CLIENT SUSTAINABILITY GUIDE



ARCHITECTS

A brief guide to sustainability and low energy building design for domestic clients

why?

The Climate Crisis is the greatest challenge of our time. Rising temperatures are leading to weather extremes, natural disasters, environmental degradation, food and water shortages, economic disruption and political conflict.

Maintaining the 'Status guo' is no longer an option. Action needs to be taken now, and by all of us. It will be no mean feat; tackling the Climate Crisis will require the collective efforts of everyone to prevent catastrophe.

The construction industry is responsible for 49% of UK carbon emissions, so taking immediate steps to adapt practices and processes within the built environment is cruicial in slowing the progress of climate change.

The UK Government requires the UK to end its contribution to global warming by 2050 by bringing all greenhouse gas emissions to net zero, and the Roval Institute of British Architects has set a 2030 Climate Challenge to meet and exceed the Government's target.

This guide has been produced in order to help our clients understand a bit more about why and how you can reduce your carbon emissions when it comes to constructing or renovating a building.

At Liv Architects, we can help you to make vour project more sustainable for the benefit of the planet, and for yourself. With good design, you can make your building not only more environmentally friendly, but also more comfortable to live in, better for vour health, and cheaper to run.

Leading scientists say that unless we change things drastically, then within the lifetime of people alive today, we are heading for a world which can only sustain 0.5 to 1 billion people.

what?

These are the key terms to understand in any discussion relating to sustainability or Zero



Operational Carbon

This is the term used to define the carbon emissions associated with the energy needed to run a building, including heating, cooling, ventilation, hot water, lighting and power. This is all the energy consumed by the building, and includes it's management and maintenance.

Embodied Carbon

This is the term used to define the carbon emissions of the manufacture of all materials and construction processes incorporated in the construction of a building. This includes any carbon emissions associated with the removal of those materials at the end of their life.



Net Zero Carbon

This is a complex term, but generally speaking is used to confirm that the sum total of the carbon emissions over the life of the building are minimised and, with additional 'offsets'. meets Zero.

Zero Carbon can relate to Operational Carbon. Embodied Carbon or the total of the two.

how?



Biodiversity

When choosing a site for a new build, it is best to pick somewhere that is already served well by infrastructure and should avoid harming the existing environmental assets of an area.

Retaining existing trees, access to high quality wildlife rich green spaces, effective water management (including rainwater harvesting) and pollution control all make for a good nature-rich development.



Reuse and Recycle

Only build new where existing buildings cannot be reused, refurbished or extended.

Prioritise materials that are reused. reclaimed, or natural from local areas and sustainable sources, or those which can be recycled at the end of their life.

If unavailable or not feasible, always seek to use natural materials or those with a high recycled content to reduce the embodied carbon of the build.



Orientation & Windows

A building's form, orientation and window proportions are all design aspects that do not add extra construction cost but can make a significant difference in the building's efficiency.

Avoiding overheating is critical, both for comfort and to remove the need for cooling, so external shading to South and West facing glazing is often necessary, as well as considerations of glass specification (triple glazing & low -G glass)



Insulation

This is often referred to as taking a 'Fabric First' approach. This is where the majority of investment is put into the fabric of the building, increasing insulation levels well above the minimum Building Regulations requirements. This will prevent or reduce heat loss through the building fabric, therefore cutting the amount of energy needed to keep the building warm.

Considering the materials and methods of construction specified is also critical.

Airtightness & Ventilation

Airtightness is one of the most important factors for improving energy efficiency and comfort, by reducing draughts and heat loss from the building.

Installing a Mechanical Ventilation with Heat Recovery (MVHR) system allows you to have control over the air flow within the building, maintaining good air guality and reducing heat loss.

And yes, you can still open the windows!

Reduce Embodied Carbon





Technology

Once the necessary steps have been taken to minimise the building's energy use requirements, sustainable technologies can be installed to ensure that the energy use which can't be designed out comes from renewable sources.

This can include Air or Ground Source Heat pumps for heating & hot water, and Photovoltaic Panels for electricity generation, coupled with battery storage to reduce reliance on the grid.

Reduce Operational Carbon

which?

LETI Building Standard

The London Energy Transformation Initiative was established in 2017 to guide the industry towards new/ Zero carbon. Their Design Guide proposes standards for new build houses and retrofit projects well in excess of the minimum standards of the Building Regulations.

This is not a certified scheme, but a set of targets which designers and homeowners should strive to achieve.

Requirements

Air Tightness: <1 air changes/hr @ 50pa

Space Heating/ <15 kWh/m² Cooling Demand:

Renewable Energy: 100%

There are a number of different standards available for both new build and retrofit projects. Deciding which is best for you will depend on the project, your priorities and your budget. Some of the options are shown on this page, and all are over and above the minimum Building Regulations standard.

Passivhaus/ EnerPHit

Passivhaus is a world-leading design solution for new build dwellings which focuses on clear, measured targets, backed up by a full certification scheme.

EnerPHit is the standard for Retrofit, which follows the same principles but with slightly relaxed targets to allow for the constraints of working with existing buildings.

Requirements (Passivhaus)

Air Tightness: <0.6 air changes/hr @ 50pa</pre>

Space Heating/ <15 kWh/m² Cooling Demand:

Overheating: <10% hours over 25°

calculated using Passivhaus Planning Package (PHPP) software. While the target figures differ, all the Standards listed on the opposite page include the same key areas to consider to achieve a low energy building, whether new build or retrofit:

- Reducing energy consumption.
- Reducing Space Heating and Hot Water demand.
- Designing for on-site renewable energy generation; reducing dependence on fossil fuels.
- Improved Thermal Performance (U-Values) of the building fabric.
- Improved Airtightness and added mechanical ventilation.
- Reduced Thermal Bridging (cold spots),
- A Balance between daylighting and overheating.
- Sensible Form Factor (the shape of the building; complex shapes are less energy efficient)

Requirements

Air Tightness: <1.5 air changes/hr @ 50pa

AECB Building Standard

schemes for both new build and retrofit.

that there can be no 'slip' in the project's

The house would be designed using the

Passivhaus Planning Package (PHPP)

software to demonstrate compliance.

intentions.

The targets are similar to those of the LET

quide, but the Certification process ensures

The Association for Environmentally

Conscious Building have Certification

Space Heating/ <40 kWh/m² Cooling Demand:

Overheating: <10% hours over 25°

calculated using Passivhaus Planning Package (PHPP) software.





If you would like any more information on the topics covered within this brief guide, or wish to discuss low energy buildings with us further, please get in touch using one of the methods below, or using @livarchitects on social media.

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