

An investigation into environmental sustainability in third level colleges in Ireland

Kenneth N. Corless B.E., L.L.B

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Supervisor: Mr Seán Conlan

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Declaration

I declare that this thesis is entirely my own work, except where otherwise stated and has not been previously submitted to any Institute or University.

Signed: 

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Abstract

The global drive toward sustainability is well under way. Academic institutions have an important role to play in this shift towards sustainability. Third level educational establishments, as part of the wider public sector in Ireland, are now expected to become exemplar organisations, leading the way in environmental sustainability. As someone who works in an Institute of Technology in Ireland, I have taken a keen interest in the linkage that exists between the demands and targets that are being set for the wider public sector in relation to energy efficiency and environmental sustainability, and the response of the individual institutions concerned. Many individual environmental protection measures are being adopted by colleges and universities; however, a more systematic approach to achieving environmental sustainability and reducing environmental impacts of their activities is preferable. This thesis sets out to establish whether or not third level colleges in Ireland are in fact embracing environmental sustainability or if they are exemplar organisations. It also seeks to establish what the drivers and benefits of environmental sustainability are for the sector and what barriers exist to achieving the goal of environmental sustainability. It does this by performing a comprehensive literature review, and by presenting the findings of a comprehensive college campus environmental sustainability survey targeted at the Institutes of Technology in Ireland. The survey clearly shows that despite the existence of many individual environmental sustainability initiatives throughout the sector, there is a distinct lack of any formal systems to address these issues, despite the clear evidence that such systems have many benefits. The other barriers to achieving environmental sustainability that emerge from the survey include human, financial and technical resource constraints and senior management leadership. This work recommends that colleges should

adopt a formal Environmental Management System, with the An Taisce Green Flag College system being recommended as the most appropriate route for a third level college in Ireland to take to achieve the goal of campus environmental sustainability. It incorporates all of the elements of a traditional environmental management system in addition to curriculum development and the involvement of the wider community.

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Chapter 1: Introduction

1.1 Background

Notwithstanding the current global economic and financial crisis rocking the world, organisations are increasingly embracing environmental and sustainability issues as a key part of their corporate management initiatives. These organisations are responding to the many environmental challenges facing the world. There is a generally accepted global realisation that our dependence on carbon based fuels has led to a build up of so called greenhouse gases in the atmosphere which has resulted in a change to the global climate with potentially drastic effects for all aspects of life on the planet. Climate change is not the only environmental threat facing the planet. Other issues with potentially serious consequences include water scarcity, deforestation, and resource depletion to name but a few.

The global financial and environmental challenges are also posing many challenges for Ireland. It can be argued that the future economic prosperity of the country is dependent not just upon addressing the financial crisis that has threatened the economy in recent times, but will increasingly be dependent upon addressing the various environmental challenges that exist.

The Irish government have identified the areas of environmental responsibility, security of energy supply and energy cost competitiveness as of key strategic importance for the country through such policy documents as The Energy White Paper (Department of Communications, Marine and Natural Resources 2007)

and The National Climate Change Strategy (Department of the Environment, Heritage and Local Government 2007).

In the area of environmental responsibility, arguably the most profound issue to be addressed is to limit and reduce greenhouse gas emissions, 67% of which are energy related (Howley et al 2010). Ireland's commitment to the Kyoto Protocol, which is an international legally binding agreement to reduce GHG (greenhouse gas) emissions, is to limit the growth in annual emissions to 13% above 1990 levels in the period 2008 to 2012. Due to the economic downturn in the economy, it is expected that Ireland will meet this target.

In 2008, the EU agreed a Climate Energy Package that included a target to reduce greenhouse gas emissions across the EU by 20% below 1990 levels by the year 2020. Whilst the exact targets for Ireland under this EU target have yet to be agreed it is expected that Ireland's target will be below our 1990 emissions levels. In recognising that Government should take a lead role in this process the Government has agreed that the public sector should achieve a reduction in greenhouse gas emissions equivalent to a 33% saving in energy use by 2020. Whilst the detail of this is addressed in more detail in chapter 2 of this report, it is sufficient to say that it will be a major challenge for the economy to meet these higher targets, given that arguably the only reason we can meet the existing Kyoto target is due to the unprecedented economic turmoil of recent years.

In relation to security of energy supply, another issue of key importance for Ireland, Ireland's dependence on imported fuels remains high. In 2009 the figure stood at 89%, despite the recent significant growth in renewable energy. This issue, in addition to the challenge of achieving cost competitive energy supply are key national challenges.

Individual citizens, organisations both small and large, as well as cities and individual countries in the form of local and national governments have roles to play in addressing some of these concerns. Organisations, depending on their size, will have possibilities for either damaging or protecting the environment and either enhancing or damaging sustainability. Public sector organisations are arguably in a particularly influential position to influence behaviour and be a beacon for good practice to the wider community. Ireland's public sector is facing into a period of profound change and challenges are being presented in the form of reduced operating budgets which will require cost efficiencies in addition to contributing in a visible and comprehensive manner to the various environmental sustainability challenges facing the country. Of course both of these challenges are interlinked. It is well established that by addressing such matters as energy use, waste management, water use, and greenhouse gas emissions, the organisation can achieve substantial cost efficiencies. The idea that public bodies "*shall fulfil an exemplary role*" with regard to energy efficiency matters has been enshrined in legislation in recent times. (European Communities (Energy End-use Efficiency and Energy Services) Regulations 2009). The public sector is now being challenged to take a collective leadership role in adopting high energy efficiency standards and practices that can exemplify and help drive change through to all sectors, saving costs, cutting emissions and halting climate change. Included in these public sector organisations are government departments, local authorities, healthcare organisations, non-commercial state agencies, commercial semi-state companies and some 4000 plus schools and third level colleges. It has been estimated by the Sustainable Energy Authority of Ireland that these organisations combined have an estimated annual

energy spend of €500 million alone as well as other costs associated with waste management, water usage and transport fleets and facilities.

The focus of this work is on examining the role that third level colleges in Ireland have to play in protecting the environment and promoting sustainability. College campuses have many diverse operations and activities that can impact the environment. These operations and activities include laboratories, sports facilities, power generation, energy use, grounds maintenance, drinking water supplies, construction and demolition activities, waste management activities and transport in addition to their central roles as education providers. Thus, in addition to the many environmental aspects of universities and colleges mentioned, the incentives for universities and colleges to adopt environmental and sustainable practices are also many and include an enhanced reputation, better management, enhanced legal compliance, cost reduction and avoidance, better community relations and achieving educational excellence. This work aims to investigate the level of integration of environmental initiatives at third level colleges in Ireland and to establish their readiness or otherwise to address these environmental sustainability challenges.

This report details the results of this research and is laid out as follows. The remaining sections of this, the first chapter of the report, outline the aims and objectives of the research and the research methodology employed, introduces the concept of sustainable development and, finally, gives an overview of the third level sector in Ireland and in particular the target audience for this work, namely the Institutes of Technology in Ireland. The second chapter examines the drivers for environmental sustainability in particular both the business case and the policy cases for sustainability. The third chapter examines college campus sustainability in the wider context by reviewing best international practice, and examining the various

approaches that are possible in relation to incorporating environmental sustainability on a college campus. The fourth chapter details a survey undertaken of the Institute of Technology sector in Ireland to ascertain a current picture on the level of awareness of environmental sustainability initiatives and to gain an insight into what the issues are in relation to college campuses becoming more environmentally sustainable. The final chapter presents an analysis of the findings of the survey and research and offers a discussion and conclusions.

1.2 Aims, Objectives and Methodology

In the context of the key role that third level colleges play in protecting the environment and promoting sustainability as outlined above, the key research question posed in this work was to establish where the sector is at in relation to these matters. The main objective of the work was thus to gain an insight into the level of integration of environmental sustainability practice in the third level education sector in Ireland, in particular, the Institute of Technology sector. To achieve this main objective, the following sub-objectives were set:

- To investigate the concept of sustainable development and in particular how it relates to the activities of a college or university.
- To establish how colleges and universities globally are responding to the challenges and opportunities of environmental management and sustainability.
- To establish how Irish colleges and universities are responding to the challenges and opportunities of environmental management and sustainability and how they are addressing national policy and legislative challenges in relation to climate change, sustainability and energy efficiency.

- Investigate best practice and suggest a pathway to achieving an environmentally sustainable campus.

The methodology employed to achieve these objectives was a combination of a comprehensive literature review of the subject area and the design, distribution and analysis of the findings of a survey, targeted at the Institutes of Technology sector in Ireland.

1.3 Introduction to Sustainability

'Fundamental changes in the way societies produce and consume are indispensable for achieving global sustainable development. All countries should promote sustainable consumption and production patterns ... Governments, relevant international organisations, the private sector and all major groups should play an active role in changing unsustainable consumption and production patterns.'
World Summit on Sustainable Development, Johannesburg Plan of Implementation, September 2002

Sustainable development and sustainability have come to the fore in the last twenty to thirty years and have as their basis offered a critique of development models that resulted in the destruction of nature.

One of the best known definitions of sustainable development has been given by the United Nations (United Nations 1987).

They defined it as development *"meeting the needs of the present without compromising the ability of future generations to meet their own needs"*. Other statements on sustainable development offered by the groundbreaking United Nations report prepared by the Brundtland Commission in 1987 included the observation that *"many of us live beyond the world's ecological means, for instance in our patterns of energy use. ... At a minimum, sustainable development must not endanger the natural systems that support life on Earth: the atmosphere, the waters, the soils, and the living beings."*, and *"In essence, sustainable development is a*

process of change in which the exploitation of resources, the direction of investments, the orientation of technological development; and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.”

The basis of the sustainability debate is that systems, both natural and human, need to be regenerative and balanced in order to last. The kinds of systems that are included in this debate include economic, environmental, societal and personal. Can we continue to design and build a world in which the Earth can thrive and people can continue to pursue flourishing lives?

At the heart of this question is a recognition that the needs of natural, economic and social systems are so interdependent that they have to be considered in an integrated way.

(Viederman 2006) in addressing the question: *Can universities contribute to sustainable development?* offers the view that the two most important and difficult interrelated issues for sustainability and development are the global economy and the distribution of power among the peoples of the world. He opines that sustainability is not a technical problem to be solved but rather that it is ultimately about what a society values, not in the technical sense of economic valuation but in the sense of human concerns and aspirations.

One thing however is clear. Irrespective of the definition of sustainability arrived at, there is a vital need for human society to address the challenges posed by the sustainability issue. Addressing this issue will lead to a transformation in the way that we work live and compete. In particular the implications for organisations is that work processes, organisational models, competitive strategies and leadership models are all going to be affected. On a more specific basis, higher education

institutions have a key role to play in shaping the vision for, and development of a more environmentally sustainable society as a whole. The recently released report on a national strategy for higher education speaks of higher education having the capacity to provide “*intellectual leadership*” and engaging more intensely with wider society than heretofore (Strategy Group for Higher Education 2011). It can be argued that higher education institutions, more so than many other organisations, either public or private, have a unique responsibility and role to play. Its graduates will be the leaders of tomorrow, in business, politics, religious institutions, science, engineering, and the arts. They will also be citizens who will participate in decision making for the common good. There are many ways that higher education institutions can respond to these challenges. One would be for these institutions to develop a model that would allow them to organise their teaching, research and outreach to help the surrounding region to develop and maintain a thriving environmentally sustainable industrial economy. This concept of colleges and education for sustainable development is reviewed in some more detail later in this report. Another more obvious way is for the individual institutions to examine, understand and reduce their own ecological footprints, and in doing so, provide the impetus and example to staff, students and the wider community alike on best practice environmental sustainability. This can be done through such initiatives as energy management, building design and maintenance, adopting environmentally aware purchasing policies, waste management, and water management and conservation – in general developing an appropriate environmental management system. With initiatives such as these underway on campus, the idea of the campus as a learning laboratory for environmental sustainability initiatives can be achieved,

whereby education for sustainability ideas and projects can be incorporated into curricula through the various faculties.

