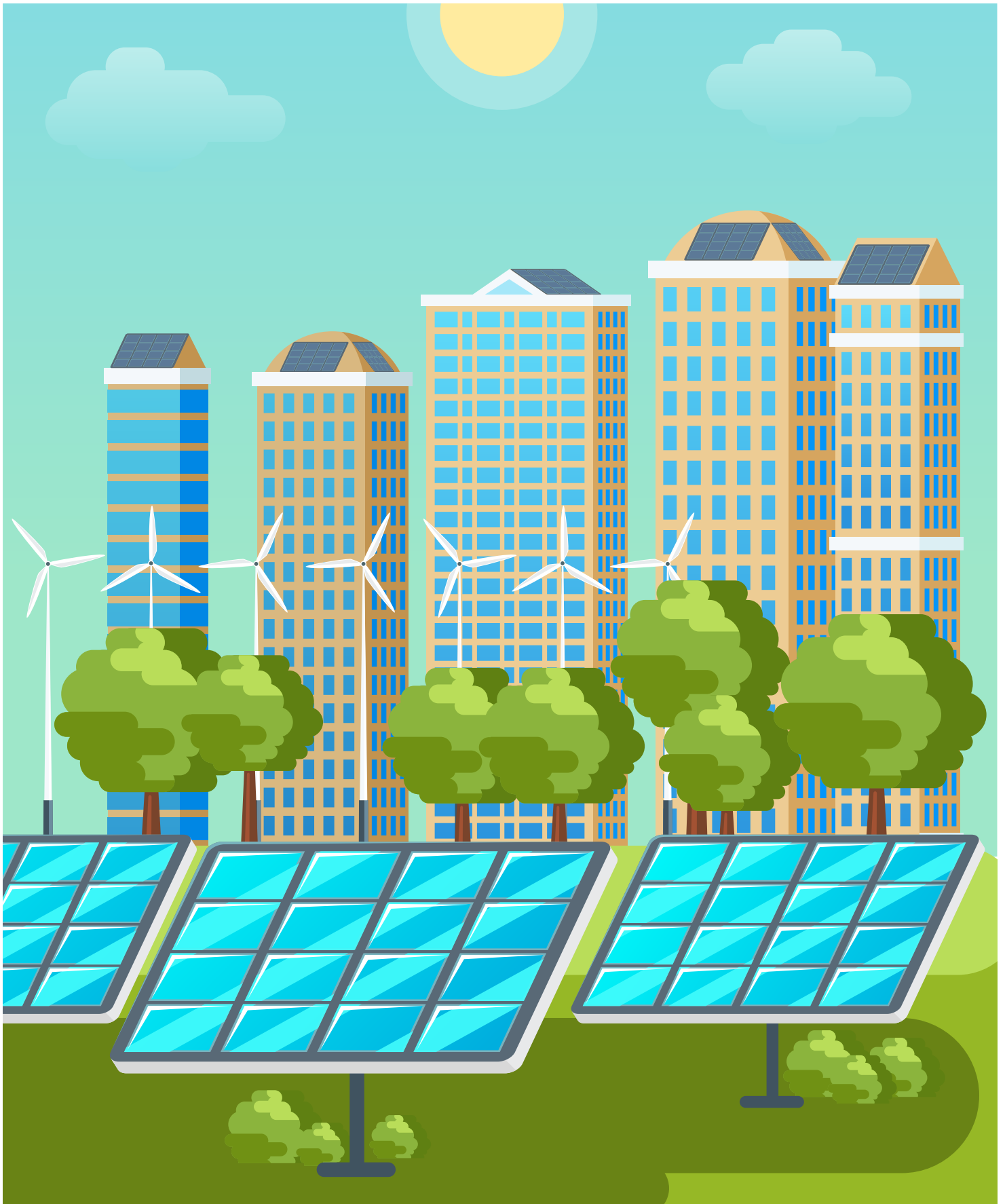


UK Cross Sector - April 2021

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**SPOTLIGHT**  
Savills Research

# Property and Carbon



Measuring risk • Green real estate • Operational challenges • Emissions reduction



## Welcome

This *Spotlight* is given over wholly to the issue of carbon in property. The Conference of the Parties (COP26), which is to take place in Glasgow in November this year, is the next milestone event for the world to address the challenge of climate change. With the built environment the source of 40% of the UK's carbon emissions, it is clear that this issue increasingly represents the pre-eminent item on the agenda for all of us in the sector.

Inside this issue we identify the key components of the industry's response to date. Net zero is becoming the benchmark for new development and organisations operating in the sector are setting their own targets to achieve this. At Savills our target is to be net zero by 2030\*. The direction of travel is therefore clear, underpinned as it is by national legislation and increasingly stringent planning policy, and the momentum within the sector is impressive particularly during the period of lockdown.

For all of us on this journey, it is increasingly a question of finding the tools and mechanisms to achieve the objective of net zero and gathering the data to endorse the effectiveness of the strategies being deployed. Encouragingly for those who make the additional investment that is necessary, there are emerging signs that there is a "green premium" to be had for property that has low carbon credentials. Occupiers of both residential and commercial property are increasingly sensitive to this metric of performance, driven by a new generation that is passionate about the planet.

At Savills UK we share that passion and trust that you find this *Spotlight* on Property and Carbon both interesting and informative.



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\*Savills (UK) Ltd is committed to achieving net zero carbon in operation by 2030. This commits us to eliminate emissions for scopes 1 and 2, which are used at our workspaces to heat, light and power our properties and fuel any company grey fleet.

“The UK is aiming to be at the forefront of international efforts to transition to a zero carbon economy”





# Heating up: the unstoppable rise of the climate emergency

The rise of the climate emergency over the next few years is inevitable, catalysing the competitive interests of the global economy to adapt and get ahead, or else get left behind in the quagmire of climate-induced problems

While awareness of climate issues has risen recently, particularly following the declaration of a “climate emergency” by governments and businesses in 2019, the full scale of climate risk is still under appreciated – and undervalued – in most business and policy circles. This is particularly true with regards to transition and policy-related risks that to date have been inadequately factored into various corporate and industrial decision-making processes. Covid-19 has shown us that coordinated action is possible where people believe it is necessary. As a side effect of national lockdowns and restrictions on

movement, the pandemic resulted in an 8% decline in global carbon emissions in 2020. An equivalent reduction every single year through to 2050 will be needed if the world is to meet net zero. However, emissions in December 2020 were higher than they were in December 2019, suggesting that there will be little long-lasting impact from the lockdowns.

### IN THE UK

On the surface, UK policy seems to be conforming to public demand. The Ten Point Plan for a green industrial revolution promises everything from modular nuclear reactors

and new national parks, to zero emissions transport for all. The UK also met, and even exceeded, targets established in the first three carbon budgets created by the Climate Change Committee.

The vast majority of the decarbonisation that has been achieved within UK borders has been driven by the power sector, plus one or two others. In many ways, these could be considered to be the “low-hanging fruit” of policy with many of the more challenging decisions yet to be engaged with.

Despite good intentions and positive beginnings however, the UK is now falling

“ The vast majority of the decarbonisation that has been achieved within UK borders has been driven by the power sector ”

behind its fourth and fifth carbon budgets, which were based upon its previous target of an 80% reduction in emissions against a 1990 baseline. The Ten Point Plan, by the government’s own admission, will only deliver 230 MtCO<sub>2e</sub> of emissions savings to 2032. Prior to the announcement of these policies, the UK was already some 331 MtCO<sub>2e</sub> behind on targets set out in the fourth and fifth carbon budgets.

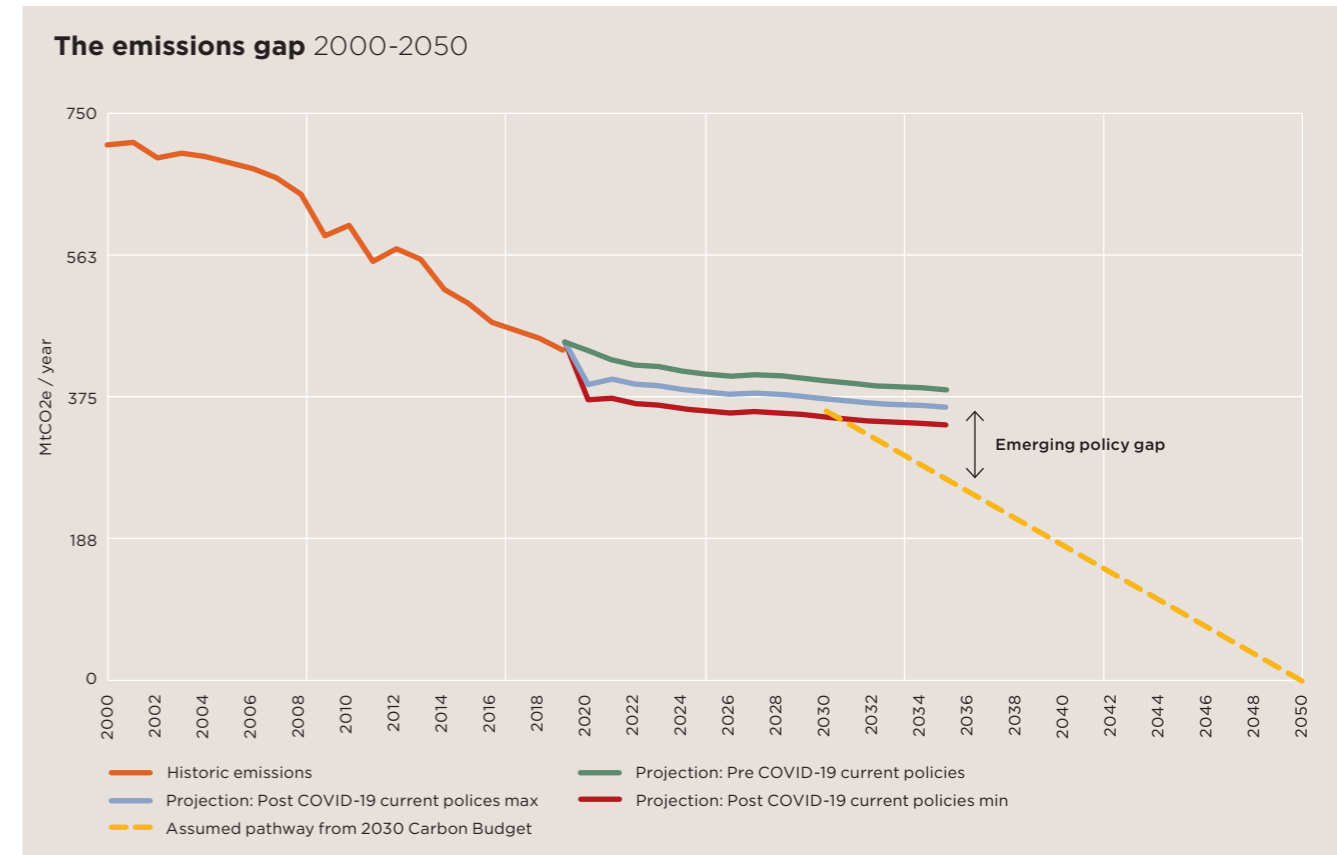
To add to the challenge, the recently unveiled sixth carbon budget was the first to consider the UK’s legal commitment to net zero by 2050; a 100% reduction in emissions against the 1990 baseline. This, in combination with the carbon account shortfall, means that achieving net zero will not be easy although the cost was estimated to be lower than previously thought. Government policy has not offered a consistent direction of travel. In the recent budget, £15bn of government bonds were announced to support the transition to net zero emissions, but the freeze on fuel duty remained in place, and no mention was made of policies to improve take up of electric vehicles, while the Green Homes Grant, only announced in 2020, has already been scrapped.

