

## Written evidence submitted by the UK Green Building Council

### *About UKGBC*

The UK Green Building Council (UKGBC) is an industry network with a mission to radically improve the sustainability of the built environment, by transforming the way it is planned, designed, constructed, maintained and operated. As a charity with over 500 member organisations spanning the entire sector, we represent the voice of the industry's current and future leaders who are striving for transformational change.

### *Responses to the Inquiry questions:*

#### **To what extent have the Climate Change Committee's recommendations on decarbonising the structural fabric of new homes been met?**

There is currently nothing in national policy that requires embodied carbon emissions to be measured, let alone reduced. To date, policy has been focused on operational emissions, but as these reduce the importance and impacts of embodied carbon increase.

The Climate Change Committee (CCC) has repeatedly made clear that Government policies for new homes are not driving change at the pace required. It is recognised, however, that some local authorities want to or are already demonstrating leadership through ambitious policy. UKGBC's New Homes Policy Playbook is a resource developed to help cities and local and combined authorities to drive up the sustainability of new homes, including decarbonising the structural fabric of buildings. It offers a consistent foundation and approach to enable local authorities to benefit from shared learning and common resources and provides stability for industry around the requirements that should be expected across the UK<sup>1</sup>. The Playbook specifically outlines two recommendations for embodied carbon, both going further than national policy, starting with the measurement of whole life carbon emissions and ensuring that that measurement is based on consistent scopes and datasets. This will help create a greater understanding and visibility of these impacts – and the ongoing collation of data enables meaningful targets then to be set for both upfront embodied and whole lifecycle emissions.

In addition, UKGBC is calling on the Government to introduce progressively more stringent requirements through Building Regulations, as follows:

- At the next uplift, the Government should phase in requirements for the assessment of whole life carbon, starting with larger developments;
- In 2025, requirements should be introduced for all developments to assess and disclose whole life carbon impacts, and targets for reductions should be phased in, starting with larger developments;
- In 2030, targets should be introduced for all developments to make reductions in whole life carbon.

The CCC's recommendations also point to an increased use of timber, specifically stating that wood in construction is the most effective use of biomass within the bioeconomy<sup>2</sup>. UKGBC believes that structural timber, when correctly designed, tested and constructed, has a role to play in the construction of safe, low carbon buildings. However, Government must urgently undertake or commission further research into the use of structural timber within external walls (such as cross-laminated timber) to obtain relevant scientific data or experimental evidence to determine and quantify the performance of buildings constructed using

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<sup>1</sup> UKGBC, [New Homes Policy Playbook](#), January 2021

<sup>2</sup> CCC, [Biomass in a low-carbon economy](#), November 2018

structural timber when subjected to real fire loads. The lack of this data – and Government guidance – has anecdotally led to two consequences: first, a collapse in confidence leading to the cost of insurance playing a decisive role in material and building design choices; and second, a potential reluctance to use timber for building uses not impacted by the ban on combustible materials.

UKGBC reiterates that any structural fabric choices should be evaluated through a whole life carbon lens, and appropriate embodied carbon policies and data collection should be implemented. However, for this to be realised in the practical delivery of net zero new homes, Government must ensure clear regulatory and safety requirements are available for all materials that can expect to play a role in the transition of the built environment to a net zero economy.

### **How can materials be employed to reduce the carbon impact of new buildings, including efficient heating and cooling, and which materials are most effective at reducing embodied carbon?**

The carbon impacts related to the product and construction stages of a new building are significant, and in some cases can account for half of a new building's whole life carbon impacts<sup>3</sup>. The greatest carbon reduction potential lies with the option to 'Build nothing', but where not feasible, to 'Build less, clever and efficiently'<sup>4</sup>. In this vein, material choices should be considered within the context of the building's whole life cycle, i.e. modules A-D of EN 15978, and not just on the basis of the individual product or component specification or across a specific lifecycle period.

