

# Climate change and carbon reduction environmental sciences essay



**ASSIGN  
BUSTER**

This chapter gives an introduction and the over-arching context of carbon reduction, ranging from global, national and higher education sector for the research and then sets out the key research aim and objectives.

## **1. 1. Climate change and carbon reduction: Global context**

Climate change is arguably one of the greatest environmental challenges facing the world today. The increase in atmospheric greenhouse gases (GHG) has driven a rapid rise in the global temperature. Emissions resulting from human activities are substantially increasing the concentrations of the greenhouse gases, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), chlorofluorocarbons (CFCs) and nitrous oxide (N<sub>2</sub>O) and are causing greenhouse gas effect. Carbon dioxide has been responsible for over half the enhanced greenhouse effect in the past and is likely to remain same in the future (Intergovernmental Panel on Climate Change 2007). The Stern Review report suggests that a 25% reduction below current levels of emissions is required in order to stabilize global CO<sub>2</sub> concentrations at levels that will not have very adverse impacts. And what we also find out from the Stern Review is that the costs of not acting on climate change are greater than the costs of acting (Stern Review 2006). It has been recognised that developed countries are principally responsible for the current high levels of atmospheric GHG emissions; the Kyoto Protocol places a heavier burden on developed nations and sets binding emission reduction targets of up to an average of five per cent emissions reduction compared to 1990 levels over the five-year period 2008 to 2012. In Doha, Qatar, on 8 December 2012, the Doha Amendment to the Kyoto Protocol was adopted. This launched a second commitment period, starting on 1 January 2013 until 2020 (United Nations Framework Convention

on Climate Change 2013). So, the motivation for this research comes from the widely-accepted need to greatly reduce the carbon dioxide (CO<sub>2</sub>) and other greenhouse gases (GHG) emissions in order to mitigate anthropogenic climate change. The social, environmental and economic costs associated with carbon emissions could be huge and mankind can face adverse effects. Therefore, the need to reduce CO<sub>2</sub> emissions has been recognised as a key part of the ongoing efforts to combat climate change.

## **1. 2. Carbon reduction in the United Kingdom: National context**

The UK accounts for less than 1.5% of global greenhouse gas emissions; the government has a clear national interest in ensuring that the world tackles climate change together as it is a global problem and it requires a global solution. (HM Government 2011). The UK government has had a growing commitment to sustainable development over the last fifteen years, first launching a strategy for sustainable development in 1994. Its current strategy, "Securing the Future" was launched in 2005 and focused on four key areas: consumption and production, natural resource protection, sustainable communities and climate change (Her Majesty's Stationery Office 2005). The current coalition government also raises a slogan of the 'greenest government ever', although it has not been followed through criticism, and shows its strategic commitment towards low carbon economy. The global imperative of climate change has been translated into national carbon reduction targets. The UK government has strongly agreed for carbon reduction after its Kyoto Commitments and has developed Climate Change Act 2008 which is the world's first long-term legally binding framework. It

aims to encourage the transition to a low-carbon economy in the UK by setting ambitious carbon reduction targets of at least 80 % by 2050 and at least 34 % by 2020 against a 1990 baseline (HMSO 2008). The UK is committed to play a leading role in order to securing global action to reduce carbon emissions which is consistent with limiting global temperature increases to below 2°C (HMSO 2010). The UK climate change act develops a new approach of managing climate change through setting institutional targets, making strategies for achieving them, strengthening institutional frameworks and regular accountability.

### **1. 3. Carbon reduction in public sector: Higher Education context**

The mounting evidence of global climate change is one of the most important issues for businesses. Carbon reduction is moving up the corporate agenda and organisations now understand the need to handle their emissions and it must be embedded within their business practices (Carbon Disclosure Project 2010). The UK public sector has long been leading the way when it comes to cutting energy costs and carbon emissions and the research has revealed that the public sector is the most committed to carbon reduction as compared to the private and third sectors (The Carbon Trust 2012). Camco (2011) found that the total greenhouse gas emissions emitted by public sector bodies from the use of electricity and fossil fuels in 2009/10 including for administrative business transport are estimated to be 16. 7-23. 5 Million tCO<sub>2</sub>. Against this background, proactive actions are required by all of the public sector organisations to reduce carbon and other greenhouse gases emissions. The Higher Education (HE) sector, due to the nature of its

