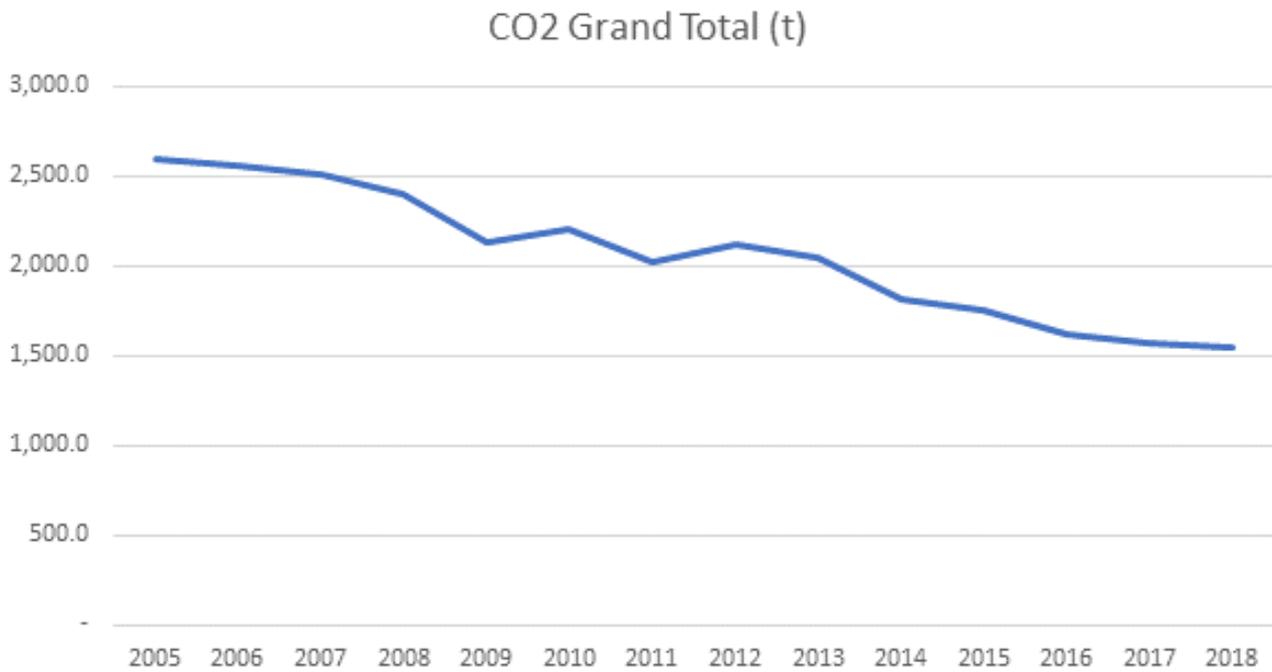
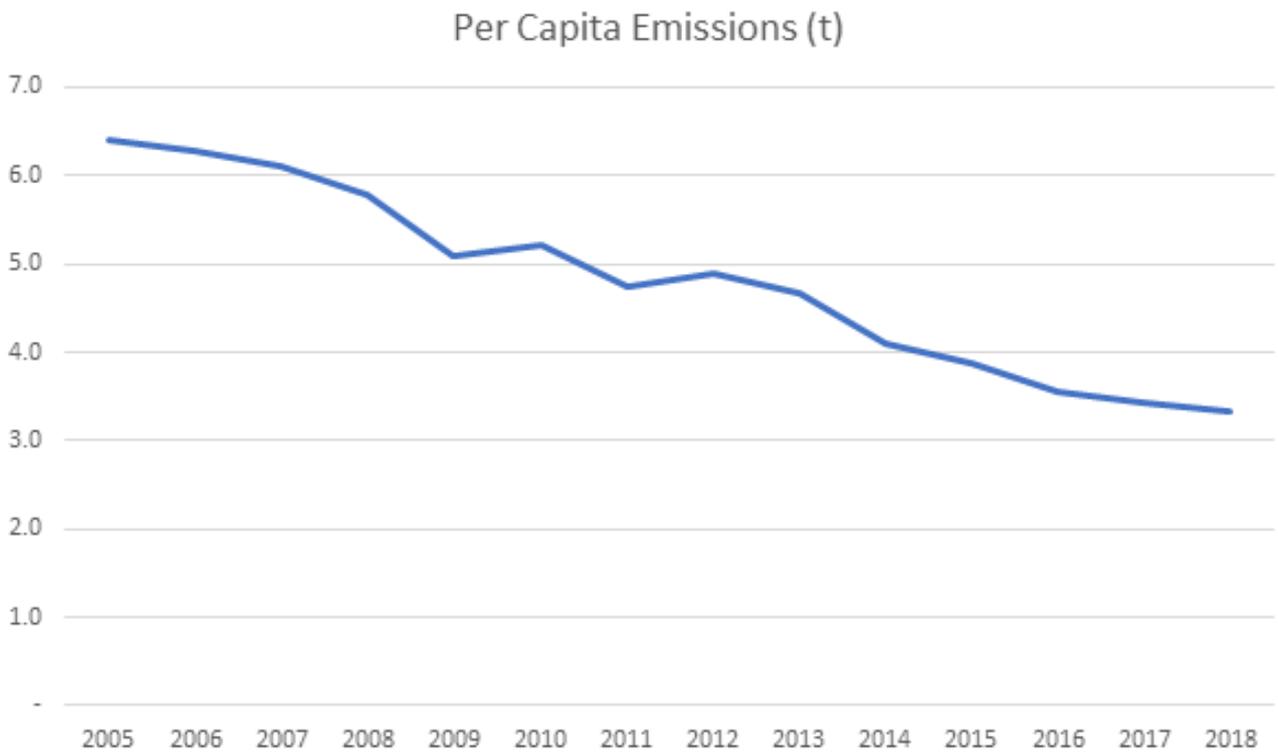
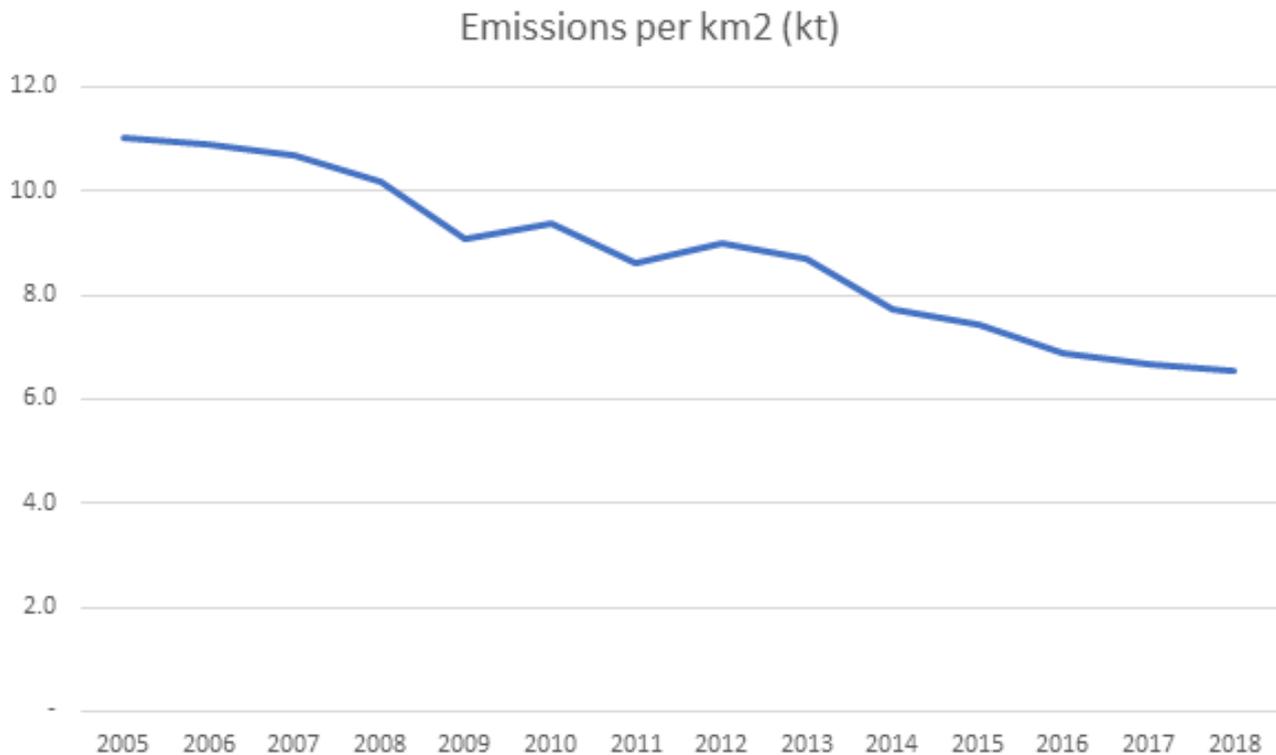
Figure 1: Total Carbon Emissions in Bristol (ton)**Figure 2 : Per capita carbon emissions in Bristol (metric tons per capita)**