1.4 Structure of the Third Level Education System in Ireland

There are approximately forty higher education institutions in Ireland in receipt of public funding. Of these, there are seven universities, fourteen institutes of technology, seven colleges of education, and the remainder are small independent institutions many with fewer than 500 students. The overall enrolment in the University sector for the years 2008/2009 stood at 107,899 and for the Institutes of Technology at 69,489. These figures included full time, part time and post graduate students (HEA 2009). The research conducted in this work was limited to the Institutes of Technology sector. The Institutes of Technology (IOT's) are further and higher education colleges, that, despite their titles, are not confined to studies in technology, and engage in both teaching and research in a wide range of disciplines. They were originally designated as Regional Technical Colleges (RTC's) and the modern title of Institute of Technology was conferred on the colleges in the 1990's. Nearly all of the colleges were new entities, the first of whom opened their doors in 1970, and the most recent in the year 2000.

Chapter 2: The Drivers for Environmental Sustainability

The changing aspirations and ambitions of citizens globally is putting pressure on institutions, both public and private, to redefine their roles and examine ways in which they can meet these demands. Public service institutions have an arguably greater responsibility to meeting and satisfying the changing needs of the communities and public that they serve. A key element of this changing context is the drive for environmental sustainability which demands a more sustainable development and the achievement of corporate social responsibility. The following chapter examines the drivers for environmental sustainability which have been categorised as environmental, business and policy case drivers and will show the imperative for organisations to address the question of environmental sustainability.

2.1 The Environmental Case for Sustainability

2.1.1 Global Environmental Concerns

The United Nations Environment Programme (UNEP) report *Global Environment Outlook (GEO-4)* outlines some of the environmental concerns facing the world and includes climate change, freshwater scarcity, biodiversity loss, collapsing fisheries, soil erosion, cropland and forests loss, increasing population, growing waste and growing consumption. (United Nations Environment Programme 2007)

2.1.2 Climate Change

Climate change represents one of the most significant of all the current environmental threats. The Intergovernmental Panel on Climate Change (IPCC) state that climate change refers to a change in the state of the climate, for example temperature and precipitation that persists for an extended period, typically decades or longer. Climate in a narrow sense is usually defined as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. (Intergovernmental Panel on Climate Change 2010).

A large majority of the climate science community has very high confidence that the net effect of human activities since 1750 has been one of warming. They also conclude that most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase anthropogenic greenhouse gas (GHG) concentrations.

Global GHG emissions will continue to grow over the next few decades due to increases in the human activities that generate GHG's, notably the combustion of fossil fuels, certain land use practices and emissions through land use changes.

These gases prevent heat from escaping to space, somewhat like the glass panels of a greenhouse. The figure below from the IPCC explains the greenhouse effect.

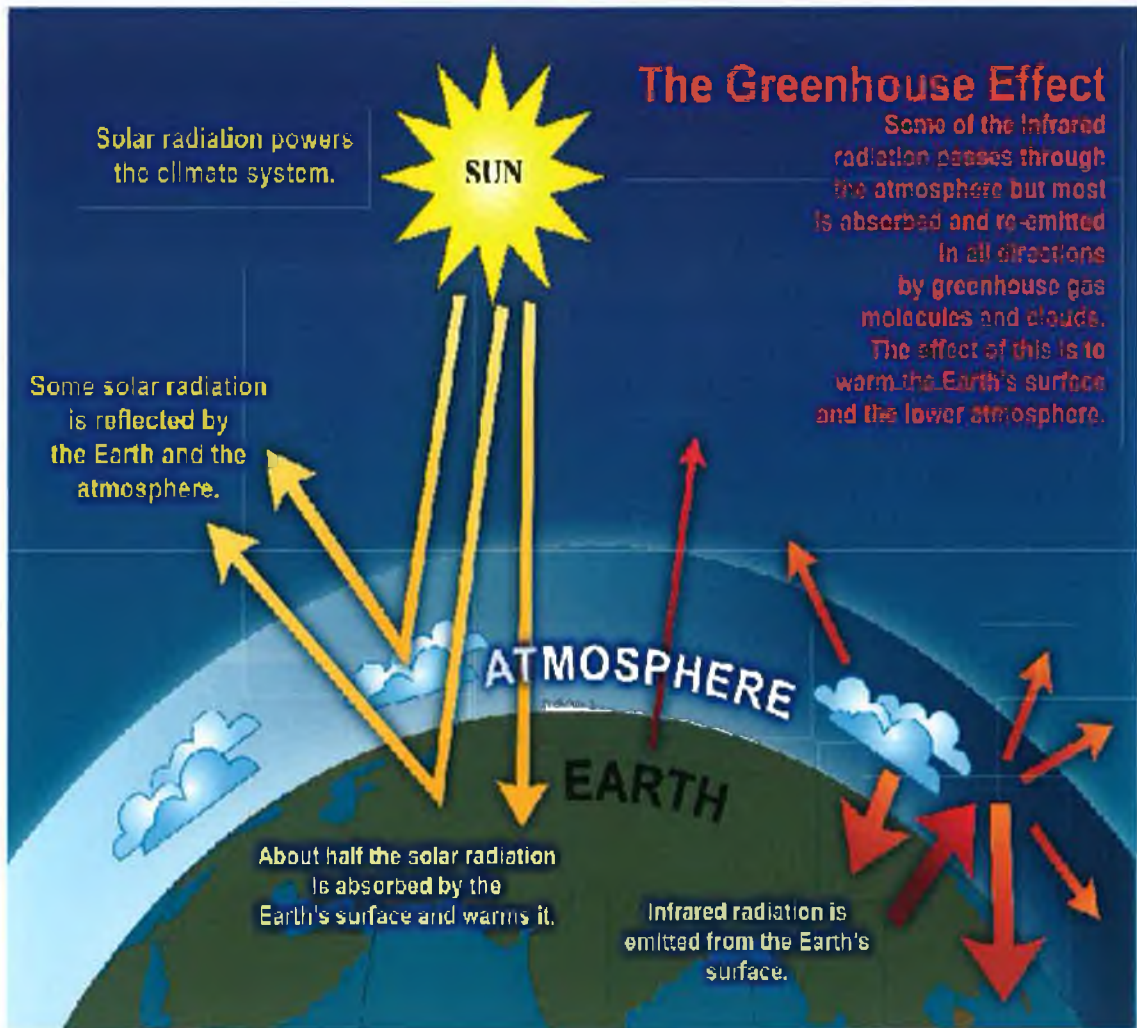


Figure 1: The Greenhouse Gas Effect (IPCC 2007)

The increased emissions to the atmosphere of greenhouse gases mean that current levels of gases far exceed their natural ranges. The figure below shows the levels of certain greenhouse gases in the atmosphere over the last 2000 years.

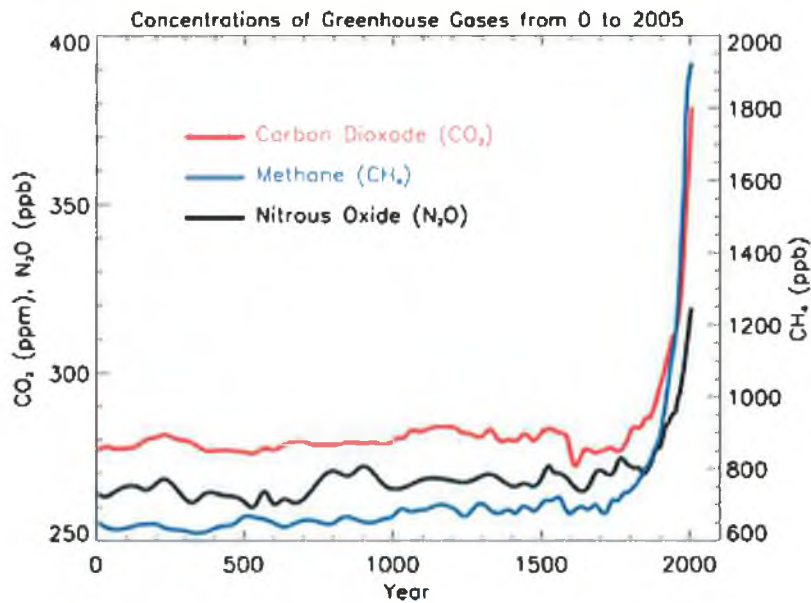


Figure 2 : Atmospheric Greenhouse Level (IPCC 2007)

This rise in greenhouse gases has increased the amount of energy being trapped in the climate system. The consequences of this are most clearly evident in the global temperature records, which show that, on average, the global temperature has increased by 0.8 degrees centigrade (°C) above pre-industrial levels. Continued emissions at or above current levels would cause further warming and result in changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century. Higher temperatures would cause further widespread change, including: a decrease in snow cover and sea ice; an increase in frequency of hot extremes, heat waves and heavy precipitation; an increase in tropical cyclone intensity; precipitation increases in high latitudes and *likely* decreases in most subtropical land regions, among many other impacts; sea level rise, and accelerated species extinction, among many other impacts.

2.1.3 Implications of Climate Change for Ireland

The EPA's Climate Change Research Programme carries out relevant and up to date studies on climate change in Ireland. Recent analysis (Desmond et al 2009) of the meteorological records shows that Ireland's climate is changing in line with global patterns. The clearest trend is evident in the temperature records which show a mean temperature increase of 0.7 °C between 1890 and 2004. Other indicators include:

- Six of the ten warmest years in Ireland have occurred since 1990
- A reduction in the number of frost days and shortening of frost season length
- An increase in annual rainfall in northern and western areas with decreases or small increases in the south and east.

These changes are reflected in Ireland's natural environment with an increase in the growing season and with greater number of animals suited to warmer temperatures being evident in Ireland and its surrounding waters. In more recent years, another significant issue has emerged. That is, increasing ocean acidity, which will have harmful effects on marine organisms and has the potential to disrupt global marine ecosystems.

Climate change impacts are projected to increase in the coming decades and during the rest of this century. Uncertainties remain in relation to the scale and extent of these impacts, particularly during the second half of the century. The greatest uncertainty lies in how effective global actions will be in reducing greenhouse gas emissions. Predicted adverse impacts include:

- sea level rise,
- more intense storms and rainfall events,

- increased likelihood and magnitude of river and coastal flooding and
- water shortages in summer in the east
- adverse impacts on water quality
- changes in distribution of plant and animal species
- effects on fisheries sensitive to changes in temperature

2.1.4 Addressing Climate Change

Addressing climate change requires two types of responses: **mitigation** (defined as an anthropogenic intervention to reduce anthropogenic forcing of the climate system (IPCC, 2007)) and **adaptation** (defined as: the “adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects that moderates harm or exploits beneficial opportunities” (IPCC, 2007)).

The European Union’s agreed objective is to limit global temperature increase to less than 2°C compared with pre-industrial levels – beyond this threshold irreversible changes, such as the breakdown of the Greenland and/or West Antarctic ice sheets, become more likely.

Ireland is committed to reducing its greenhouse gas emissions under the Kyoto protocol. This is an international agreement designed to reduce greenhouse gas emissions in developed countries by achieving national emission targets. Under this agreement, Ireland is allowed to increase its emissions by 13% relative to 1990 levels in the period 2008 to 2012. Significant growth in the Irish economy in the 1990s has resulted in emissions that are far higher than our Kyoto target levels. The EPA are of the opinion that neither adaptation to new climate conditions nor the reduction of emissions alone can ensure that major negative climate change impacts

can be avoided over the coming decades. Addressing climate change they feel will therefore require planning for sustainable development and measures to tackle the oncoming impacts of climate change. Investments over the next two to three decades will have a large impact on opportunities to achieve required GHG emissions reductions targets in addition to reducing the risks of future climate impacts.

If we hope to combat climate change, concerted efforts will need to be made locally and internationally by governments, public agencies, businesses, industries, communities and individuals. Achieving major reductions in the use of fossil fuels is essential if Ireland is to secure the major cuts being sought in GHG emissions. In addition, improvements in energy efficiency, coupled with widespread use of alternative energy sources, will also be needed. Sustainable transport and agricultural practices aimed at reducing emissions are also urgently needed

2.1.5 Other Global Environmental Concerns

The United Nations Environmental Programme, (UNEP 2011), have an initiative called the UN Global Compact that is a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption. By doing so, business, as a primary driver of globalization, can help ensure that markets, commerce, technology and finance advance in ways that benefit economies and societies everywhere. In particular principle 7 states that “*businesses should support a precautionary approach to environmental challenges*”, principle 8 states that businesses “*undertake initiatives to promote greater environmental*

responsibility” and principle 9 that businesses “*encourage the development and diffusion of environmentally friendly technologies*”.