Materials can be employed to reduce the carbon impacts of new buildings in multiple ways, notably those that have lower embodied carbon, those that can minimise operational carbon from heating and cooling and those that can be used within a circular economy, thereby reducing the use of raw materials. Further details on these opportunities can be found within UKGBC's client guide on implementing circular principles within the design brief<sup>5</sup>. It should be emphasised however, that low-carbon material use should not be a substitute for a resource- efficient building design.

It is noted, however, that greater market awareness and innovation of low carbon materials is required to support the practical delivery of net zero buildings. This includes exploring opportunities to reduce the carbon impacts of traditional buildings materials, such as steel and concrete, whilst also working with the insurance, risk and fire industry to enable the potential of timber as a construction material.

### **What role can nature-based materials play in achieving the Government's net zero ambition?**

Nature-based materials can be considerably less carbon-intensive over their whole life cycle than some more traditional alternatives. They can, therefore, play a significant role in achieving the Government's net zero ambition, but this would require sufficient practices in place to ensure end-of-life and circularity pathways are developed and implemented.

For example, with timber there needs to be a greater awareness within industry of how biogenic carbon is considered in the scope of a whole life carbon assessment, as per the RICS methodology<sup>6</sup>. There is the potential for unintended consequences if end-of-life and circularity pathways are not effectively considered early on – for example, if timber is discarded and left to decompose at end of life (such as in landfill) methane is released, alongside the sequestered carbon dioxide. As methane has a global warming potential 28 times greater than CO<sub>2</sub>, this has the potential to negatively impact the achievement of the Government's net zero ambition<sup>7</sup>. This is exacerbated if the sequestration benefits of carbon are mistakenly double-counted through multiple reuse of the timber.

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<sup>3</sup> RICS, [Whole Life Carbon Assessment for the Built Environment, 1<sup>st</sup> Edition](#), November 2017

<sup>4</sup> Green Construction Board, [Infrastructure Carbon Review Technical Report](#), November 2013

<sup>5</sup> UKGBC, [Circular Economy Guidance for Construction Clients](#), April 2019

<sup>6</sup> RICS, [Whole Life Carbon Assessment for the Built Environment, 1<sup>st</sup> Edition](#), November 2017

<sup>7</sup> Ibid.

Any major signalling towards the use of timber or other nature-based materials will require a fundamental shift in how the UK manages and uses its land in order to ensure responsible and sustainable agriculture growth. It would also require a compatible regulatory and commercial environment to ensure confidence in the material, i.e. that there has been an appropriate level of safety and risk mitigation incorporated within the design, construction and operational life of a building.

Consideration should also be given to broader nature-based solutions (NBS), such as the benefits of green roofs, sustainable urban drainage, etc. which can all play a role in delivering a net zero built environment beyond just the building structure itself. Further details of these benefits are documented within UKGBC'S report, *'Principles for delivering urban nature-based solutions'*<sup>8</sup> and the Ignition Project report, *'Nature-based solutions to the climate emergency'*<sup>9</sup>.

### **What role can the planning system, permitted development and building regulations play in delivering a sustainable built environment? How can these policies incentivise developers to use low carbon materials and sustainable design?**

#### **Planning:**

The planning system has an extremely important role to play as a mechanism for driving a strategic approach to holistic decarbonisation, nature's recovery and climate adaptation - through site location, orientation, and whole-site design. The current system, including recent NPPF changes, is not currently delivering the pace of change we need to see in order to meet our environmental targets.<sup>10</sup> The Government's proposed reforms to planning in England offer an opportunity to promote greater action - however there is currently no overarching vision for land use, clarity on cross-boundary cooperation or a 'national spatial strategy' to underpin the proposed map-based system and new land designations. To help address this, we therefore recommend the following:<sup>11</sup>

There must be direct legal alignment between the new Planning Bill, the Climate Change Act and the forthcoming target for biodiversity abundance in the Environment Bill. The Planning White Paper made no mention of the existing requirements/statutory duties for Local Plans to pursue carbon emission reductions, in line with the Climate Change Act, and was silent on how carbon emissions data will be used to inform local policy and planning decisions under the new system.<sup>12</sup> We are concerned that proposed changes to Local Plans will therefore remove this duty and lose the impetus it generates for climate action on a local level. In any new Planning Act, or changes to the NPPF, we need an updated, strengthened duty which applies to all relevant parts of development. National guidance should set out a clear methodology for accounting for carbon emission in the local plan preparation and the development management process.<sup>13</sup> This should include developing guidance on a process for local authorities to record and report on development-related emissions data. This should be backed by sufficient funding for local authorities and other stakeholders such as Natural England and the Environment Agency, and ultimately include both operational, embodied and whole life carbon data.

