June 2023

Transform & renew

Making non-domestic buildings in the UK fit for a low carbon future

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FOREWORD

The built environment generates 40% of annual global CO_2 emissions.

23%

Non-domestic buildings are responsible for 23% of operational carbon emissions from UK building stock.

87%

87% of non-domestic buildings need upgrading in some way.

Addressing the climate emergency is a social imperative for us all, but particularly for the built environment sector, which is responsible for around 40% of all carbon emissions[1].

We at Mace are keenly aware of our responsibility to tackle this challenge directly. That's why we set 'to pursue a sustainable world' as one of our strategic priorities in our 2026 Business Strategy[2]. In January 2021, we achieved 'carbon neutral' status, just one year after setting out our ambition. We are on track to save 1m tonnes of carbon from our client's operations through our work and have increased our target to save 10m tonnes by 2026. Our aim is to accelerate the built environment's response to the climate emergency with bold targets that look beyond our direct responsibility and into our scope of influence.

As part of this wider strategy, retrofitting – that is, "the retrospective upgrading of a building to enable it to respond to the imperative of climate change[3]" – has become increasingly important across the Mace group. Our consultancy business is working closely with local and central government authorities in the UK, and private developers, to help them decarbonise their portfolios, and our construction business is repurposing ageing office buildings in the City of London and bringing them up to the highest energy efficiency and wellbeing standards.

If the UK is to reach net zero carbon by 2050, retrofit must be a central part of that strategy. The UK has some of the leakiest building stock in the world, and we are wasting tonnes of carbon each year heating these buildings. According to the Committee for Climate Change (CCC)[4], heating UK buildings accounted for more than a fifth of the UK's greenhouse gas emissions in 2021, while London had the highest proportion of emissions from buildings out of all 15 major global cities assessed by JLL in 2022[5].

The CCC has said that reducing energy demand in buildings is now the biggest gap in current government energy policy. This has come into sharp focus due to the war in Ukraine and record high energy prices. It doesn't just make environmental sense to enhance energy efficiency, but also economic sense. In fact, M&G Real Estate[6], CBRE and MSCI[7] have all undertaken research that demonstrates buildings with high sustainability credentials command higher premiums and rental yields.

Alongside this, there has been a growing awareness in the built environment of whole life carbon. It has been estimated that around 50% of the world's raw materials are consumed in the development of buildings[8]. We need to radically reduce the amount of embodied carbon in the buildings we are creating, through retaining and repurposing as much of a building as we can and re-using and recycling materials. Government policy is playing catch-up here and there is currently not even a consistent government backed definition of how to measure embodied carbon.

We are facing a climate crisis, but our industry can help. Enhancing the energy efficiency of our building stock and changing the way we build to ensure we are using less carbon for the whole life cycle of a building can turn the tide, but we need the support of government policy to be truly successful. This policy paper showcases the actions government and industry can take that we believe will have the most significant impact.

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INTRODUCTION

Non-domestic buildings make up around 13% of our building stock for account for 23% of UK operational carbon emissions from buildings.

The government recently announced a new department focused on energy security and net zero[9]. The Department for Energy Security and Net Zero is tasked with the challenge of reducing energy consumption from households and businesses by 15% by 2030[10]. To achieve this level of reduction in energy demand, a serious strategy around retrofit is needed. This is where the newly established Energy Efficiency Taskforce will play a key role in informing and setting direction for government policy in this area. This is a huge opportunity.

While a great deal of attention has been paid to decarbonising homes, reducing carbon across non-domestic properties like commercial buildings and publicly owned spaces has not entered public or political consciousness in the same way. Even the most recent Powering Up Britain paper was predominantly focused on domestic retrofit, as opposed to commercial or public sector estates, and the annoucement of a Great British Insulation Scheme[11].

This is a grave oversight. There are approximately 1.75m 'non-domestic' properties in England and Wales, totaling around 13% of our building stock[12] but accounting for 23% of UK operational carbon emissions from buildings[13]. More than a quarter of these were built before 1900 and almost two-thirds before 1970. Failing to address the operational and embodied carbon across this estate would seriously impact the UK government's ability to achieve net zero.

It is our view that the government's approach to policy in this area has, so far, been piecemeal and lacking in focus. While setting ambitious energy efficiency targets, we are calling on the government to clarify how it aims to reach these goals and how it expects non-domestic property owners to support their ambitions. We hope the upcoming Future Buildings Standard will contain this information.

The purpose of this report is to identify the immediate steps property owners can take, shine a light on this important part of the retrofit landscape and suggest some areas of focus for new government departments and the Energy Efficiency Taskforce.