As part of the Global Compact initiative, UNEP have prepared an environmental principles training package (UNGlobalCompact 2011) in which they outline some of the global environmental concerns driving the sustainability agenda.

The first one is under the general heading resource depletion, in particular freshwater. It is recognised that access to freshwater is arguably the world’s most urgent resource issue. Every year about 5 million people die due to a lack of access to water and sanitation. Approximately 30% of people live in countries which suffer moderate-to-high water stress, and by 2025 more than 4 billion people will be living in water stressed countries. Between 1900-1995, global freshwater consumption rose six-fold, more than double the population growth rate.

More than 20% of the world’s freshwater fish species have become extinct, threatened, or endangered in recent decades.

In 60% of the European cities with more than 100 000 people, groundwater is being used faster than it can be replenished.

Another global environmental concern is population growth.

After reaching 1 billion for the first time around 1800, the world’s population has since increased exponentially, reaching six billion by late 1999. Despite declining fertility rates, population is expected to increase to 8.9 billion by 2050. Nearly all of this growth will be concentrated among the poorest population in developing countries, taking place in the regions of the world least able to absorb large increments of people, threatening sustainable development and producing a further

deterioration in levels of living and quality of life.

UNEP outline that the total environmental burden of human activity is a function of three factors: population, affluence and technology. The product of these three factors determines the total burden of human activity on the stocks of natural capital, on which many of the other capital stocks depend. For sustainability to be attained, the environmental burden of human activity will need to be reduced by decreasing the human population, changing consumption patterns, and/or changing the technology used to create wealth. Human population dynamics – coupled with consideration for the effects of poverty and excessive consumption – has a profound impact on each of the planet’s five main capital stocks. It affects the assimilative and regenerative capacity of the natural environment and has significant implications for health, nutrition and education, as well as impacting on the nature and distribution of wealth and technology. UNEP point out that the importance of highlighting that it is not population levels *per se* that are the main cause of environmental degradation, but rather the associated consumption and production patterns. An important challenge in terms of environmental management is to find an appropriate balance in terms of inter and intra-generation equity: how to meet the basic needs of the existing population (such as food, shelter, health, education, and clothing), without unduly impacting on the capacity of future generations to meet their own needs. This is the basic definition of sustainable development. Finding this balance will require significant innovation in terms of our current production *and* consumption patterns.

Another pressing global environmental concern as outlined by UNEP is unsustainable consumption. With the ongoing growth in personal income, there has

been a general increase in the personal consumption of all types of products and services, ranging from basic needs through to more luxury items.

Such high levels of consumption by the world's affluent can have a disproportionate impact, particularly on natural capital stocks and human health. One-fifth of the world population is responsible for more than 80% of total personal consumption.

The disparity between the consumption levels per individual in the industrial world and in developing countries is stark.

One child born in the industrial world adds more to consumption levels in one lifetime than 40 children born in developing countries.

Ecological footprint analysis (Chambers et al 2000) is a graphic approach for conceptualising the environmental impact of a particular individual (or organisation, product, service or political region), and for understanding how this relates to the overall carrying capacity of the planet.

The Ecological Footprint is an estimate of human pressure on global ecosystems, expressed in 'area units'. Each unit corresponds to the number of hectares of biologically productive land required to produce the food and wood people consume, the infrastructure people use, and to absorb the CO₂ produced from burning fossil fuels; thus the footprint takes into account the total impact people have on the environment. The world's Ecological Footprint is a function of population size, average per capita consumption of resources, and the resource intensity of the technology used. During 1970-96, the world's Ecological Footprint rose from 11 000 million area units to more than 16 000 million area units.

If we continue with our current production and consumption trends it has been estimated that we would need four planet Earths by the end of the 21st century.

These extra planets would be needed to provide the resources necessary to maintain rapidly growing consumption patterns, as well as to effectively absorb the associated wastes and pollution that is generated. The problem of *overshoot* remains. Overshoot reflects our ability to exceed temporarily the carrying capacity of the earth, helping people to live better in the short run but putting our natural capital into decline in the long run.

Based on the above, it is clear that if we are to achieve environmental sustainability, we need to significantly change the way we currently do business and treat the planet. This sentiment is captured in the following statement made by the former CEO of a large multinational chemicals company.

“We cannot continue to do what we have always done, only incrementally better, and expect to achieve sustainability. If sustainability is to be achieved, we will have to rethink virtually all of our industrial processes.”

Edgar S Woolard – Former CEO of Du Pont

2.2 The Business Case for Sustainability

“In the next society, the biggest challenge for the large company - especially for the multinational – may be its social legitimacy: its values, its missions, its vision.”

Peter Drucker

“As the private sector has grown in size, influence and reach, so too have the demands for increased corporate responsibility. They are unlikely to go away. The

'business case' for corporate responsibility is becoming clearer, louder and more urgent."

Jane Nelson – International Business Leaders Forum

A workshop commissioned in the United Kingdom by the Department of Trade and Industry and organised by Forum for the Future in May 2003, addressed the issue of measuring the benefit for business competitive advantage from social responsibility and sustainability. A report on its key findings, (DTI 2003), outlined that a business with strong corporate social responsibility will often be more successful in generating Economic Value Added, for reasons rooted in business strategy. It was attended by 70 senior business researchers and practitioners from the Chief Economists of Shell and BA to the Senior Corporate Responsibility Adviser at Vodafone. The finding that corporate social responsibility (CSR) is not necessarily a cost of doing business was revealed by the significant overlaps between stakeholder and environmental management concerns and what modern resource-based business strategy sees as the source of business competitive success. The workshop also found that parallel research on business intangibles (such as brand value) and intellectual capital, including the contribution stakeholder management could make to a company's competitive advantage, has direct application. Many of the tools developed to measure business intangibles could be applied to measure the shareholder value of a company's CSR policies and performance, offering for the first time robust evidence of the business value of corporate sustainability and responsibility. The workshop found that past attempts to measure the business case were mostly concentrated on eco-efficiency cost savings and green or ethical price premiums. With some notable exceptions the resulting numbers have been small and relatively insignificant compared with other pressing issues for business. Most

previous studies, the workshop found, omitted a major contribution to business success from stakeholder and environmental management: their contribution to a company's competitive advantage in its main markets. Other key findings of the workshop included:

- Capacity to innovate can be enhanced by both sustainability and corporate social responsibility. The workshop heard that Vodafone has developed both niche products and overall brand, while Interface has been able to develop a bestselling carpet based on how nature designs a good ground cover.
- Reputation and the importance of CSR and sustainability are clearly linked, particularly in developed, higher-income, markets. BT collects reliable attitude data every month from thousands of UK customers through an independent research agency. Based on eighteen months tracking, BT has identified that CSR attitude accounts for at least 25% of the dimensions that drive BT's corporate reputation. Corporate reputation is directly linked as a driver of customer satisfaction thus establishing a direct link between CSR and customer satisfaction;
- Key internal and external relationships are widely accepted as a source of competitive advantage that could be enhanced through stakeholder management. The workshop also heard that Carillion found significant business benefits in a recent mapping exercise that quantified the effect links with key stakeholders had upon value creation. Statistical modelling by The Work Foundation showed how important high performance workplaces are for UK productivity growth.

- Strategic assets are an obvious source of competitive advantage as their owner has an important but very scarce resource. Several businesses demonstrated the value of stakeholder and environmental management to maintaining the licence to operate that asset with regulators and local communities (eg British Airway's hub airport slots at Heathrow).

A well known study in the business case for corporate sustainability, *Developing Value: The Business Case for Sustainability in Emerging Markets*, (SustainAbility, International Finance Corporation 2002) looked at more than 240 examples in over 60 countries, and identified the following issues as the most significant business opportunities associated with pursuing more sustainable approaches to business:

- saving costs through improved efficiencies;
- increased revenues by improving the environment and benefiting the local economy;
- reducing risks through stakeholder engagement;
- improved access to capital;
- building brand value and reputation;
- developing human and intellectual capital; and
- improving access to capital through better governance.

2.2.1 The Business Case Drivers

The United Nations, (UNGlobalCompact 2011) outlines the main sets of themes under which the various business benefits can be categorised. They include; the licence to operate, cost and liability reduction, market access and new markets.

The first set of business case benefits relate to a company's "licence to operate" within existing or new markets and/or within different communities and jurisdictions. It is essentially the level of acceptance of the organisation by its stakeholders. This so called "licence to operate" can be "granted" by the stakeholders of the organisation. Typical stakeholders of an organisation might include regulators, politicians, local communities, the general public, the media and civil society.

Some examples of how sound environmental management practices can create opportunities and value for companies include

- ***Licence to Operate:*** Evidence of a history of responsible corporate behaviour can assist in securing the approval of regulatory authorities regarding new business activities, and contribute to reduced costs associated with compliance and gaining permits and licences. Environmentally responsible behaviour is also important in building positive relationships with local communities and other external stakeholders each of whom can have a bearing on a company's social "licence to operate."
- ***Proactive Legislative Compliance:*** Effective environmental management practices will often result in reduced costs associated with subsequent legislative requirements; companies that adopt responsible management

practices will typically predict and be proactive in addressing legislative developments, and will thus usually incur savings over those who adopt a more reactive approach.

- **Employee Relations:** There is a competitive market for attracting and retaining the best-and the- brightest employee. Graduates considering their employer of choice are increasingly looking beyond the specific job function to consider the company's value systems and operational practices. A number of companies have found that effective and visible sustainability initiatives can help to attract and retain talented and committed employees, as well as contributing to their ongoing motivation. A related observation is that in the recently published Fortune magazine's 100 best companies to work for, a common characteristic of many of the companies on the list is their commitment to corporate social responsibility. Boston Consulting Group, ranked third, has a "social impact" program that targets global health issues. Number 34, Umpqua Bank in Roseburg, OR, offers paid time to its employees for volunteering in the community.
- **Brand Image:** The marketplace is becoming more environmentally sophisticated, with increasing implications for a company's intangible assets such as its brand image and reputation. Appealing to the ecological and social as well as economic sensibility of consumers can increase customer loyalty. It has been estimated, for example, that since 1990, McDonald's has enhanced its brand image by buying recycled products worth \$3 billion without paying a price premium or otherwise increasing costs. Conversely companies that fail to identify and respond to consumer interests can incur

significant additional costs, as Shell's experience with the proposed sinking of an oil platform in the North Sea in the mid 1990s (the Brent Spar) indicated, and indeed more recently with the attempts to bring ashore the gas reserves off the North West Mayo coastline and the so called *Shell to sea* campaign. Similarly, for some organisations, a failure to identify and respond to stakeholder concerns may result in the company brand being used against them.

“Consumers are looking for new sorts of brand values. These go well beyond the practical issues of product benefits and further than the emotional and psychological aspects of brand image. Consumers are moving to the top of Maslow's hierarchy of needs and seeking 'self-realisation'. Marketing's understanding of brand's territory needs to be extended into that of 'ethics' and 'beliefs'” (Lewis 2003).

The second broad set of business case benefits relates to the reduction of costs and liability associated with effective environmental management. Responsible environmental management is increasingly seen as a proxy for good management in general. The reasons outlined for this include:

- ***Improved operating efficiencies and enhanced productivity:*** Effective environmental management practices can result in significant cost savings associated with reduced waste and pollution disposal costs, and lower input and resource expenses. Environmentally sustainable buildings are often more cost-effective to build and operate, and provide a comfortable working environment that can result in a healthier, happier and more productive work force.

- **Reduced risks and liability:** Proactive environmental management can also result in reduced costs (for example with legal liability and possible clean up costs arising from polluting activities). Many companies have found that ineffective environmental management practices in the past have come back to haunt them, in the form (for example) of significant site remediation costs and/or legal action from regulatory officials or personally affected individuals.

