

A REVIEW AND CASE STUDY OF STRATEGIC CARBON MANAGEMENT IN UK HIGHER EDUCATION SECTOR

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ABSTRACT

Climate change is arguably one of the greatest environmental challenges facing the world today, bringing organisations under increasing pressure from government, shareholders and stakeholders to reduce carbon emissions. 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. The term 'carbon management' is popular in the literature but strategic carbon management (SCM) is an under-developed and under-researched area as it is an applied concept, especially within the HE sector. Scope 1 and 2 emissions reduction initiatives have received more attention than scope 3 thereby missing a significant opportunity for fully effective carbon reduction. These gaps have been identified through analysis of the academic and practitioner literature, reports, and websites. The study proposed in this paper will look into the gaps and possible future research direction of SCM in the HE sector through a case study of De Montfort University (DMU). It will explore how carbon emissions can be reduced strategically and develop a systematic and comprehensive strategic management approach to doing so. Finally this paper makes some provisional principles for transferable best practices for the HE sector.

Keywords: climate change, carbon management, higher education, stakeholders, strategic management.

INTRODUCTION

The motivation for this research comes from the widely-accepted need to greatly reduce the carbon dioxide and other greenhouse gases (GHG) emissions in order to mitigate anthropogenic climate change (IPCC 2007). The Stern Review report suggests that a 25% reduction below current levels of emissions is required in order to stabilize global CO₂ concentrations at levels that will not have very adverse impacts (Stern Review 2006). The UK government passed the Climate Change Act 2008 as its long-term legally binding framework to tackle climate change under its Kyoto commitment. Carbon management is moving up the corporate agenda and organisations now understand the need to handle their emissions. It must be embedded through the business (Carbon Disclosure Project 2010).

The Higher Education (HE) sector is not exempt from this challenge and needs to play its part in both meeting the national carbon reduction targets and demonstrating the leadership (HEFCE 2010a). In 2005 the HE sector in England emitted 5.4 million tonnes of carbon dioxide and through pressure from the Higher Education Funding Council for England (HEFCE) is being strongly encouraged to show leadership by

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reducing its emissions (HEFCE 2011). Carbon management is slowly becoming a strategic management issue for universities' senior management due to HEFCE's carbon emissions targets and strategies. Guidance has recently been published by HEFCE on monitoring and measuring scope 3 emissions (Procurement, travel, waste and water) (HEFCE 2012) and universities like De Montfort University (DMU) are developing ambitious carbon management plans for scope 1, 2 and 3 emissions.

The aim of this paper is to identify a potential gap in the academic literature of Strategic Carbon Management (SCM) and discuss the potential role of the HE sector in achieving substantial carbon reduction. It starts with the history of carbon management and then introduces the issue associated with the development of SCM in the HE sector and then within DMU. It will consist of findings from the existing academic, non academic literature, policy and strategic documents. It also provides a systematic analysis and discussion on SCM within the HE sector and identifies themes and potential gaps to be further researched. The final part of the paper summarises the methodological and theoretical implications associated with SCM and makes recommendations for how this process can be moved forward.

CARBON MANAGEMENT

In recent years, the climate change and carbon management debate has dramatically risen up the public agenda. The emphasis in the past has been on the science involved, and communicating the extent humans are affecting the global environment; this is now widely accepted that humans are impacting the natural environment (Kolk & Hoffmann 2007). Over the last few years, some interesting studies on organisations' carbon management have emerged (Čadež and Czerny 2010). Liu (2012) states carbon management as any corporate effort to address and reduce the impact of a firm's business activities on climate change, although not all greenhouse gases directly relate to carbon but these are included in the definition of carbon management in terms of their carbon dioxide equivalents. The established measures of carbon management have focused on specific fields such as a reduction in GHG emissions, development of low-carbon technology and clean energy and the adjustment of economic structures. Organisational structure and business models have contributed to the progress of carbon management but step changes are still needed (Liu 2012).

