



# Low carbon fit out checklist

## Introduction

Developing a low carbon strategy within your business is a complex and significant piece of work. Your property portfolio will form an integral part of this strategy, as it makes a

major contribution to your carbon emissions.

By investing time in assessing the impact of a fit out and taking steps to reduce the subsequent carbon emissions, your business will gain significant environmental benefits.



^ Deloitte, London – BREEAM Outstanding, WELL Gold

## Table of Contents

<b>Before you begin</b>	3	<b>Contractor selection</b>	10
<b>Design and material selection</b>	5	<b>Construction process</b>	11
Design principles	6	<b>Low carbon operation</b>	12
Design for low operational carbon	7	<b>Monitor emissions and celebrate success</b>	13
Material and product selection	8		

# Before you begin

## Define your project's low carbon objectives

Review your organisation's carbon targets and assess how this project can contribute to reducing emissions

Where possible, decide on the carbon targets you want to achieve

Consider whether your business needs a full fit out or whether your plans can be scaled down to reduce embodied carbon impact

Hold stakeholder forums to discuss objectives and requirements to ensure you have robust and achievable carbon targets

Map out the expectations of your investors, customers and staff

Consider your property strategy and determine how reducing carbon emissions will work alongside your plans

Communicate to your key decision makers the benefits of reducing carbon in your property portfolio

Set out a clear project brief which includes your carbon targets and define responsibilities to achieve these targets

If applicable, set an embodied carbon budget

If applicable, set an operational carbon target



^ JLL, Manchester – BREEAM Excellent, WELL Platinum, Certified SKA Gold

## Assess potential sites

Obtain existing Energy Performance Certificates (EPCs), though these likely won't be the best measure of operational energy requirements

Ensure the building meets the minimum EPC rating for new tenancies which is currently a rating of E. As of April 2023 all existing leases must be at minimum a rating of E

Check if your potential site has an environmental rating, such as BREEAM, LEED or SKA as this will be an indication of a better performing building when it comes to low carbon

Where possible, get an estimate of the operational CO<sub>2</sub> emissions of your potential sites

Estimate the embodied carbon impact of fitting out your potential sites

Assess the percentage difference in CO<sub>2</sub> emissions between potential sites

Do your potential sites have existing on-site renewable sources of energy and heating, including a local district heating system?

Consider the viability for passive design measures of your potential sites

measure the building's solar gain to assess the impact on energy use

assess the orientation of the space and how effectively daylight can be used to reduce artificial lighting

assess the viability for natural ventilation of the potential sites

Determine whether HVAC systems will need to be replaced – consider both the embodied and operational impact

Assess the effectiveness of any existing building management system which monitors and controls energy use

Determine if there is sufficient sub-metering in place to measure and report energy use

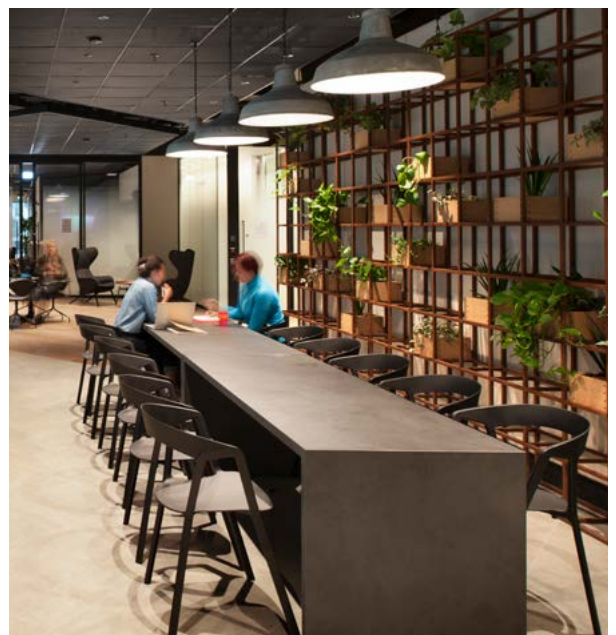
Assess whether transport links are sufficient to support your staff in making low carbon commuter choices