Figure 3: Emissions per km2 (kilotonnes)

3.2 Drivers of emissions and demand

While an increase in population and economic output are the main drivers of carbon emissions in Bristol and the United Kingdom, overall total carbon emissions are falling every year regionally and nationally.

Despite an above national average increase in population (10.1% increase since 2010) and economic output (15.7% increase between 2014–2015 and 2018–2019), Bristol has seen an overall decrease in carbon emissions since 2005. This has largely been driven by decarbonization of the electricity grid and energy efficiency improvements across multiple sectors.

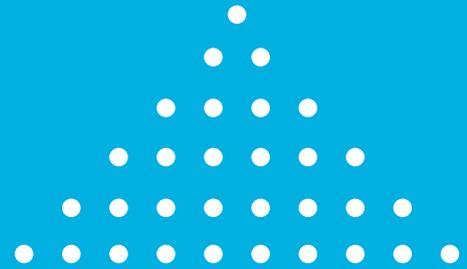
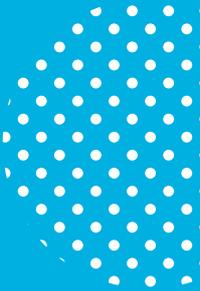
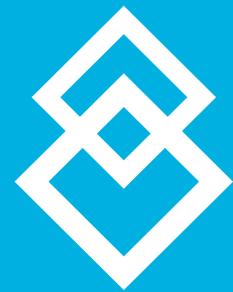
Another 29% reduction in coal use was the driving force behind the decline in the United Kingdom's emissions in 2019, with oil and gas use largely unchanged. Carbon emissions from coal have fallen by 80% over the past decade, while those from gas are down 20% and oil by just 6%. The 2.9% fall in 2019 marks a seventh consecutive year of carbon cuts for the country, the longest series on record. It also means the country's carbon emissions in 2019 fell to levels last seen in 1888.

Carbon dioxide (CO₂) from burning gas remained virtually unchanged during 2019. The fuel is now the single-largest contributor to the United Kingdom's emissions, ahead of oil. Gas demand for [electricity generation](#), as well as demand to heat homes and businesses, were relatively flat, with 2019 seeing similar [temperatures](#) to those in 2018. (Both years were around 0.5C above the long-term average for 1981–2010.)

Oil demand and emissions fell by nearly 1% in 2019, Carbon Brief's analysis suggests. This is despite [rising road traffic](#), up 0.8% in the year to September 2019, according to separate government figures published in December.

4.

About Bristol's zero carbon housing challenge

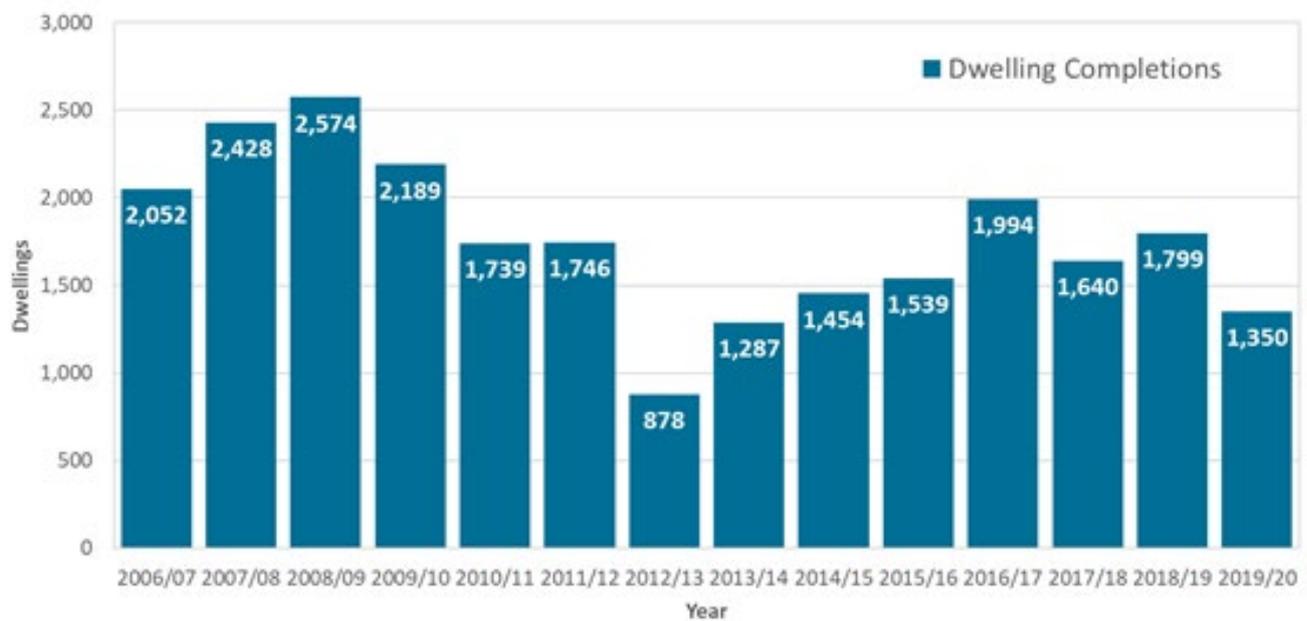


4.1 Housing delivery in Bristol

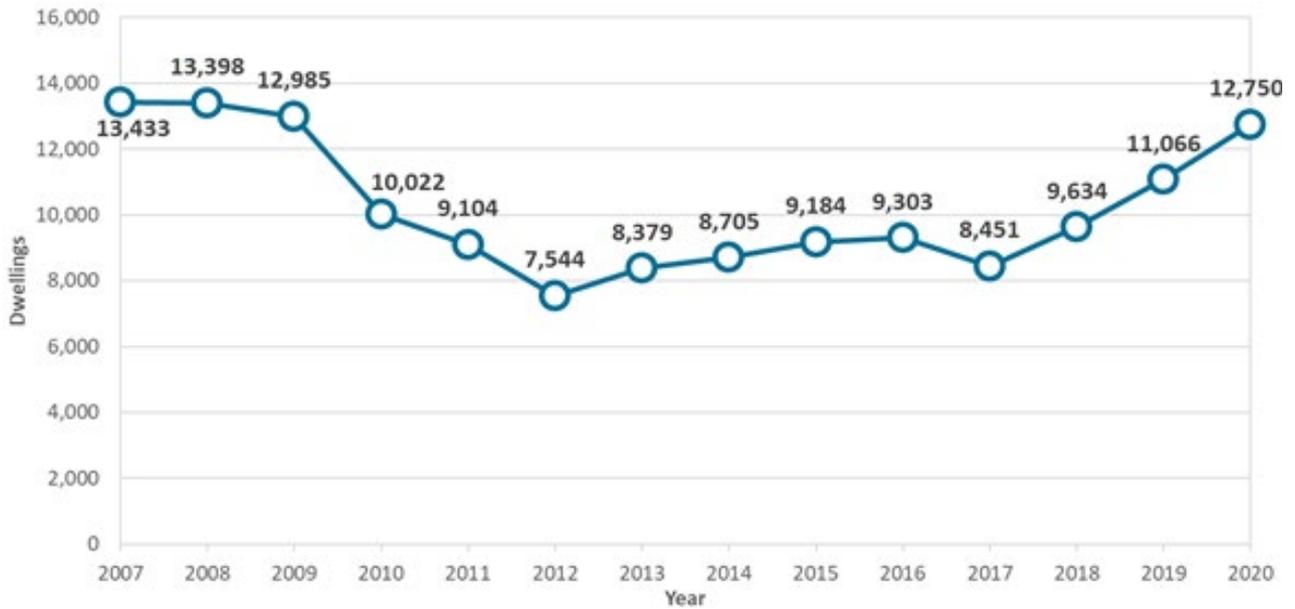
Bristol currently has over 15,000 individuals and families on the housing waiting list, and over 800 households in temporary accommodation. Bristol's figure for those households currently in temporary accommodation is the third highest in the core cities, and Bristol reported more than eight times as many households in Emergency Temporary Accommodation than WECA partners.