Despite the challenges set out in this paper, the UK remains a leader in building efficiency and sustainability. By tapping into this expertise, not only can we tackle the climate crisis but shore up energy security for the long term and unlock opportunities to export our sustainability successes around the world.

KEY ASKS FOR GOVERNMENT

1 Provide immediate certainty on energy efficiency regulations for commercial buildings.

2 Lead a joint awareness raising campaign with industry for landlord assets with EPCs lower than E.

3 Introduce a new energy performance standard for commercial buildings over 1,000m^2 aligned to NABERS UK.

4 Provide a clear and precise roadmap for businesses to reach net zero, with guidance and actionable objectives.

5 Work with BSI Group and wider industry to review PAS2038 to align with retrofit best practice.

6 Collaborate with industry to understand and surmount retrofit investment challenges.

7 Mandate whole life carbon assessments on all major construction projects and provide a definition of embodied carbon in legislation.

8 Introduce a ‘consideration of retrofit’ for every major planning application that involves demolition.

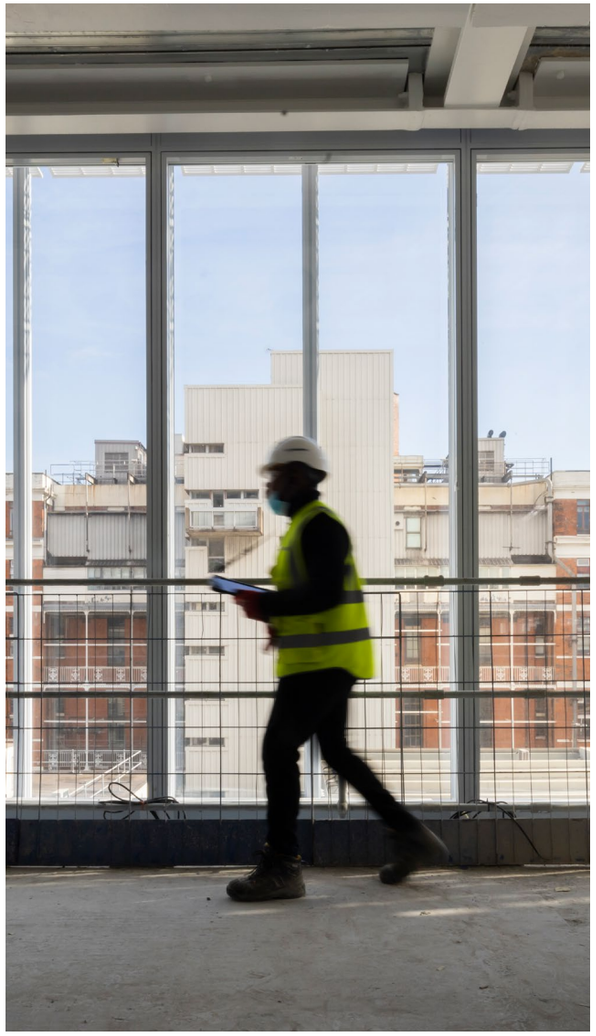
9 Develop fiscal incentives linked to the reuse or recycling of materials on both existing and new developments.

10 Organise a nationwide knowledge sharing campaign partnering successful applications for Public Sector Decarbonisation Scheme funding with those looking to apply.

11 Review the Public Sector Decarbonisation Scheme and the Public Sector Low Carbon Skills Fund to better support applicants from less economically stable regions.

12 Drive collaboration between energy suppliers and public sector bodies to improve the latter’s understanding of energy usage across their estates.

COMMERCIAL SECTOR



By ‘commercial’ we mean any buildings or infrastructure that is privately owned and not intended as residential space. From our work with businesses and commercial property owners nationwide, we know the drive to decarbonise is there. While this is undoubtedly driven by growing volatility in the energy market, this is not the only driver. Businesses keen to support the push to reach net zero and tackle the climate crisis are being bold and innovative with retrofitting their estates to support this nationwide initiative.

However, hurdles remain in the way of these goals. For decarbonisation across the commercial estate to be successful, the UK government has to meaningfully address these blockers to unlock as much net zero activity as possible.

Energy efficiency regulations - where we are at

To encourage commercial landlords to retrofit their properties, the government introduced the Minimum Energy Efficiency Standards (MEES) in 2018. It is still the government’s stated ambition for all non-domestic leased buildings to have an EPC rating of EPC B by 2030. To achieve this ambition, 87% of non-domestic buildings would need upgrading in some way. As a steppingstone to this target, all leased non-domestic properties will need to have an EPC of E from April 2023.