The third broad set of business case benefits relates to the potential financial advantages associated with improved market penetration and improved access to capital:

- **Improved market penetration:** With increasing consumer awareness of environmental and social issues there is the potential for companies to benefit by demonstrating environmental and social responsibility in the design, manufacturing, distribution, packaging and use of their products. In some markets and for certain products, such differentiation can provide the opportunity for higher margin and/or higher sales volumes.
- **Improved access to capital:** Provision for environmental and social concerns in corporate strategy is seen by many in the investment community as a proxy for sound financial and risk management. The recent growth in socially responsible investment funds, the increasing number of sustainability indices (such as FTSE4Good and the Dow Jones Sustainability Index), and the development of initiatives such as the Equator Principles, The Extractive Industries' Transparency Initiative and the Carbon Disclosure Project, is

indicative of the growing interest of the financial community in sustainability issues. This in turn is having an impact on companies who in a number of instances are finding that the implementation of effective sustainability strategies can reduce the cost of capital.

- **Condition of entry:** In a number of cases a company's environmental performance is also a *de facto* condition of market entry. Increasingly, larger companies are including environmental considerations within their procurement policies, with their supplier being required to demonstrate socially and environmentally responsible behaviour.

Perhaps the most exciting of the business case benefits relates to the potential for accessing completely new markets.

With growing populations and increasing demands for resource-intensive lifestyles, coupled with the existing evidence of certain resource constraints, it is highly likely that there will in the near future be significant changes in the pricing of a number of key resources (such as water and fossil-fuel based energy). A number of forward-looking companies are thus seeking opportunities associated with the development of renewable energy sources or new forms of personal transport. One only has to look at the proliferation of electric powered vehicles on the mainstream market for evidence of this shift.

Applying environmental principles to the design and manufacture of products has helped several leadership companies bring entirely new product lines to market.

In a recent newspaper article, (Ruddy 2011), the editor of Checkout Magazine, John Ruddy, wrote about how industry leaders are starting to incorporate sustainability into the business agenda. In the article he described how big and small companies, particularly in the fast moving consumer goods sector, are realising that sustainability makes real business sense.

He notes that the chief executive of Unilever, Paul Polman, in late 2010 announced a new strategy that made sustainability the linchpin of everything it would do for the next ten years. Polman was quoted as describing the plan “not as a project to celebrate, but a business model to implement”, and as stating that “tackling sustainability challenges provides new opportunities for sustainable growth, creates preference for our brands, builds business with our retail customers, drives our innovation, grows our markets and, in many cases, generates cost-savings”.

The article went on to describe how Proctor and Gamble launched a similar strategy last year, promising that , by 2020, all of its plants would be powered by renewable energy, all packaging material would be 100 per cent renewable or recyclable and that no waste would be sent to landfill. Proctor and Gamble chief executive Bob McDonald was quoted as saying “what’s important is that we don’t treat environmental sustainability as something separate from our base business”. The article also noted that Coca Cola chief executive Muhtar Kent describes himself as the company’s “chief sustainability officer”.

The article discusses some of the initiatives being undertaken by Irish companies to address the sustainability agenda and the challenges presented by the sustainability agenda, and concludes by noting that just as global giants like Unilever are shaping their own destiny by moving towards a sustainability focused business strategy, Irish

brand owners must also figure out what sustainability means to them and the customers they ultimately serve.

In conclusion, it is worth quoting from an article by Professor Stuart Hart that appeared in the Harvard Business Review in 1997:

“Over the next decade or so, sustainable development will constitute one of the biggest opportunities in the history of commerce.”

2.3 The Policy Case for Sustainability

Ultimately governments are responsible for framing the market conditions within which the business case outlined above can be made. This section outlines the framework regulatory requirements that currently exist and which serve to advance the case for sustainability.

2.3.1 National Policy Initiatives

The Government White Paper, Delivering a Sustainable Energy Future for Ireland - The Energy Policy Framework 2007 – 2020, seeks to set out the roadmap to steer Ireland to a sustainable energy future.

It is set firmly in the global and European context which has put energy security and climate change among the most urgent international challenges. In charting the course for Irish energy policy, the publication took full account of global and EU developments. Ireland faces similar energy challenges to those being confronted worldwide. (Department of Communications, Marine and Natural Resources 2007)

Section 3 of the White Paper sets out the Government’s comprehensive action-oriented Energy Policy Framework to 2020 under each of three stated strategic goals, namely, Security of Supply, Sustainability of Energy Supply and Competitiveness of Energy Supply.

Under the goal, sustainability of energy supply, the document states that sustainability is at the heart of the Government's energy policy objectives. The challenge of creating a sustainable energy future for Ireland is being met through a range of strategies, targets and actions to deliver environmentally sustainable energy supply and use.

Some of these underpinning strategic goals are:

- Addressing climate change by reducing energy related greenhouse gas emissions
- Accelerating the growth of renewable energy sources
- Promoting the sustainable use of energy in transport
- Delivering an integrated approach to the sustainable development and use of bio energy resources
- Maximising Energy Efficiency and energy savings across the economy
- Accelerating Energy Research Development and Innovation Programmes in support of sustainable energy goals

Some notable specific targets that are included in the framework document, in the context of this work, include the following:

- *“We will lead by example setting a target of 33% for energy savings across the public sector. This will be achieved by introducing comprehensive Energy Efficiency Programmes (targets and standards) for Government Departments, State Agencies, Local Authorities, the Health Service and the public sector overall. The Programmes which will be rolled out progressively from 2008 will build on the achievements to date under the Public Sector Investment Programme and the work of the Energy Management Bureaux”;*

- *“We will publish an action plan for Green Public Procurement, with the aim of achieving, by 2010, a level of Green Procurement equal on average to that achieved by best performers in Europe. The plan will focus on targets to be achieved, how to drive the adoption of green procurement by public and semi-public authorities, indicators for measuring progress and the legal and administrative framework for public procurement;”*

Another important policy document driving the sustainability agenda is the National Climate Change Strategy, (Department of the Environment, Heritage and Local Government 2007), which sets out a range of measures to ensure that Ireland reaches its carbon emissions targets as agreed under the overall EU burden sharing agreement in the period 2008 – 2012, and the period beyond that towards 2020. The European Union as a whole, as a contribution to its commitment under the Kyoto Protocol, has set an 8% reduction target for the 2008-2012 period as compared to 1990. Ireland’s target within that was set at a limit of 13% above the 1990 level, to allow for the exceptional rate of growth and development that the country has experienced. The EU has adopted a much more challenging reduction target for 2020. It has committed itself to reducing its greenhouse gas emissions to 20% below 1990 levels by 2020. It has also committed to a reduction to 30% below 1990 levels if there is a global agreement on comparable reductions elsewhere. Ireland’s commitment for 2020 will not be known until the completion of international negotiations on a new agreement and the EU’s internal discussions on burden sharing among the Member States, but it is likely to require a reduction to below our 1990 emission levels.

The principal areas addressed in the strategy include energy supply; transport; residential; industry, commercial and services; waste; adaptation; implementation, report and review; and notably for this work the public sector.

The strategy noted that the public sector is the biggest landowner, property owner and tenant in the State and also owns the largest fleet of transport vehicles. It further noted that the public sector has a key leadership role in adopting high energy efficiency standards and practices that can lead by example and drive change through the wider community. It also plays an important role in creating markets and supply chains for renewable technologies, through setting high standards of energy efficiency in procurement of goods and services.

While emissions attributable to the public sector arise from energy use in public sector buildings, the report noted that there is a lack of comprehensive data on energy consumption in public sector buildings and further stated that the collation of specific data will be essential for developing a greater understanding of future progress in reducing emissions from this sector.

As noted above, the White Paper, *Delivering a Sustainable Energy Future for Ireland*, has set a target of 33% energy savings across the public sector.

In cross referencing this target, the National Climate Change Strategy sets the following overall target. *“The Government will require the public sector to lead the way on energy efficiency with a mandatory programme of efficiency measures, including the sole use of energy efficient lighting in offices, schools, hospitals and other public buildings. In light of this commitment, the Government has agreed that the public sector should achieve a reduction in greenhouse gas emissions equivalent*

to a 33% saving in energy use by 2020. Every public service organisation will be required to adopt specific targets for reducing emissions, and to measure and report progress in their annual reports.”

A summary of the measures proposed in National Climate Change Strategy for the public sector include:

- Energy Efficiency Programme with target of 33%
- Energy savings across public sector by 2020
- Biomass heating in schools
- All street lighting and traffic lights required to be energy efficient
- All public sector fleets to be required to move to biofuel blend
- Carbon offsetting of all official air travel

Another important national policy initiative is the National Energy Efficiency Action Plan 2009 – 2020, (Department of Communications, Energy and Natural Resources 2009), which, when writing an introduction to the plan, was described by the then Minister for Communications, Energy and Natural Resources, Eamon Ryan T.D., as *“designed to chart Ireland’s path towards a more sustainable future”*. The Action Plan has set Ireland a challenging target of delivering 20% energy efficiency savings by 2020 (as compared to the average energy use in the 2001 to 2005 period), and, in recognising that Government should take a lead role in this process, has set a higher target of 33% for the public sector. For the purposes of the target, the public sector is considered to encompass the Civil Service, commercial and non-commercial state bodies, the Defence Forces, An Garda Síochána, Health Service Executive hospitals and other facilities, Local and Regional Authorities, schools, and, in the context of

this work, universities and colleges. A national target of 20% equates to a total of 31,925 Gigawatt hours (GWh) saved in 2020.

The Action Plan contains 90 actions, measures and programmes, spread across key areas, which it is envisaged will each play their part in achieving a more sustainable energy future for Ireland. The areas which are addressed in the Plan containing, measures and programmes include business; residential; transport; energy supply; research and development; cross-sectoral and public sector.

The 2020 vision for the public sector was stated as *“the public sector will improve its energy efficiency by 33% and will be seen to lead by example – showing all sectors what is possible through strong, committed action”*.

The specific actions, measures and programmes outlined in the Plan for the public sector number 13, and are as follows:

Current Actions

- 1. We are supporting exemplary design and energy management practice by public sector organisations through SEI’s Public Sector Building Demonstration Programme.*
- 2. We are localising the delivery of energy efficiency measures through the Local Energy agencies*
- 3. We have rolled out an energy rating system to public buildings from 2008.*

Planned Actions

4. *We will establish in 2009 a high level Working Group, involving key Departments and Agencies, to draw up an Action Plan for achievement of the 33% energy savings target for the public sector.*
5. *We will investigate the feasibility of a public sector obligation scheme to facilitate the achievement of the 33% target.*
6. *We will require all public sector bodies to produce annual reports setting out their energy efficiency actions and progress towards the 33% target.*
7. *We will introduce energy efficiency programmes for Government Departments, State Agencies, Local Authorities, the Health Service and all other areas of the public sector.*
8. *We will assist public sector agencies with buildings over 1,000m² to improve their BER as displayed on their Display Energy Certificates initially to a D1 level or better.*
9. *We will investigate the feasibility of applying a minimum standard beyond building regulations for new buildings (including significant renovations) intended for use by public sector bodies.*
10. *In 2009, we will put in place mechanisms to facilitate and enable the exchange of energy efficiency best practice between public sector bodies at local, national and international level.*
11. *We will introduce in 2009 Guidelines for Green Public Procurement in the Public Sector.*
12. *We will require public bodies to purchase only energy-efficient lighting when installing or replacing lighting.*
13. *We will require that all street-lights and traffic lights are energy efficient.*

At the time of writing, the progress on these particular actions is mixed. An update provided on the Department of Communications, Energy and Natural Resources website, (Department of Communications, Energy and Natural Resources 2011), and outlined in the table below, shows that some of the actions are complete, some are ongoing are some are either under active consideration or not progressed. Of particular note in the context of this work is action 4, “*We will establish in 2009 a high level Working Group, involving key Departments and Agencies, to draw up an Action Plan for achievement of the 33% energy savings target for the public sector*” that is stated as being “not progressed”. This is particularly noteworthy given that the plan itself, in recognising that Government should take a lead role in this process, set a higher target of 33% for the public sector.