The following graphs (see figures 4–6) provide information on the Bristol housing sector. This includes the total number of completed dwellings, total number of dwellings that received planning permission, and the number of affordable dwellings.

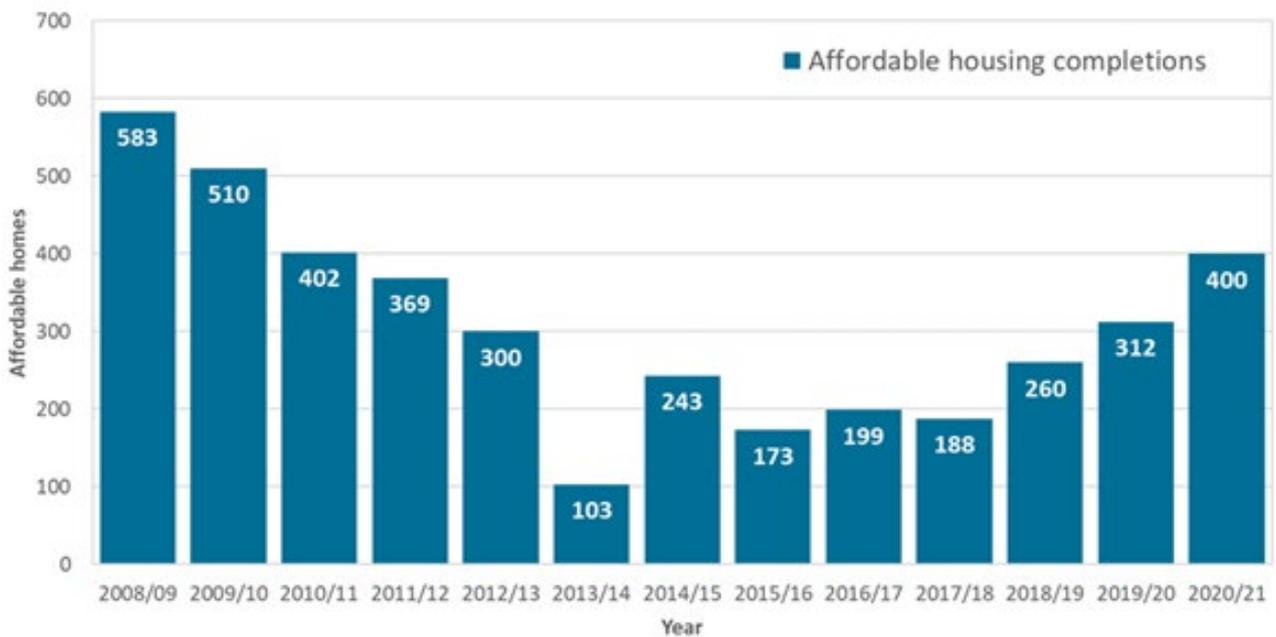
Figure 4: Dwelling completions per year (net) in Bristol 2006–2020



Source: Bristol City Council

Figure 5: Dwellings with planning permission or agreed subject to s106 in Bristol

Source: Bristol City Council

Figure 6: Affordable housing delivery 2008–2021

4.2 Emissions and energy usage characteristics in the housing sector

Heat accounts for 737 ktCO₂e in Bristol (~45% total emissions) based on Regen analysis of the United Kingdom's [greenhouse gas emissions national statistics](#) from 1990–2017. The graphs of figures 7 and 8 are also based on this analysis.

Figure 7: Bristol's carbon emission by sector

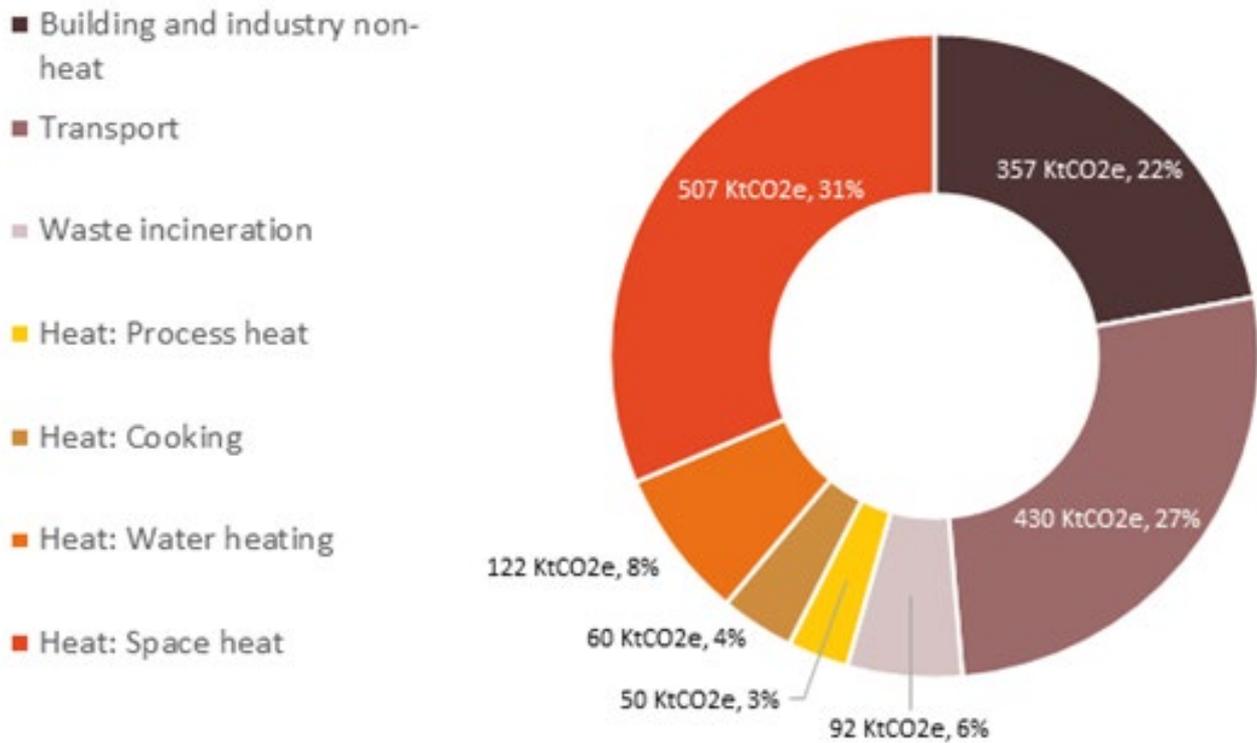


Figure 8: Bristol's Fuel Consumption for heat (GWh)