It will be an offence to let if it doesn’t have this rating, and landlords could be fined up to £150,000 per breach[14]. According to the government EPC database (last updated January 2023) 136,278 non-domestic properties still had an EPC rating of F or G. It is estimated that almost a quarter (24%) of London office space fail to meet these standards and could be unlettable from April 2023 upon their leases renewing[15].

The government has consulted on increasing this to EPC C in 2027 and then to EPC B in 2030. However, whilst the government have consulted on these proposals, at the time of writing there have been no firm proposals to introduce this into legislation. As this is likely to impact over 1 million properties, landlords and developers, need certainty on this, or they risk having stranded assets. The greater the certainty in this area the more the cost of undertaking such retrofit work can be priced into contracts enabling essential works.

87% of non-domestic buildings would need upgrading in some way

1 Provide immediate certainty on energy efficiency regulations.

2 Lead a joint awareness raising campaign with industry for landlord assets with EPCs lower than E.

MOVING BEYOND EPC'S

Measuring actual building performance as well as modelling energy use at the design stage helps to reduce the performance gap.

Is it time to move beyond EPCs?

The government consulted previously on mandating high building energy performance in buildings over 1,000m^2. Despite being few in number, these properties are responsible for almost 53% of carbon emissions from buildings[16].

Measuring actual building performance as well as modelling energy use at the design stage helps to reduce the performance gap, therefore reducing energy demand in buildings over the longer-term. Research found non-domestic buildings tend to use 3.8 times more energy in operation than they are predicted to do at the design stage[17].

Many new commercial developments are now using the NABERS certification which measures and rates the actual energy use of an office. This helps the owners of an asset track and communicate the energy performance of their buildings. If the government intend to proceed with their plans to introduce an energy performance standard for large commercial buildings, it should use a similar model to NABERS and ensure they are aligned.

3 Introduce a new energy performance standard for commercial buildings over 1,000m^2 aligned to NABERS UK.

PROVIDING CERTAINTY

Regardless of government commitments to net zero, there is a severe lack of a clear roadmap to support the commercial sector reach this goal[18].

Despite regular recommendations from the Climate Change Committee, including January's Investment for a well-adapted UK[19], this lack of clear direction is leaving estate owners in a bind, and risks a rush on retrofit in the lead up to 2050.

Industry groups like the Construction Leadership Council have been proactive in outlining the key steps organisations need to take to reach net zero, such as the CO2nstructZero[20] plan. It is also encouraging that the Transition Plan Taskforce, launched by HM Treasury in April 2022, has provided a series of recommendations to help private businesses create achievable, fundable net zero transition plans.

However without a clear government position on steps to decarbonisation, including timelines and expectations for each stage, business retrofit efforts could be stifled.

To be clear, the ambition from property owners to achieve net zero and align with government targets is there, with many taking the initial steps of examining emissions across their estates and installing measures like better insulation or low carbon heat methods. However, without a clear roadmap from government businesses may lack the confidence to commit without further support from expert consultants.

4 Provide a clear and precise roadmap for businesses to reach net zero, with guidance and actionable objectives.

The government also needs to address the primary industry standard for the retrofitting of non-domestic buildings, PAS 2038. Produced by the BSI group, sponsored by the former Department for Business, Energy and Industrial Strategy, the standard is a good starting point for addressing decarbonisation of commercial estates. However it falls down in two key ways.

First, the goals set out within PAS 2038 are not in keeping with cutting edge thinking about building decarbonisation, currently being championed by leaders across our industry. As a result, even if the standards of PAS 2038 are kept across all non-domestic retrofit projects, it's highly probable that net zero will never be reached.

Second, in its current form it doesn't offer best practice guidance for how a retrofit project should commence and proceed. By this we mean that it doesn't assign specific roles and responsibilities for key stakeholders across such projects, or outline essential works that need to be undertaken as part of a retrofit project.

For the former, while the document does outline that some roles on a retrofit project, such as Retrofit Lead Professional, and Lead Assessor among others, it leaves a lot of the detail of team organisation and responsibilities open to the business delivering the project. This often results in mismanaged expectations between clients and consultants when delivering work, particularly over who is responsible for risks or delivery outcomes. Given the complexity present in some retrofit works, this lack of clarity opens the door to poor outcomes for retrofit projects.

For the latter, PAS 2038 fails to clearly set out key stages in delivering retrofit works. This includes any repair or enabling works that are required to even begin this work. While this might seem self-evident to experienced retrofit professionals, for businesses without this knowledge it can set them up to fail right out the gate.

It is therefore essential that the government commits to a major review of the support it offers to the commercial sector regarding decarbonisation initiatives. If the goal of net zero by 2030 is to be met, we need a clear vision and roadmap on how each industrial sector can best align with this vision, as well as up to date standards and detailed guidance to enable non-domestic estates to be retrofitted successfully.

