



CARBON
M A S T E R S

Are your buildings at risk?

A Low Carbon Buildings Briefing

January 2013



Background to Energy Performance Certificate Legislation

Energy Performance Certificates (EPCs) were introduced in 2008 to inform potential buyers and tenants about the energy efficiency of a building. For non-domestic properties, EPCs were required on the sale or rent of buildings with a floor area greater than 50m². **Subsequently, the Energy Act 2011 mandated that from 2018 onwards it will be illegal to sell, rent or let any business premise with an EPC rating greater than an 'E'.**

Could this impact your buildings?

Of the **1.8 million** non-domestic properties in the UK that account for approximately 18% of total UK emissions, approximately **300,000** non-domestic buildings are estimated to have an energy rating of greater than an 'E' i.e. **one in every six non-domestic buildings might be at risk arising from this legislative requirement. Could this impact you?**

Who are we?

Carbon Masters is a carbon management company headquartered in Edinburgh with offices in India and Ecuador, experienced in helping organisations across the UK and globally to reduce their carbon emissions. We have worked with large private and public sector organisations such as airports, local authorities, manufacturers and universities. Our client list includes:



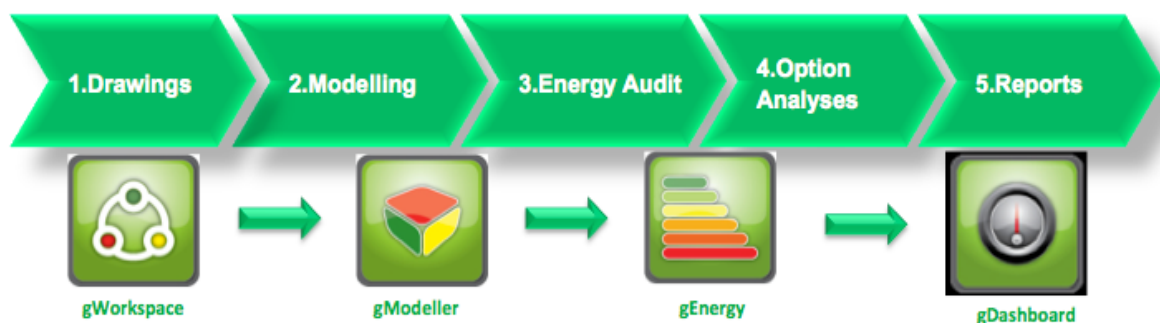
How Can Carbon Masters Help?

Carbon Masters have developed a unique solution, which combines a software platform called **Carbon Guru** with expertise from a Carbon Masters energy advisor. The software, developed by our partners greenspaceLive is made up of a suite of innovative cloud-based tools, which work on the principle of **Building Information Modelling (BIM)**.

The concept of BIM involves creating re-usable 3D models of the building and allowing the user to run different options as to what measures could be introduced in the building in order to find out what impact these measures would have on the carbon rating of the building.

The Process

Our assessment process involves creating a 3D model, a physical survey followed by detailed scenario analyses to produce a comprehensive recommendation report. This is illustrated below:



Step 1

Drawings of your buildings are placed in gWorkplace, a secure cloud-based repository acting as one central store for all physical assets relating to the building portfolio.

Step 2

These drawings can be used by Carbon Masters modelers to convert them into 3D models of the building using the greenspaceLive gModeller, a unique plug-in for sketchUp. The models are rendered with appropriate colour codes for building material type, windows, doors etc.

Step 3

A site survey is then carried out by a Carbon Masters Energy Advisor. The data from this survey and the 3D model file are fed into the gEnergy analysis engine.

Step 4

i) Provisional EPC

Using gEnergy, a provisional EPC in line with EU Energy Performance of Buildings Directive can be produced.

ii) Operational Rating

The Operational Rating for the building will be calculated based on real consumption data from meter readings/utility bills. This will be compared to the asset rating to identify the gap between the buildings actual performance against the performance it is theoretically capable of delivering.

iii) Options Analysis

Carbon Masters will then carry out detailed option analyses for the building showing what changes to the buildings carbon and energy rating would arise from each recommendation.