There should be robust environmental requirements embedded in the process for determining all area designations, but especially in growth areas, given the scale of development likely to take place. This should include delivering biodiversity net gain, alongside measures to ensure that buildings are sufficiently

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<sup>8</sup> UKGBC, *Principles for delivering urban nature-based solutions*, April 2021

<sup>9</sup> Business in the Community, UKGBC, Greater Manchester Combined Authority, *Nature-based solutions to the climate emergency*, April 2021 <https://www.ukgbc.org/wp-content/uploads/2020/08/Nature-based-solutions-to-the-climate-emergency.pdf>

<sup>10</sup> See the Housing Audit 2020: <https://indd.adobe.com/view/23366ae1-8f97-455d-896a-1a9934689cd8>

<sup>11</sup> For our full response to the Government's White Paper see: <https://www.ukgbc.org/wp-content/uploads/2020/10/UKGBC-Planning-for-the-Future-White-Paper-response.pdf>

<sup>12</sup> For more information, See: <https://www.cse.org.uk/downloads/reports-and-publications/policy/planning/planning-white-paper-consultation-october-2020.pdf>

<sup>13</sup> <sup>13</sup> Ibid

prepared for the impacts of climate change and that what is built is compatible with reaching our national net zero emissions target. These requirements should also be supported further in revisions to the NPPF, guidance for local authorities in the drafting of Local Plans, planning policy guidance and in design codes. To ensure any land allocations do not contribute negatively to the climate resilience of a locality, greater powers should be given to Catchment Partnerships and these bodies should act as a statutory consultee to the planning process and ensure that flooding and drainage issues are considered holistically across the catchment.

Local Area Energy Plans should become a required component of the evidence base for any new-style 'zoned' Local Plans, to ensure that the energy needs (and therefore carbon emissions) of new developments are planned in such a way as to fit within the decarbonisation strategy for the Local Plan area as a whole.<sup>14</sup> Any new, consolidated 'sustainable development test' should include a standardised requirement for local plans to assess, describe and plan for the energy system transition that will be needed across the entire Local Plan. To deliver this, clear underlying metrics for carbon accounting, monitoring and reporting (as well as securing climate adaptation in plan-making and site allocation decision-making) must be developed.<sup>15</sup> The new test should also embed a natural capital approach - designed to assess the value of the natural environment for people and the economy. This would effectively encompass the Environment Bill's four target areas: air quality, biodiversity, water, waste reduction and resource efficiency.

Many local authorities have already set ambitious targets for waste reduction and material reuse within their planning requirements. Some have required the provision of a 'Circular Economy Statement' or a requirement to calculate and reduce the whole lifecycle carbon emissions (including embodied carbon emissions) through a nationally recognised Whole Lifecycle Carbon Assessment methodology.<sup>16</sup> Other potential options include applying mandatory pre-demolition and pre-refurbishment audits to projects above a certain size. This can be a vital catalyst for promoting reuse, reducing material consumption, embodied carbon emissions, and whole life carbon. We therefore recommend that local authorities be encouraged to develop and enact these policies.

### Design codes

We support the introduction of the National Model Design Code (NMDC), its proposed role in supporting the development of local codes, and the inclusion of a wide range of sustainability issues, including embodied carbon, biodiversity enhancement and climate resilience.<sup>17</sup> However, we would wish to see a much stronger emphasis on the importance of delivering sustainability outcomes throughout the NMDC, and sustainability should be explicitly added to the list of minimum requirements for all resulting local codes, in line with the importance of supporting progress towards the UK's various environment commitments.