### MEETING THE CHALLENGE

Real estate owners that do not adapt are likely to suffer from “stranded assets”, not just because of regulatory burden or consumer perception, but for being too slow to change. From an investor perspective, it’s a question of avoiding the famous “Kodak moment”, where being left behind lost a company its competitive advantage and ultimately its viability. However, change isn’t without risk. Rapidly changing policy and financial disruption from the need to switch to potentially more expensive low carbon technologies could impact most on early adopters. But these risks are small compared to the impact of no climate action.

As the host of COP26, the UK aims to be at the forefront of international efforts to transition to a zero carbon economy. In the run up to the conference, the UK government will be working closely with businesses, civil society groups, schools and people across the UK as part of the conversation on tackling climate change. In this document, we will explore the three key instigators of change: policy requirement, investor priorities, and occupier attitudes, and how they might impact on real estate in a low carbon economy.

**£15bn** of government bonds were announced in the 2021 budget to support the transition to net zero emissions





# Risk or reward

For real estate investors, understanding the risks associated with climate change puts them in the best position to reap the potential rewards of a green portfolio

The importance of sustainability and the drive for net zero have undoubtedly increased for real estate investors over the past few years. Despite worries that the Covid-19 pandemic would derail progress towards net zero, that has not been the case. If anything it has demonstrated that the status quo can be disrupted and has accelerated the change.

For real estate investors, there are two key drivers: to understand and assess risks associated with climate change, and to avoid foreseeable costs. On the other hand, developing and owning sustainable assets can improve the investor's reputation and have financial benefits, especially given the government support for this sector. (See Green premiums article on pages 8-9).

## UNDERSTANDING RISK

The Bank of England has identified three key risks that climate change poses to financial stability: physical, transitional and liability.

**1 Physical risks** caused by climate change are perhaps the easiest for us to understand and indeed perceive as the economic costs of natural disasters continue to increase over time. In the UK, an increase in warm spells and decrease in cold spells have already been linked to climate change, a trend that is forecast to continue along with more heavy rain and wind storms.

Floods, storms and extreme temperatures can damage buildings. Increased flooding is

a particular concern in this country, particularly for homes on floodplains and low-lying coastal towns. Even if the temperature only rises by the unavoidable 1.5°C, sea levels around the UK will keep rising beyond 2100.

To cope with the current, and forecast, conditions, measures to protect property from damage are needed from both the government and property owners. Understanding the physical risk to a building is an increasingly important assessment for real estate investors, as well as understanding the associated insurance premiums.

What are perhaps less apparent are the transitional and liability risks associated with climate change.



Developing and owning sustainable assets can improve the investor's reputation and have financial benefits

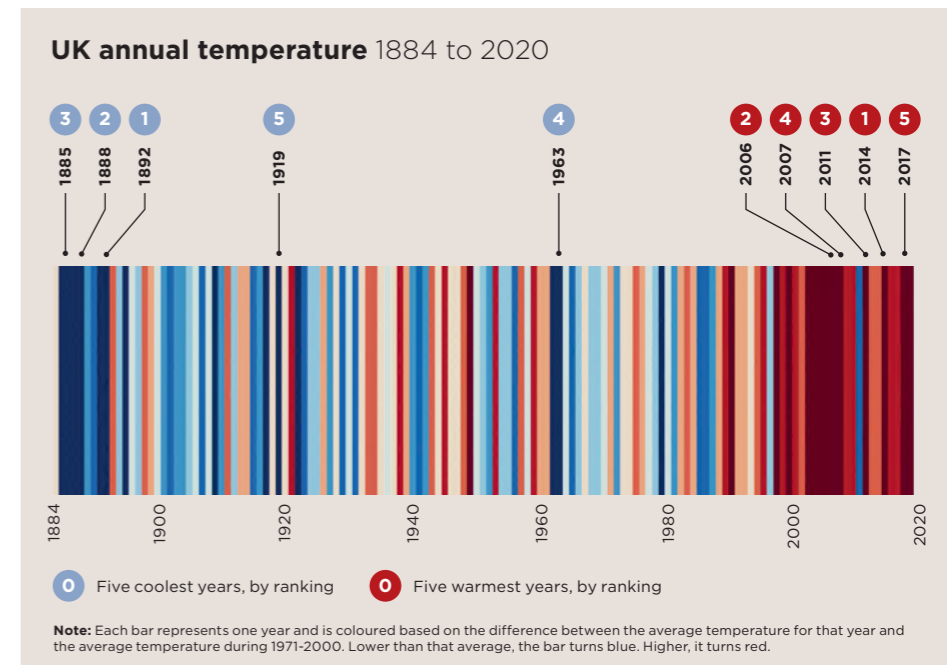
**2 Transitional risks** occur in the move towards a cleaner, greener economy. With that shift, sectors of the economy will face seismic changes in asset values and business costs. For polluting companies, such as those producing fossil fuels, steel and cement, and aviation, those changes will undoubtedly be negative. Many are choosing to redirect funds away from these polluting sectors to avoid being invested in stranded assets, and towards green investments where the opportunities for growth are greatest.

For real estate investors, this can translate to the green credentials of the buildings they own. Demand is likely to be focused on the most sustainable assets, making them more saleable (and easier to lease). While a building that does not meet the desired criteria or government regulations could well become a stranded asset. Many investors are getting ahead now to future-proof their assets by upgrading them, changing the use or selling.

**3 Liability risk** can occur when we ask the question about who we hold responsible. Should a business fail to adequately declare climate risk exposure and suffer a loss due to climate-related events, investors might make a claim against that business. Here, the role of accurate reporting becomes vital. To have a better understanding of the ESG performance of their investments and to have access to comparable and reliable data, an increasing number of real estate investors are using the Global Real Estate Sustainability Benchmark (GRESB). This allows them to compare their results with peers each year and make improvements.

The Task Force on Climate-related Financial Disclosures (TCFD) has also seen an increase in adoption from the real estate industry as demand for decision-useful, climate-related financial information grows. The framework helps companies identify and measure their physical and transitional risks. This growth will continue as the UK is set to become the first country to make this reporting framework mandatory from 2025, but some requirements are already in place.

While the task of measuring climate risk may seem daunting, real estate investors are used to measuring economic risk, market risk, credit risk, so this becomes another part of due diligence. The importance of doing so is rising as properties may be particularly vulnerable to climate change because they are physical assets that are typically held for long periods. Understanding the different risks assets are exposed to will help build a complete picture and enable investors to position themselves in the best place to reap the potential rewards of a green portfolio.



Source Met Office

## Changes to the UK climate and weather events

Weather type	Changes in intensity or frequency so far	Is this linked to climate change?	What is expected in the future?
UK warm spells	Increase	Yes	Increase
UK cold spells	Decrease	Yes	Decrease
UK heavy rain	Increase	Inconclusive	Increase
UK dry spells	No trend detected	Inconclusive	Increase (summer)
UK wind storms	No trend detected	Inconclusive	Increase*

\* Some, but not all, evidence supports an increase

Source Met Office



**13%** Over the last decade, summers have been 13% wetter and winters 12% wetter than the period 1961-1990, according to the Met Office





# Does demand for green buildings lead to a premium?

There is demand for sustainable buildings in both the residential and commercial sectors, but the impact on pricing is still being debated

Concerns around climate change are now widespread. In the UK in March 2021, 26% of people considered the environment the most important issue facing the country, placing it fourth behind the economy, health and leaving the EU. But does this translate into increased demand for green real estate?

### THE RESIDENTIAL MARKET

In the residential sector, occupiers are individuals or households. There are a number of surveys indicating that there is increasing demand for environmentally-friendly homes. In August 2020, a Savills survey of people looking to buy a property found 49% said green credentials had become more important and a separate survey by Redrow found that

29% of buyers said energy efficiency was the most important feature of a new home.

Focusing on the energy efficiency of homes, it does appear that properties with higher ratings do come with a premium. Savills analysis of EPC records suggests that there is an average differential of 17% in the value of a property between a band B and band F property and an average 15% differential between one in band D and band G.

However, green credentials, especially energy efficiency, are often conflated with cost savings from lower energy bills, which may indicate why buyers are willing to pay more. At the moment, location, size, type of property and affordability are bigger drivers for buyers than environmentally-friendly features.