Carbon management strategies provide an interesting research stream and Pino et al. (2009) put forward six components of them; verifying the data of greenhouse gas (GHG) emissions, setting and updating performance targets, identifying cost-effective emissions reduction, internal communication management, finding new business opportunities and adapting to market-based solutions. The acknowledgement of the growth of climate change and the subsequent business response of organisations is by no means widespread (Kolk & Hoffmann 2007). Debate still ensues as to why some organisations are responding to climate change and others are not. The literature on carbon management and other associated issues remains in its infancy, and thus provides a good opportunity for further research (Jackson 2008). A study of corporate carbon strategies of Korean companies' suggests that companies have started considering the carbon issue in their overall strategic positioning. A comprehensive theoretical framework has been developed from the Industrial Organisations (IO) theory which divides carbon management activities into six categories: emission reduction commitment, product development, process and supply improvement, new

market and business development, organisational involvement and external relationship development (Lee 2012).

Management studies claim that there is a business case for companies to address climate change through adequate carbon management strategies. Thus, climate change constitutes a business relevant issue and that companies are able to increase their competitiveness by implementing carbon management strategies (Busch and Wolfensberger 2011). Corporate carbon management is not limited to mitigation efforts internally but also comprises of supply chain optimisation, product-related improvements, and compensation activities (Busch and Wolfensberger 2011). Our initial analysis shows that there is an established literature on the corporate response to climate change and carbon reduction strategies. Other researchers have developed strategy frameworks. For example, Hoffmann and Weinhofer (2010) noted that we understand a company's CO₂ strategy as 'a pattern in action over time' intended to manage its direct and indirect carbon emissions. A framework is developed that conceptualizes a company's CO₂ strategy as the focus of one or a combination of several strategic objectives: CO₂ compensation, CO₂ reduction and carbon independence (Hoffmann and Weinhofer 2010). Horgan (2011) has also developed a carbon management hierarchy as shown below.

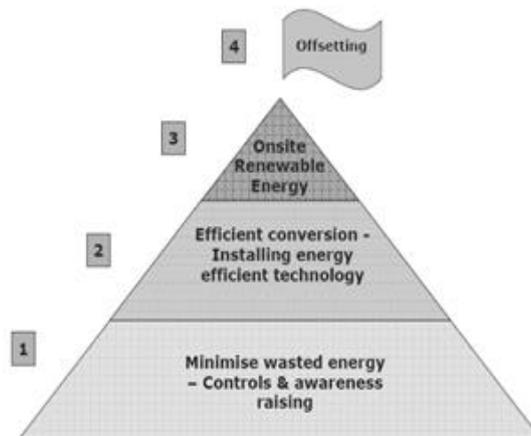


Figure 1: Carbon Management Hierarchy (Source: Horgan 2011)

STRATEGIC CARBON MANAGEMENT (SCM)

Research framework:

As climate change has emerged as a legitimate business concern; academics have attempted to gain a better understanding of firms' carbon strategies by characterizing their climate change response (Lee 2012). The actual and potential strategic impacts of climate change on companies are intensifying (Kolk and Pinkse 2005). Management research on the topic of corporate carbon strategies within the organisations is still a relatively new endeavour though a few studies have analysed firms' responses to climate change from a strategic perspective. Yet most of the studies of corporate carbon strategies have examined large-sized and international firms (Lee 2012). Increasing regulatory pressure, public opinion, and environment oriented consumers and financial institutions have led companies to consider climate change in their strategic management (Hoffmann and Weinhofer 2010).

The strategic importance of carbon is expected to grow over the next ten years and will be embedded in the business as a long-term priority (Carbon Disclosure Project 2010). Strategic Carbon Management (SCM) is an approach to address the carbon and financial cost of an organisation's operations. Strategic management of carbon is complex and starts with understanding the ways carbon management can affect the organisations' activities – both tangible and intangible. For example, the operational aspects such as process efficiency and alternate energy sources, regulatory aspects, or possible impacts on company reputation based on stakeholder perceptions, carbon has the potential to impact the bottom line (Two Tomorrows Group 2012).