5 Work with BSI Group and wider industry to review PAS2038 to align with retrofit best practice.

INCENTIVISING RETROFIT

It is often challenging for businesses or venture capitalists to invest in retrofit or decarbonisation projects compared to new build developments.

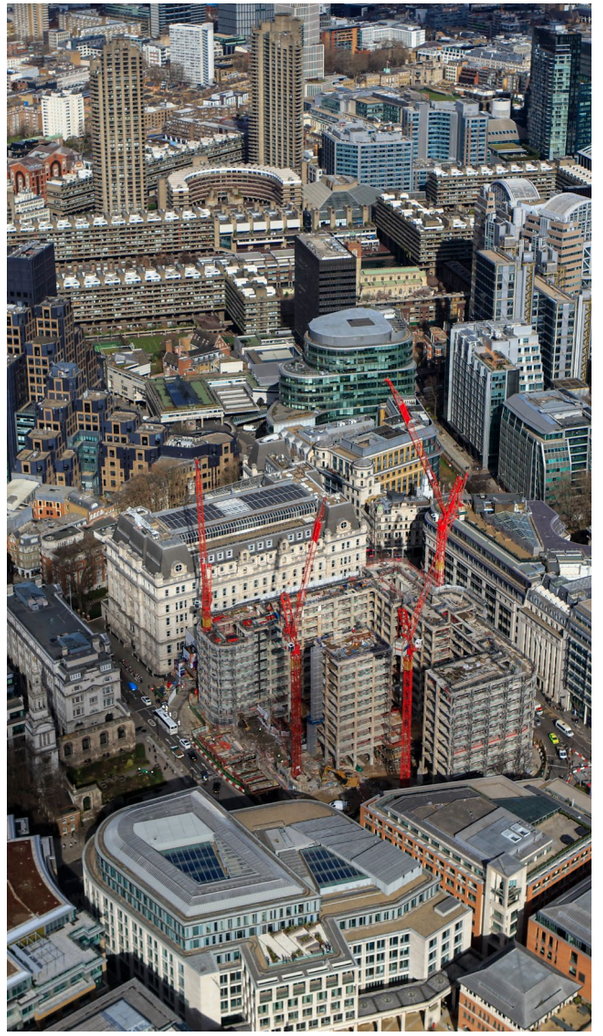
Across all manner of business decisions, price has historically been the key driver behind directions of travel. While it is not fair to say that no other factors impact decision making, the issue of cost and increasing value has, understandably, held the most weight.

This means that the need to decarbonise or otherwise retrofit commercial estates to reduce energy usage has typically fallen further down the chain, or at least difficult to justify without a strong business case focused on delivering value. It's worth noting that the conversation around this has shifted with the increased volatility of energy prices, but the fact remains that cost and value for money remain as key priorities.

Alongside operational decision making, it is often challenging for businesses or venture capitalists to invest in retrofit or decarbonisation projects compared to new build developments. Retrofitting an existing building to meet future standards while revitalising it for the market are seen as more risky ventures. It's a common perception that delays during delivery from quirks or difficulties present in the existing building could reduce the potential return on investment of these projects. In older buildings this sentiment is typically driven by a lack of records on the building's condition and works history, but it could also be a result of lack of knowledge sharing across a building's life cycle.

With the government recently recommitting to a 15% reduction in operational energy use across all variety of buildings and infrastructure[21], it is essential that the government address these misconceptions and cultural challenges. Its backing of the Social Value Toolkit in 2020 is a fantastic step forward, but a surer vision and greater incentives are essential to change investor behaviour and meet the drive for net zero.

6 Collaborate with industry to understand and surmount retrofit investment challenges.



REGULATING WHOLE LIFE CARBON

“The single most significant policy the Government could introduce is a mandatory requirement to undertake whole life carbon assessments for buildings.”

Environmental Audit Committee, 2022

While the focus of government policy on energy efficiency is critical, a large percentage of the emissions from the built environment come from the extraction, manufacture, and transportation of materials[22].