No	Action	Responsible Agency	Update Feb 2011	Commencement Date
1	<i>We are supporting exemplary design and energy management practice by public sector organisations through SEI's Public Sector Building Demonstration Programme.</i>	SEI	Complete	Ongoing
2	<i>We are localising the delivery of energy efficiency measures through the Local Energy agencies</i>	DCENR, DEHLG Local Energy Agencies	Ongoing	Ongoing
3	<i>We have rolled out an energy rating system to public buildings from 2008.</i>	SEI, OPW, all public sector organisations	System established. Over 1000	2008

			valid DEC's and 220 registered assessors by end 2010	
4	<i>We will establish in 2009 a high level Working Group, involving key Departments and Agencies, to draw up an Action Plan for achievement of the 33% energy savings target for the public sector.</i>	DCENR	Not progressed	2009
5	<i>We will investigate the feasibility of a public sector obligation scheme to facilitate the achievement of the 33% target</i>	DCENR, SEI	Under active consideration	2009
6	<i>We will require all public sector bodies to produce annual reports setting out their energy efficiency actions and progress towards the 33% target.</i>	DCENR	In place from 2011	2009
7	<i>We will introduce energy efficiency programmes for Government Departments, State Agencies, Local Authorities, the Health Service and all other areas of the public sector.</i>	DCENR, SEI OPW	Rollout took place in 2009	2009
8	<i>We will assist public sector agencies with buildings over 1,000m² to improve their BER as displayed on their Display Energy Certificates initially to a D1 level or better.</i>	DCENR, SEI OPW	Complete	2009

9	<i>We will investigate the feasibility of applying a minimum standard beyond building regulations for new buildings (including significant renovations) intended for use by public sector bodies.</i>	DCENR, SEI OPW	Included in SI 542 of 2009	2009
10	<i>In 2009, we will put in place mechanisms to facilitate and enable the exchange of energy efficiency best practice between public sector bodies at local, national and international level.</i>	SEI	In progress via public sector programme	2009
11	<i>We will introduce in 2009 Guidelines for Green Public Procurement in the Public Sector.</i>	DEHLG	In progress	2009
12	<i>We will require public bodies to purchase only energy-efficient lighting when installing or replacing lighting.</i>	DCENR, SEI, Local Authorities	Public Sector Lighting Group established	2007
13	<i>We will require that all street-lights and traffic lights are energy efficient</i>	DCENR, SEI, Local Authorities	Pilots have taken place	2009

Table 1: Progress on National Energy Efficiency Action Plan 2009 – 2020 targets (Department of Communications, Energy and Natural Resources 2011)

The 2009 Plan contained a commitment to publish updated Action Plans in 2011 and 2014. Ireland is required to submit a second National Energy Efficiency Action Plan by end-June 2011 in accordance with the provisions of the Energy Services Directive.

Another key document in the context of the obligations of public bodies in relation to energy efficiency is the so called S.I. No. 542 of 2009 on energy end use efficiency and energy services, (European Communities (Energy End-use Efficiency and Energy Services) Regulations 2009). Part 4 of this Statutory Instrument incorporating Regulations 10 to 15 deal with the public sector. Regulation 11 deals with the exemplary role of public bodies. It states that *“public bodies shall fulfill an exemplary role with regard to energy efficiency, with the aim of achieving energy savings targets”*. *indicative energy savings target for all public bodies to be achieved in the year 2016 ... set at 1,500 GWh (primary energy equivalent)*”. It sets out that public bodies shall meet its obligations through the use of energy audits (Regulation 13), energy efficient procurement (Regulation 14), use of energy efficient buildings (Regulation 15), and their energy management practices, use of financial instruments for energy savings and annual reporting on the actions being taken to improve energy efficiency.

Regulation 12(2) states that , *“from 1 January 2011, a public body shall include in its annual reports published after that date, a statement describing the actions it is taking, or has taken, to improve its energy efficiency and an assessment of the energy savings arising from those actions.”*

The Sustainable Energy Authority of Ireland (SEAI) has stated, (Sustainable Energy Authority of Ireland, 2011), that they, SEAI, and the DCENR are initiating a three-

year project to develop a monitoring and reporting system. All Public Sector organisations will report their energy consumption and energy performance to SEAI from 2011 onwards (the 2011 report will contain 2010 data). Selected organisations will be invited to participate in a pilot phase reporting in 2010. At the time of writing the author is aware of a request made to individual Institutes to provide historical annual energy use statistics to the Department as well as reminding them of their energy saving responsibilities per the target outlined above.

SEAI have also stated that *“further organisation-level targets will be developed by SEAI and DCENR in co-operation with Public Sector organisations over a three year period between 2010-2012. The targets will be ambitious and will stretch organisations. They will use a baseline period 2001-2005, so energy saving actions taken since the baseline will count as progress towards the targets. Certain energy saving actions taken before the baseline period that can be demonstrated to have a lasting effect extending into the target period will also count. It is anticipated that an interdepartmental committee will formally assign mandatory organisation-level targets in 2012. There will be a detailed support package to assist organisations to achieve the targets”*

The methodology for measuring this has not yet been developed according to SEAI. However, they anticipate that the methodology will account for an organisation’s energy performance as well as its energy consumption. Energy performance relates energy use to the service or activity output of the organisation.

The SEAI suggests that public sector organisations should develop and implement a structured Energy Management Programme. This will enable them to deliver sustainable energy savings in the short term and, importantly, to identify strategic

initiatives to work towards more significant longer term savings, i.e. to 2020. They will be requesting from all public sector organisations a list of all of the MPRNs and GPRNs for the organisation. An MPRN is a unique 11 digit number assigned to every single electricity connection and meter in the country. A GPRN is a unique number assigned to every natural gas connection. They also suggest that public sector organisations start to put a system in place to record overall energy consumption on an annual basis. Such a 'system' could be as simple as a spreadsheet with consumption data copied from your bills.

2.4 Conclusion

We have seen that climate change is a global issue that presents challenges both locally and internationally. It will require an organised and concerted effort by all stakeholders in order to combat its effects. Likewise, we have seen that other global challenges including resource depletion, population growth with its associated consumption and production patterns pose equally challenging threats to the world and society at large. As part of its contribution to the international response to these environmental challenges, Ireland will need to adopt more environmentally sustainable practices at every level in society from both the public and private sector down to the individual citizen. What is also clear is that government and public bodies will need to show example and take the lead in these matters if progress is to be made.

We have also seen that the business case for environmental sustainability is loud and clear. The organisation that adopts sound environmental management practices can expect to achieve an improved brand image, improved employee relations, proactive legislative compliance, attainment / retention of a licence to operate, as well as

achieving improved operating efficiencies and enhanced productivity leading to cost savings, reduced risks and liability, improved market penetration and improved access to capital. All of these benefits can be expected to accrue to the organisation who adopts sound environmental practices whether a public or private sector organisation. Now more than ever, given the limited public expenditure budgets and the need to do “more for less” in the public sector, environmental sustainability has a part to play in the overall governance of these public sector organisations.

We have also seen that the national policy and regulatory initiatives exist that call for organisations, and in particular public sector organisations, to adopt sustainability initiatives, in the areas of green procurement, greenhouse gas emissions reduction, energy efficiency. Other areas where environmental legislation is influencing behaviour include, waste management, air pollution and water pollution. All of these initiatives form part of the overall drive to adopt environmentally sustainable practices.

The drivers for environmental sustainability, be they in the areas of environmental, business or policy, have been set out and provide a compelling case that such initiatives can and should play an important role in the governance of any organisation. This extends to the public sector. Within the public sector, the particular focus in this work is on Third Level institutions in Ireland, in particular the Institutes of Technology sector, and it is the proposition that these initiatives need to form part of the overall governance of these institutions. Taking the lead from this, the next chapter examines best practice in college campus sustainability, and examines some of the approaches that can be used to achieve this.

Chapter 3: Approaches to Achieving College Campus

Environmental Sustainability

This chapter reviews approaches and methodologies that can be employed to assist in achieving the goal of college campus environmental sustainability. In the first instance, the use of an Environmental Management System as a tool to achieve college campus sustainability is examined. The chapter then examines the use of an Energy Management System and the use of Carbon management as potential methodologies that may be employed to achieve the goal of college campus sustainability. The prime function of a third level college is as a provider of education, thus the chapter concludes by detailing how environmental sustainability need not be a standalone initiative in a college, rather a more holistic approach is possible that can make the environmental sustainability initiative integral to the education of students.

3.1 Environmental Management Systems

“Creating a healthy and environmentally sustainable campus requires a systematic approach that integrates sustainability into every aspect of campus life, including addressing ‘How, When, Where of campus growth’, identifying compliance requirements, implementing sustainable practices, and realising fiscal benefits. Using an environmental management system will allow colleges to take a more holistic view of their campus and work together to grow in a more sustainable manner and improve their overall environmental performance”

Peggy Bagnoli

EPA College and University Sector Liason
Office of Policy, Economics and Innovation
U.S. Environmental Protection Agency

College campuses have been compared to small cities or towns encompassing within their campus borders a myriad of diverse operations and activities that can impact the environment. Examples include waste generation, water and materials intake, as well as electricity and hydrocarbon fuels consumption in operating machinery, heating and lighting, transportation, construction and demolition, grounds maintenance, the list goes on. Many of these are regulated, all have increasingly high operational costs as well as having implications for environmental sustainability. Whilst many colleges are addressing these issues with individual environmental protection measures, a more systematic and sustainable approach to reducing the negative impacts of these activities and making these campuses more sustainable is lacking (Aishuwaikhat and Abubakar, 2008). One such systematic approach is the adoption of a college environmental management system (EMS).

An Environmental Management System (EMS) has been described as providing a framework for understanding an organisation's 'environmental footprint', complying with environmental regulations, and implementing proactive pollution prevention and sustainability strategies (US Environmental Protection Agency 2007). An EMS involves a continual cycle of planning, doing, reviewing and improving. This cycle can keep a college on a path towards environmental sustainability. An EMS is a system of processes that helps an organisation to identify its environmental priorities, establish plans to reach its environmental goal and make environmental understanding and responsibility part of everyone's daily business. The basic steps

of an EMS or Sustainability roadmap have been articulated by the US EPA (US Environmental Protection Agency 2007) as:

1. ARTICULATE the vision (compliance, environment, sustainability)
2. IDENTIFY and gather data on how operations affect the environment
3. UNDERSTAND what legal and other requirements apply
4. PRIORITISE what to work on
5. ESTABLISH your measures
6. SET GOALS to be met
7. MANAGE your most significant issues
8. DOCUMENT what you are doing
9. TRACK progress
10. CHECK if your system is working
11. LEARN from your efforts
12. IMPROVE

As with the case of energy management dealt with in the next section, the option is open to develop a system that adheres and is certified to a particular standard. The most widely used approach internationally is the ISO 14001. Whilst it is not mandatory, many colleges internationally have made internally driven decisions to follow and seek certification to this standard. The ISO standard (ISO 14001 2004), has been implemented by a large number of universities in the USA and Europe. The standard is known throughout the corporate world. It specifies the requirements for an environmental management system and guides the organisation in managing the impact that its products, services and operations have on the environment. The key elements of the ISO 14001 environmental management system model are:

1. **Develop an Environmental Policy**
2. **Planning:** involving identifying the environmental aspects for the organisation; understanding the (environmental) legal requirements that apply to the organisation; setting objects and targets and developing management programmes to meet these targets
3. **Implementation and Operation:** involving developing a structure and operations to achieve the plans; carrying out training, improving competence and increasing awareness; communication; preparation of documents and document control and the establishment of an emergency preparedness and response plan.
4. **Checking and Corrective Action:** involving monitoring and measuring performance; identifying non-conformance and implementing preventive actions; maintaining appropriate records and carrying out audits of the system or system elements
5. **Management Review:** involving an overall review of the system to gauge its efficacy

In the day to day operation of a college campus, various activities are undertaken. These activities result in ‘interactions’ with the environment, also known as environmental aspects. These ‘interactions’ or aspects result in environmental impacts. The basis of environmental management is that the organisation identifies its environmental aspects and impacts, and, having determined the significance of these impacts against a pre determined set of criteria, they then manage those impacts that are deemed to be ‘significant’.