Assess whether there are amenities close by including gyms, shops and green spaces that reduce the need for use of transport

Determine if there is space for bicycle racks and showers to support your staff who would like to cycle to work

Assess the viability for additional low carbon technologies within the potential sites

### ✓ Deloitte, London – BREEAM Outstanding, WELL Gold





^ Interface, Birmingham – Biophilia throughout

## Design and material selection

The design principles, operational decisions and selection of materials and products will significantly impact the carbon emissions of a fit out project. Their impact on the environment will continue throughout the entire life cycle of your building.

# Design principles

## A minimalist design is a good design

Ensure the design does not incorporate the unnecessary use of materials

Choose a design that uses minimal finishes, paints, wall coverings and plastering

Maximise occupancy with the least amount of furniture

Minimise storage to encourage more electronic archiving

Consider open plan space to avoid unnecessary partitions

## Flexibility

Design using elements which allow the space to be easily adjusted for future changes in use or occupancy e.g. demountable partitions

Design to include hot desk or flexible locations

Consider how to allow areas or whole floors with low occupancy to be 'closed' at certain times. For example leave only one floor open outside normal working hours to reduce energy use during very low occupancy times

## Design out waste

Design spaces to regular sizes and linear layout so that integrated sets can be sourced i.e. doors and frames

Select products which can be easily maintained or repaired on site with minimal further waste or carbon expenditure

Use random, non-linear patterned finishes, such as carpets, where you can easily replace one tile with another without having to replace the whole floor

Carry out the design process with factory prefabrication in mind - in order to avoid waste by procuring, pre-finishing or prefabricating to set lengths

## Layering

*'During refits or refurbishment, the ability to peel off layers and apply new ones ensures that the neighbouring layers are undamaged.'*

### Handbook to Building a Circular Economy

Rather than refit an entire office, look to retain some of the 'layers' and reconfigure the space to meet the new needs of the occupants

Have a look at Overbury's insight paper on the [Circular Economy](#) for more information

## Deconstruction

Design for low carbon deconstruction by considering how the space and its products will be taken apart or reused at end-of-life

Ensure the information regarding the layering of components is passed on in a deconstruction guide

Ensure the information regarding material take-back schemes is passed on in a deconstruction guide

# Design for low operational carbon

Consider undertaking an energy model, such as TM54 or NABERS to better understand the anticipated operational energy requirements of your space.

Work with your project team to model alternative engineering solutions to drive down energy intensity.

## Lighting

Lighting Control systems are often the easiest way to save energy

Choose light fittings with built-in daylight sensors and dimming capability, to make the most of your natural light

Use zoned lighting, with separate occupant override controls

Install infrared motion detectors for automatic lighting control

Install timers to shut off lighting on weekends and at night

Select energy-efficient lighting such as LED

Resist the temptation for too much feature lighting which often only serves aesthetic purposes

Investigate the refurbishment and conversion of old fluorescent fittings to LED, swap out drivers and controls and reuse the light body and diffuser or louvre

## Heating

Generate free energy through solar PV

Assess renewable energy options in order to purchase efficiently

Investigate alternatives to high carbon gas-fired systems (such as air source, ground source, water source heat pumps)

Look at opportunities to use waste or rejected heat (such as that derived from communications room coolers or chillers) to pre-heat domestic water (such as showers)

Consider carrying out a thermal image scan of the building to see where heat is escaping (such as thermal bridges, failed double glazing, poor or missing insulation) and rectify any issues

Recommission existing heating controls and create more controlled zones to improve space heating

## Alternative fuel

Consider using renewable fuels: HVO fuel for example reduces greenhouse gas emissions by up to 90% for generators versus traditional diesel equivalents

# Material and product selection

Embodied carbon is the CO<sub>2</sub> (and other greenhouse gases) emitted during the extraction, manufacture, transportation and assembly of materials and products. It makes up around 10% of all global emissions each year.

