PLANNING APPLICATION

NET ZERO CARBON STATEMENT

FOR

MS K. SUTTON

AT

HIGH TREES

POOLE LANE

STROUD

GLOUCESTERSHIRE

GL5 5LD

1231 -BDR-V1-XX-ST-A- 6104

Issue Record

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Net zero only means net zero when it calculates carbon emissions over the entire lifecycle of a building. Calculations also have to be based on reliable data and models.

Traditional construction materials and methods generate vast quantities of embodied carbon emissions. There's no way around this. Carbon emissions happen when raw materials are extracted, processed, transported and assembled.

You can mitigate emissions by using more recycled content and potentially through carbon capture – but you can't eliminate them. Embodied carbon emissions are irreversible.

For a building to be net carbon zero, the embodied carbon in steel, concrete and other materials has to be balanced.

Structural timber can achieve this. It has negative levels of embodied carbon because trees extract and store atmospheric carbon as they grow. Carbon is safely locked into the structure until the timber is burned or decomposes.

In practice, few construction projects have achieved the levels of energy efficiency modelled in the design

Designers Statement

Our sustainable and regenerative design policy commits us to making a meaningful contribution to the UN Sustainable Development Goals (SDGs). SDG13 requires us to take urgent action to combat climate change and its impacts, including reducing emissions to align with global commitments.

To achieve net zero emissions for our 2025 operations we will:

- Continue to implement our office emission reduction action plans as part of our overall environmental management system.

- Disclose our annual greenhouse gas emissions accounts and, for residual hard-to-decarbonise emissions, we will purchase Gold Standard certified offsets, particularly to offset all domestic and international flights.

- We will explore science-based targets and seek to set global reduction targets for our scope 1, 2 and 3 greenhouse gas emissions in line with 1.5 degrees C projections.

Implementation

- We will explore the Science Based Target initiative and evaluate its target-setting approach and reporting mechanisms.

- We will develop a greenhouse gas emissions management plan, to identify regional targets for Scope 1, 2 and 3 emissions, priorities for action, investment, governance and reporting.

- We will increase the proportion of renewable energy consumed in our offices and be advocates for appropriate energy transition pathways in locations where purchasing renewable energy is limited.

- We will review our procurement practices to reduce consumption and minimise waste.

- We will explore partnerships and funding mechanisms to support greenhouse gas emissions removal both through nature-based systems and technology to accelerate our own and others' efforts to decarbonise.

- We will consider alternative working practices, review the location of our offices, and provide information and support to employees on sustainable transport options to and from our offices and how best to work

- We will integrate our greenhouse gas emissions reduction plans through the application of our environment policy and working towards environmental management system ISO 14001.

- We will communicate our progress to our clients and stakeholders.

Governance

This statement is made on behalf of the directors and is implemented across all BDR Design Limited operations. The Sustainability Practice Leader will monitor performance and provide bi-annual updates to directors. This statement will be reviewed and approved annually.

Environmental Policy

BDR Design Limited's strategy is to design and deliver socially and environmentally regenerative buildings and assets by 2035, and as a first step to reach this, to design net zero carbon / net zero carbon ready buildings and infrastructure by 2030. BDR Design Limited is also committed to making its operations (energy use in offices and business travel) carbon neutral, first through reducing energy consumption, energy efficiency and procurement of renewable energy, and finally through buying carbon offsets.

BDR Design Limited acknowledges that it has an impact on the environment both directly, through business operations, and indirectly, through the designs it develops on behalf of clients. In relation to our direct impacts, we recognise that we must 'lead by example' and commit to protecting and restoring the environment. This involves effectively managing our significant environmental impacts through the implementation of appropriate controls designed to limit adverse impacts and promote beneficial impacts of the direct and indirect aspects of our business operations and services.

Whilst we have the most influence over our direct impacts, we also realise that our designs can impact the environment. We therefore endeavour to do everything we can to ensure that our designs limit the potential for negative impacts and seek to enhance the natural environment, recognising the need to restore planetary boundaries. Furthermore, we inform our clients of their legal obligations and encourage them to go beyond compliance and to recognise the current climate emergency and biodiversity extinction crisis.