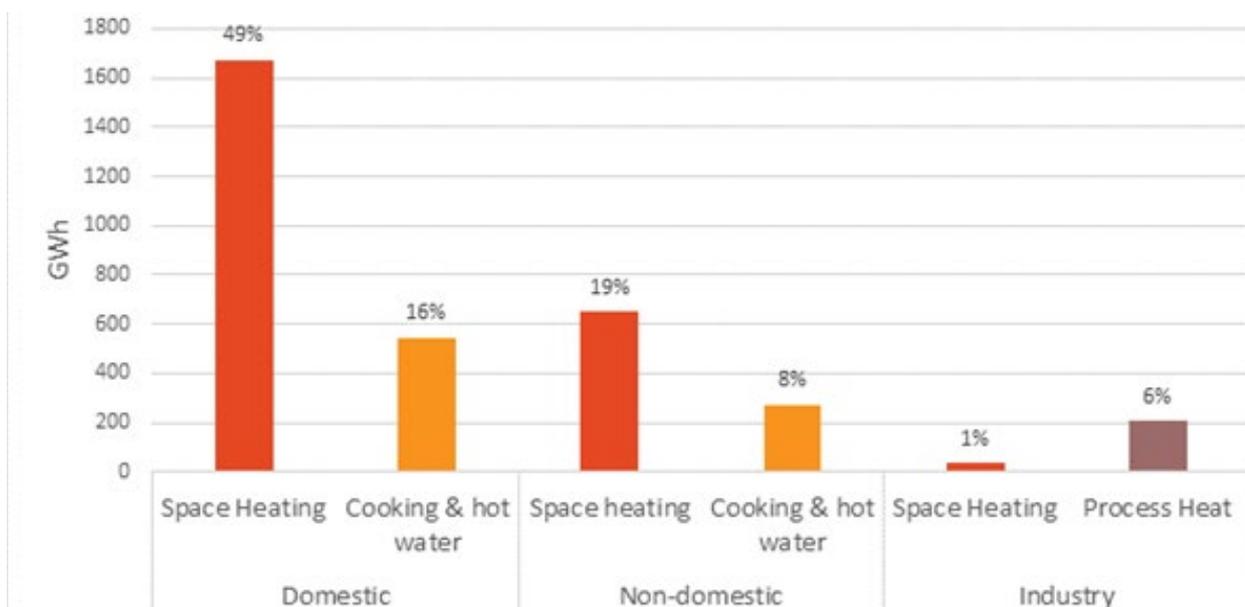
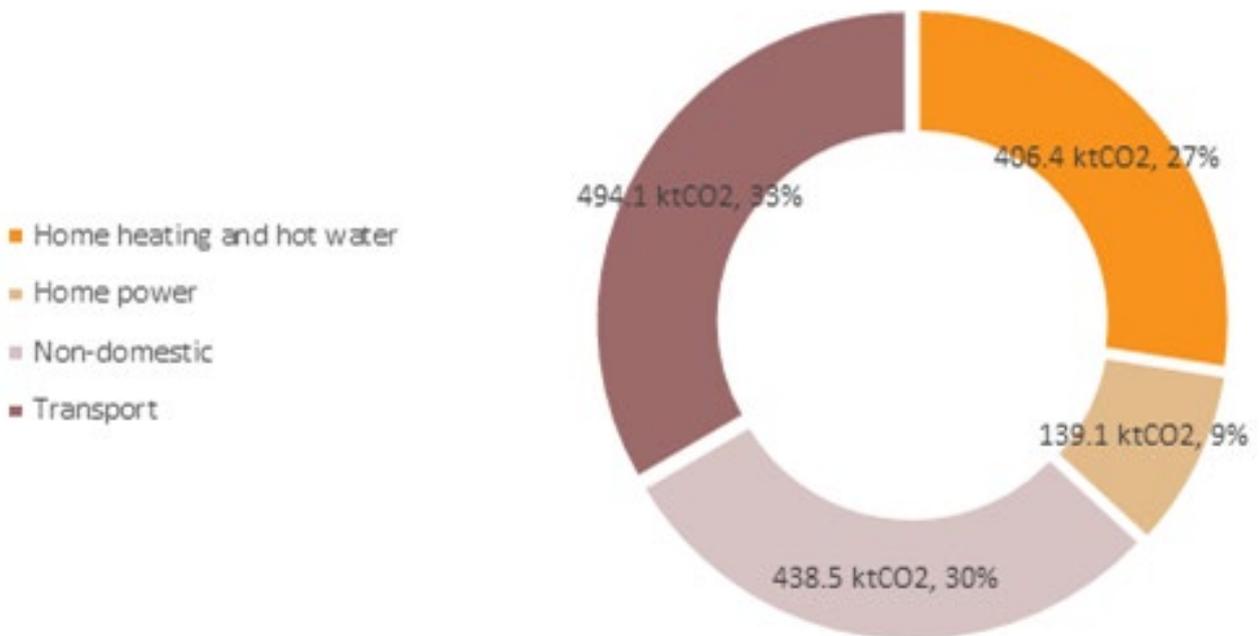


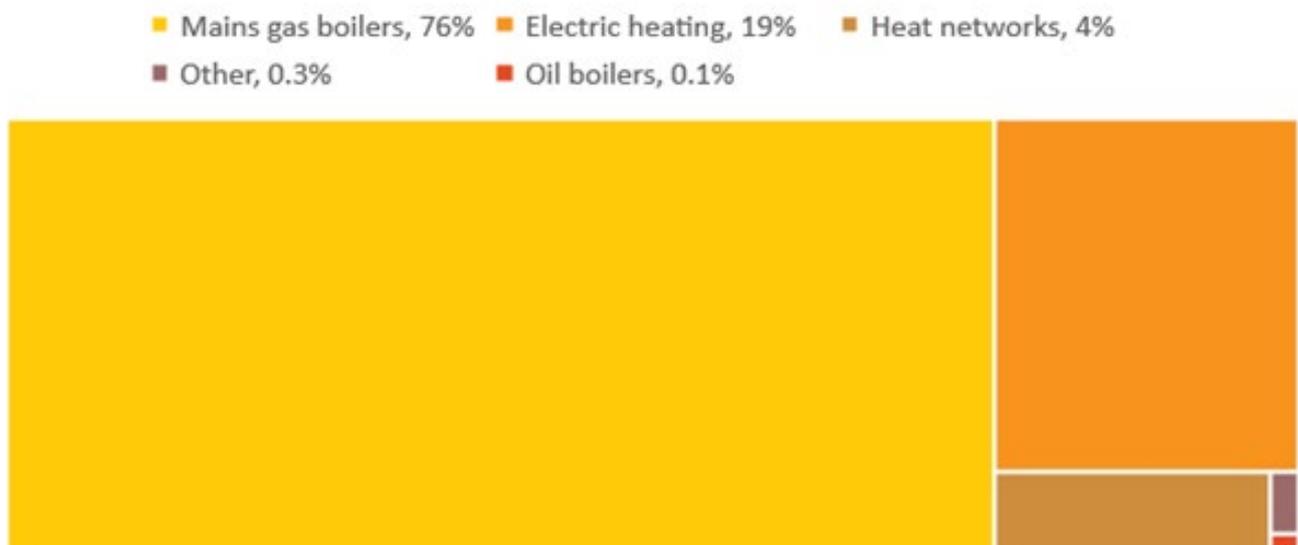
Figure 9 shows information based on the [2019 data from BEIS](#) for Bristol and assumes that home heating and hot water is equivalent to gas and "other fuel" consumption, and home power is equivalent to electricity consumption. However, some heating is produced via electricity which is not shown on the graph.

Figure 9: Bristol's carbon emissions attributable to home heating, specifically



In Bristol, 169,612 homes have Energy Performance Certificates (EPC). There are over 200,000 homes, meaning that over 30,000 do not have certificates. Of these: >1% EPC A, 10% EPC B, 29% EPC C, 39% EPC D, 17% EPC E, 4% EPC F, 1% EPC G. This data is based on the [Energy Performance of Buildings Search Results, available at opendatacommunities.org](#), as is shown in the graph for figure 10.