The National Model Design Code and derived local Design Codes need to be much more specific in terms of the best practice and quality they seek to deliver, particularly in terms of sustainability, with illustrative best practice targets, metrics, requirements, mechanisms or benchmarks, such as those included in UKGBC's New Homes Playbook. They should also include specific mechanisms such as greening factors.<sup>18</sup> There should be much greater detail and guidance on how these sustainability requirements can be successfully integrated and coded for across the various area types and development archetypes

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<sup>14</sup> <https://www.cse.org.uk/downloads/reports-and-publications/policy/planning/planning-white-paper-consultation-october-2020.pdf>

<sup>15</sup> <sup>^</sup>Ibid

<sup>16</sup> <https://www.ukgbc.org/wp-content/uploads/2021/03/UKGBC-local-elections-briefing-2021.pdf>  
<https://www.ukgbc.org/wp-content/uploads/2021/01/New-Homes-Policy-Playbook-January-2021.pdf>

<sup>17</sup> <https://www.ukgbc.org/wp-content/uploads/2021/03/UKGBC-response-to-the-NPPF-and-National-Model-Design-Code-consultation-proposals.pdf>

<sup>18</sup> <https://www.ukgbc.org/wp-content/uploads/2021/01/New-Homes-Policy-Playbook-January-2021.pdf> ;  
<https://greenblue.com/gb/the-urban-greening-factor/>

illustrated. For design codes to be meaningful, and not simply duplications of existing guidance, they should be firmly connected to new site allocations in development plans and accompanied by improved enforcement.

### **Building Regulations:**

As highlighted in our response to MHCLG's consultation on Part L and the Future Homes Standard, we believe that the Government must set out a trajectory for tightening Building Regulations to ensure that all new buildings in 2030 operate at net zero carbon for regulated and unregulated energy.<sup>19</sup> We have also set out in our response to Q. 1 our recommendations for tackling embodied carbon through successive upgrades to Part L.

To ensure that new development is suitably resilient to the impacts of climate change from the outset, Part C of Building Regulations should also be updated to require all properties at risk of flooding to include property flood resilience measures. These measures should be specified and installed in accordance with the industry Code of Practice for property flood resilience. The use of Sustainable Drainage Systems (SuDS) should also be made mandatory for all development, where applicable, and updates to Non-Statutory Technical Standards for SuDS should include a requirement for multi-functional environmental benefits, such as biodiversity enhancement. Part G of Building Regulations should be updated to use a 'fittings-based' approach only, underpinned by a mandatory water label for all fixtures, fittings and water-using products, visible at the point of sale (similar to the existing energy consumption label). This label should be linked to minimum standards for water efficiency, which could be tightened over time. Minimum product standards should be set to achieve 100lpppd initially and be tightened over time to achieve 85lpppd by 2050.<sup>20</sup>

### **Permitted development**

UKGBC has repeatedly expressed strong concerns about the extension of Permitted Development Rights (PDR), given the extensive evidence of their detrimental impact on development quality, sustainability outcomes and residents' health and wellbeing. Despite the use existing pattern books and standard specifications, permitted development continues to deliver poor quality development across the built environment.<sup>21</sup> We believe the proposed changes to the NPPF should better reflect the Building Better Building Beautiful Commission's recommendation that: "The government should evolve a mechanism whereby meaningful local standards of design and placemaking can efficiently apply to permitted development rights."<sup>22</sup> Permitted development rights should be used as sparingly as possible (e.g. for small-scale, low-impact development that is unlikely to be contentious). PDR should also be reformed to include much stronger sustainability requirements, such as achieving higher energy efficiency and air quality standards, access to green spaces, ensuring climate resilience through mitigating overheating risk, and promoting nature-based solutions and urban greening.

We also believe that the recent expansion of permitted development rights, which allows developers to demolish and rebuild vacant commercial buildings, industrial buildings and residential blocks as homes without planning permission is a highly retrograde step and should be withdrawn.