SCM provides an understanding of the way in which organisations are translating strategic issues into management actions in the context of their carbon impact. It is needed to examine the strategic response of organisations to the challenge of carbon reduction. Organisations need to consider climate change in a strategic context and to integrate carbon management issues into their long-term decision making process. SCM will provide an effective approach to issues such as capital costs of investment, strategic decision making, carbon reduction target setting, sourcing funding, building business cases and winning internal support in an organisation (Deloitte 2012). This is not simply about reducing the organisational carbon footprint, but taking into account

“how the organisation is thinking about carbon and thinking about what it needs to do for adaptation and contribute towards sustainable development in the context of the decisions and the duties it undertakes” (Barter and Bebbington 2011, p. 2).

Managers and boards in most industries are beginning to come to terms with new realities of a carbon-constrained economy and emphasise to take a strategic approach. It helps to unearth opportunities to gain competitive advantage over your rivals by developing the strategies. The bottom line is that carbon, just like capital, human resources and products, is now a strategic part of the new competitive game (Schultz and Williamson 2005). A survey revealed that although 60% of the 2,000 responding executives thought that climate change was an important consideration within their company's strategy, translation into actions remained limited (McKinsey 2008).

Life cycle wide emissions:

Corporate carbon management is not only limited to mitigation efforts in the organisation but it also comprises of supply chain optimisations, product-related improvements, and compensation activities. A life-cycle context is relevant for corporate competitiveness and a framework of eight carbon management strategies has been developed based on the Industrial Organisations (IO) literature and each strategy of the framework contributes to the potential competitive advantage (Busch and Wolfensberger 2011). The companies are now aware of life-cycle wide thinking of assessing the environmental impacts because of the intensifying stakeholders' pressure to manage it (Busch and Wolfensberger 2011). Examples are the Carbon Disclosure Project (CDP) and the California Climate Action Registry (2009). Both accelerate the discussion on scope 3 emissions as per Greenhouse Gas Protocol Standard (World Business Council for Sustainable Development (WBCSD) and World Resources Institute (WRI) 2004).

SCM routemap:

Ansoff (1980, p. 133) suggests that

“a strategic issue is a forthcoming development, either inside, or outside the organisation, which is likely to have an important impact on the ability of the enterprise to meet its objectives”.

What Ansoff (1980) suggests is that while firms might face a variety of issues (including those that are social), only certain ones are considered significant enough to impact the ability to fulfil corporate objectives. Horgan (2011) has provided a comprehensive SCM routemap detailing various strategic issues for public sector organisations to reduce their emissions. It involves the integration of various themes within the process; most common are low carbon culture, low carbon strategy, stakeholders’ engagement, low carbon procurement, financial case, metering and monitoring and performance evaluation. It also involves a five step approach to carbon/energy management starting with senior management’s commitment to the monitoring and controlling the carbon/energy performance. Environmental performance is a strategic issue and needs strategic intention which adds value in terms of strategic competitive advantage. Worthington and Patton (2005) in their studies of Small and Medium Enterprises (SMEs) in the UK screen-printing sector have discussed management decisions and implications lack in strategic orientation and innovative response is needed within the companies for both demand and supply sides benefits. We will now look at the role of SCM both within the UK’s HE sector and a specific case study example.

STRATEGIC CARBON MANAGEMENT - HE CONTEXT

Overview of the Higher Education sector:

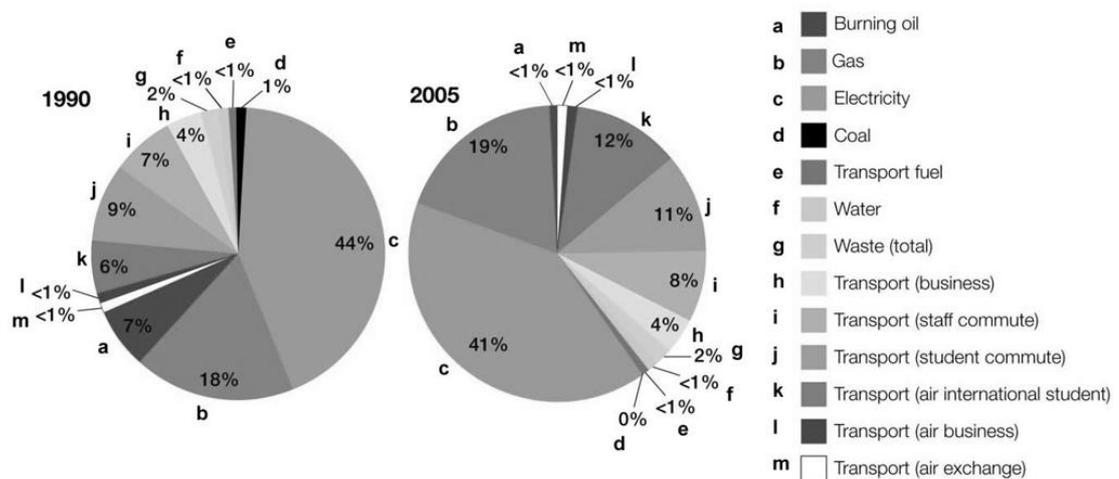
The context of the ongoing study is restricted to the UK HE sector and its ability to meet government’s national and international binding targets. Worldwide, HE sector has expanded phenomenally; for example, since the 1960s, the UK HE system has expanded sixfold to >2.4 million students (Zhang et al. 2011). As a result, growth of physical infrastructure and services in the universities has led to a parallel impact on the natural environment in terms of carbon emissions. Many of the larger universities produce greenhouse gas emissions equivalent to small cities (Knuth et al. 2007).

Carbon reduction target and strategies:

The UK Government has ambitious targets to reduce greenhouse gas emissions by 80% by 2050 and 34% by 2020 against a 1990 baseline, together with 5 year carbon budgets for 2008-12, 2013-17 and 2018-2022 (Her Majesty’s Stationery Office (HMSO) 2008). The HE sector is being encouraged to lead in this area as it is a significant contributor of carbon emissions in the public sector but also because of the privileged position universities occupy in being [it is hoped] centres of research excellence and cultivating ‘thought leaders’ for the future (HEFCE 2009). The Higher Education Funding Council for England (HEFCE) encourages Higher Education Institutions (HEIs) to adopt ambitious targets in its national carbon strategy (HEFCE 2010a). HEIs are compelled to set individual reduction targets for 2020 against a 2005 baseline for their direct and indirect emissions related to the use of fossil fuels and purchased electricity in their own buildings, stationary and mobile emission sources (scope 1 and 2 emissions under the definitions of the GHG Protocol Corporate Standard; (HEFCE 2010b; WRI/WBSCD 2004)). Indirect emissions from

procurement, business travel, and commuting among other relevant sources (scope 3 emissions) are not currently included in the targets. Figure 2 shows carbon emissions baseline during 1990 and 2005. It includes energy use within the estate (fossil fuel combustion – gas, coal, oil and electricity use), transport (institutions’ own vehicle fleet, business travel and commuting), water; and waste. These results exclude procurement, which has a considerable indirect carbon impact, but the data for estimating these emissions is not readily available (HEFCE 2010a). The HE strategy requires institutions to undertake work to monitor and report these emissions, including the measurement of a baseline of procurement emissions by December 2012 and set a carbon reduction target by December 2013.

Figure 2: HE sector carbon emissions baseline – breakdown in 1990 (left) and 2005 (right)



(Source: ‘Research into a carbon reduction target and strategy for Higher Education in England: a report to HEFCE’ 2009)

The UK government has identified the HE sector as key to delivering carbon reduction with its Kyoto commitment and the Carbon Trust Higher Education Carbon Management programme is designed in response to this. HEFCE has produced guidance to the universities on how to produce carbon management plans which set out universities’ strategic direction on carbon management. The majority of universities have carbon management plans which state their targets and strategies to manage their carbon emissions. HEFCE has also produced carbon reduction targets and strategy for the HE institutions and linked capital funding with the carbon performance of the institutions (HEFCE 2010a).