### THE COMMERCIAL MARKET

Occupier demand in the commercial market works differently as this relates to corporates rather than individuals. In line with UK law, all companies need to reach net zero carbon by 2050. However, there's still a lot of work to be done. Recent analysis by Arabesque found that emissions from 31 FTSE 100 companies are well above what is needed to hit the Paris Agreement targets. This drive to lower emissions is causing companies to take a close look at the real estate they occupy to make sure it is in line with their carbon policies. BT is a good example as one of the first firms in British industry to really focus on environmental policies. As far back as 1992, it set a carbon reduction target and since

**26%**

of people in the UK considered the environment the most important issue facing the country

**49%**

of people looking to buy property said green credentials had become more important, according to a Savills survey in August 2020

then its policies have grown. BT's "Better Workplace Programme" is about transforming where and how people work and creating environmentally-conscious spaces.

It is not just a trend in offices. A Savills survey of logistics occupiers found that "green/sustainability features" have climbed from 11th to 6th most important warehouse feature. As warehouse occupiers like Amazon, retail brands such as Marks & Spencer or tourism businesses like Tui set ambitious carbon emissions targets, these need to be reflected in the property space they occupy.

### A GREEN PREMIUM?

In the office sector, there is an ongoing debate around a green premium. Those buildings that achieve the highest levels of certification are usually the newest and so separating the two factors is a challenge. That said, there are many benefits that companies may be willing to pay more for, such as lower energy and operational costs, reduced employee sick leave, improved employee recruitment and retention and enhanced environmental corporate social responsibility.

Savills analysis of BREEAM ratings demonstrates the difficulty in separating the new build factor with green credentials. In some cities buildings with a rating above "very good" are more likely to command top rents. In Manchester, analysis of the top 10 rents paid over the last two years shows that over 90% had a BREEAM rating of very good or above. This reflects occupier demand for sustainable buildings but also a well-supplied office market as over one million sq ft of office space has completed in the past two years, many with high BREEAM scores.

However, this is not the case in all cities. In Glasgow, there has been no new office space completed in the past two years. This means just 30% of the top 10 rents paid in the city over the last two years had a BREEAM rating of very good or above. New development is likely to change this as BREEAM or other green certifications become commonplace. In Glasgow, it is expected that new office space under construction, aiming for BREEAM excellent, will set new rental records.

While a green premium is still being debated, what is more certain is a brown discount. The standards that companies expect from the properties they occupy are getting higher and buildings that do not meet them will be left with fewer tenant options and space that becomes harder to lease.

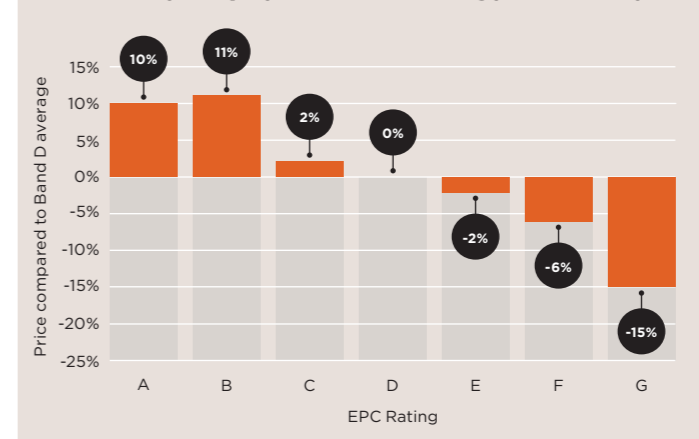
### NET ZERO BUILDINGS

Despite an increase in BREEAM-rated buildings, there are still very few offices across the UK that are classified as net zero.

Using the UK Green Building Council's definition, it was January 2020 when the first offices achieved net zero status based on their operational carbon emissions. The offices, 11 in total, are in Manchester and Liverpool and owned by Peel L&P. Summer 2020 saw this taken a step further and the UK's first energy-positive office, which generates more solar energy than it consumes, was opened at Swansea University.

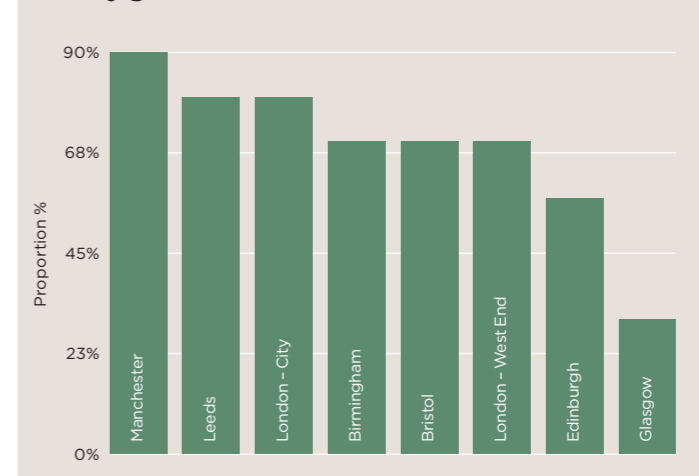
Demand for green real estate space from companies appears to be more significant than in the residential sector, but they can only occupy what is available. Investors and developers across all sectors need to meet this demand with more buildings reaching net zero status.

### Homebuyers pay more for energy efficiency



Source Savills Research

### The proportion of the top 10 rents paid in the last two years that have a BREEAM rating of 'very good' or above



Source Savills Research

### BACK TO THE OFFICE?

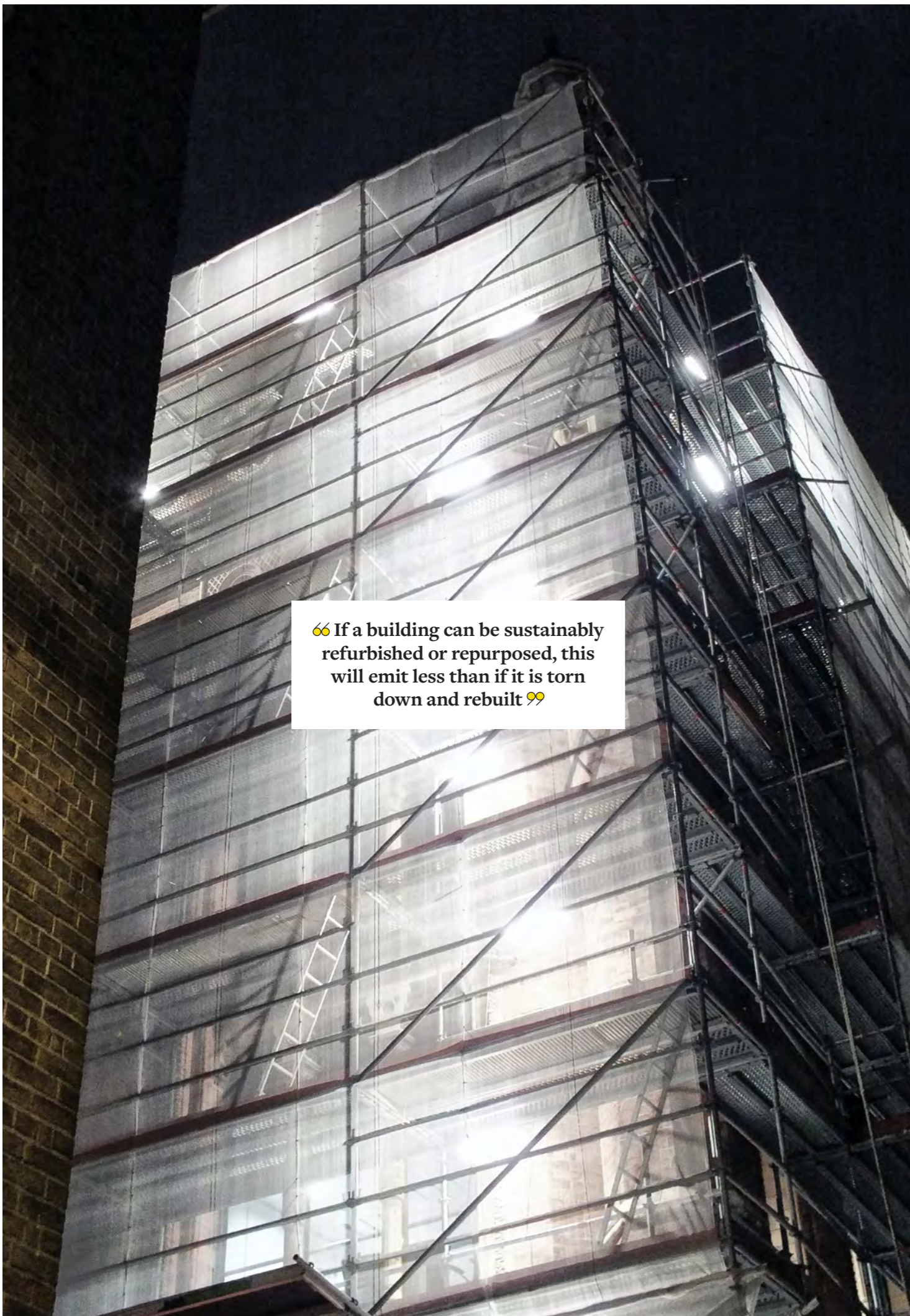
While sustainability is an ongoing topic in the office market, the debate over the past year has been focused on whether the shift to working from home during the lockdowns will lead to a more permanent change in office use and demand. The general consensus from surveys is that we are likely to see a hybrid model of working from the office and home emerge.

It does mean that the quality of office space can play a role in encouraging workers back to the office when the pandemic begins to ease. Employees will require a safer and more desirable workplace than pre-Covid-19. Buildings demonstrating the most sustainable credentials will attract the occupiers (and the investors) they need to benefit from the ongoing flight to environmental quality.