### **What methods account for embodied carbon in buildings and how can this be consistently applied across the sector?**

The BS EN 15978 standard 'Sustainability of construction works: Assessment of environmental performance of buildings calculation method' is accepted as the industry leading standard for measuring

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<sup>19</sup> <https://www.ukgbc.org/wp-content/uploads/2020/02/UKGBC-Response-to-MHCLG-Future-Homes-StandardConsultation-FINAL.pdf>

<sup>20</sup> <https://www.policyconnect.org.uk/research/bricks-water-building-resilience-englands-homes>

<sup>21</sup> <https://www.gov.uk/government/publications/quality-standard-of-homes-delivered-through-change-of-use-permitted-development-rights>

<sup>22</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/861832/Living\\_with\\_beauty\\_BBBBC\\_report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/861832/Living_with_beauty_BBBBC_report.pdf)

and reporting the embodied carbon impacts of buildings in the UK. This standard is commonly applied for leading new commercial and residential development projects, and further market penetration should be supported for new homes.

This standard is the overarching framework, under which additional pieces of guidance provide further detail and consistency. This includes the RICS Professional Statement<sup>23</sup> and CIBSE TM65 guidance<sup>24</sup>, with additional pieces of guidance that are still emerging and that continue to build on the BS EN 15978 standard.

### **Should the embodied carbon impact of alternative building materials take into account the carbon cost of manufacture and delivery to site, enabling customers to assess the relative impact of imported versus domestically sourced materials?**

Yes – customers should always be provided with the relevant information to assess carbon cost from ‘cradle to grave’, in other words taking a whole life carbon perspective. This information should not discriminate between UK territorial emissions or those imported from overseas, as the UK’s ambition is to reduce global greenhouse gas emissions and not just its own. Whilst the CCC may not currently address emissions from overseas, UKGBC’s Whole Life Carbon Roadmap project<sup>25</sup> is ensuring that this blind spot no longer persists, and that the UK’s property and construction sector account for all emissions it is responsible for.

BS EN 15978 provides a readily applicable method for calculating and reporting the carbon cost of construction products and materials from ‘cradle to gate’. This includes emissions from: raw materials extraction (module A1), transportation for manufacturing (module A2), manufacturing (module A3), transportation to construction site (module A4), and construction and installation process (module A5).

Widespread use of Environmental Product Declarations (EPDs) and embodied carbon assessments (using BS EN 15978) should be deployed to allow customers to undertake a fair comparison between alternative building materials.

### **How well is green infrastructure being incorporated into building design and developments to achieve climate resilience and other benefits?**

There is a wide variation in how developers, industry bodies and LPAs have incorporated green infrastructure into building design and developments. These inconsistencies can also create delays and uncertainty for developers. A lack of policy certainty and consistency has been specifically cited by planners and ecologists when discussing barriers to the delivery of beneficial green infrastructure. Whilst green infrastructure is undoubtedly being deployed across the sector, it is currently unlikely that this will be sufficient to deliver consistent, high quality progress at a national level without further intervention. In 2018, 22% of UKGBC’s Gold Leaf members had a commitment to biodiversity net gain (up from 9% in 2017). 44% of UKGBC’s Gold Leaf members have a nature and biodiversity strategy in place.<sup>26</sup>

UKGBC strongly supports initiatives such as urban greening factors in the London Plan, as these provide clear mechanisms by which green infrastructure can be delivered and its benefits quantified. Our members have particularly welcomed the certainty provided by the likes of the urban greening factor. The virtues of simplicity and consistency in approaches such as biodiversity net gain and the urban greening factor, have been strongly emphasised, providing potential efficiency savings for developers and consultants. The National Model Design Code, and derived local codes, should include greening factors and accompanying detailed guidance to help promote green infrastructure.<sup>27</sup>

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<sup>23</sup> RICS, [Whole Life Carbon Assessment for the Built Environment, 1<sup>st</sup> Edition](#), November 2017

<sup>24</sup> CIBSE, [TM65: Embodied carbon in building services: A calculation methodology](#), January 2021

<sup>25</sup> UKGBC, [Whole Life Carbon Roadmap project](#), ongoing

<sup>26</sup> <https://www.ukgbc.org/wp-content/uploads/2019/02/UKGBC-Leading-the-Way-2019.pdf>

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In order to fully secure the benefits of green infrastructure for climate adaptation and resilience, consistent metrics must be developed to help quantify the impacts and benefits at both the scale of an individual development and in local plans. UKGBC supports the introduction of the principle of 'environmental net gain', to help quantify and deliver the benefits of green infrastructure for climate adaptation resilience. Furthermore, the use of Sustainable Drainage Systems (SuDS) for all new developments in England should be made mandatory under Schedule 3 of the Flood and Water Management Act.