This is best illustrated by an example:

Operation: *(Service we provide)*

Grounds Maintenance

Activity: *(What we do to provide this service)*

Application of Fertiliser and Pesticides

Aspects: *(That results in these interactions with the environment...)*

1. Fuel Use
2. Fertiliser / Pesticide Use
3. Potential Spills

Impacts: *(Which have the following environmental effects...)*

1. Air Pollution
2. Resource Conservation
3. Pollutant Runoff - possible ground / water contamination

In deciding which aspects are the significant ones, and therefore those that receive priority in the management system, the following criteria may be used:

- Is of concern to key stakeholders (or its associated impact is of concern)?
- Has it the potential to cause a demonstrable impact on the environment?
- Does it have major financial implications – either positive (savings or market opportunities) or negative (costs)?

- Is it controlled by regulatory requirements? (this is a fundamental requirement of ISO 14001)

An organisation may use additional criteria, each organisation will be different and there is no standard technique

There is no standard method for assessing significance and no guidance is given in ISO 14001. This provides the organisation with flexibility as how they conduct and present the assessment however it is vital that the process be recorded so that others in organisation can understand why an aspect is considered significant when implementing environmental management, so that the process can be reviewed and so that accredited certifiers can understand the process if that route is chosen.

It has been suggested (Simkins and Nolan 2004), that commonly held motivations for implementing an EMS in a university include better regulation of responsibilities, better environmental performance documentation, reduced risk of regulatory breaches, cost reduction, improved personnel motivation and training, and better environmental communication. In fact, these are motivations that could apply to almost any organisation. Specific to colleges or universities, an EMS may improve public perceptions by providing evidence of its calibre and social responsibility (perhaps attracting students), assist in student education and training, provide access to research grants and encourage inter-departmental collaboration. An EMS may also assist in fulfilling existing or pending environmental commitments, in particular those discussed earlier in relation to energy and climate policy developments in Ireland. A suggested limitation on the ISO 14001 EMS standard (Aishuwaikhat and Abubakar 2008) are that it focuses primarily on the environmental dimensions with little or no consideration being given to economic or social issues. Nevertheless,

given the complexity of the college operating space and the challenges posed in achieving environmental sustainability, the systematic approach offered by the use of an Environmental Management System can be an invaluable tool in achieving that goal

3.1.1 Green Campus Programme

It is also worth mentioning here, in the context of looking at campus environmental management systems, the Green Campus Programme, which is operated by An Taisce in Ireland. It is based on the very successful Green Schools Programme, known internationally as eco-school. It is described by An Taisce as “*an international environmental education programme, environmental management system and award scheme that promotes and acknowledges long-term, whole school action for the environment*”. It has operated very successfully for over fourteen years in primary and secondary level schools in Ireland. While the green schools programme has all of the essential elements of an environmental management system, it aims to be more than an environmental management system. It also aims to engender a sense of citizenship and leadership among participants and the wider community. It also promotes a sense of teamwork among teachers, students and the wider community, all the stakeholders, to reach a common goal. It brings the children into the decision making process and serves to flatten and democratise the school management structures. The Green Schools program in the academic year 2008-2009 saved a minimum 2 million euro in waste, electricity, water and fuel costs, diverted a minimum of 12 tonnes waste from landfills in Ireland every school day, saved 3.7 million units of electricity, saved 200 million litres of drinking water and saved around 500,000 litres of transport fuel (An Taisce 2011).

It is out of this foundation, and building on the success and knowledge capital among the student population at primary and second level, that the Green Campus initiative has grown. The idea of the Green Campus initiative is that it mirrors the principles of the Green Schools initiative by endeavouring to extend learning beyond the classroom / lecture theatre and develop responsible attitudes and commitment, both at home and in the wider community. The implementation of the Green Campus programme is based on a seven step methodology.

1. Green Campus Committee:

The committee should include students, academic staff, administration staff, and representatives from buildings and facilities management. The Green Campus committee can also include representatives from the local community, businesses located on campus, and other stakeholders.

2. Environmental review:

This examines the environmental impacts of the campus in order to set targets for action and improvement.

3. Action Plan:

This gives specific and achievable targets with proposed completion dates

4. Monitoring and Evaluation:

This ensures that progress towards targets is checked, amendments are made where necessary and success is celebrated

5. Curriculum work:

Many classes generate data from the examination of environmental aspects on campus. Efforts should be made to use these data where possible.

6. Informing and involving:

This ensures that the campus and wider community are aware of the work being done and are empowered to become involved.

7. Green Charter:

These are statements and procedures that commit the Campus to improved environmental performance.

The seven step approach outlined above is an entirely holistic approach to achieving campus environmental sustainability. All of the elements of a traditional environmental management system are contained in the model in addition to the application of the program to augment curriculum development and the involvement of the wider community in the initiative. There is more of an emphasis on a partnership approach and a move away from the more traditional management driven approach of environmental management systems. The suggested timeframe for a college to achieve a Green Flag status is 1.5 to 2 academic years. Once a green flag has been awarded to a college, an annual application must be submitted for its retention. This fosters continual improvement of the program. The central themes to the program are litter and waste prevention/reduction/management; energy conservation / reduction, water conservation; travel; biodiversity; procurement, and environmental risk analysis.

The suggested benefits to a college of achieving the green flag can be grouped in the following key areas; benefits to the college, benefits to the students and learning and benefits to the local and wider community. The benefits to the college include that it creates a forum for college management, academic staff and students to meet; creates a more balanced campus community, empowers students and staff, actively prevents / reduces environmental impacts, reduce associated costs, generates good publicity. The benefits to students and learning include improved learning outcomes whereby students gain useful research skills in action planning, investigation, target setting progress monitoring and reporting. Students are also introduced to new topics and learn skills that are transferable to the workplace such as communication, facilitation, teamwork and committee membership skills. There are also benefits to linking environmental sustainability topics throughout the curriculum. This is addressed in more detail in a following section. The benefits to the local and wider community include setting an example in the locality, involving local groups and representatives, passing on experience and best practice and becoming a better neighbour.

In February 2010, University College Cork became the first third level educational institution in Ireland to be accredited with the Green Flag award as a result of implementing the Green Campus program over a three year period. In that period the university has saved over €300,000 in waste management costs, by reducing waste to landfill by nearly 400 tonnes and improving recycling from 21% to 60%. They have also reported savings of 60,000 m³ of water or €90,000 in the same time period. UCC spent €4.67 million on energy in the academic year 2007-2008. They have set a target of 5% energy use reduction per annum, which, if achieved, has the potential to achieve savings of over €1.06 million over five years. Other initiatives

included college vehicles running on bio diesel salvaged from waste cooking oil on campus, the introduction of car pooling, and enhanced park and ride and bicycle parking areas to encourage more sustainable travel. UCC was the first third level institution in the world to be awarded the designation. In April 2010, Colaiste Dhulaigh Coolock campus, were awarded the Green Flag, becoming the first College of Further Education in Ireland to achieve that distinction. In April 2010, GMIT Castlebar became the first Institute of Technology to be awarded a Green Flag following three years of diligent work undertaken by students and staff since commencing the Green campus programme in 2008. Some notable achievements included: a 60% reduction in paper use, diversion of a minimum of 12 tonnes of waste from landfill through recycling and composting, an estimated 72 tonnes per year of CO₂ saved through improved energy initiatives and water conservation measures saving almost 1000 litres of water per day. Staff and students have also been involved in projects to benefit the local and wider community such as recycling printer cartridges and mobile phones to raise money for charity, and engaging in clean ups of the local rivers. Curriculum links between the programme and courses taught at the college led to students examining transport patterns, preparing five year management plans for green campus at the college and conducting a preliminary Building Energy Rating survey of the campus. A number of other Institutes of Technology are reported to be working towards the Green Flag including Sligo I. T. and Waterford I.T. (An Taisce 2011).

3.2 Energy Management

The drive for sustainability and the need to reduce the overall operating cost base are key issues facing public sector organisations. This has key implications for these organisations, in the areas of efficiency improvements in resource consumption, the

appropriate selection of resources, waste minimisation strategies and improved waste management, but also most importantly in a reduced energy consumption. This can be achieved by applying energy management techniques. It is important to note that adopting energy management techniques as part of an energy management program would most likely be a key activity, and quite an important one at that, of an overall Environmental Management System. In other words, managing the environmental aspects of an organisation by developing an Environmental Management System, will certainly include the management of energy consumption. However, it is a vitally important activity and merits discussion in its own right.

Energy management has been described as aiming to achieve organisational objectives at minimum energy cost, which can be achieved by two methods; pay less per unit of energy consumed and reduce the amount of energy consumed (Sustainable Energy Authority of Ireland 2011). The main benefits of energy management can be stated as reducing costs, saving fossil fuels, reducing pollution, creating an improved work environment, assisting with achieving legal compliance, achieving improved environmental performance, and reducing replacement and maintenance costs.

For an organisation who wishes to undertake an energy management program, it will require a strategic approach. The most successful energy management strategies typically involve the setting up of an energy management team with participants from several functions such as senior management, who provide the leadership and set direction, finance, technical staff, and human resources. This team would support an energy manager with responsibility for the coordination of energy management activities. Depending on the size of the business, this may or may not be a full-time, dedicated post. The team, in association with senior management would establish an

energy management policy, which should include general aims and specific targets, timetables and budgetary limits, the methods to be employed and the organisation of management resources. The energy manager should set up a system to collect, analyse and report on energy consumption and costs. This can consist of reading meters on a regular basis and the analysis of utility bills. The next step is to assess how, when and why energy is used in the organisation through an energy review or audit. An energy audit establishes energy use patterns, the potential for energy and cost savings, and usually includes recommendations for actions for improving energy efficiency. The typical energy survey examines the use of the main utilities including electricity, gas, oil and water. Based on the findings and recommendations of the energy survey, a prioritised action plan should be drawn up. Energy and cost savings and the required investment should be listed for all items in the plan. The projects should be implemented in order of priority as set out in the action plan. The energy team should report results and progress to management and staff on a regular basis. An energy management plan or strategy will be more effective if its results are reviewed annually and the action plan revised. The organisation may develop their own strategic energy management system or they may choose a more a formal system such as the ISO 16001 Energy Management System standard. Organisations that are already utilising quality and/or environmental management systems such as 9000/14001 or EMAS will undoubtedly find the implementation of a formal energy system familiar as the method and management of the system should follow the structured 'plan-do-check-act' approach ideally to provide an integrated approach to business sustainability.

A case study on University College Cork (UCC), (O Gallachoir et al 2007), outlined how using energy indicators to profile energy consumption helped to inform energy

policy in a university. The case study outlined that if available energy data is poor in particular for public service organisations, it makes it difficult for them to compare and benchmark their energy performance, despite their being an onus on such organisations to provide leadership in this area. It was noted that data on energy supply and end-use are a pre requisite to developing policies and initiating a change towards increased sustainability. The case study for UCC detailed the use of energy performance indicators to profile both energy consumption and the related carbon dioxide emissions, and also explored how an energy management policy was developed and implemented using these indicators. The college had a long established Energy Policy Committee which monitored energy use and made recommendations on reducing energy costs and developed energy management initiatives. The energy bill for the university was stated as reaching €2.6 million for the year 2004, which represented 6% of the non-pay budget. This gives an indication of the annual energy costs for the larger college or university in Ireland as UCC would be typical of this sub sector of the tertiary education system. The trends in energy consumption were monitored and tracked in conjunction with the student numbers and buildings' floor space. The energy indicators developed in the college were as follows; electricity cost (€) / student, fuel cost (€) / m² of building, electricity (kWh) / student and fuel (kWh) / m² of building. Using these metrics allowed the college to identify trends and respond to them. This could be described as a basic energy efficiency and trend analysis system. However, it is recognised that monitoring and analysing bulk energy use on its own is not a driver for effective energy management. Other factors that are important are the proliferation and complexity of the many varying activities that are undertaken in a third level college, such as lecturing, research, sporting activities, administration and catering, all with

different levels of intensity and undertaken in different kinds of building, depending on the levels of computerisation, the nature of the research activity, etc. In order to fully understand the impact of these factors, an increase in the energy data detail would be required. An effective energy monitoring and targeting (M & T) system can provide this level of analysis. Energy monitoring and targeting is primarily a management technique that uses energy information as a basis to eliminate waste, reduce and control current level of energy use and improve the existing operating procedures. It combines the principles of energy use and statistics. While, monitoring is essentially aimed at establishing the existing pattern of energy consumption, targeting is the identification of energy consumption level which is desirable as a management goal to work towards energy conservation. It involves a systematic, disciplined division of the facility into Energy Cost Centres. The utilities used in each centre are closely monitored, and the energy used is compared with production volume or any other suitable measure of operation. Once this information is available on a regular basis, targets can be set, variances can be spotted and interpreted, and remedial actions can be taken and implemented. The Monitoring and Targeting programs have been so effective that they show typical reductions in annual energy costs in various industrial sectors between 5 and 20% (Bureau of Energy Efficiency 2011). UCC developed an M & T strategy whereby energy was monitored according to defined clusters of buildings or individual buildings where possible. This analysis pointed to interesting insights and usefully informed energy policy decisions.