**90%**

In Manchester, analysis of the top 10 rents paid over the last two years shows that over 90% had a BREEAM rating of very good or above





“ If a building can be sustainably refurbished or repurposed, this will emit less than if it is torn down and rebuilt ”

40%

of the UK's carbon footprint is attributed to the built environment

8%

of global carbon dioxide emissions come from cement, according to analysis from thinktank Chatham House

# The real estate life cycle and carbon

To reduce carbon emissions, interventions have to be made in the construction, operation and demolition of buildings

Climate change is impacting real estate and real estate is impacting climate change. Every building has embodied, operational and end of life carbon emissions and the built environment contributes 40% of the UK's carbon footprint. This is now a familiar figure in real estate circles. The problem is acknowledged, engagement with the issue is significantly increasing and solutions are beginning to be implemented.

Carbon emissions are present at all stages of a property's life. In order to properly reach net zero, we need to eliminate emissions from construction through to operation and finally to the end of a building's lifespan.

Carbon is emitted by a building from the first moment the ground is broken, as emissions are produced by manufacturing materials. Cement, for example, is responsible for 8% of global carbon dioxide emissions, according to analysis from thinktank Chatham House, and the construction industry is the largest consumer of natural resources in the UK. Further carbon is emitted by the vehicles transporting and assembling the building on

site. This is typically referred to as embodied carbon and, unlike operational emissions, cannot be improved or reversed at other points in the lifetime of a building.

Once complete, a building's operation emits carbon. Emissions arise from activities such as heating, cooling, ventilating and lighting the structure, as well as the use of appliances within the building. On top of the day-to-day usage, repair and maintenance of the building also emit carbon for many of the same reasons as the initial construction.

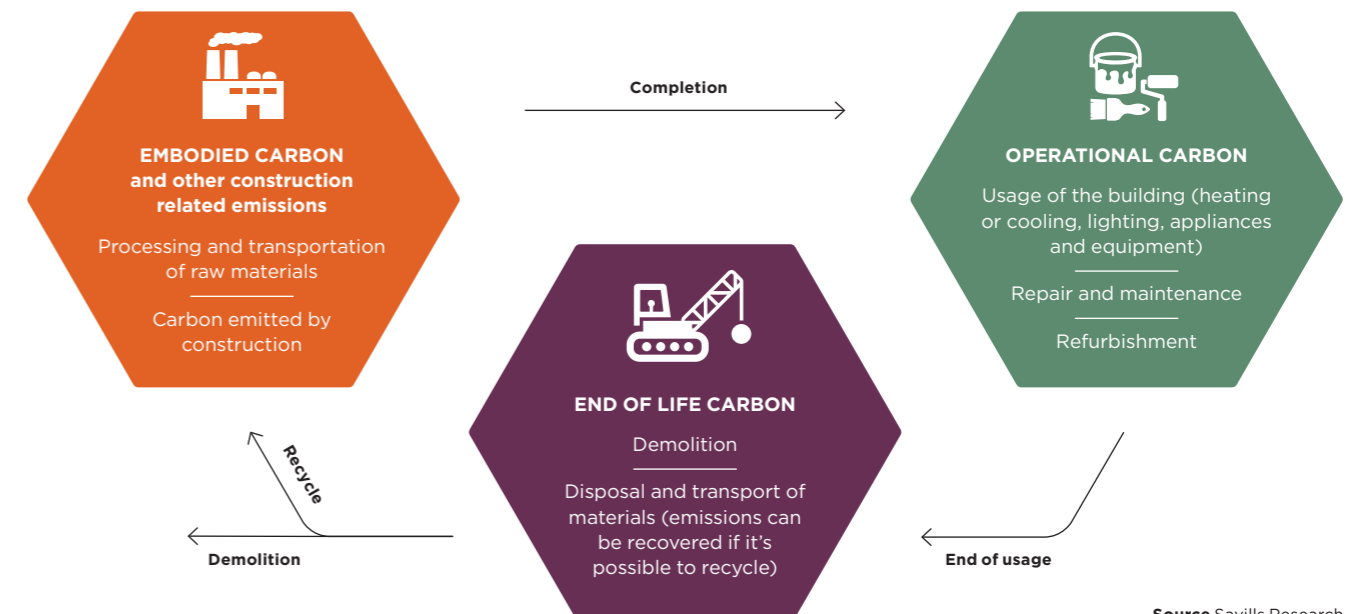
The UK's Sixth Carbon Budget tells us that progress in reducing direct building emissions has broadly flatlined since 2015, so significant change is still needed. There are three main priorities: improving the efficiency of buildings, removing fossil fuels as a source of energy, and decarbonising the supply chain. Policy will impact all factors. The government has targets to upgrade all buildings to a minimum EPC C over the next 10-15 years and is promoting heat pumps as alternatives to fossil fuel powered boilers. Any energy used should be renewable and potentially generated on site.

Finally, when a building has reached the end of its useful lifespan, there is the potential for further emissions. The demolition process and the transport and disposal of the building materials can release carbon. If the waste material is completely discarded rather than recycled elsewhere, the embodied carbon involved in the creation of those materials is effectively wasted.

If a building can be sustainably refurbished or repurposed, this will emit less than if it is torn down and rebuilt, assuming the same operational performance can be achieved. On top of this, if a building can be dismantled and recycled then it can also limit emissions from extracting new raw materials, as well as not wasting the embodied carbon from making the material in the first place.

Real estate must become a sustainable industry to combat climate change, but there are also other benefits. Green buildings save money on energy and water bills, help attract occupiers and investors, can lock up carbon and create a healthier environment, and in some cases they command a value premium.

## The sources of carbon across the life cycle of property



Source Savills Research





## Operational carbon: what are the key challenges in each sector?

There are two key areas for all real estate sectors to focus on when it comes to managing their operational carbon. Perhaps the most obvious is to remove fossil fuels as a source of energy and only use renewable energy sources. However, grid capacity is stretched, so improving the energy efficiency of buildings to reduce energy consumption is also necessary. Each real estate sector has unique challenges.

# 142m

The UK currently has 142 million sq ft of vacant retail space, equivalent to 12.6% of retail units



### OFFICES

New offices are arguably the most advanced part of the built environment as providers of this accommodation have been adhering to global sustainability standards such as BREEAM or LEED for decades. High levels of redevelopment in central business district markets means that historic office stock is being upgraded more quickly to the latest ESG standards than other parts of the property market.

However, the operation of offices continues to be a significant source of carbon emissions with the temperature in offices controlled all year; warmed in winter and over chilled in summer. This is changing and the latest British Council for Offices Guide to Specification (2019) has suggested that standard operating temperatures should be revised upwards from 22°C to 24°C in summer (+/- 2 degrees). The benefits of reduced energy usage and carbon emissions are expected to offset any issues that could be raised around dress code.

A topical debate at the moment is around the environmental impact of working from an office or from home. Employees working from home, rather than the office, results in a reduction in scope 1 and 2 emissions (direct company emissions from owned or controlled sources and indirect emissions from purchased energy). But these emissions have not been removed, instead they've relocated to employees' homes. Typically, it is hard to assess the relative benefits of home working versus office working as there are many factors to consider: distance and mode of commute, energy source and efficiency of employees' homes versus the office, the season, even how many video calls are being made. EcoAct, in partnership with Lloyds Banking Group and NatWest Group, has published a White Paper on this topic, seeking to standardise the approach taken by companies to calculate home working emissions.



### LOGISTICS

The demand for warehouse space in the UK is continuously increasing as more retail moves online. By the end of 2021, online sales are expected to account for 23.2% of all retail sales compared to 19% at the end of 2019. As well as creating more demand for warehousing space, this also means more deliveries being made, both of which could give rise to increased carbon emissions.

Warehouses are typically large buildings with thin walls and flat roofs, so by their very nature are hard to heat or cool. They need to be heated in spaces that employees are

working regularly and either heated or cooled where the stock is being stored to prevent any damage to inventory. As air warms it rises and this presents another challenge, with studies showing it is not uncommon to have a 20 degree temperature difference between the floor and ceiling of a warehouse. Improvements are happening with a focus on efficient heat generation, often from an industrial heating system, and air circulation. Other measures to prevent heat loss include high speed doors and improved insulation.

However, heating is not the only source of energy use in warehouses. The recent evolution towards warehouse automation, robotics, data centres and cold storage has meant that warehouses are using more energy. Transport is the other factor to consider, both the patterns of delivery and the mode of transport. More transportation using electric vehicles will cut carbon emissions from petrol or diesel, but the energy use of warehouses will increase again as they will be charged onsite. Producing renewable energy onsite from solar or wind could help meet this need.

# 23.2%

By the end of 2021, online sales are expected to account for 23.2% of all retail sales compared to 19% at the end of 2019





# 13%

In 2019, homes accounted for 13% of the UK's greenhouse gas emissions, mainly due to burning fossil fuels for heating



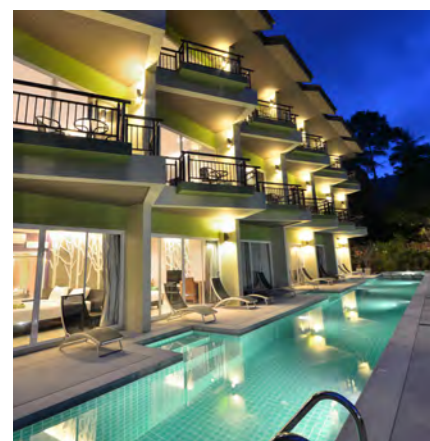
Supermarkets are worth a particular mention. Refrigeration is estimated to account for 30% to 60% of electricity consumption for these buildings because open fridges are still the norm for displaying products, despite calls for refrigerators with doors to be the standard. A much bigger issue that supermarkets face is the carbon from food wastage and food miles, although this sits outside operational carbon considerations. In 2019, all of the UK's major supermarkets signed up to a pledge to halve food waste by 2030, but they are still behind other countries in this area.

Repurposing retail is another angle to consider. The UK currently has 142 million sq ft of vacant retail space, equivalent to 12.6% of retail units. These units have the potential to be converted into residential, co-working space or even life science labs to breathe life back into town centres. How the repurposing is done has an impact on carbon emissions. The decision whether to retrofit or rebuild will be looked at from many angles – viability, planning regulations, demand – but the environmental impact should also be a central consideration in decision-making. In most cases a retrofit will result in less emissions but it is not always the cheapest or easiest option and may depend on the sector. For example, a typical department store requires less structural change to retrofit into co-working space than residential dwellings and therefore less carbon is emitted.