### **How should we take into account the use of materials to minimise carbon footprint, such as use of water harvesting from the roof, grey water circulation, porous surfaces for hardstanding, energy generation systems such as solar panels?**

It is critically important that any measures or equipment are considered within a whole life carbon assessment, as otherwise the operational savings and broader benefits may be unknowingly outweighed by the embodied impacts. A good example of this challenge is with solar photovoltaics (PVs) – crystalline PVs in particular are known to have a high embodied carbon footprint. With the UK electricity grid expected to decarbonise rapidly over this decade, the operational savings through avoided emissions will decrease over the PV's operational lifetime.

Including these measures or equipment within whole life carbon assessments means that greater pressure is applied for the embodied carbon data of these products to be calculated, produced and shared. It also supports a shift towards lower carbon alternatives, innovation in the manufacturing, maintenance and lifecycle of these products and fundamentally provides a more accurate reflection of the whole life carbon impacts of the project. This is increasingly important as embodied carbon starts to account for a bigger share of the overall carbon impacts of the built environment.

### **How should re-use and refurbishment of buildings be balanced with new developments?**

Re-use should be prioritised wherever possible, and the requirement for new-build development interrogated through the planning process, with high-rise new-build development considered a last resort from a carbon point of view. Upfront embodied carbon assessments are starting to be requested by planning authorities, for example the GLA – however, targets are not yet established in policy, and embodied carbon is not yet being factored into formal carbon appraisals for determination of carbon offset payments.

Foundations and structure account for c. 50% of a building's upfront embodied carbon (i.e. up to building completion), which is a significant proportion of a building's whole life carbon emissions. Critically these emissions are already emitted at the point of building handover, i.e. before the building is even occupied. Therefore development viability assessments for urban development should focus on the development potential of sites whilst retaining as much of the existing sub- and super-structure as possible. It is likely that some form of new development or extension will be required to fulfil the development opportunity of sites, but significant embodied carbon savings will be achieved where foundations and existing structure are retained. Lightweight structural additions are a key approach to maximising the development potential of existing structures at lowest embodied carbon cost.

### **What can the Government do to incentivise more repair, maintenance and retrofit of existing buildings?**

Embodied carbon data could be included in sustainability assessments submitted with planning applications and could form part of the process in determining carbon offset payments. This would directly incentivise and reward the retention and re-use of assets as opposed to the demolition and re-build approach. A comprehensive and wide-ranging strategy to domestic retrofit is also required, dealing with this complex and multi-faceted challenge, as proposed in the Construction Leadership Council's National Retrofit Strategy<sup>28</sup>.

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<sup>28</sup> Construction Leadership Council, [Greening our existing homes: National Retrofit Strategy](#), December 2020

We also strongly advocate changes to the current VAT regime, which perversely incentivises new build through a zero-rating, whereas VAT is charged at 20% on refurbishment, repair and maintenance. We have therefore been calling for some time for the VAT rate on refurbishment, repair and maintenance to be reduced from 20% to 5%. Retaining existing structures – depending on structure size and condition – can typically result in up to 60% of carbon savings, as the construction of a new structure constitutes the bulk of carbon emissions.<sup>29</sup> Consideration should also be given to reducing the VAT on materials and products made of re-used materials and circular solutions, based on a sliding scale to reflect the proportion of embodied carbon saved over the whole life of the material or product.

Please note too our previously expressed strong objection to the new expansion of permitted development rights that enables vacant commercial buildings to be demolished to create new residential units, without planning permission.

*June 2021*

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<sup>29</sup> AECOM, [\*The carbon and business case for choosing refurbishment over new build\*](#)