operational activities, predominantly and directly emits carbon and to a much lesser extent other greenhouse gas emissions, often indirectly, such as methane (CH<sub>4</sub>) (Higher Education Funding Council for England 2010). The Higher Education (HE) sector has a significant social and economic impact and is not exempt from challenging carbon reduction targets, in fact, it is argued, should be demonstrating leadership in the field. A research was carried out by Camco (2011) and was presented to the Department of Energy and Climate Change (DECC), which suggests that the most cost effective opportunities to achieve the carbon reduction targets exist within the Further and Higher Education sectors. In 1990, total HE sector carbon emissions were 2.445 million tonnes of carbon dioxide (MtCO<sub>2</sub>) and in 2006 they were 3.288 MtCO<sub>2</sub>, a rise of 34% (HEFCE 2009). The HE sector is being encouraged to lead in carbon reduction as it is a significant contributor of carbon emissions in the public sector but also because of the privileged position universities occupy in being centres of research excellence and in cultivating 'thought leaders' for the future (HEFCE 2009). HE is a growing consumer of energy and resources and generator of carbon emissions. In 2008-09 the UK Higher and Further Education sector organisations consumed 7.7 TWh of energy (all fuels) producing emissions of 2.6 million tonnes of carbon dioxide equivalent (Hopkinson and James 2011). So, there is a need to understand that how Higher Education Institutions (HEIs) can strategically reduce their increasing carbon emissions through an integrated and comprehensive approach. In National Carbon Strategy, HEFCE encourages higher education institutions to adopt similar targets (HEFCE, 2010a). Carbon reduction target and strategy for higher education in England has also been formulated in order to provide guideline for HE institutions to set their own

<https://assignbuster.com/climate-change-and-carbon-reduction-environmental-sciences-essay/>

targets inline with the UK targets and then develop action plans through carbon management plans. The only targets do not meet results; they need to be supported with the strategies. Within the next ten years the higher education sector in this country will be recognised as a major contributor to society's efforts to achieve sustainability through the skills and knowledge that its graduates learn and put into practice, its research and exchange of knowledge through business, community and public policy engagement, and through its own strategies and operations (HEFCE). Capital funding for higher education institutions in England is linked to carbon reduction from 2011 which makes higher education's senior management concern about their energy consumption and carbon emissions.

#### **1. 4. Research aim and objectives:**

There is an ongoing need to analyse and evaluate the process of carbon management in the higher education sector and to propose a clear road map for a strategic approach to improve carbon management. It is surprising that empirical research examining the strategic approach and commitment to carbon management within the higher education institutions is relatively sparse (Chapter 2: Literature Review). A research question was formulated that " How higher education sector institutions can strategically manage their carbon emissions from all of their organisational activities?"

##### **1. 4. 1. Aim:**

The aim of this research is to develop a strategic carbon management framework for reducing higher education sector institutions' carbon emissions in the context of the broader public sector.

### **1. 4. 2. Specific objectives:**

To systematically review and evaluate the literature, documents, strategies and carbon management plans of the Higher Education (HE) sector institutions. To analyse the current state and effectiveness of carbon management within the higher education sector institutions. To identify the drivers and barriers for carbon management within the higher education sector institutions. To identify and understand the features and processes for implementing effective carbon management strategies; particular attention will be paid to the role of procurement and other scope 3 emissions. To develop, propose and validate a Strategic Carbon Management (SCM) framework for reducing overall carbon emissions for the higher education as well as the broader public sector organisations.

### **1. 5. Novel contribution to the knowledge:**

The PhD research will produce a coherent set of findings on a strategic approach to carbon management and will have the following original contributions to the existing knowledge. Contribution in the existing theoretical knowledge of strategic carbon management. Substantial/practical contribution for a strategic approach to carbon management in the higher education sector as well as the wider public sector. Strategic Carbon Management (SCM) framework will be proposed for improving HE carbon management and embedding carbon management in corporate strategy. It will explore how scope 3 emissions, particularly procurement can be incorporated into universities' carbon management process. Novel methodological contribution with qualitative and quantitative data integration.

## **1. 6. Thesis structure:**

The thesis will have nine chapters and the remaining chapters are outlined below:

### **Chapter 2: Literature review**

This chapter will introduce the theoretical background for the research through the review of existing literature around various aspects of carbon management.

### **Chapter 3: Research Methodology**

This chapter will detail the overall design of the research and outlining the chosen research methodology in order to meet research aim and objectives.

### **Chapter 4: Systematic analysis of secondary data**

This chapter will meet the first objective by systematically analysing the secondary data. It will mainly consist of universities' carbon management plans and strategies, other strategic documents and relevant policies.

### **Chapter 5: Policy context, drivers and barriers to carbon management**

This chapter will address carbon management drivers and barriers with for higher education institutions. It will also address policies regarding carbon reduction in general and higher education in particular.

### **Chapter 6: Preliminary research findings**

This chapter will analyse and produce first phase preliminary research findings based on the exploratory interviews carried out with higher



education sector managers in order to inform more structured approach in the second phase of the research.

## **Chapter 7: Survey Questionnaire**

This chapter will provide public sector analysis based on the questionnaire survey results. It will analyse the current state and effectiveness of carbon management within the higher education sector institutions, also comparison between different sector bodies in carbon management leadership.

## **Chapter 8: De Montfort University Case Study**

This chapter will provide descriptive case study of De Montfort University to find out what is currently happening in relation to strategic carbon management. It will help in identifying and understanding various features and processes for implementing effective carbon management in a university. It will also explore the role of procurement and other scope 3 emissions in carbon management.

## **Chapter 9: Discussion**

The discussion chapter will take the research findings from in-depth DMU study and consider in the context of wider higher education as well as the broader public sector organisations. It will incorporate the development and validation of strategic carbon management framework for managing carbon emissions.

## **Chapter 10: Conclusions**

This chapter will summarise of the key research findings and the original contribution to knowledge arising from this research, followed by direction to future work.