## RETAIL

Despite the increase in online shopping, there remains three-quarters of retail sales that are undertaken in physical stores. Energy use for these vary significantly depending on the building fabric and age, but there are some common themes that impact carbon emissions for all retail buildings.

Bright lighting is used to attract customers, consuming a high amount of energy and doors are often left open or are opened regularly leading to significant energy waste. As with other sectors, changes are being made with low-energy lighting technology and a range of open door alternatives, including automatic or revolving doors and draught lobbies.



## HOTELS

Sustainable tourism is a growing section of the hospitality industry as travellers become more conscious of the carbon footprints they are leaving behind. Although the Covid-19 pandemic has put many trips on hold, as restrictions lift and travel can resume, the

sustainability of hotels is an important consideration.

A challenge in this sector is that implementing carbon reduction initiatives can be seen to be at odds with providing a luxury service to guests. Often, guests at luxury hotels expect bed sheets changed and new towels provided daily and are not willing to go without air conditioning in hot climates. Attitudes are changing, for example a survey undertaken by Booking.com in 2019 found that 73% of global travellers intend to stay at least once in eco-friendly or green accommodation in the year ahead and 53% were actually willing to pay more for it.

Food and travel are other considerations for hotels. Like supermarkets, the food wastage and food miles can contribute to carbon emissions. For transportation, although the method guests use to travel is outside of the hotels' control, electric vehicle charging points can be installed and complimentary shuttle services to and from the hotels could use electric vehicles.



## RESIDENTIAL

Decarbonising the UK's housing stock is one of the largest challenges the country faces. In 2019, homes accounted for 13% of the UK's greenhouse gas emissions, mainly due to burning fossil fuels for heating, according to the Climate Change Committee. There are nearly 30 million homes in the UK and a wide range of tenures, which makes policy in this area complicated. New-build properties are easier to fix as building regulations are adaptable. However, existing properties, particularly owner occupied ones (64% of the housing stock) are harder to regulate and the question about the trigger point for improvements and who will pay for them is critical.

These existing homes are some of the most energy inefficient in Europe and natural gas is used to heat roughly 85% of homes, whereas renewable energy is only used in 8%. Solutions to decarbonise this stock include heat pumps, district heating systems and hydrogen.

In the institutional residential sector there are other considerations. UK Build to Rent operators used to favour bundling energy bills and other utilities with the rent so residents only had one bill to deal with. Generally operators have stopped doing that both for environmental and financial reasons, with experience of some residents leaving their heating on full blast all the time, increasing costs for everyone else. In student housing, residents tend to be especially environmentally-conscious so operators can use good environmental credentials effectively in marketing perhaps more than other sectors. Affordable housing providers have led the way so far in delivering low-energy housing, with Norwich City Council winning the 2019 Stirling Prize for the development of 105 Passivhaus homes.

In general, the sector has to balance the delivery of innovative new developments with the need to retrofit the circa four million homes in the affordable housing sector.



👉 Sustainable tourism is a growing section of the hospitality industry as travellers become more conscious of the carbon footprints they are leaving behind 👈



“Until renewable energy capacity has expanded to fully meet the UK’s power needs, improving the energy efficiency of the built environment will be a critical element of reducing carbon emissions”

## Operational carbon – a focus on energy efficiency

The emissions of residential property could be halved if all properties were upgraded through improvements to their current estimated EPC potential

Operational carbon emissions will depend on both the energy source (renewable or non-renewable) and the energy efficiency of the building itself. Until renewable energy capacity has expanded to fully meet the UK’s power needs, improving the energy efficiency of the built environment will be a critical element of reducing carbon emissions. Energy Performance Certificates (EPCs) are therefore an imperfect but necessary part of understanding operational carbon emissions.

EPCs assess the efficiency of a property from A (most efficient) to G (least efficient), and recommend specific ways in which the efficiency of the property could be improved. In April 2018 Minimum Energy Efficiency Standards were introduced that made it a legal requirement for all privately-owned properties to have an EPC rating of at least an E before they are sold or let. The legislation applies to both domestic and commercial properties, although there are some exemptions, for example if a property is a listed building. The majority of homes across England and Wales have an EPC D rating, with less

than 1% achieving an A rating. Tightening environmental regulations for new homes has led to higher EPC ratings, with most new homes from the last decade achieving a B grade on their EPCs.

### THE IMPACT OF EFFICIENCY

How much of a difference is there between EPC bands in a home’s emissions? Obviously an EPC grade is not the only factor at play. Houses typically emit more than flats, and larger homes emit more than smaller ones. However, when taking equivalent sized homes and flats, each EPC grade climbed represents around a 30-40% reduction in CO<sub>2</sub> emissions per year on a diminishing scale. Based on all domestic EPCs lodged in the last decade, there is the potential to halve the emissions of residential property if all properties were upgraded to their current estimated potential – typically including roof and cavity insulation and installing a condensing boiler. This is a reduction of around 50Mt of carbon per year.

An EPC B rated house of 900-1,000 square

foot with 3 bedrooms emits just under 2 tonnes of CO<sub>2</sub> per year. An equivalently sized house with a D rating emits around 4 tonnes per year. A 600-700 square foot flat with 2 bedrooms with an EPC B rating, emits 1.2 tonnes of CO<sub>2</sub> per year; while an equivalent rated D flat would emit 3 tonnes per year.

### THE COMMERCIAL SECTOR

This is not just a concern for residential property. Savills have analysed the EPCs of retail and office stock in 22,000 retail locations across the country. As it stands, 130 million sq ft of space sits in the lowest two bands. Comparing current emissions to target emissions on the EPCs, retail and office stock is currently emitting 7.7Mt of CO<sub>2</sub> more than would be achieved if all the recommended efficiency measures were implemented. The majority of this excess, 5.2Mt, comes from retail, with vacant units accounting for 20% of emissions. Vacant units make up less than 20% of stock, so are emitting disproportionately more than active units. This makes them prime targets for refurbishment or repurposing.

# 7x

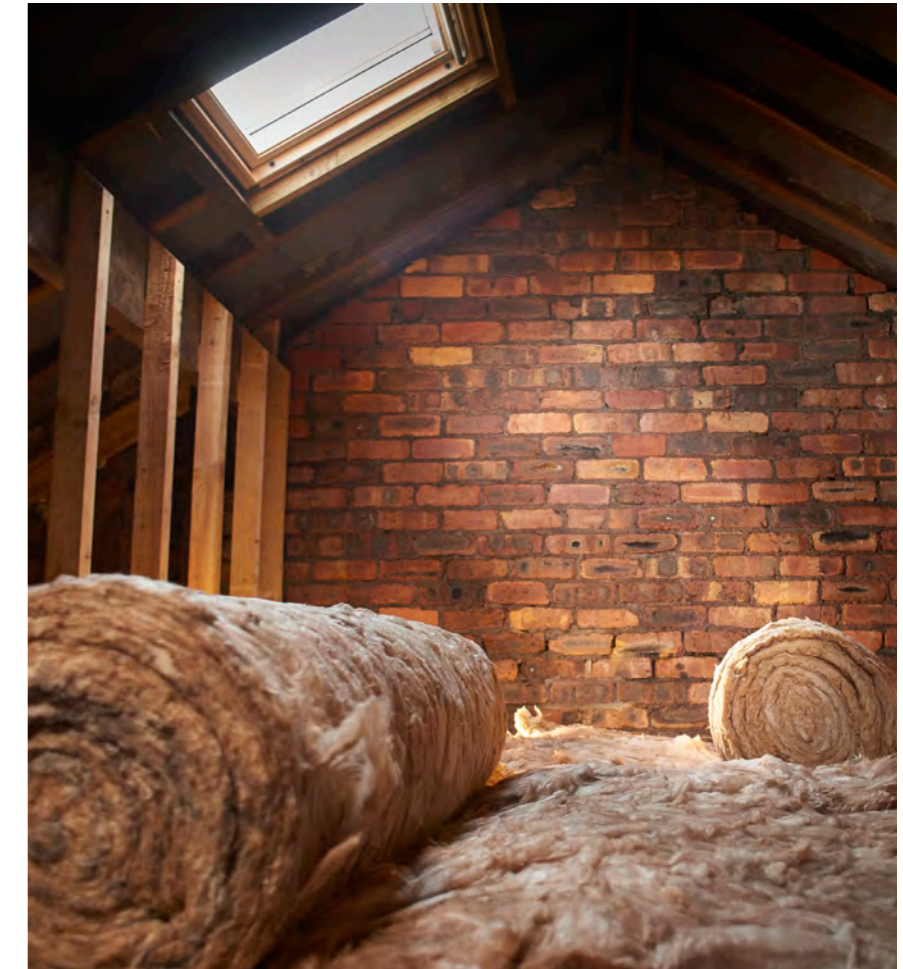
To meet the 2035 target for EPC-rated C homes, energy-efficient renovation needs to increase by seven times its current rate