Figure 10: Breakdown of type of space heating appliances in Bristol homes



4.3 Existing data collection/monitoring systems

The data sets from above are drawn from the [UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2019) and the [Energy Performance of Buildings Search Results, available at opendatacommunities.org](https://www.opendatacommunities.org) which.

However, there are issues with the validity of the Energy Performance of Buildings data set as EPC assessments are not often very accurate.

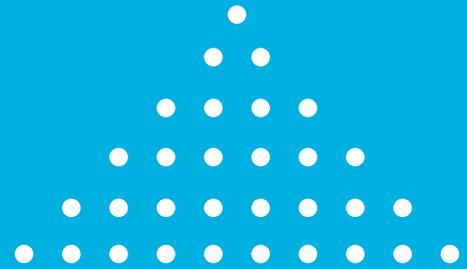
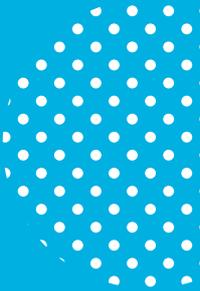
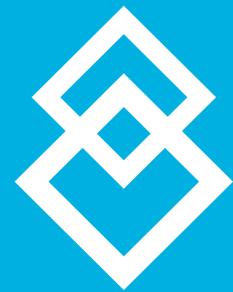
Bristol is also in conversation with the Micro Generation Certification Scheme to get data on installations of heat pumps in in the city under the scheme.

Data that is not yet available but would be useful includes heat and energy demand profiles, meaning data that shows how heat and energy demands change throughout the day and the year for different property archetypes, tenures and household characteristics.



5.

Social and development challenges



5.1 Profile of communities impacted by issues in the challenge

Bristol's figure for those households currently in temporary accommodation is the third highest in the core cities, and Bristol reported more than eight times as many households in emergency temporary accommodation than WECA partners.

Both the total number of individuals with applications in the HomeChoice System, and the number of applications broken down by band (level of priority) is presented in the table 1.

Table 1: Housing Need in Bristol at the start of September 2021

Band	Number of bedrooms needed							Grand Total
	1	2	3	4	5	6	7	
Band 1 (Highest Priority)	289	63	62	30	11	7	1	463
Band 2	852	755	508	199	38	5		2357
Band 3	2279	7,55	1292	1200	223	24	1	5019
Band 4	5449	2006	602	59	2			8118
Grand Total	8869	4116	2372	511	75	13	1	15957

Homelessness is highly visible in Bristol, and Bristol reported the second highest number of street homeless nationally at the 2020 national rough sleeper street count. At the end of the quarter, 400 households were found to be eligible for homelessness relief duty, while 144 households were owed homelessness prevention duty. The total of main and s193C(4) homelessness duties owed on the last day of the quarter was 1,001 (households).

The number of rough sleepers according to the official annual count in 2020 was 98. However, the number is thought to be much higher when "sofa surfers" and other "hidden homeless" are taken into account. It is estimated that 1 in 170 people in Bristol do not have permanent shelter. The lack of affordable housing in Bristol is a significant cause of homelessness. Homelessness numbers decreased through the Government's "Everyone In" policy during the Covid-19 pandemic. Yet many people are once again vulnerable to homelessness due to a lack of longer-term funding.

To overcome these challenges, the Bristol One City Plan Homes and Communities Board have set a number of key goals, with the overarching goal that by 2050 every Bristolian in the city will be able to live in an affordable, warm and secure home. New home delivery is part of that strategy: 60,000 new homes will have been built by 2050, of which 24,000 will be affordable. This is roughly 1,000 affordable homes per year.

5.2 Equity issues in the city

Not everybody in Bristol has the same access to housing and green spaces. Research shows that access to housing can be limited by data bias: the disproportionate weight in favour or against an idea or thing caused by the available data not being representative of the group that the data purports to represent. Therefore, certain groups may not have the same voice in a development consultation process as others, or the same access to rental properties and mortgages.

A report by Arup, intended to widen the discussion about where decision-making in the built environment can be improved and made more inclusive, defines and breaks down the impact of bias on access to housing.

The report identifies:

1. Bias caused through selection – where the target audience is not reached, and observer bias – often when the wrong questions are asked; typically this occurs at the consultation stage.
2. Bias ingrained in algorithms that act as gatekeepers to services such as mortgages and car insurance. For example, car insurance for someone named Mohammed could cost £1,000 more than someone with identical details, except for their name.
3. There is more explicit bias in the housing lifecycle. For example, five of England's leading letting agents actively discriminate against tenants on housing benefit.

Examples of bias were evident throughout the whole housing lifecycle, starting with community consultation. It is well established that traditional methods of community consultation such as meetings and questionnaires do not reach all parts of the community.

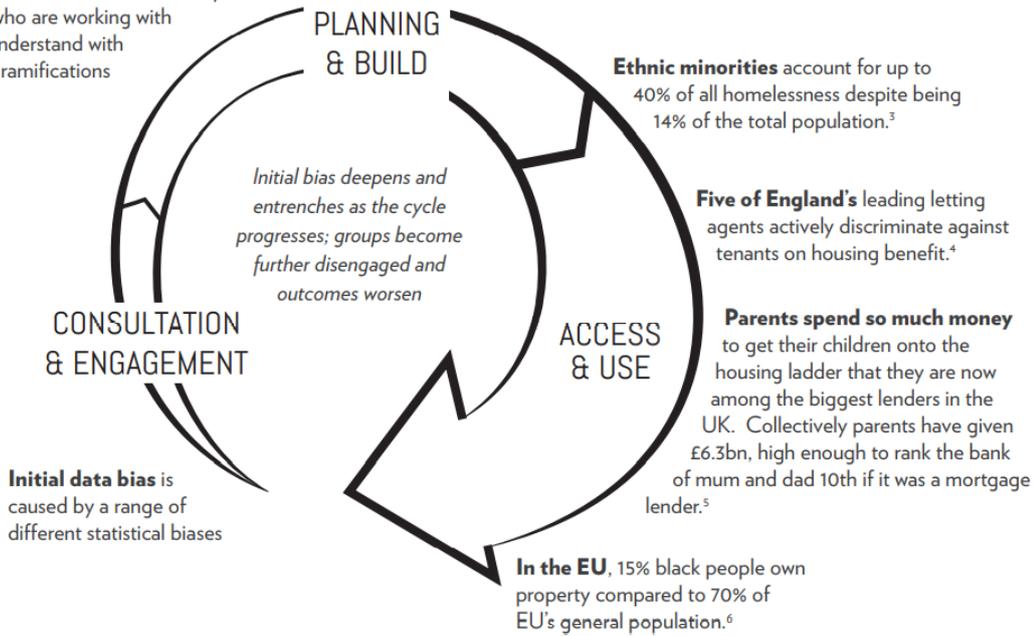
In planning, very often the default approach taken does not embrace the needs or desires of a diverse population, and it is much more difficult to get planning permission for home improvements in poor areas than rich ones. Housing design itself is often not suitable for all parts of a diverse community which is likely to range from young people setting out on their own, to multigenerational households, disabled and elderly people. To add to this, the "race disparity audit" conducted for Theresa May when she was prime minister of the United Kingdom revealed disparity in ownership – some 2 in 3 white British householders own their home compared with 2 in 5 householders from any other ethnic group.

Bias is also active in artificial intelligence and digital algorithms where it can be harder to get a mortgage or household insurance if you have a name that is associated with an ethnic minority group. Figure 11 is a snapshot of the current housing lifecycle from consultation, through planning and onto access and use.