Step 5

Recommendations Report

The key findings of the analysis will be highlighted in the form of a detailed recommendation report and if required will be presented to the client via a webinar or a face-to-face meeting. The recommendation report will include a list of asset and operational improvements that can be implemented at the site in order to save energy, carbon and costs. This will also comprise ROI associated with each of the measures recommended.

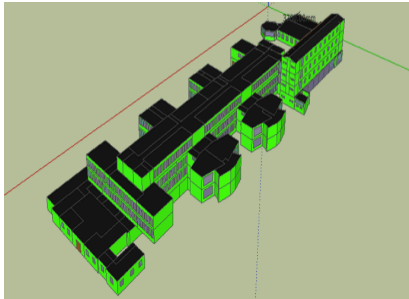
How will you benefit?

The Low Carbon Buildings Solution can help you:

- **Be Regulatory Compliant** - i.e. help you find out which of your buildings are exposed to the risks arising from legislative requirements set out in the Energy Act 2011 and what can be done in order to improve the fabric/asset ratings of your buildings to ensure you are regulatory compliant.
- **Reduce Costs and Carbon** – Help you reduce your energy consumption and hence carbon emissions across your entire buildings portfolio. Our comprehensive recommendation report will provide you with details of pay back periods for the measures recommended to help you make informed carbon management decisions and save operational costs.

Case Study – Scotland’s Rural College

Background



- Peter Wilson Building is one of SRUC’s largest buildings.
- Constructed in 1950’s with a floor area over 10,000m².
- Comprises lecture theatres, tutorial rooms, offices, workshops
- EPC produced in 2009 with E+ rating.
- Subsequently, A Building Energy Management System (BEMS) was installed

SRUC wanted to look at what impact the BEMS had on the EPC rating of the Peter Wilson Building and also wanted to be able to identify further areas for improvement.

What did Carbon Masters Do?

Our assessment included:

- Creating a 3D model of the building (see above);
- Carrying out a site survey and feeding the survey data into an energy analysis tool;
- Generating a Provisional Energy Performance Certificate;
- Calculating the operational rating of the building based on energy consumption data from energy bills and meter readings and;
- Carrying out detailed option analyses to identify carbon and cost saving opportunities

Key Findings

- The new rating had improved to a D as a consequence of newly installed BEMS.
- The building was shown to be capable of 40% energy/carbon emission reduction.

Benefits

- The 40% reduction implied CO₂ savings of **358 tonnes** annually.
- The new EPC also confirmed that the building is regulatory compliant under regulations contained in the Energy Act 2011, which will make it illegal to sell, rent or let any property with an EPC rating greater than E after 2018.

Key Areas of Improvement identified

- **Main Boilers** - replacement of main boilers could save up to 147 tonnes CO₂ per year with a payback period of 3.1 years.
- **Cavity Wall Insulation** – cavity wall insulation can lead to savings of up to 74 tonnes of CO₂ per year with a payback of 4.5 years
- **Lighting Improvements** - it was estimated that switching to T5 lights could save around 10 tonnes of CO₂ per year.
- **Domestic Hot Water** - Replacing the existing hot water boiler with a 90% efficient new boiler could generate savings of 21 tonnes of CO₂ per year.

Testimonial

" The Carbon Masters assessment helped us build upon our understanding of the energy usage of Peter Wilson Building, one of the largest building in the organisation's building portfolio. The report they developed identified a significant gap between the operational usage as opposed to what the building is capable of performing based on its carbon and energy asset rating. The report pointed out changes we could make to the fabric of the building as well as operational efficiency improvements required to bridge this gap. We found this approach very useful. Given rising energy costs and likely future carbon taxes on our energy consumption this will help us build a strong business case to facilitate the implementation of some of the measures recommended in the report."

Joan Chalmers, Energy Manager, SRUC