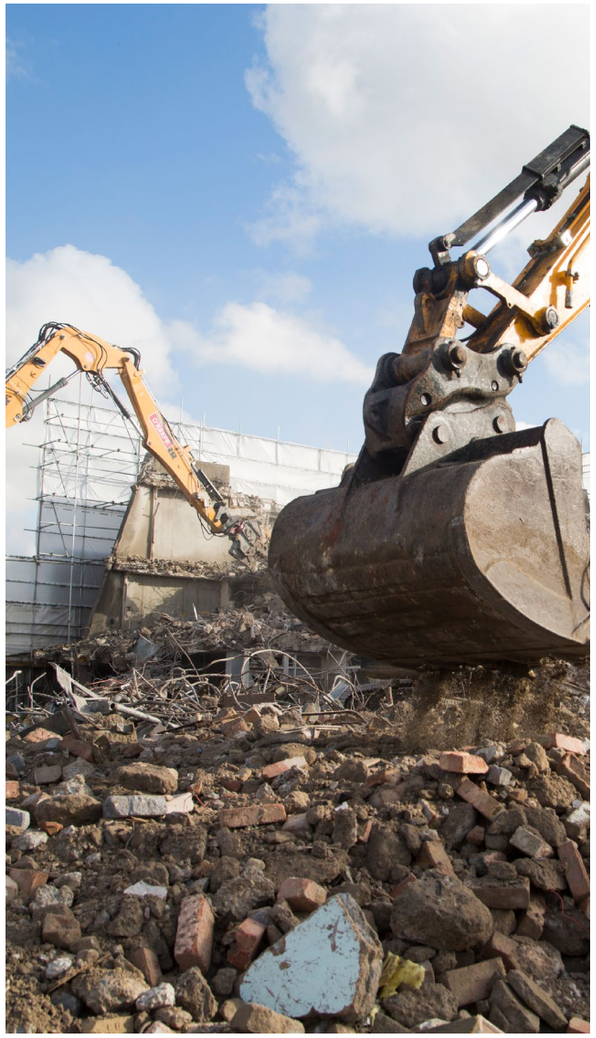
The industry and government must adopt a ‘whole life’ view of carbon and it is therefore important that a balance is struck in policy between operational carbon and the embodied carbon of buildings. However, regulation is mostly focused on the former rather than the latter.

Where regulation has been lacking, our industry has led the way. Many commercial developers and investors are placing embodied carbon targets into contracts, often based on targets developed by LETI[23]. Organisations from across the industry have been collaborating to develop the UK’s first Net Zero Carbon Building Standard, which will create a robust mechanism to prove built assets are net zero and in line with national climate targets. This is very welcome and is driving change through the construction industry in the way we deliver commercial office buildings. However, there is still no unified government definition or measurement of embodied carbon with different stakeholders in the industry using different mechanisms.

The ‘Part Z’ campaign is calling for an amendment to The Building Regulations 2010 to mandate the reporting of whole life carbon on all projects as well as imposing caps on embodied carbon on major projects. The Carbon Emissions (Building) Bill was recently re-introduced to parliament by Jerome Mayhew MP and would create the changes set out in this campaign. The Environment Audit Committee (EAC) support this campaign saying that introducing such a mandatory requirement would be ‘*single most significant policy the government could introduce*’ in this area[24].

7 Mandate whole life carbon assessments on all major construction projects and provide a definition of embodied carbon in legislation.

JUSTIFYING DEMOLITION AT PLANNING STAGE



There has been a growing movement in the built environment industry over recent years towards a retrofit-first approach to construction. This is in response to the high levels of materials the industry uses globally, and the embodied carbon these materials contain. Examples include the Green Construction Board's Zero Avoidable Waste initiative[25]. According to the RetroFirst campaign, construction is responsible for the majority of the world's demand for concrete, 50% of steel and 25% of plastics. RICS estimate that 35% of the whole life carbon of a typical new build office job will already have been emitted by practical completion.

It is for this reason, that campaigners have been calling for developments to take a 'retrofit-first approach' and why the government has taken the decision to intervene on some high-profile new build developments that require demolition. We agree that retrofit should be considered for every development which involves demolition, but this should be done at the earliest opportunity to avoid unnecessary delays, uncertainty and costs impacting on the delivery of new workplaces, homes and infrastructure. There may be good reasons to demolish a building, such as poor design, but these should be justified and set out clearly and up front in any planning application.

The government has committed to carrying out a review of the National Planning Policy Framework (NPPF) to ensure it aligns with climate mitigation targets, as well as to a consultation on the measurement and reduction of embodied carbon. We believe these provide an opportunity for the government to introduce a 'consideration of retrofit' for every major planning application that involves demolition. We are not advocating for a retrofit-only approach, but if a building is going to be demolished, clear reasons should be provided for this up front and mitigation measures of how materials will be reused or recycled should be included.

This would provide much greater clarity and, ultimately, we believe would help to future-proof our development pipeline and ensure that the Government will not face a growing need to intervene in the delivery process.

8 Introduce a 'consideration of retrofit' for every major planning application that involves demolition.

TAKING A CIRCULAR ECONOMY APPROACH

Contractors should be incentivised to retain, reuse or recycle as much of a pre-existing building as possible.