### COST SAVINGS

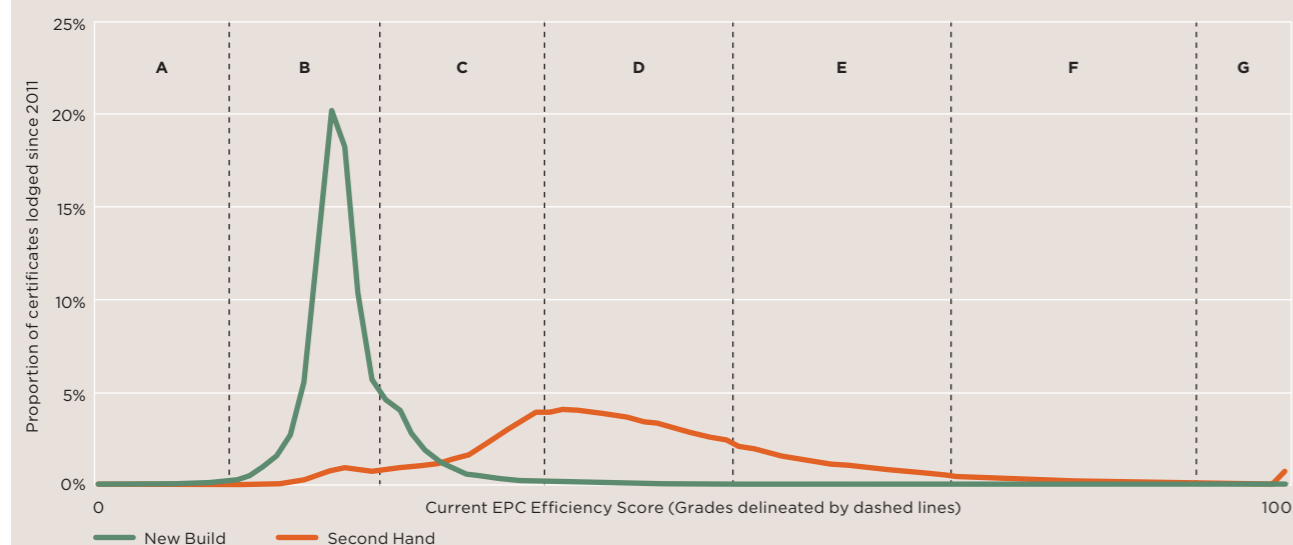
There are clear incentives for improving the efficiency of your home. From a societal perspective, reducing the environmental impact is vital in dealing with the climate emergency. Boosting the efficiency of your home also reduces the running costs, which provides an incentive to invest in improvements. Improving the country’s existing stock is a big undertaking.

The Green Homes Grant, which started in 2020, was a clear statement of intent. But a combination of restricted usage and a lack of capacity to carry out home improvements meant that only a fraction of the money allocated to the scheme was actually used. To meet the 2035 target for EPC C homes, the energy-efficient renovation of existing homes would need to increase by seven times its current rate.

The question is how to increase this rate. The government could intervene to set higher minimum energy performance standards earlier, but if this is not accompanied by expanded retrofitting capacity, and potentially a grant system, the cost could be prohibitive for some homeowners. Further incentives could be provided by mortgage lenders, if they are able to offer lower interest rates for more energy-efficient homes. This would also provide additional trigger points; at present an EPC is only needed for a property sale or letting, but lenders could prompt behavioural change at other events such as re-mortgaging.



### Distribution of domestic EPCs by efficiency score



Source Savills Research using MHCLG and HM Land Registry

### ALTERNATIVES TO EPCs

Currently, EPCs are the only consistent measure of energy efficiency in buildings across all properties in the UK. However, there are many critics of EPCs, who claim they can be misleading and focus too much on the fuel cost of heating a property rather than accurately measuring energy efficiency. The Environmental Audit Select Committee recently recommended that the methodology for producing an EPC should be fundamentally overhauled.

For the commercial sector, the Department for Business, Energy & Industrial Strategy has launched a consultation regarding a mandatory rating for the energy use of buildings of 1,000 sq m and above. This could see the NABERS UK scheme, which was brought over to the UK from Australia, become mandatory. It would start with the office sector and then expand to take in other non-domestic buildings.

### Median CO<sub>2</sub> emissions for equivalent properties



Source MHCLG

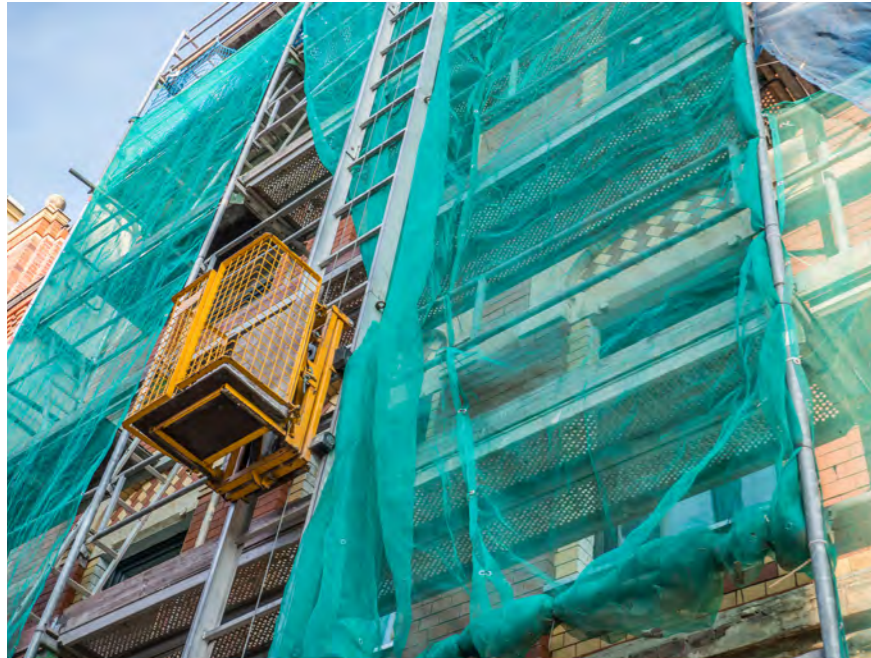


**83%**

A WRAP study identified 83% less site traffic for offsite construction compared to site-build developments

**1%**

Offsite construction produces far less waste, with less than 1% of the total materials unused



## Embodied carbon and construction

How much carbon is emitted during construction and how carbon efficient the building is when completed are the determining factors for all new developments

When constructing new buildings two factors need to be considered where carbon is concerned: how carbon efficient the building will be when it's completed and also how much carbon is emitted during the construction phase.

### BUILDING REGULATIONS

New properties are more energy efficient than older stock as building regulations have become stricter over time. This will continue and there's now also a focus on removing fossil fuels as a source of energy for new buildings. In the residential sector, the ban on gas boilers from 2025 in favour of heat pumps has made headlines recently. This will help reduce emissions from new homes, provided grid capacity is created to enable the heat pumps to run from renewable energy sources. Onsite generation demands and grid capacity for heat pumps and EV infrastructure may impact on site viability.

### CONSTRUCTION

The use of Modern Methods of Construction (MMC) offers a way to help reduce the impact

of construction, both for the embodied carbon through construction and through the operational life of the building. A key issue in traditional construction is waste, as around 20% of raw materials procured for a new-build development are wasted. Offsite construction produces far less waste, with less than 1% of the total materials unused. This is because within the controlled environment of a factory, production can be optimised to minimise waste. On top of this, modular construction means fewer deliveries to sites, cutting the carbon emitted from transport. A WRAP study identified 83% less site traffic for offsite construction compared to site-build developments. Finally, the buildings themselves are more efficient when completed. Keepmoat Homes estimates that homes built with MMC take 20-30% less energy to heat.

MMC offers a great deal of potential for environmental benefits and is gaining traction in the UK, particularly in the education and the health sectors where there's a need to build quickly. The current construction

costs are roughly 10% more than traditional construction. However, the increase in cost to build a net zero carbon property using MMC is much lower than for traditional construction. Furthermore, as more orders come through the factories, economies of scale will further reduce the cost of MMC. Housing Associations may well lead the charge here, with many of them expecting to use more and more MMC in the next few years.

Building materials are another consideration. Timber acts as a long-term store of atmospheric carbon, compared to manufactured materials such as concrete or steel, which are heavy emitters of carbon. However, regulations in the UK only allow timber to be used on low-rise buildings due to fire risk concerns, despite some successful international examples. Currently, there's no sustainable building material that's appropriate for high-rise buildings in the UK, although there are trials to make "green steel". There are a number of alternatives for carbon intensive concrete emerging, from hempcrete to the Vertua ultra zero cement by CEMEX. Nothing yet rivals concrete on costs, but that situation could change as demand rises and scale is achieved.

Construction is the best time to also consider installing solar panels as they can be integrated into the roof. This has a number of benefits, including reducing carbon emissions, spending less on energy bills and putting unused roof space to good use. Technology in this sector is evolving and solar panel prices have dropped significantly over the past couple of decades.

### REPURPOSING

Demolition and rebuilding is a carbon intensive business. Transport and disposal of the old materials produces emissions, and wastes the embodied carbon that went into the materials in the first place. Repurposing and sustainably refurbishing old assets provides a solution to this and is something that is increasingly happening.

Using as much of the old building as possible, while using cleaner materials and techniques to rebuild can have a big impact. Trilogy's Republic Campus in London took an old shell and brought it up to modern office standards. The techniques used, only altering where necessary, bringing in significant public realm and using sustainable materials where needed, meant that the development actually sequestered 1,000 tonnes of carbon. An equivalent new-build development would have emitted 100,000 tonnes of carbon.

Clever use of existing assets complemented by modern, cleaner materials and methods has huge potential to reduce carbon.



“MMC offers a great deal of potential for environmental benefits and is gaining traction in the UK”



# Planning for reductions in new-build emissions

Local plans on new developments and the built environment are playing a key role in ensuring the UK's commitment to achieve net zero by 2050 is met

The planning system has the potential to play a crucial role in the effort to decarbonise the built environment. It is the mechanism through which the spatial and transport aspects of decarbonisation can be addressed, and regulates the standards new developments must be delivered to. Local plans are now legally required to contain policies that are aligned with the commitments of the Climate Change Act 2008 to reduce emissions and achieve net zero by 2050.

Since 2018 around 75% of local authorities have declared a climate emergency and many have proposed earlier target dates than 2050 to reach net zero. Nottingham has one of the most ambitious carbon reduction targets, aiming for the city to be carbon neutral by 2028, requiring a 22.8% reduction in emissions every year from current levels. However, these

ambitions are yet to filter through to specific requirements in the local plan.

It is unclear yet how these climate commitments might shape the planning system, but the National Planning Policy Framework already sets out the goal of “contributing to the achievement of sustainable development” and plan policies must include an assessment of the potential for local policy to achieve local emissions reductions over the plan period.