Scope 3 emissions:

HEFCE commissioned Arup, DMU and the Centre for Sustainability Accounting (CenSA) to work towards helping the UK higher education sector measure scope 3 emissions, supply chain (procurement), transport, water and waste related carbon emissions to form the part of an overall approach to reducing carbon emissions (HEFCE 2012). Good practice guidance is available for the sector which provides Higher Education Institutions (HEIs) with information on how to quantify scope 3 carbon emissions. It aims to help HE sector to adopt efficient and effective data

collection techniques and includes examples of good practice within the sector (HEFCE 2012). The HE sector is currently dealing with a plethora of initiatives intended to reduce energy use, carbon emissions, and other environmental impacts in universities and colleges (Hopkinson and James 2007). The HEI's can also make carbon reductions through their other business activities including teaching, research and public communications. While these can be categorized as 'Scope 4' emissions and are featured in the carbon management plans but it is not possible to measure the results of these activities (HEFCE 2010a).

STRATEGIC CARBON MANAGEMENT - DMU CONTEXT

Overview of De Montfort University (DMU):

DMU is based in Leicester, England and has approximately 21,585 students, 3,995 staff, and an annual turnover of £132.5 million (Ozawa-Meida et al. 2011). DMU acknowledges that its activities have an impact upon the environment and as an organisation it remains committed to a policy of reducing carbon dioxide and other greenhouse emissions. Therefore, DMU has made a commitment to move sustainability out of the 'green ghetto' and into the mainstream culture of its organization. A key objective is that within the next ten years the university aims to make a major contribution to society's efforts to achieve environmental sustainability and become a leader in the HE sector (DMU Strategic Plan 2011).

Policies and strategies:

This section outlines DMU's own approach which seeks to explore and embed carbon management into the strategic management process through the systematic analysis of the university's strategic documents. DMU has made a strong commitment to be a sustainable university and has set a strategic direction for carbon management. DMU has a cross-faculty and departmental Sustainable Development Task Force (SDTF) that has produced a Sustainability Strategy (2009) which sets out the overall sustainable development pathway for the whole university. The Sustainability Strategy (2009) highlights the importance of measuring and monitoring environmental performance and greenhouse gas emissions to implement an ambitious carbon reduction plan. DMU has developed relevant policies and strategies in all areas of environmental and greenhouse gas emissions management including Energy Policy, Green Travel Plans, Waste Management Policy, Procurement Policy, Biodiversity Policy and Carbon Management Plan.

Consumption-based carbon footprinting:

De Montfort University is the first university in England to calculate its consumption-based carbon footprints for the effectiveness of carbon management and progress of its policies and strategies. In August 2010, the university commissioned Arup to undertake a carbon footprint assessment using a consumption-based approach. The aim of the study was to quantify the overall carbon emissions within DMU, identifying actions to make quantitative reductions in greenhouse emissions. The total consumption-based emissions for 2008/09 were estimated to be 51,080 tCO₂e (metric tonnes of CO₂ equivalent). Building energy, procurement and travel contribute with 33%, 38% and 29% respectively to the overall emissions in academic year 2008/09

which runs from August to July (Ozawa-Meida et al. 2011). The World Resources Institute (WRI) has divided emissions sources in three ‘scopes’. Scope 1 is direct emissions that occur from sources owned or controlled by the organisation, for example emissions from combustion in owned or controlled boilers, furnaces, vehicles; scope 2 accounts for emissions from the generation of purchased electricity consumed by the organisation; scope 3 is all other indirect emissions which are a result of the activities of the company, but occur from sources not owned or controlled by the organisation, for example, commuting and procurement. Under the classification of the WRI/WBCSD Greenhouse Gas Protocol, scope 1, 2 and 3 emissions represented 6%, 16% and 78% respectively to the overall emissions in the academic year of 2008/09. DMU study has divided its scopes’ emissions into the sub-categories.