Mace recently fed into a report by the Green Alliance[26] that showed that its possible for the construction industry to reduce raw material use by 35% by 2035 by using technology and best practice that is already available. To achieve this the Green Alliance suggested the government set out clear, bold and long-term targets for the industry on reducing resource use in a similar way to the net zero target set out in the Climate Change Act 2008.

This could be achieved in separate ways including through the use of differing fiscal incentives. For instance, translating the total tonnage of materials reused or recycled into tax-credits, or offering reduced VAT on refurbished buildings. Sectors where recycling of materials is in its infancy, such as glass, should be supported with Research and Development funding.

Underlying these incentives requires a bedrock of quality data. Material Passports track important information about what goes into a building including materials, components and products. This technology as the time of writing remains rare in the UK, but if the industry is to radically reduce waste and resource usage, the government should encourage the take-up of Material Passports through the building regulations. The industry is already gearing up to digitise construction production information through the Golden Thread of Information, so moving to Material Passports should be the natural next step.

9 Develop fiscal incentives linked to the reuse or recycling of materials on both existing and new developments.

PUBLIC SECTOR

Local councils across the UK are often responsible for significant property and infrastructure estates.

The public sector is facing enormous pressures to deliver carbon savings and meet upcoming net zero targets. There has never been as much political and public will for an effective response to the climate emergency, and public bodies need to align their efforts with these expectations.

Local councils across the UK are often responsible for significant property and infrastructure estates, from schools and libraries to office buildings and public amenities. With many of these estates built in past decades, there exists substantial sources of operational and embodied carbon that the public sector needs to address.

Funding through the Public Sector Decarbonisation Scheme (PSDS) has proven invaluable in providing local councils, schools, NHS trusts and other public bodies grants for decarbonisation and energy efficiency measures, with over £711m awarded over the past three[27] phases to local authorities alone. Mace has worked with several councils to secure and/or direct funding towards retrofit measures across their estates.

However, while PSDS is a fantastic resource, this funding is not reaching all public bodies equally. Looking at the first three phases of funding specifically for local authorities, 33% of funds are going to the top ten applicants while over 50% are going to the top twenty.

This is not to say that such funds are allocated unfairly or that councils do not deserve the grants they received; this is a nuanced challenge that the government needs to address in partnership with UK councils and the industries that support them.

£711m awarded over the past three phases to local authorities alone

APPLICATION REQUIREMENTS

There is a risk that swathes of constituencies across the UK could miss out on funding for decarbonisation projects.

One of the most significant reasons for the disparity in PSDS funding allocation is the ability and resources available to councils to secure funding.

Salix Finance, the organisation working on behalf of the forner Department for Business Energy and Industrial Strategy to operate the PSDS, invites public sector applicants on an annual basis. The process is demanding, requiring detailed write-ups of current and historic energy usage, what decarbonisation initiatives the council wishes to commit funding to, as well as how it will deliver its retrofit programme if funded. This is only a snapshot of the detail require to secure funding.

The demands of the PSDS application process are valid since it would not be politically or economically prudent to be frivolous with public funds. However, they present significant hurdles for councils which lack the resources internally to develop strong applications, or the funding allocated to both employ consultants to support delivery or match-fund PSDS awards as required. While Salix can support the skills gap with funding through the Public Sector Low Carbon Skills Fund[28] (LCSF), this further puts a strain on the applicant's resources and is still unattainable for some.

As a result, there is a risk that swathes of constituencies across the UK could miss out on funding for decarbonisation projects. Some authorities are even deciding not to apply in future phases due to the high application demands and the risk of no funding despite best efforts.

With the joint pressures of needing to align with national net zero targets, changing energy standards and increasing energy costs, councils who miss out on funding could face estates that do not meet future demands and become stranded.