Sustainable and Regenerative Design Policy

To design and deliver socially and environmentally regenerative buildings and assets by 2035, and as a first step to reach this, to design to an outcome of net zero carbon/net zero carbon ready for all our design work

BDR Design Limited recognises the importance of the UN Sustainable Development Goals in providing a holistic framework through which we can measure improvements to both the natural world and society, and we are committed to measuring our design work against these goals.

Our strategy involves collaborating with clients and suppliers that share the same ambitions, upskilling and training our architects and designers, and partnering with research organisations and other groups to deliver our objectives.

Client Engagement

There are plenty of benefits to clients in having their projects working towards Net Zero Carbon

- Enabling more accurate forecasting of business expenditure in face of rising operating costs since targets are performance targets of actual use
- Reduced whole life operating costs as buildings are more efficient and cheaper to run
- Potential reduced capital costs as embodied carbon targets push towards leaner, more efficient designs using
- Reduced levels of dissatisfaction and discomfort in building users and occupiers driven by the focus on quality and commissioning required to meet the performance targets
- Increased levels of productivity and happiness in building users as a consequence of improved building performance and commissioning
- Greater insight and clarity of client's own environmental and carbon footprint
- Supporting net zero business models and buildings' role within these
- Staying abreast of mega trends of increased societal awareness and accountability
- Increased customer, consumer, staff and occupier driven expectations for brand credibility and reputation
- Demonstrable leadership ahead of business-as-usual approaches
- Mitigates and removes risk of non-compliance with future regulation and future mandatory performance declaration

Clients that commit to an engagement in becoming Net Zero Carbon will be requested to provide actual energy and water usage data one year after project completion to the project designer. These figures should be taken from energy/water meter readings (or energy/water bills) for the building over a year so that both winter and summer seasons feature in the calculation.

We will be requesting that interest domestic clients target energy usage less than 35 kWh/m2/yr. This aligns with the Climate Emergency Design Guide, published by LETI (London Energy Transformation Initiative).

An embodied carbon, the carbon dioxide (CO_2) emissions associated with materials and construction processes throughout the whole lifecycle of a building or infrastructure, including any CO_2 created during the manufacturing of building materials, the transport of those materials to the job site, and the construction practices used, target of less than 625 kg CO2e/ m2 in domestic buildings.

Design Strategies

Reduction is the overarching design approach for all net-zero strategies as it directly affects the carbon required to offset later. Reducing the energy demand on a building provides the appropriately sized system for building operations and can lead to large cost savings. Reducing embodied carbon through material decisions often results in enhanced occupant experience by decreasing harmful off-gassing from chemicals that affect the occupants' productivity.

As each building and its conditions are unique, it's important to note that rule-of-thumb concepts are not enough to make a net-zero building, and optimization is the key to striking the neutral-balance. However, there are common design strategies that help understand the impact of their decisions. Applying any number of the below strategies during the design process will guide working toward energy and embodied carbon reduction and keep the project on track toward net-zero.

Think About It Early

Considering the building physics at the start of the design process can create a much more efficient building

Passive Strategies

Designing with passive strategies is about understanding the environmental constraints of the site and designing a response that does not require active mechanical systems. Examples include using ambient energy sources to cool, heat, shade, or ventilate a building space. Working with the existing natural conditions without requiring added electrical load helps decrease the energy required to offset for a net-zero building. Environmental qualities have a critical role in design to know what is specifically needed to minimize heat transfer through the building envelope (exterior walls), which will then rely less on mechanical systems to maintain occupant comfort levels. The challenge with designing for passive strategies is that they must be incorporated in the early stages of the process to be effective.