Strategic approach:

DMU has set its own target for reducing emissions from energy use and own vehicle emissions by 43% by 2020 based on its emissions in 2005/6. There are also interim targets of a 12% reduction by 2012 and 29% by 2017 in order to ensure regular monitoring and progress (DMU Carbon Management Plan 2011). The university is committed to reducing its overall carbon emissions and has developed a comprehensive carbon management plan until 2020 using a baseline year of 2005, which indicates university’s strategic approach. It has designed the following strategic themes in its carbon management plan.

- Strategic approach
- Monitoring, targeting and reporting
- Policy review
- Embedding activities on carbon savings
- Strategic investment

DMU has identified a number of different carbon reduction projects relating to the strategic themes and the implementation of these projects will aim to deliver the carbon reduction targets (DMU Carbon Management Plan 2011). Progress has already been made in reducing greenhouse gas emissions from the baseline year through a mixture of changes to the university estate and space management. The university has shown very good results in environmental and sustainability benchmarking schemes (Universities that Count& People and Planet’s Green League).

DISCUSSION

This paper has provided an overview of the status of current Strategic Carbon Management (SCM) research and future opportunities. It has analysed three levels of literature starting from SCM in general to the SCM in the HE sector and DMU. It has identified a need for a systematic process for a SCM in HE sector and also the lack of theoretical insights in order to understand that how this process can be implemented by the universities’ senior managers. The literature reveals that there is no direct empirical knowledge on why and how organisations integrate carbon management in their strategic management process. There is a vast literature available in the form of carbon management implementation plans and strategies in the public sector but no strategic carbon management focussed academic literature was found which indicates that the field is relatively under-developed and under-researched.

The term 'Strategic Carbon Management' (SCM) is undefined so far and literature is unable to identify the difference between carbon management and strategic carbon management which is an important question for researchers to investigate. SCM is an emerging research agenda based on the literature review of this wide academic discipline. As it has been discussed, strategic management of carbon is a complex organisational task and it must begin with understanding how carbon management can affect the business. Though carbon management is a strategic issue, there remains a need for a strategic management approach to abate carbon emissions. According to the GHG Protocol (2004) the government policies will not sufficiently solve the problem of carbon emissions. Strong leadership and innovation from business is vital to making progress. The literature on SCM is very sparse and some studies have focussed on the measures to reduce carbon emissions which also include technical measures and behavioural change strategies. Efficient carbon management strategies will help decision-makers to achieve carbon reduction targets in a cost-effective manner. A SCM framework needs to be developed by all universities as a catalyst for actions against carbon emissions which can guide senior managers in how they can contribute towards carbon reduction in their decision-making.

DMU measured its carbon emissions using a consumption-based approach but there is a real need to evaluate the advantages and disadvantages of the different approaches to carbon footprinting. There is a need to carry out a study which will help in developing an understanding that how SCM can be integrated in scope 3 emissions (supply chain emissions) and support senior management to manage its overall carbon emissions. Eisenhardt (1999) explained strategy as a strategic decision-making process and therefore, the ability to make quick, widely supported, and high-quality strategic decision is the cornerstone of an effective strategy. Thus, there is a need to understand the context and the process of strategic decision-making within the institutions that how senior management makes the choices to manage its carbon emissions. Higher education provides an obvious example of applying this innovation.

CONCLUSIONS

There is an ongoing need to evaluate the process of SCM in the HE sector and to propose a clear routemap for integrating carbon management into the strategic management process. Some studies have already sought to analyze the carbon management issues within the organisations and have provided many insightful results and helpful recommendations. However it is surprising that empirical research examining the strategic approach and commitment to carbon management and strategic decision-making process within the HE organisations is relatively sparse. There is also a gap in the consideration of scope 3 emissions in the carbon management process because very few organisations are dealing with their supply chain emissions. This paper is part of a wider PhD study at DMU which aims to contribute to the debate by exploring the topic of strategic carbon management using DMU as a case study. Future research then will apply the case study research methodology to collect data using the relevant data collection tools and techniques. The evaluation and contribution to SCM knowledge in the HE sector will act as transferable best practices for other universities in an effort to lead to a breakthrough in the management of carbon through this novel strategic approach

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