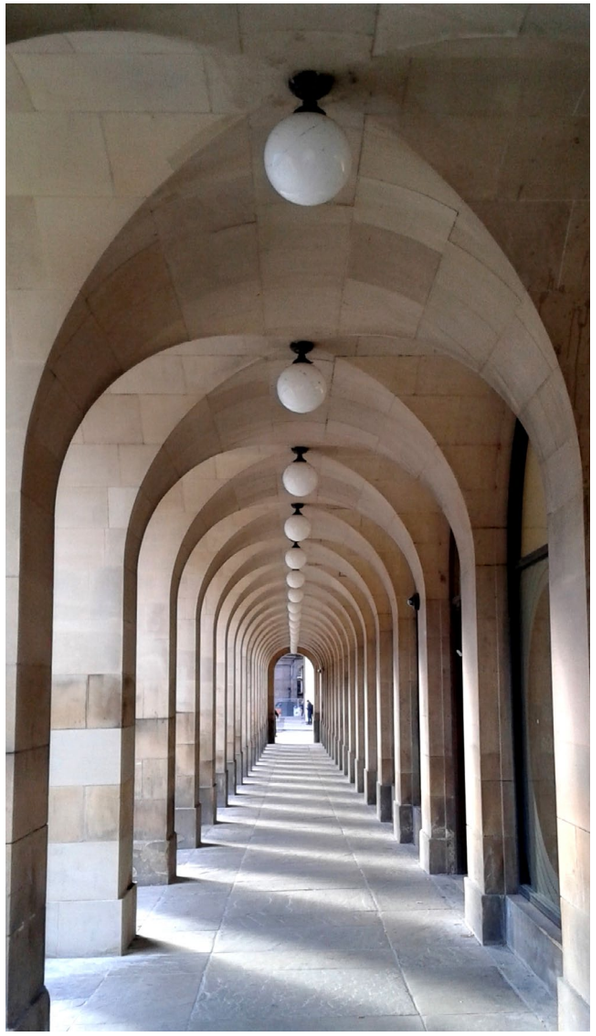
This is not an easy problem to fix. However, the new Department of Energy must work closely with councils nationwide to ensure that greater levels of decarbonisation schemes can be funded. While this can partly be solved through providing greater support to councils through expanding the LCSF, there is also the opportunity to launch a knowledge sharing campaign across council bodies.

With some councils proving more successful than others in securing PSDS funding, a campaign to help circulate their knowledge and experience would benefit those who have not secured funding so far. This would also need to include businesses across the private sector, particularly those who have supported councils receive and deliver funds successfully.

10 Organise a nationwide knowledge sharing campaign partnering successful applications for Public Sector Decarbonisation Scheme funding with those looking to apply.

11 Review the Public Sector Decarbonisation Scheme and the Public Sector Low Carbon Skills Fund to better support applicants from less economically stable regions.

INSTITUTIONAL LACK OF DATA



Another key issue with retrofitting public sector estates is a severe lack of data or awareness of operational and embodied carbon across their estates.

There are a multitude of reasons for this, from aging estates where carbon isn't tracked during construction to a lack of resource and know-how to accurately translate their energy usage to carbon emissions. Authorities typically need to request their energy data from their supplier network, which is not always timely or easily understandable by those responsible within the council. The outcome is poorer knowledge of where decarbonisation schemes are needed.

This of course prevents councils from submitting successful PSDS funding, but also presents a further risk to successful applicants. For instance, if a council is successful in receiving funding but it is found out that its carbon emissions data it reported is not accurate, they face significant legal repercussions. The risk of getting the submission wrong, combined with the lack of confidence in their data as it stands, further deters smaller or less well-resourced councils to submit for funding.

The installation of smart meters across public sector estates could go some way to resolving this issue, as recommended by a 2021 consultation from the former Department for Business, Energy and Industrial Strategy[29]. However, with some school estates still relying upon oil heaters, alongside large buildings across wider estates with multiple energy sources and uses, it is unclear how smart meter installation could help certain public sector organisations get on top of their energy usage data.

The creation of the dedicated Department for Energy Security and Net Zero is very encouraging in starting to resolve this problem, as it is not exclusive to councils and public sector bodies. Tackling this challenge requires a collaborative approach between the energy and public sectors. Ideally, ministers will want the energy sector to support councils and other bodies to better understand their energy consumption.

Again, this could form part of a wider knowledge sharing campaign to level up the public sector, but the government needs to offer incentives to accelerate this process. Otherwise, it risks stalling and falling further from its net zero target.

12 Drive collaboration between energy suppliers and public sector bodies to improve the latter's understanding of energy usage across their estates.

OWNERSHIP OF THE PROBLEM

It is all too tempting to focus on quick decarbonisation wins instead of a more structural review of how councils operate.

The UK government has made a legal commitment to becoming net zero by 2050, a 100% reduction in greenhouse gas emissions compared to 1990 levels[30].

Politically, this long-term goal can be challenging to act on now. While all mainstream parties are committed to the goal of decarbonisation, actual delivery of net zero by 2050 is potentially five or six general elections away and many more local elections across successive authorities. It is all too tempting to focus on quick decarbonisation wins instead of a more structural review of how councils operate that could easily be revoked and reworked by the next leadership.

This compounds the challenge of a lack of retrofit and decarbonisation skill sets across the built environment sector, as noted elsewhere in this paper. If public sector bodies only address the challenge of net zero after 2030 or 2040, they face twin challenges of a lack of industry resource to support them and likely inflated costs due to high demand.