Solar Shading

Solar shading is a form of solar control that can be used to optimize the amount of solar heat gain and visible light that is admitted into a building. Solar Shading is a powerful passive strategy that if fully utilized can have a massive impact on a building's overall performance and space quality. A good way to think about this is to consider that the heat added to the inside of your building has to be adjusted to stay at set temperature levels, typically by an HVAC system. The less the mechanical system has to work, the less energy you need to use, and the more likely your design will reach net-zero. Solar shading encompasses a large scope of design strategies, like WWR (Window to Wall Ratio), Glazing Placement, Fenestration Performance, Shading Elements, among others.
Using this strategy, designers can reduce energy use and have a strong impact on the thermal and visual comfort of the occupants by preventing overheating and glare during sunny seasons in the year. However, the effectiveness of the shading strategy is dependent on multiple factors, including shading device type, depth, context, and building program.

Strategise the costs

Calculate the uplift in capital costs against whole-life cost reductions, or isolate the costs to have a realistic discussion about a better market value for a better product.

Active Strategies

A building's energy use refers to the energy required to operate and sustain the project once it's occupied. The metric is expressed as the energy per square meter per year (kWh/m2/yr.), or as it is more commonly known, as the EUI or energy use intensity. By calculating the energy a building consumes annually, designers can better predict the project's cost as it is directly linked to a building's energy

EUI breakdown includes heating, cooling, lighting, equipment, fans, pumps, and hot water, representing the mechanical system of a functional building. A more detailed overview of what is covered in these categories can be found here.

The goal is to increase the efficiency of the active system to decrease the demand for energy overall. Showing a reduction of energy use is helpful, but to reach net-zero energy the optimal overall solution is

project has many variables and entities involved that don't all have net-zero as the top priority. Optimizing for energy reduction and initial cost helps the whole team quickly reach an informed decision on the best route forward with the best performing options

Renewable Energy

On-site renewable energy is another essential tool for reaching net-zero. Off-site renewable energy is also essential but requires live operational data from the source energy (power plant) and is thus outside the scope of building design. Providing energy generation is the final tool for net-zero energy design and is possible through technologies that produce electricity, like wind or photovoltaic "solar" panels.

The strategy is simple: Use natural energy sources like the wind or the sun to generate electricity.

For a building to reach net-zero, this strategy must produce enough electricity to what it uses annually. For example, solar panels are an assembly of silicon cells mounted in a frame with wiring that helps absorb and convert sunlight into usable electricity. By calculating the total square feet of panels and the type of panels used, designers can calculate the annual power generation of the building project. Power generation is the final piece of building design to reach both net-zero-energy and net-zero-carbon status.

To achieve positive results, it is necessary for the designers and all the actors present in the construction to have access to information and data so that they can choose the best solutions and strategies for each situation. In this sense, analysis and simulations are valuable resources.

Do not forget the other stuff

Do not get blinkered in the pursuit of zero carbon. Make sure to create a broadly sustainable solution and, of course, a great building that people will love.

Obstacles to achieving net zero carbon

The first obstacle is to reduce the operational carbon in buildings. The Passivhaus Planning Package (PHPP) works as an accurate energy predictor, which helps think about efficiencies ahead of trying to ‘game’ your carbon output. However, note that this system has a real impact on the design of a building from the start – achieving the standard is difficult with a complex and inefficient building form.

The next hurdle is the embodied carbon of a building and however there are no statutory test for these measurements. Tackling this will have a real impact on the design buildings. This will involve using natural materials and products and drastically reducing reliance on concrete, both aesthetically and to solve fire and acoustic issues.

Sustainability is such a wide-ranging issue and it's perilous to forget nature, ecology, landscape, water, lifestyle, waste, drainage and transport to create a beneficial holistic system. Most importantly the aim is to create buildings that people will love, and allow communities to thrive, creating a positive addition to our urban and rural environments.

Requirements

Whilst at present there are white papers "ENERGY WHITE PAPER Powering our Net Zero Future December 2020 | CP 337". There are governmental strategy documents "Net Zero Strategy: Build Back Greener October 2021". There are assessments "UK Climate Change Risk Assessment 2017". But there are, regrettably, no legal requirement set down as to the levels of carbon that can be emitted either in the construction of or utilisation of a building during its lifespan in effect at this present time.