This gives the planning system economic, social and environmental objectives to create places that protect and enhance the environment. Planning can deliver these objectives by ensuring that new development supports sustainable settlement patterns, aligns with economic growth, and makes best use of existing public transport infrastructure.

## ZERO CARBON STANDARDS

One key area of carbon reduction that may emerge in local plans is a defined low or zero carbon requirement for new developments. This could cover many areas including specifying a building's operational energy use, limiting the emissions involved in the construction of a development, requiring clean energy sources for the scheme, or establishing an offsetting scheme for developments unable to achieve zero carbon onsite.

For example, Reading's adopted local plan includes policies requiring new buildings to be orientated to maximise the opportunities for both natural heating and ventilation; and for new and existing buildings to demonstrate how they have been designed to maximise resistance to climate change, for example by including measures such as solar shading,



75%

of local authorities have declared a climate emergency since 2018

50%

Over 50% of new developments are over a mile from a station

35%

uplift to the housing need figure in the 20 largest cities and towns in England has been introduced by the government

thermal mass heating and ventilation of the building, reducing the energy required for the day-to-day running of the building. All new-build housing is required to reach at least a 19% improvement in the dwelling emission rate over the target emission rate, as defined in the 2013 Building Regulations. Where this cannot be achieved on site, an offset may be possible through planning contributions. Advancing on some aspects of the Reading policies, the Oxford local plan adopted in 2020 states that planning permission will only be granted for new-build houses and other forms of development if they achieve at least a 40% reduction in carbon emissions from the 2013 Building Regulations. The requirement will increase from 31 March 2026 to at least a 50% reduction in carbon emissions.

Local plans are, therefore, requiring developers to push beyond national Building Regulation standards and so are a key policy driver for change. Evidently, this will place increased demands on developers and in lower value areas could limit the potential for other forms of developer contributions to be delivered. For local plans to become an effective mechanism for delivering carbon reductions, policies need to be established that meet the current tests of “soundness” and

be underpinned by viability assessments to ensure that the demands placed on developers don't adversely impact much needed delivery across all markets.

## SPATIAL STRATEGY

Local plans also govern the spatial pattern of new development and in doing so can help limit transport emissions by encouraging growth in locations that are accessible by sustainable forms of travel, including public transport.

Our research shows that hitherto the planning system has not been acting to locate new development in the most sustainable locations. Between 2015 and 2019, less than 50% of homes gaining full consent were within a one mile radius of a train or underground station and 6% were over five miles from a station. This type of development is likely to encourage private car use, particularly if the development does not include retail or leisure amenities. To combat this, masterplanning strategies may instead shift to embracing the concept of the “15-minute city”, which moves away from a zoned planning approach to creating neighbourhoods where residents can live, work and reach recreation facilities within a short walk or cycle.

In order to be sustainable, sites gaining consent at a greater distance from existing settlements need to be large enough to support local facilities and thereby reduce the need for travel. Our research shows that instead these remote schemes are more likely to be smaller, with 75% of sites gaining full consent over five miles from an existing train station having capacity for fewer than 100 homes. Similarly, over half of sites achieving consent over one mile from an existing urban settlement had capacity for fewer than 50 homes. These are likely to be locations where it is challenging to provide frequent public transport. Department for Transport data shows that those living in rural villages or hamlets travelled on average three times as many miles per year by private car as those living in urban locations.

Recent changes at the national level might be about to turn the tide back towards more housing in urban areas. The government's Standard Method for setting housing targets introduced in 2020 has introduced a 35% uplift to the housing need figure in the 20 largest cities and towns in England. Part of the rationale for this is to maximise access to existing infrastructure such as public transport and local facilities such as schools, GPs and shops. It remains to be seen how effective this new approach is going to be on changing the pattern of delivery while still aiming to push numbers higher up to the target of 300,000 homes per year.





# 104,000,000

In 2019, globally, there was a near record volume equivalent to 104 million tonnes of CO<sub>2</sub>e removed or prevented from entering the atmosphere through voluntary offsets



## Carbon offsetting - a piece of the net zero puzzle

An introduction to the carbon credit market and nature-based carbon offsets

Carbon offsetting is the last part of the solution to the enormous challenge of reaching net zero emissions by 2050. Carbon offsets are used to compensate for the residual emissions of a system once direct emissions reduction has been completed. While emissions reductions should be the priority, offsetting plays an important role in enabling the transition to net zero. *Read more on this topic here: [sav.li/mg3](#)*

There are two types of carbon offset market: the compliance market and the voluntary market. The compliance market is regulated and applies to companies that by law have to reduce their greenhouse gas emissions. The UK has its own “cap and trade” Emissions

Trading Scheme, which applies to energy intensive industrial plants, power stations and aviation operators.

### GROWTH IN THE VOLUNTARY CARBON MARKET

Voluntary carbon offsetting is a rapidly developing market. Voluntary carbon credits are purchased by businesses, organisations and sometimes individuals. Motivations for purchase include internal net zero targets, climate-related financial disclosure requirements and a growing awareness of environmental liability. Policy shifts and increasing regulation are driving companies to take their carbon accounts seriously, which

has led to the creation of an offset-hungry marketplace. In 2019, globally, there was a near record volume equivalent to 104 million tonnes of CO<sub>2</sub>e removed or prevented from entering the atmosphere through voluntary offsets. This is equivalent to the annual emissions from 27 coal fired power plants. *Read more on this topic here: [sav.li/mg4](#)*

### TYPES OF CARBON OFFSET

There are different mechanisms by which carbon offsets can be generated – there are projects that avoid or reduce carbon emissions and projects that remove carbon from the atmosphere. There is growing demand for nature-based carbon offsets generated in the

🌿 Woodland creation projects require rigorous assurance standards to verify that the trees are successfully absorbing carbon 🌿

UK. This is because there is an increasing awareness of the damage of offshoring carbon liabilities and the UK offers high-value, accredited and verified carbon offsets. UK offsets provide companies with the assurance they demand to prove to shareholders and consumers that they are making an impactful difference, not falling into the reputational trap of “greenwashing”.

### PLANTING TREES TO SAVE THE PLANET

In the public imagination, tree planting has become the saviour of our rapidly warming planet. Planting new trees sequesters carbon through photosynthesis. However, creating carbon credits through afforestation is not as simple as people might imagine. The rate of carbon sequestration depends on the type of tree, its age, location, soil type, stocking density and management. Trees take around five to 10 years to start substantially sequestering carbon, peaking at approximately 30 years, depending on tree species.

Woodland creation projects require rigorous assurance standards to verify that the trees are successfully absorbing carbon. This enables land managers to sell legitimate carbon offsets. Within the UK, the government-recognised standard for woodland carbon units (or credits) is called the Woodland Carbon Code (WCC). In order for new woodland to become WCC accredited, the project needs to be able to prove additionality – in other words, that the carbon sequestration occurred over and above what would have happened anyway. Within the context of the WCC this often comes down to proving that the project would not have been economically viable without carbon income. This is to ensure that the project is sequestering “additional” carbon through its ability to sell carbon credits. Trees that are already established, or trees that by regulation have to be planted (for example, through the replanting conditions of a felling

licence) do not pass the additionality test. Therefore, despite sequestering carbon, they cannot generate sellable carbon credits. Across the UK, there are 595 projects signed up under the WCC, with a projected carbon sequestration of 9.6 million tonnes of CO<sub>2</sub> over 100 years. *Read more on this topic here: [sav.li/mg7](#)*

However, there are barriers to planting trees. The UK’s nursery stock of tree saplings is limited and woodland creation requires prior planning approval, which can be time intensive in England in particular. Once approved, the land needs to be kept as woodland in perpetuity, which can deter land managers. Finally, there is a limited area within the UK that is suitable for tree planting – it is important not to compromise other biodiverse habitats and protected ecosystems in order to reach tree planting targets.

Restoration of degraded peatland and good soil management also sequester carbon. In the UK, peatland restoration can be accredited and sold as an offset under the Peatland Code. However, there is not yet a standardised code for verifying and, therefore, selling soil carbon.

### SCALING UP VOLUNTARY CARBON MARKETS

The Taskforce on Scaling Voluntary Carbon Markets calculated that in order to reach the goals of the Paris Agreement, voluntary carbon markets across the globe need to grow 15-fold by 2030. Clearly, there is potential for the UK to rapidly upscale its provision of nature-based offsets to meet the increasing demand. Prices of voluntary offsets currently sit between £10-£25/ tonne of CO<sub>2</sub>. However, with mounting demand, regulation and the target of 2050, carbon prices are likely to increase.

Carbon offsetting is not new. However, society and business are waking-up to the fact that if left unaddressed, carbon emissions pose an operational threat to business and this has placed carbon offsetting centre stage.

### Types of Carbon Offset

AVOIDANCE / REDUCTION	REMOVAL / SEQUESTRATION
<b>Avoided nature loss:</b> limits the loss of nature such as forests and peatland, which currently sequester large amounts of carbon	<b>Nature-based sequestration:</b> uses natural processes to sequester more carbon in the biosphere, for example through reforestation, restoring soil, mangroves, seagrass and peatlands
<b>Additional emissions avoidance:</b> reduces emissions from current sources that do not have the financial incentive or regulatory requirements to decarbonise	<b>Technology-based removal:</b> removes CO <sub>2</sub> from the atmosphere with the help of technology and stores it in the geosphere or through other secure methods (for example, bio-energy with carbon capture and storage – BECCS)

### BIODIVERSITY NET GAIN

Mandatory biodiversity net gain, a concept within the Environment Bill, requires that all future development provides a 10% uplift in biodiversity as compared to the level of biodiversity prior to development. This mechanism generates demand for another type of nature-based offsetting market – for habitat creation and restoration. This market is not related to carbon offsets, instead developers purchase biodiversity units (as calculated from the Defra metric) from land managers. However, there is a logic in linking biodiversity offsets to carbon offsets, as increases in biodiversity are likely to result in additional carbon sequestration. Whether future policy will enable this is yet to be seen. *Read more on this topic here: [sav.li/mg6](#)*



# 595

Across the UK, there are 595 projects currently signed up under the WCC, with a projected carbon sequestration of 9.6 million tonnes of CO<sub>2</sub> over 100 years



35,000

ULEV charge points need to be installed per year in this decade

£3bn

The government recently launched a £3bn plan to make buses across the country cheaper and easier to use

# Ways to travel

In order to achieve net zero by 2050, the UK needs to not only embrace Ultra Low Emission Vehicles wholeheartedly, but also look at other modes of public transport

Transport as a sector now exceeds energy as the biggest emitter of carbon. One of the building blocks to reaching net zero by 2050 will, therefore, be the phasing out of petrol and diesel vehicles, with the UK government committed to all new cars being Ultra Low Emission Vehicles (ULEVs) by 2030. It is estimated that 80% of vehicles on the road will be electric by 2040.