Figure 11: Housing lifecycle from consultation

Artificial intelligence is generating, sustaining, and potentially deepening racial, ethnic and gender discrimination and it is increasingly tied to the distribution of goods and services in society... Many engineers who are working with AI often do not understand with nuance the social ramifications of their projects.¹

Planning applications from Knowle West are twice as likely to be rejected than those from Clifton.²



The Quality of Life Survey provides insight into the opinions of Bristol's residents on issues like housing and sustainability. The tables 2 through 5 show the response rates for the 10% most deprived groups against the Bristol average. Many people in this socioeconomic group report lower levels of satisfaction on issues of housing and lower rates of environmental concern than the Bristol averages.

Table 2: Levels of satisfaction with housing reported by the 10% most deprived group in Bristol

Indicator Theme: Housing	Group Average	Bristol Average
Satisfied they can stay in their home for as long as they choose to	79.2%	85.7%
Satisfied with the state of repair of their home	60.2%	78.6%
Satisfied with their current accommodation	68.0%	86.9%

Table 3: Contribution to climate change reduction efforts reported by the 10% most deprived group in Bristol

Indicator Theme: Sustainability	Group Average	Bristol Average
Who have changed the way they travel around Bristol due to climate change concerns	24.2%	34.4%
Who have changed what they buy due to climate change concerns	39.0%	51.1%
Who have eaten less meat and dairy products due to climate change concerns	32.9%	43.2%
Who have reduced energy use at home due to climate change concerns	43.3%	50.7%
Who have reduced flying for holidays due to climate change concerns	20.9%	28.6%
Who have reduced their household waste due to climate change concerns	58.0%	65.6%

According to the survey, there is also geographic spread in the distribution of housing issues within the city. Table 4 show some of the largest disparities between the Bristol average and ward scores for questions relating to the quality of housing.

Table 4 : Wards with significantly worse than the Bristol average in relation to housing satisfaction

WARD	Housing Percentage of people/ward who are:	Group Average	Bristol Average
Cotham	Satisfied with the state of repair of their home	68.3%	78.6%
Brislington West	Satisfied with the cost of heating their home	38.7%	51.6%
Clifton	Satisfied with the cost of heating their home	39.9%	51.6%
Filwood	Satisfied overall with their current accommodation	77.7%	86.9%
Hartcliffe and Withywood	Satisfied with the state of repair of their home	62.2%	78.6%
Hotwells and Harbourside	Satisfied they can stay in their home for as long as they choose to	75.6%	87.5%
Lawrence Hill	Satisfied with their current accommodation	77.9%	86.9%
Stoke Bishop	Satisfied with the cost of heating their home	37.2%	51.6%
	Satisfied with the cost of their rent or mortgage payments	48.5%	60.1%

5.3 Sources of information for residents

Some developers have noted that certain groups are harder to access, for example those on the housing waiting list are unlikely to benefit from a new development with socially rented housing, seldom attend the consultations. Current residents are therefore easier to communicate with than future residents, yet may contribute to the data bias already mentioned.

5.4 Impacts of the sector on the residents

As is shown in the preceding tables, both the group comprised of the overlapping 10% most deprived groups in Bristol, and some of the most deprived wards will be disproportionately affected by a failure to deal with this challenge.

Climate change is often perceived as a white middle class issue. Authorities design sustainability policy that puts the onus of change on the individual rather than building sustainability into larger policies and providing necessary support to those who need it to contribute to lowering carbon emissions. This creates a culture in which those who can afford to contribute to lowering emissions can choose to, and those who cannot afford to are locked out of the issue, as is suggested by the evidence in the previous tables. Furthermore, a lack of representation in political and economic systems makes it difficult for deprived communities to impact policy design or to build climate resilience or the ability to prepare and respond to extreme events that occur due to climate change.

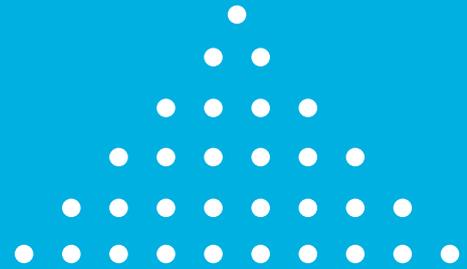
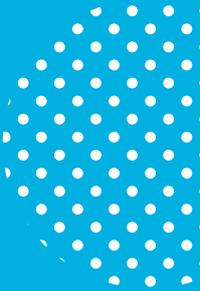
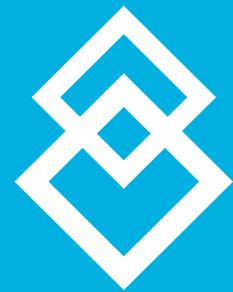
As a result of this socioeconomic component to sustainability policy, a lack of access to housing or security in existing housing often overlaps with a reduced ability to contribute to lowering emissions. Existing in a lower socioeconomic bracket contributes to, and as such compounds the impact of, both issues. This impact is reflected in the previous tables, which indicate the reduced ability of the most deprived groups and wards to ascertain and maintain housing, and to contribute to lowering carbon emissions.

Deprived groups, particularly those living in poverty, as 1 in 4 children in Bristol are, will be less prepared to defend themselves against climate change effects like extreme weather, flooding and overheating. They will also be less capable of contributing to lowering emissions while trying to meet their own basic needs. Those who occupy professions that are closely linked to weather and climate will also be disproportionately affected, alongside those clustered close to flood-risk areas. Climate migrants are both fleeing the impact of climate change and arriving in the country vulnerable, and with limited financial resources to cope with relocation, increases in food costs or gas, or evacuation.

Communities in more densely populated areas of the city, often areas disproportionately populated by Black, Asian minority ethnic communities who are clustered in low-income areas, may be more at risk of amplified heat waves due to living in "heat islands that don't allow heat to escape at the same level as less densely populated areas". These areas also see higher levels of air pollution than their less densely populated or more rural counterparts. It is these communities who face more barriers in accessing health care, and are more likely to experience pre-existing health conditions and poor living conditions.

6.

Costs and planned investments



6.1 Investment and infrastructure plans

The following investment and infrastructure either exists or is planned for Bristol:

1. The Heat Network

The Heat Network is the City Council's own network of pipes that provides local businesses, organizations, and housing with heat and power from more sustainable sources.

The network will supply low-carbon heat to buildings across Bristol through a system of underground pipes from a number of energy centres including a new gas combined heat and power plant. The plant integrates the production of heat and electricity into a single process, reducing carbon emissions and increasing efficiency. The council is also looking to install new zero carbon heat technologies including water-source heat pumps that capture heat from the floating harbour to supply hot water and space heating from the heat network.

While the network is currently low carbon, in the coming years the plan is to become no carbon. Over time, new renewable alternatives will be installed which will further reduce carbon emissions. This will increase the city's resilience to fluctuating energy prices and reducing public reliance on gas.

Heat networks are central to achieving the mayor's goal for Bristol to be a carbon neutral city by 2030. The council's existing heat networks already connect over 1,000 social housing properties.

2. Castle Park Energy Centre

The new Castle Park Energy Centre, part of the [Bristol Heat Network](#), will be delivered by the City Council and [Goram Homes](#) in partnership with [Vital Energi](#), and will house England's largest water source heat pump.

Water source heat pumps are estimated to reduce the amount of energy needed to heat a building by 80%. The Centre will provide affordable heating with a low-carbon footprint for a greener, cleaner Bristol.

The 3MW water source heat pump will take water from the nearby floating harbour and use it to generate heat and hot water for local businesses and residents. Bristol's heat network currently supplies over 1,000 properties with low-carbon heat from a variety of sources across the city and continues to expand to new areas across the city.

The Castle Park modernization will also include the revamping of biodiversity as well as landscaping of one of the city's most iconic and popular green spaces.

Once the Energy Centre is complete, a mixed-use development will be built over it with construction due to begin in late 2021.

3. The Affordable Homes Programmes

The Affordable Homes Programme provides grant funding to support the capital costs of developing affordable housing for rent or sale.

As the Government's housing accelerator, Homes England has made available £7.39bn from April 2021 to deliver up to 130,000 affordable homes by March 2026, all outside London. The funding is for the supply of new-build affordable housing, not met by the market.