This level of analysis however requires a commitment to resources in terms of the M & T hardware and software system, and also crucially in human resources by selecting an appropriate person for whom energy management becomes a key part of

their role and who can lead and direct the energy management initiative in the organisation. The key issue that arises for most organisations is the availability of these resources, technical, financial and human, in order to crystallise the benefits of implementing an energy management system. The question whether or not this is a major stumbling block for individual colleges in the Institute of Technology sector embarking on an energy management program as part of an overall environmental sustainability initiative is addressed later in this report.

3.3 Carbon Management

Another approach to help with the goal of achieving college campus sustainability that is being employed by many colleges and universities is that of carbon management. In this approach, the focus is on cutting CO₂ emissions as part of the response to climate change. The idea is that this becomes a key priority for colleges and universities who then lead by example. The college or university in question prepares a carbon management plan, which has senior management approval. Each plan would contain a full carbon emissions baseline, plus a series of carbon saving projects to meet ambitious cost and carbon savings targets which ultimate aim of reducing the CO₂ emissions. The Carbon Trust in the United Kingdom have developed a programme aimed at assisting colleges and universities to manage their carbon footprint called the Higher Education Carbon Management (HECM) programme (The Carbon Trust 2011). This programme first helps institutions to create a systematic analysis of their carbon footprint. Structured action plans are then developed for realising carbon savings and embedding best practice in the institutions day to day operations. The primary focus is on reducing CO₂ emissions

from energy use in campus and halls of residence, travel planning and procurement. Such a programme has the potential to save money by managing and reducing energy bills, increase competitiveness by enabling the college to become one of the best managed, assist the college in meeting regulations and climate reduction targets, allows the college to lead by example, and improves the reputation of the college among the student and potential student populations and the community at large. The absolute pre requisite to be accepted by The Carbon Trust on the programme is the establishment of a team that is committed to driving the programme forward. The team should include sponsors from senior management who can champion the initiative at the top of the organisation, a practical, enthusiastic and knowledgeable team leader and willing and relevant stakeholders from across the institution. This requirement is no different to that which is required in order to successfully implement an energy management programme or an environmental management system. The programme consists of a five step process.

The first step is to mobilise the organisation. This involves identifying key members of the carbon management team and preparing the foundation for all subsequent steps. The step will also involve determining the scope and ambition of the institution with regard to carbon savings and climate change mitigation, making sure all stakeholders understand the broad issues and opportunities and setting out a timetable for the development of the carbon management strategy and implementation plan.

The second step is to set a baseline, forecast and targets. It asks the questions “Where are we at now?” and “Where do we want to be?”. It will involve mapping out all of the key strategic influences and drivers for the institution relevant to carbon management, calculating the carbon emissions baseline, produce emissions forecasts

based on informed assumptions (such as national sectoral targets) and known future developments (such as new buildings etc.), estimate the financial implications and develop a vision and strategic goals.

The third step is to identify and quantify option. Here opportunities for emissions reductions are identified and their impact on carbon emissions and overall performance including financial implications, management practices and public image are assessed. The result will be an extensive appraisal and database of carbon emission abatement opportunities. This will form an important part of the carbon management strategy and implementation plan.

The fourth step is to finalise the strategy and implementation plan. The plan that has been developed in the previous steps should ultimately be endorsed and approved at a high level within the institution.

The fifth step is to implement the plan. This is where the opportunities identified in the plan are auctioned. Progress is monitored regularly and success communicated to stakeholders. It should form part of a cyclical process of implementation, monitoring and updating the plan.

More than 40 institutions across the UK are participating in this programme and succeeding in reducing their carbon emissions. Several case studies are highlighted by The Carbon Trust, (The Carbon Trust 2011). Cambridge University have reported making annual savings of £476,000, achieved a 17% reduction in carbon emitted per unit of income since 2006 and saved 1,130t CO₂ per year, Liverpool University have reported making annual savings of £153,000 and saved 671t CO₂ per year while Kings College in London have identified potential financial savings of £4,400,000, and saved 3,000+t CO₂ in the first year of the programme.

Carbon management is not unique to the United Kingdom. In the United States, the American College and University Presidents Climate Commitment (ACUPCC) has lead to the most coordinated and far-reaching of the climate change actions taken by colleges. By signing up to this commitment, the institution in question is required to become climate neutral (that is, to emit no net GHG emissions or offset any emissions that they cannot eliminate). Signatories must develop an implementation plan with targets and timetables, integrate climate change and sustainability into the curriculum, and make their plans and GHG inventories publically available.

The University of New Hampshire developed a greenhouse gas inventory (GHG) tool, which they called the Campus Carbon Calculator, to assist in the development of a climate action plan. The tool includes as part of its overall functionality, a capability that allows for the comparison of potential carbon reduction measures by their cost and magnitude of emissions reduction (Cleaves et al 2009). This tool is used in the University of New Hampshire as a support tool to project team known as the Energy Task Force. The mission of this group is to advise senior management on a full range of issues relating to climate and energy. These issues include everything from energy generation, demand side management, efficiency and conservation, GHG mitigation and action, as well as curriculum, research and outreach opportunities related to climate and energy. It is important to note that this group benefits from leadership at the top, being chaired by a member of senior management, as well has having cross campus membership.

In the Central Connecticut State University, as part of the drive to attain carbon neutrality and sustainability, (Button 2009), an advisory committee on environmental

sustainability was convened by the President of the university. The mission statement of this committee was to:

[...] seek to have the University community embrace environmental sustainability as an institutional way of operating. We will work to minimise our impact on the environment so that we leave a better and more balanced ecosystem.

The committee developed a plan for environmental sustainability which has been adopted as part of the universities mission. Recycling has been rolled out across the campus, hybrid vehicles have been purchased for use by staff, a GHG emissions inventory was prepared which serves as a carbon benchmark against which all future improvements can be measured. A “Green Payday” initiative has been developed whereby on certain days, the facilities management division of the university do not use their vehicles and instead walk to all their functions. They also implemented water conservation measures across the campus and the adoption of new campus building construction standards that requires all new buildings to meet stricter energy and environmental design criteria.

3.4 Colleges and Education for Sustainable Development

Colleges and universities can have an influential role in promoting sustainability and giving the lead to society as a whole in this area. This can obviously be achieved by following best practice in their operations, as described above, but also by working with local or national communities in outreach programs and perhaps more importantly through education. For the college or university that is embarking on a path towards environmental sustainability, this should involve initiatives that go

beyond managing the traditional physical plant and operations. Koester et al talk about a full campus approach and consider how integration across an entire campus can be best achieved so that goals for the curriculum, the physical plant, and the administration are all aligned with sustainability (Koester et al 2006). As outlined above, in their operations, third level academic institutions need to improve the campus' performance in demonstrably sustainable ways. These operations include physical facilities management, classroom management, materials flow, energy use, transportation and waste management among others. In addition to the long term economic and environmental benefits of such initiatives, these efforts in themselves have the potential to be educational. For example a well managed, implemented and communicated waste recycling initiative in a college has an educational value. Likewise, the use of a Building Management System in a building can be used as an educational tool by students to observe real life building management information. Through community outreach activities, academic staff, students and community members can come together to address issues of economic, environmental and social equity in the local area, regionally or nationally. This holistic approach has been described as the "greening of the campus" (Koester et al 2006, p42). Koester et al in outlining the initiatives undertaken at Ball State University in the U.S., describes one of the first initiatives undertaken at little or no cost as providing an annual staff development workshop to increase the number of academic staff who were literate in environmental issues. This would enable them *"to modify course syllabus materials, engage in readings and conduct research necessary to find a more inclusive environmental view in course offerings"* (Koester et al 2006, p45). The rationale was an understanding that different faculty members may find it difficult to step outside of their own area of expertise and investigate how environmental matters

could be incorporated into their courses. These staff development workshops have now moved toward Education for Sustainability rather than their previous emphasis exclusively on environmental issues. Under this approach, the green outcomes that each participant expected to return to the university or local community included:

1. Incorporating some environmental focus in one or more classes that each instruct (“greening the curriculum”),
2. Helping their respective department or academic unit to lower its environmental impacts in its operations or policies (“greening campus operations”), or
3. Carrying the message of environmental sustainability to a broader audience through community outreach project (“greening the community”).

This approach to education for sustainability may be a useful template for other third level colleges who wish to embrace environmental sustainability.

In Ball State University, an education for sustainability curriculum was developed by primarily using existing courses which were supplemented by optional modules or programs of study that implemented each student’s chosen program of study. These included modules in the following areas; *The Environmental Context for Business*, *The Environmental Contexts in Healthcare*, *Environmental Policy*, *Sustainable Land Systems*, and *Technology and the Environment*. They also developed a capping module that participants in all programs could partake, *Creating a Sustainable Future*.

In Macalester College, also in the U.S., students were used to develop a greenhouse gas emissions inventory for the college campus, which was used as a baseline for

their carbon management program. It provided the students with “an enriching academic experience and useful career skills” (Wells 2009).

In Miriam College in the Philippines, also in the tertiary education sector, similar efforts have been undertaken (Segovia and Galang 2002). Here, the authors suggest that environmental education in higher education should deepen the knowledge of, and develop the necessary skills for, the management and improvement of environment policy conducive to the well being of the Filipino people. They also suggest that it should also help develop a critical mass of specialists for the management and sustainability of environmental resources. For non-specialists, environmental education should incorporate important environmental perspectives in the general education curriculum as well as the specialisation subjects of all professional disciplines. Likewise in The University of Bradford, UK, examples of embedding education for sustainable development within science and related curricula are presented (Hopkinson and James 2010). The authors posit that people with science, technology, engineering and mathematics (STEM) backgrounds are also likely to have a considerable influence on broader public and policy debates in the area of environmental sustainability, and hence the greening of STEM is vitally important.

3.5 Conclusion

This chapter examined the utilisation of an Environmental Management System (EMS) as a tool for achieving college campus sustainability. It is clear that the use of such a system, as well as bringing many benefits, also brings a systematic approach to the task of managing the environmental aspects associated with the day to day operation of the college or university. The cycle of planning, doing, reviewing

and improving can keep the college on a clear path towards environmental sustainability. Many EMS models are available one of the best known of which is the internationally recognised ISO14001 Environmental Management System standard. A limitation to the ISO 14001 EMS system, however, is that such a system is management driven and that it focuses primarily on environmental dimensions with little or no consideration being given to economic or social issues. A specific campus environmental management system, the An Taisce Green Campus model, whose seven steps correspond with the criteria of the ISO 14001 EMS system, was also presented. This system, specifically geared for college campuses, as well as addressing the environmental impacts associated with the activities of the college, also places an emphasis on economic considerations as well and the wider social considerations in that it involves all the stakeholders in the management system both within the college community and in the local and wider community.