Last year was significant in seeing the number of new registrations of ULEVs double to the end of September 2020. However, they still account for less than 1% of all existing vehicle registrations. Despite lower running costs, the additional cost of production means a lot of those vehicles are targeted at the top end of the car market, while those produced by non-luxury brands still carry a significant up-front premium compared with their more traditional equivalents.

Our research shows that on average, levels of private ownership of electric vehicles and hybrids in local authorities with an average house price of over £500,000 are more than four times those seen in the local authorities where the average price is under £200,000. Having a charging facility at home is also a

challenge for some. The English Housing Survey tells us that 33% of dwellings do not have a garage or off-road parking facilities, rising to 63% in urban and city centres. The availability of three-phase electricity needed for EV charging (and heat pump) installation is an issue in rural and remote places.

How then do we get from a position where the electric car is the preserve of the wealthy to one where we have widespread adoption? Much is made of the need for a widespread public charging infrastructure and it is estimated that 35,000 charge points need to be installed per year in this decade. Generally, the growth in the provision of these facilities has gone hand in hand with the rise in vehicle registrations.

Across the country as a whole there are 7.5 ULEVs for every public charging point. But there are significant local and regional disparities. London sits alone in terms of having relatively high rates of ULEV registrations and a relatively high number of public charging facilities.

Providing the locations for these much needed charging points is a problem the real estate community can help solve. Investors,

developers and landowners need to establish charging points alongside hotels, offices, petrol stations, retail parks, supermarkets and new residential developments. They should ensure they have grid availability early on and the infrastructure to suffice or develop alternative solutions such as on site renewable energy generation.

Even with a greater uptake of ULEVs, there remain residual issues with the use of cars, not least that they still generate air pollution from tyre particles and dust from brakes. Part of the solution, therefore, needs to be to get people out of their cars altogether. For the committed enthusiast there are "active forms" of travel such as walking and cycling. Increases in these modes challenge town planners and transport engineers, who need to dedicate more road space to those rather than car users.

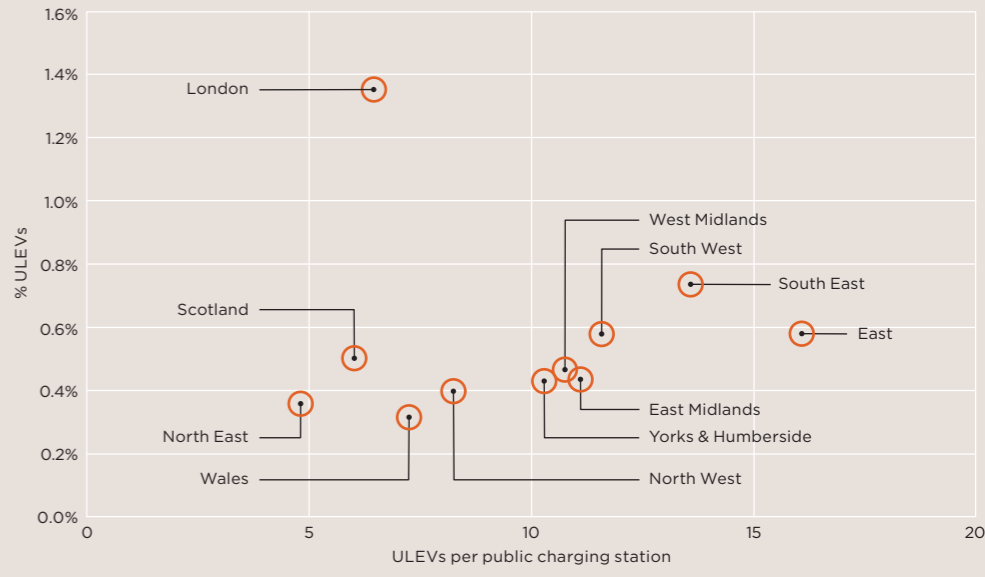
Additionally, however, to achieve the level of transfer out of cars that is required, our public transport systems need more capacity and to be priced as an attractive alternative to other modes. Progress has begun as the government recently launched their £3bn plan to make buses across the country cheaper and easier to use.

“London sits alone in terms of having relatively high rates of ULEV registrations and a relatively high number of public charging facilities”

80%

It is estimated that 80% of vehicles on the road will be electric by 2040

ULEV adoption v public charging provision



Source Savills Research





# Savills Earth

Sustainability delivered through a real estate lens

Savills has a new team: Savills Earth. It brings together the expertise of more than 80 specialists to support and advise clients on their sustainability, energy and carbon strategies. This is against a backdrop of increased public interest in cutting carbon emissions, more regulation, the proposed green-led recovery post Covid-19 and the clear need for action on climate change, environmental protection and social wellbeing. The team is working with clients to develop strategies that turn sustainability targets and commitments into reality. It recognises that every client has different requirements whether it's an individual project or a national portfolio.

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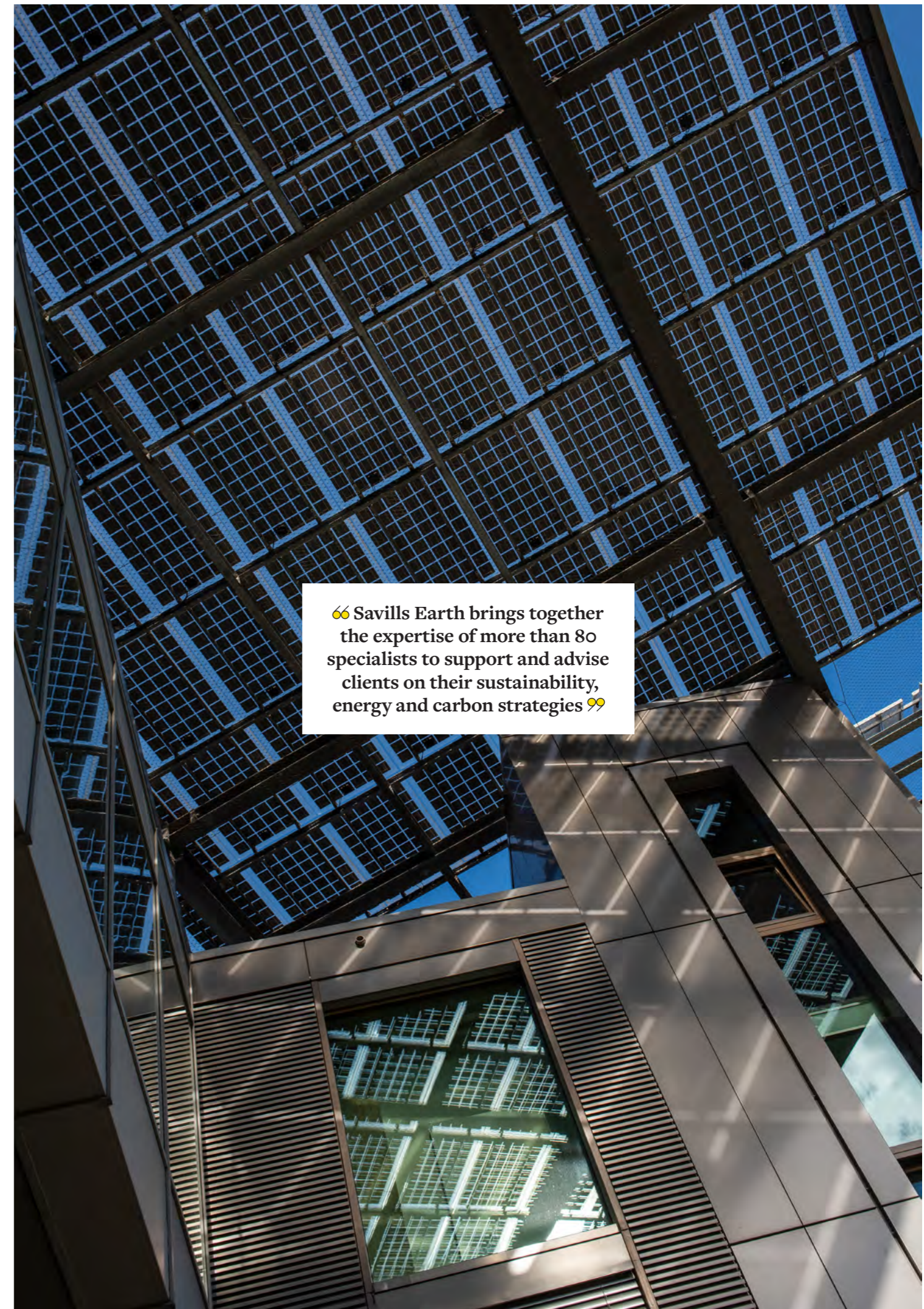
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“ Savills Earth brings together the expertise of more than 80 specialists to support and advise clients on their sustainability, energy and carbon strategies ”





## Savills Research

We're a dedicated team with an unrivalled reputation for producing well-informed and accurate analysis, research and commentary across all sectors of the UK property market.

To view copies of our previous Spotlight publications, go to [www.savills.co.uk/insight-and-opinion/](http://www.savills.co.uk/insight-and-opinion/)

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