Of the funding held by Homes England, £577,000 has been awarded to Bristol City Council to help develop 50 much needed new homes in the North Bristol.

The allocations are the latest to come through the government's £350 million Local Authority Accelerated Construction Programme, used to encourage MMC (Modern Methods of Construction), which the government has said can increase the speed of housebuilding by 40%.

In Bristol, the Blake site in Lockleaze is being developed to help older people with care and support needs to live active and independent lives. The Local Authority Accelerated Construction grant will prepare the Blake site for the construction of modern new housing, of which at least 30 % will be affordable.

Plans for the site prioritize the use of more sustainable, modern hybrid building methods. This will reduce time on site and minimize the impact on the local community, whilst delivering high quality homes.

6.2 Financial resources and investment plans available

This information is not currently available as the HRA 30-year business plan is being reviewed, and will enter public consultation toward the end of 2021. The City Council capital budget plan is also being reviewed.

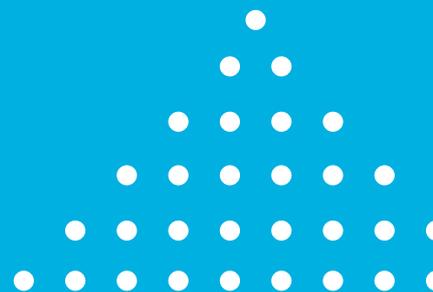
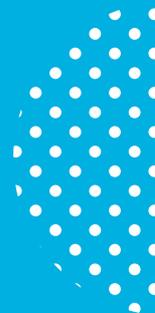
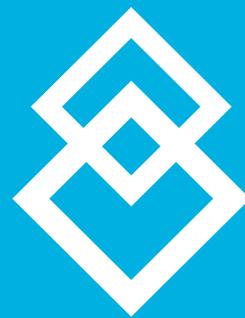
6.3 Average costs associated with zero carbon new build

The city is working on collecting this data, which depends on the housing system. What is currently clear is that, if the city builds like for like (traditional build and modern methods), there is a cost increase. However, most MMC suppliers prefer not to give this breakdown in full detail as it is commercially sensitive. As the challenge progresses the city can potentially provide more detail.



7.

Creating a conducive environment for climate- friendly housing innovation



7.1 Laws, plans and policies

National

[National Design Guide 2021](#)

[Public Services \(Social Value Act\) 2012](#)

[Climate Change Act 2008, reviewed 2015](#)

[Build Back Better 2021 – Our Plan for Growth](#)

[National Planning Policy Framework February 2019.](#)

[Planning White Paper August 2020. Updated February 2021.](#)

[Planning for the Future: planning policy changes in England in 2020 and future reforms January 2021.](#)

[Fixing our Broken Housing Market 2017 \(Housing White Paper\) February 2017.](#)

[Building More Homes, Select Committee on Economic Affairs 2016–2017](#)

[Regulatory Framework for Social Housing in England from April 2012](#)

[Tackling the Under Supply of Housing in England January 2021](#)

[Stimulating Housing Supply – Government Initiatives - England February 2021](#)

[Conservative Government Manifesto Review at next election](#)

[Housing statistics 1 April 2020 to 30 September 2020. Published December 20, Last update February 21](#)

Regional

[West of England Spatial Development Strategy Consultation 2nd half 2021, Examination 2022](#)

[West of England Joint Local Transport Plan Annual Progress Reports](#)

[Wider Bristol HMA Strategic Housing Market Assessment Update March 2018 \(original 2015\)](#)

[West of England Climate Emergency Action Plan September 2020](#)

Housing

[Bristol Development Framework Core Strategy Adopted June 2011 Annual Monitoring Report published December each year](#)

[Bristol Development Core Strategy 2020–2024 Review 2024](#)

[Site Allocations and Development Management Policies – Local Plan Adopted July 2014. New one to be adopted late 2023](#)

[Site Allocations Sustainability Appraisal March 2013](#)

[Homelessness and Rough Sleeping Strategy 2019–2024](#)

[Annual Housing Delivery Test Action Plan August 2020 Annually](#)

[Affordable Housing Delivery Framework for Social Housing 2015–2020](#)

[Bristol City Council's Housing Delivery Plan 2017–2020](#)

[Home and Communities, Bristol One City](#)

[Housing Allocation Scheme January 2021. Specific updates made annually/bi-annually](#)

Energy and Environment

[Environment Policy 2017](#) (reviewed annually)

[Bristol Biodiversity Action Plan](#) Annual Reviews

[“Route to Zero” - proposal for revised energy performance standards for new BCC housing](#)

[Climate Change and Sustainability Practice Note – How to build low-carbon and resilient developments](#)

Related

[Social Value Policy – January 2019](#) (Public report produced twice a year).

[Social Value Toolkit](#)

[Bristol One City – Climate Strategy Review late 2020s](#)

[Mayor’s Climate Action Plan 2020](#)

[Health and Well-being Strategy 2020–2025](#)

[Bristol Parks and Green Space Strategy 2008–2028](#)

7.2 The One City Climate Strategy

The One City Climate Strategy sets out an ambitious goal of making Bristol carbon neutral and climate resilient by 2030. This is set in the context of the city’s wider objectives for a fair and inclusive transition that does not marginalize disadvantaged communities or leave people behind.

The climate strategy has been developed with Bristol’s vision and principles informing and guiding all of the activity. The city has set out ten delivery themes for the vision. They are:

1. Transport
2. Buildings
3. Heat decarbonization
4. Electricity
5. Consumption and Waste
6. Business and Economy
7. Public Services
8. Natural Environment
9. Food
10. Infrastructure and Interdependencies

These represent the city’s collective commitment to capture the opportunity and respond to the challenge of reaching its ambition to be carbon neutral and climate resilient by 2030.

Some fundamental system changes will be required, within Bristol and beyond, to deliver the plan. These have been described as “enabling conditions for change”; cross-cutting changes that will be required to achieve delivery following themes:

- Data
- Funding
- National Action
- Skills
- Engagement
- Infrastructure

Transport

Transport represents 34% of the average Bristol resident's carbon footprint, and a substantial percentage of the economy's footprint within and beyond the city. Bristol's transport goals revolve around the central aims of reducing the number of vehicles, particularly cars, on the road and phasing out petrol and diesel by converting to biogas or hydrogen. This will be done through redesigning and delivering infrastructure to provide alternative travel options and incentivize low-emission travel like active travel. The location of new homes and their connection to the rest of the city will be central in ensuring that any homes built do not lock in further carbon emissions. New homes will need to be well connected to accessible public transport and active travel options so that residents are not reliant on cars.

Buildings

Both development and installation of new buildings and transformation of existing ones will need to align with the city's approach to decarbonizing heat and transport. The effort will also need to involve financial incentives to reduce or spread the cost of energy performance improvements, alongside specific approaches to tackle the performance of the private rented sector.

The aim is to achieve these goals through a focus on retrofitting to improve energy performance as well as supporting local jobs and businesses through upgrading skills and knowledge. Ideally, this will be achieved under revised national energy efficiency regulations for new builds



Heat Decarbonization

Heating buildings and hot water in Bristol currently accounts for nearly 40% of the city's scope 1 and 2 carbon emissions. Bristol aims to improve energy performance by switching completely away from gas boilers to efficient electric heating supplied by carbon neutral electricity, potentially creating significant job opportunities.

A phase out of gas heating will also be supported by connecting buildings to heat networks, ideally under a national or regional planning system that is supportive of this transition to heat decarbonization and requires the alignment of each new development with the city's heat decarbonization plans.

Electricity

Achieving carbon neutrality by 2030 will depend heavily on the electricity consumed being decarbonized. In turn, this depends on the decarbonization of the national electricity system (grid decarbonization).

Bristol will need to generate more "in area" zero-carbon electricity, by realizing more of the potential rooftop solar PV on buildings across the city. It will also enable the low-cost decarbonization of the national grid by creating strong demand and price support for subsidy-free renewable generation, and by participating at scale in smart energy solutions to create more flexible demand.