Materials must be carefully considered and low embodied carbon products can be selected to ensure you significantly reduce the impact of your fit out project.

## Monitor, calculate and reduce embodied carbon

Undertake an initial embodied carbon assessment of the project to identify the largest sources of embodied carbon

Work with a project team who can support the specification of lower carbon materials

Engage manufacturers who consider, report and reduce the carbon impact of their own products

Assess the Environmental Product Declarations (EPD) of the materials sourced

If product EPDs are not available, consider what could be used as alternatives for assessing the carbon impact

Use an embodied carbon calculator to visualise and measure the carbon impact of design decisions

Identify ways in which the largest sources of embodied carbon can be reduced: e.g. swap out one material with another; redesign the space so it doesn't need that element; reuse products instead of buying virgin ones

## Pre-refurbishment materials audit

Assess and quantify what materials are currently available to reuse, for example furniture

Assess what elements can remain in situ including partitions, ceilings and M&E equipment

Determine the potential for repair of existing materials and products

Determine the potential for reuse of existing materials and products by others

## Supplier selection

Assess the environmental responsibility of the supply chain for all materials and products

Focus on the availability of Environmental Product Declarations (EPDs), then use the contents of the EPD to inform decision making

Determine whether you can source materials from local suppliers

Consider the longevity of products and materials installed by selecting suppliers and materials with long product guarantees relative to embodied carbon

## Volatile Organic Compounds (VOCs)

Reducing VOCs is traditionally focused on improving air quality. However, VOCs are in fact greenhouse gases and therefore contribute to climate change, so reducing VOCs also reduces the carbon impact of a project.

When assessing the carbon impact of a project, you need to include areas which incorporate the highest volumes of VOCs.



VOCs are most commonly found in these products:

- paints
- varnishes
- coatings
- adhesives
- sealants
- composite wood products
- carpets and associated adhesives
- furniture

Communicate VOC requirements to sub-contractors

## Drive 'circular economy' principles

Determine the potential for sourcing products with a high recycled content

Investigate 'direct-recycling take-back' schemes for stripped-out materials and off-cuts

Avoid manufacturers who use all virgin materials particularly where good recycled content alternatives are available

Consider whether a product can easily be reused at the end of its lifecycle

Avoid use of composite materials and PVC that are difficult to recycle or separate at the end of their life

Minimise the use of adhesives (as they make it harder to take products apart without causing damage)

If products are selected that cannot be reused, consider whether they can be disassembled and recycled

## Ongoing maintenance

Install products that can be easily repaired or have replacement parts available

Where possible use mechanical fastenings rather than glues and adhesives

Ensure materials and equipment are easily accessed via access wall panels and ceilings for concealed plant

Explore leasing products as an alternative to buying them (as an incentive for manufacturers to create products which can be easily maintained and have residual value that can be extracted at end-of-life)

## Sustainable timber

Timber acts as a carbon sink - it prevents CO<sub>2</sub> being released back into the atmosphere. Therefore, as long as your timber is sustainably sourced, the more timber you use in your fit out, the better.

Look for opportunities to use reclaimed timber

Where reclaimed timber cannot be sourced, ensure any timber on the project is [Forest Stewardship Council](#) (FSC) or [Programme for the Endorsement of Forest Certification](#) (PEFC) certified

Communicate effectively with all subcontractors that only FSC and PEFC timber can be purchased and ensure certificates are obtained before any order is placed

Obtain delivery notes and invoices for all timber deliveries with chain of custody numbers recorded

Look for opportunities to procure timber grown (relatively) locally



^ BBC, Cardiff – BREEM Outstanding

## Contractor selection

When the goal is to achieve a project that aligns with an organisation's environmental agenda, it is important to select a contractor who demonstrates a responsible and proven commitment to energy use and lowering carbon emissions.

