Abstract

Buildings account for approximately 40% of the carbon emissions in the UK, with non-domestic buildings responsible for 18% of the UK’s total. The Government has stated its ambition and has revised its policies in an aim to help the industry reduce their building emissions to be ‘close to zero’.

Capgemini is a global leader in consulting, technology and outsourcing services. In the UK, Capgemini has 15 offices that heavily contributes to their total energy consumption and greenhouse gas emissions. Reducing energy consumption and carbon emissions from Capgemini offices is one of the objectives as part of their sustainability programme.

This research project examines sustainability best practices towards the management of energy and carbon emissions for commercial offices.

Introduction

The UK has approximately 1.8 million non-domestic buildings that accounts for 18% of total carbon dioxide emissions (Carbon Trust, 2009). They use around 300TWh of energy a year, predominantly for heating, lighting, and cooling and ventilation. The UK Government has set a target to reduce carbon emissions by 80% by 2050 and non-domestic buildings presents an opportunity to significantly help the UK reach that target. The challenge that most businesses face is finding a cost-effective solution in achieving an 80% carbon dioxide emission reduction.

This research project will examine why businesses are not making significant investments in reducing their buildings’ carbon emissions, deciding what areas of the building that needs improvements and devising mechanisms towards the management of energy and carbon emissions with a more integrated approach. The solution would initially be specific to Capgemini’s requirements but then further refined and generalised so that it is adaptable and customisable.

Project Background

Demands for more energy and rising fuel costs have presented a number of challenges to businesses that is driving them to achieve more energy efficient solutions. According to the DUKES 2012 Annual Tables, the expenditure on energy by industry has nearly doubled between the year 2000 and 2010 to approximately £12.5 billion. In that time, the cost of electricity and gas has also more than doubled. It is expected that the cost of energy will continue to rise.

The main drivers for non-domestic buildings to reduce their carbon dioxide emissions are due to legislation and progressive emissions regulations that have been introduced by the UK Government. The CRC Energy Efficiency Scheme affects organisations that consumed more than 6,000 MWh per year. It will be mandatory for organisations to record and monitor their carbon dioxide emissions and also purchase allowances of £12 per tonne of carbon dioxide to cover their emissions.

Other legislations, such as, the Climate Change and Sustainable Energy Act 2006 has also contributed to changes in the Building Regulations. Building owners now have to be more aware of recent updates to the Building Regulations which includes microgeneration, energy efficiency and carbon emissions reduction targets included in its rules.

Energy Performance Certificates (EPCs) records the energy efficiency of a property providing a rating of A to G, where A is very efficient and G is very inefficient. All private rented properties will need to have a minimum EPC rating ‘E’ by 2018. EPCs are produced using the National Calculation Method with standard assumptions about energy usage so that buildings of the same type can be easily compared.

However, EPCs does not always ensure organisations are spending less money on energy in buildings. The activities of a building space is not accurately taken into consideration as which a building’s energy consumption could be higher than the rating it was given. In order for businesses to make informed decisions and have a strong business case for investing in their buildings there needs to be a better understand of how and where their buildings waste energy. Then, a strategy and plan for properly reducing energy consumption can be devised.

Aims & Objectives

The research aim is to develop a sustainability assessment framework to reduce ‘in use’ energy consumption and carbon dioxide emissions in existing commercial offices.

The objectives are:

1. To investigate the issues of energy consumption and carbon emissions in buildings, and social, economic and environment impact on business organisations.
2. To review the state-of-the-art in sustainable buildings, building lifecycle assessment, intelligent building management, and the approaches and methods used in practice towards effective management of energy consumption, reduction of carbon emissions, and improvement of occupants’ health and well-being.
3. To develop a sustainability assessment framework that defines building information requirements, space and activity dimensions within the ‘in use’ of the office building.
4. To develop methods for profiling space and activity which can be used to support prioritisation of sustainability investment.
5. To evaluate the framework using relevant office buildings; identify a change plan for facilities and activities managers.

References


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