Business and Economy

Businesses in Bristol contribute £1.7 billion to the British economy. Businesses and organizations in Bristol have an approximate total greenhouse gas footprint of 5,000 ktCO₂e.

The carbon neutral goal and adoption of a circular economy seeks to decouple economic or business growth from resource consumption by creating value from resources in new ways, and to develop jobs related to specialized skills in the green economy. Bristol can benefit from the opportunities presented through new green jobs and the green economy by becoming a regional and national hub for the green sector. This will be particularly true for the skills and companies that will be required to deliver new homes and retrofit.

Natural Environment

By 2030, Bristol needs to deliver blue and green infrastructure and to restore the city's natural environment to protect from future climate events, whilst also providing ecological net gain and enhancing all sequestration potential of all developments. Action in this area is also needed to limit the damage that will be caused to wildlife by the impacts of climate change, whilst also supporting opportunities for recovery and protection of species by making businesses wildlife-friendly. Any new homes built will need to ensure they are provided net positive biodiversity gain.

Food

By 2030 Bristol needs to develop a resilient and low-carbon food supply chain that will contribute to the reduction of the city's carbon footprint, whilst improving security to the supply chain and boosting the local food economy. Urban food production potential will be maximized for sustainable and resilient food production that will be made available to everyone. New neighbourhoods will need to consider how residents can access and grow healthy sustainable and low-carbon food.

Infrastructure Interdependencies

As the city is made up of complex interdependent systems, climate risks can have direct or indirect relationships between wider city assets and cause cascading shocks and stresses. New homes need to be low carbon and climate resilient so as not to put residents at risk of future climate shocks.

7.3 The One City Ecological Emergency Strategy

The One City Ecological Emergency Strategy was launched by the One City Environment Board in September 2020 having been developed by a working group of over 30 organizations from across the city. The strategy sets out the action required to reverse declines in wildlife and restore the natural systems on which mankind depends.

Bristol was the first major city in the United Kingdom to declare an ecological emergency in February 2021, with a joint declaration by the Bristol City Council and Avon Wildlife Trust, supported by city partners. Bristol has already seen huge drops in once-common species. Populations of swifts and starlings have declined by 96% between 1994 and 2014 in the West of England, and populations of linnets have declined by 80% over the same period.

The strategy sets out four key goals to be achieved by 2030: at least 30% of land in Bristol is managed for the benefit of wildlife; pesticide use to be reduced by at least 50%; 100% of Bristol's waterways have excellent water quality that supports wildlife health; and people and businesses reduce consumption of products that undermine the health of wildlife and ecosystems around the world. For each goal there are actions that need to be taken for success.

These actions are set out in the Ecological Emergency Action Plan. Bristol's Ecological Emergency Action Plan has five key points:

1. Integrate best ecological practice into each area of the council's activity, to lead the city by example.
2. Demonstrate the council's commitment to the One City Ecological Emergency Strategy alongside the One City Climate Strategy and its objectives.
3. Support and influence action by partners and through partnerships.
4. Support and enable action by citizens.
5. Develop evidence and knowledge to support decision-making and innovation in addressing nature-related issues

In partnership with communities, organizations, and businesses, Bristol is aiming to create a healthy, happy, habitat-rich city. It plans to ensure that 30% of the city's land is managed for the benefit of wildlife, while halving the use of pesticides. Likewise, all waterways will be of excellent quality with reduced consumption of products that undermine ecosystems around the world.

7.4 Bristol One City Plan

The One City Plan is a document produced by the City Office and City Partners. It details the city's key challenges and the goals set to combat them up to the year 2050. The plan brings the city together around a shared vision, drawing from feedback, input and consultations throughout the year to create a set of aims that target issues facing the entire city. The Plan is a written manifestation of the goals and ethos of the One City Approach, which brings together a wide range of public, private, voluntary and third sector partners within Bristol who share an aim to make Bristol a fair, healthy, and sustainable city.

The One City Plan guides the One City Approach in its promotion of systems-change and its facilitation of participation and collective leadership between many different sectors and organizations. In its current iteration the plan is built around 6 core themes with accompanying boards all underpinned by the United Nations Sustainable Development Goals, which provide an internationally recognized framework with which to benchmark the city's aspirations and progress. Those themes are:

- Children and Young People
- Economy and Skills
- Environment
- Health and Well-being
- Homes and Communities
- Transport

There are also two new boards, Culture and Digital, which work in a supporting capacity alongside all the existing One City Thematic Boards.

The plan will help focus activity from organizations across the city including the business sector, the local authority, education groups, the NHS, social care providers and the voluntary sector. By drawing on existing partnerships, strategies and expertise, the plan will aim to form a collaborative and place-based approach to resolving city challenges and create a more equal, inclusive and sustainable city.

7.5 Experimentation environments and test beds

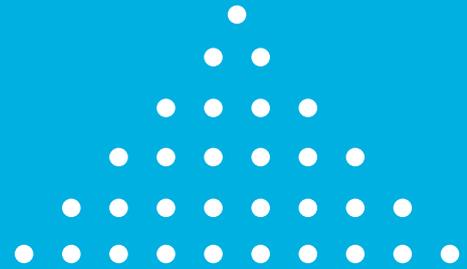
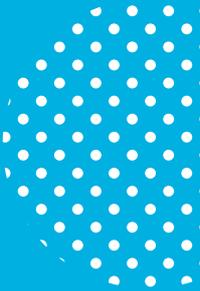
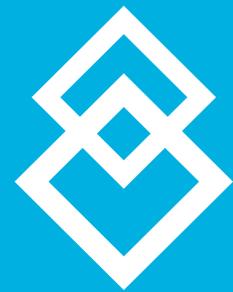
The Bristol Housing Festival was set up in support and in partnership with Bristol City Council and the Bristol City Office. The council has established a Bristol Housing Festival Working Group that reports directly into the council's top governance structure: the Housing Delivery Board. This relationship enables the festival to encourage innovation by piloting and testing new housing technology with the goal of finding scalable solutions.

In April 2020, a consortium of partners led by [YTKO](#) included the City Council, Bristol Housing Festival, BRE, and 9 leading modular housing companies. They were awarded an Innovate United Kingdom grant for their project, Enabling Housing Innovation for Inclusive Growth, which was essentially one that enabled nine demonstrator sites across the city. The project is an 18-month effort working with multiple partners towards the delivery of major research, development and innovation in the use of modern methods of construction. Bristol is therefore positioned to pilot and test innovation as required by this challenge.



8.

Studies, research and data



8.1 Links to important documents, research reports, and data sets

1. The Bristol Housing Festival has produced Lessons Learnt reports on each of their completed pilot projects.

[LaunchPad Lessons learnt](#)

[Hope Rise Lessons Learnt](#)

In 2019 the City Council was awarded a Local Government Association Grant, to fund research that would support its new council house building programme. This funding created the opportunity to draw on experts who were tasked with exploring key questions about the delivery of MMC housing. To enable innovation in housebuilding, robust and practical procurement solutions, that are effective in delivering triple-bottom-line value (social, environmental, and economic benefits), need to be developed and embedded in procurement practice. With a view to understanding best-practice, Arcadis was instructed to identify and evaluate a number of case-study examples, where other local authorities had been successful in procuring and delivering modular housing solutions, and those where social value was a key factor in procurement.

[LGA Research for Building Council Homes](#) (Part 1)

[LGA Research for Building Council Homes](#) (Part 2)

[LGA Research for Building Council Homes](#) (Part 3)

2. Bristol Quality of Life Survey

[The quality of life in Bristol - bristol.gov.uk](http://bristol.gov.uk)

3. Other

[About the One City Plan - Bristol One City](#)

- One City Plan

[one-city-climate-strategy.pdf \(bristolonecity.com\)](#)

- One City Climate Strategy
- Quality of Life Survey

[UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2018 - GOV.UK \(www.gov.uk\)](#)

- Carbon Emissions Data

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