Assess contractors' abilities and track record in measuring and reducing carbon

Determine whether they can demonstrate case studies that show successful energy reduction and/or embodied carbon reduction

Assess how they can demonstrate their ability to deliver upon the project's carbon targets

Assess the method they are proposing to use to measure the project carbon

Align with any industry standards, such as RICS Whole Life Carbon Guidance

If they have a carbon calculating tool (developed in-house or off the shelf), has it been third-party-audited?

Assess a contractor's own carbon credentials including their own carbon reduction targets and statistics. Ideally, they have had their carbon targets ratified by the Science Based Targets Initiative



^ Odeon, Manchester – BREEM Very Good

# Construction process

The complex stages during the process of construction offer meaningful opportunities to reduce a project's carbon emissions.

## Project programming

Ensure enough time is given for trades to finish once the other elements are complete as this prevents damage and reduces the need for replacements and touch ups

Ensure any value engineering considers both the carbon impact as well as monetary savings

Ensure time is allowed to deconstruct the existing space to ensure materials can be reused or retained. If they cannot, allow time to divert them from landfill

## Resource management

Develop a waste management plan to highlight which products are at risk of being sent to landfill, then look for alternative solutions

Identify waste streams and additional options for reuse, recycling or other management

Donate unwanted furniture, computers and appliances to charity

Adhere to systems which avoid over-ordering materials through phasing and quantities ordered

Make use of all material off-cuts around site

Look for prefabrication opportunities

# Low carbon operation

Once the construction phase is complete, the consistent adherence to a low operational carbon approach will ensure the project lives up to its original objectives.

## Operation management

Put an environmental management system (EMS) in place

Put limits on temperature controls for day-to-day use

Install an automatic shut-off system to put equipment on standby

Choose a building management system (BMS) to automatically turn off power at night and during weekends

Ensure the highest possible level of total energy demand comes from local renewable or low emission energy sources

Consider closing areas of the space on low occupancy days

Install 'workplace footprint tracker' software to control and display energy use on dashboards to encourage building occupants to reduce their individual energy use

Install devices to manually shut down workstations when not in use

Install timers on appliances to automatically shut down equipment out-of-hours, for example televisions, audio-visual, etc.

Reassess your systems at the end of the first year

Undertake an energy audit every year

Ensure all services are regularly maintained and commissioned to intended design

## Communicate with the occupants

Engage the occupants through a shared commitment to meet low carbon targets

Incorporate signage that encourage turning off equipment and lights

Communicate clearly about your ongoing sustainable goals and objectives:

- design presentations
- project extranet
- noticeboards and company newsletters

Provide training on how to use all the systems (lights, heating and air, etc.)

Make the case for a 'paperless' office by encouraging electronic archiving



^ Channel 4, Leeds – Certified SKA Gold

# Monitor emissions and celebrate success

## Monitor carbon emissions

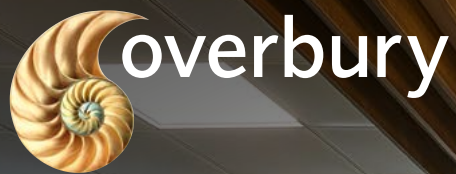
Assess the outcome of the project against your targets

Regularly monitor and measure your operational carbon emissions

Communicate your successes to:

- occupants
- stakeholders and decision makers
- investors

Celebrate and promote your successes online and in the press



## London

Head office  
77 Newman Street  
London  
W1T 3EW

T 020 7307 9000

## London

Corporate Partnerships  
and Higher Education  
17 Gresse Street  
London W1T 1QL

T 020 7307 4400

## Southern

Maxis 1  
Western Road  
Bracknell Berkshire  
RG12 1RT

T 01344 386 600

## Midlands

207 Fort Dunlop  
Fort Parkway  
Birmingham  
B24 9FD

T 0121 748 8600

## Manchester

The Zenith Building  
26 Spring Gardens  
Manchester  
M2 1AB

T 0161 829 3400

## Leeds

First Floor  
6 East Parade  
Leeds  
LS1 2AD

T 0113 241 2000

## Scotland

180 St Vincent Street  
Glasgow  
G2 5SG

T 0141 248 8688