There are of course encouraging signs that many local authorities are taking steps now to plan to hit net zero and well ahead of the 2050 deadline. However, according to Climate Emergency UK's 2022 Council Climate Plan Scorecards[31], only 86 councils have an area-wide net zero target of 2030 or earlier, and 33% of authorities have not set a target of 2050 or earlier. Combining with the finding that around a fifth of UK councils have not published plans to tackle climate change, there is a major risk that decarbonisation across public estates simply cannot happen in line with government targets.

For the government's net zero commitment to be reached by 2050, it needs to address this inertia and provide clear support, incentives and detriments to drive planning for success across the public estate.

A fifth of UK councils have not published plans to tackle climate change

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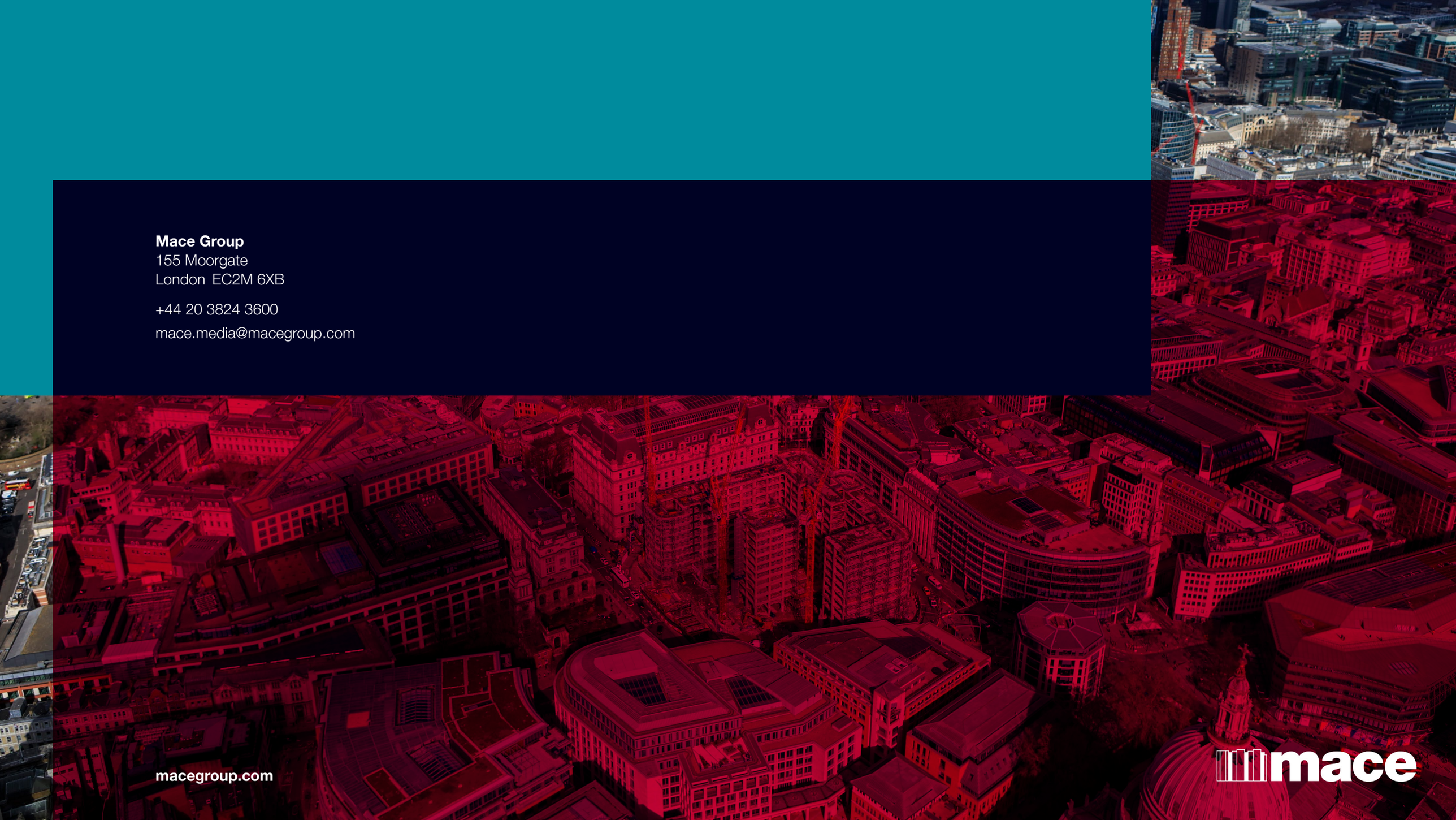

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