The adoption of a systematic and organised approach to Energy Management as a possible strategy to achieve college campus sustainability was also presented. The benefits of such an approach include cost reduction, saving fossil fuels, reducing pollution, helping achieve legal compliance and achieving improved environmental performance. However, managing energy consumption, whilst a very important activity, is not the only activity that is required to achieve a sustainable campus. Other issues such as waste management, water management, procurement, travel and involvement of the wider community are also necessary.

The employment of carbon management strategies by colleges was also reviewed. Here the focus is on cutting CO₂ emissions associated with the activities of the college. Systematic approaches have been employed by colleges worldwide to manage their carbon footprints to great effect. Once again, not unlike energy

management, carbon management as a strategy to achieve college campus sustainability is limited by its focus cutting CO₂ emissions. Whilst this is a very important component to the overall goal it is not the entire picture.

Finally, in addition to the long term economic and environmental benefits that adopting environmentally sustainable practices can have, the case was also made that these efforts also had the potential to be educational by being incorporated into the college curricula. The An Taisce Green Campus model, mentioned earlier, also has as one of its key components, linking the environmental sustainability initiative to curriculum work.

Whilst all of the initiatives presented have their merits, it seems to me that a well planned and implemented environmental management system based on the An Taisce Green Campus model, incorporating energy management targets and methodologies as well as targets to reduce greenhouse gas emissions, in addition to its inclusion of education for sustainability principles and extension beyond the college campus to the local and wider community, provides an ideal model for the attainment of college campus sustainability.

A key issue however, that arises for most organisations considering developing an environmental management system, is gaining senior management commitment and the allocation of sufficient resources, both financial and human, to achieve the goal of environmental sustainability. If these are absent, then success is unlikely.

Chapter 4: College Campus Sustainability in the Institutes of Technology Sector

As outlined earlier, the issues of protecting the environment and promoting sustainability are of key and growing importance to Ireland. Public sector organisations will be expected to take the lead in these matters and show example to the community at large, none more so than third level colleges. College campuses have many diverse operations and activities that can impact the environment. These operations and activities include laboratories, sports facilities, power generation, energy use, grounds maintenance, drinking water supplies, construction and demolition activities, waste management activities and transport in addition to their central roles as education providers. Whilst the nature of their operations result in several potential environmental impacts that need to be effectively managed, the incentives for universities and colleges to adopt environmental and sustainable practices to do so are also many. They include an enhanced reputation, better management, enhanced legal compliance, cost reduction and avoidance, better community relations and achieving educational excellence.

This chapter investigates, through the use of a targeted survey, the level of integration of environmental initiatives in the Institute of Technology Sector in Ireland. The survey also seeks to establish the readiness or otherwise of this sector to address these environmental sustainability challenges and endeavours to identify what barriers if any exist to achieving college campus sustainability.

4.1 Survey Target Audience

The survey was targeted at the 14 Institutes of Technology in Ireland. The questionnaire that was issued is available in Appendix 1. This questionnaire was sent to the Estates Office of each of the colleges. It was felt that this office would be most likely the one involved in environmental sustainability initiatives and/or have access to the relevant information in the colleges. This was decided as a result of a number of informal conversations with different personnel occupying various positions within the Institute of Technology sector. The colleges surveyed were as follows; Limerick Institute of Technology, Athlone Institute of Technology, Dundalk Institute of Technology, Galway Mayo Institute of Technology, Institute of Technology Blanchardstown, Institute of Technology Tralee, Institute of Technology Sligo, Waterford Institute of Technology, Cork Institute of Technology, Dublin Institute of Technology, Institute of Technology Carlow, Institute of Technology Tallaght, Letterkenny Institute of Technology, Dun Laoghaire Institute of Art Design & Technology. Of the 14 colleges who were issued with the questionnaire, 10 colleges returned a response, the analysis of which is presented below.

4.2 Survey Design

A total of 28 separate questions were presented to the respondents on the questionnaire. There were four separate categories of question; General, Strategic/Management; Policy/Legislation and Operations, whose intention it was to establish a clear picture of what is happening in the sector as regards environmental sustainability initiatives.

In the General category, just one question was posed, “*What is the size of your college*” in order to establish the number of students in each college and if this had an influence on the integration of environmental sustainability initiatives.

In the Strategic / Management category, seven questions were posed. The purpose of these questions was to establish the relationship between the strategic priorities of the college and its senior management, and the integration of environmental sustainability initiatives. In this category, questions were also posed to gain an insight into public perceptions of sustainability in the colleges, what were the current drivers of any environmental sustainability initiatives that are underway, what the perceived benefits of these were and what the obstacles were to addressing sustainability in the colleges.

In the Policy / Legislation Awareness category, four questions were posed. The purpose of these questions was to establish the level of awareness of national policy targets in the areas of energy efficiency, climate change, and waste management as applied to the activities of each college. Also information was sought on the level of awareness and compliance with environmental legal / regulatory requirements as applied to the activities of the college.

In the Operations category, fourteen questions were posed. The purpose of these questions was to establish the level of activity and knowledge in the areas of: energy costs, monitoring and management; water usage and monitoring; waste management and environmental management in general. Questions were also posed to establish what plans if any were in existence and what the barriers were, if any, to achieving these plans in the above areas.

A final question was posed which gave the respondent an opportunity to add any additional comments.

The categories and questions are presented in the following table.

Category	Question Number	Question
General	Q.1	What is the size of your college?
Strategic / Management	Q.2	Do sustainability issues form part of your college's mission statement (e.g. concerns and responsibilities for the environment)?
	Q.3	In your opinion, how do the general public view your college's commitment to the environment and sustainability?
	Q.4	In your opinion, what is the status of sustainability on the agenda of senior management at your college?
	Q.5	Do you currently have sustainability projects or initiatives ongoing at your college?
	Q.6	How influential is each of the following in driving your college's attention to sustainability initiatives? Senior Leadership / Champion; Employees; Students / Potential Students; Government / Regulators (Legislation / Policy Targets); Grant Aid; Competitors; Other (please specify)
	Q.7	How do you rate the benefits to your college from addressing sustainability issues? Enhanced public image; Reduced cost due to energy efficiency; Reduced cost due to materials or waste efficiencies (e.g. waste management or water efficiency); Potential to attract students; Improved regulatory compliance; Better innovation of service offerings to students (e.g. curriculum development); Reduced risk; Enhanced stakeholder relations
	Q.8	To what extent is your college engaged in each of the following activities? Improving efficiencies and improving waste; Identifying opportunities to enhance or differentiate the brand image of your college through sustainability strategies; Building awareness of sustainability on your campus; Analysing risks associated with not fully addressing sustainability issues (e.g. environmental,

Category	Question Number	Question
		legal, competitive or reputational risks); Analysing existing and potential regulations or policies (e.g. public sector energy efficiency targets, climate change targets), and preparing an appropriate response; Analysing stakeholder expectations relating to sustainability; Reducing or eliminating CO ₂ or other greenhouse gas emissions; Benchmarking sustainability practices of competitors and sustainability leaders
	Q.9	How significant an obstacle is each of the following in addressing sustainability in your college? Difficulty considering sustainability at all given competing priorities; Difficulty quantifying and valuing effects of sustainability related strategies on the brand image of the college; Difficulty of predicting value of sustainability related strategies to attracting potential students; Lack of knowledge of a model, system or methodology to address sustainability related issues; Lack of resources (human or financial) to address sustainability related issues; General lack of appreciation on sustainability issues among key decision makers
Policy / Legislation Awareness	Q.10	Are you aware of the national sustainability policy targets in the areas such as climate change, energy efficiency and waste management that apply to your college's activities?
	Q.11	Are you aware of your responsibilities under the European Communities (Energy End-Use Efficiency and Energy Services) Regulations 2009 (S.I. No. 542 of 2009) which places a number of obligations on public bodies (including schools and colleges) relating to energy efficiency savings targets, the use of energy audits, energy efficient public procurement, and the use of energy efficient buildings?
	Q.12	Do you know what legal / regulatory environmental requirements apply to the operations in your college?
	Q.13	Are the operations in your college in compliance with the legal and regulatory environmental requirements?
Operations	Q.14	Do you know, or do you have access to, the annual energy use for your college campus?
	Q.15	If you answered Yes above, do you meter, monitor, report and manage your energy use and costs as well as potential ways to reduce them?
	Q.16	What is your overall annual energy cost?
	Q.17	Do you have a formal Energy Management System (e.g. an energy policy, objectives and targets, procedures, responsibilities assigned) in place?

Category	Question Number	Question
	Q.18	If you answered No above, is it because of: Human or financial resources constraints; Do not see the need for one; Don't know
	Q.19	Do you have a dedicated person responsible for managing energy?
	Q.20	Do you know, or do you have access to, your annual water use?
	Q.21	If you answered Yes above, do you meter, monitor, report and manage your annual water use and costs as well as potential ways to reduce them?
	Q.22	Do you manage your waste?
	Q.23	If you answered Yes above, do you (Choose all that apply): Segregate and Quantify the different waste categories yourselves; Have your waste segregated and different waste categories quantified on your behalf by your waste collection contractor; Monitor and report your waste figures; Explore potential ways to reduce the volume, toxicity and associated disposal costs
	Q.24	Do you have a formal Environmental Management System (e.g. an environmental policy, objectives and targets, procedures, responsibilities assigned) in place?
	Q.25	If you answered No above, is it because of: Human or financial resources constraints; Do not see the need for one or Don't know
	Q.26	If you answered either, Yes, or No, but we have plans to implement one, which of the following have you implemented or do you intend to implement? ISO 14001; An Taisce Green Flag College or Neither of the above (please supply details)
	Q.27	Do you have a dedicated person responsible for managing environmental matters?

Table 2: Categories and Detail of Survey Questions

4.3 Survey Findings and Analysis

4.3.1 General

The findings in the General category were as follows:

Question 1

Sustainability in Third Level Colleges

What is the size of your college?

Answer Options	Response Percent	Response Count
0 - 3000 students	20.0%	2
3000 - 5000 students	40.0%	4
5000 - 10000 students	30.0%	3
More than 10000 students	10.0%	1
<i>answered question</i>		10
<i>skipped question</i>		0

70% of the colleges reported having between 3000 – 10000 students. This can be taken as the typical size of an Institute of Technology in Ireland. 20% or two colleges reported having less than 3000 students and 1 college reported more than 10000 students.

4.3.2 Strategic / Management

The findings in the Strategic / Management category were as follows:

Question 2:

Sustainability in Third Level Colleges

Do sustainability issues form part of your college's mission statement (e.g. concerns and responsibilities for the environment)?

Answer Options	Response Percent	Response Count
Yes	60.0%	6
No/Don't know	40.0%	4

<i>answered question</i>	10
<i>skipped question</i>	0

Of the 4 respondents that answered No/Don't know to this question, two of them were the two colleges in the 0 to 3000 students category, and the other two were from the 3000-5000 category, indicated that the size of the college seems to have an influence on the incorporation of sustainability issues in the mission statement of a college.

Question 3:

Sustainability in Third Level Colleges

In your opinion, how do the general public view your college's commitment to the environment and sustainability		
Answer Options	Response Percent	Response Count
Very responsible & committed	10.0%	1
Neutral	90.0%	9
Irresponsible & not committed	0.0%	0
<i>answered question</i>		10
<i>skipped question</i>		0

It is notable that 90% of the respondents had no opinion on the perception of the public to their environmental sustainability initiatives. This could indicate a dearth of a wider social context being adopted through linking with and looking towards the wider community. The one college that did feel that the public would have a positive perception of its environmental sustainability initiatives was from the 3000 – 5000 students category and also answered very positively in the other Strategy / Management questions indicating a strong level of senior management commitment, the integration of environmental sustainability in the core mission statement of the college and that sustainability is permanently on the agenda of senior management.

Question 4:

Sustainability in Third Level Colleges

In your opinion, what is the status of sustainability on the agenda of senior management at your college		
Answer Options	Response Percent	Response Count
Permanently on the agenda and a core strategic consideration	10.0%	1
Permanently on the agenda but not a core strategic consideration	20.0%	2
Occasionally or temporarily on the agenda but not a core strategic consideration	70.0%	7
Never considered on the agenda	0.0%	0
Deliberately excluded from the agenda because viewed as a passing fad	0.0%	0
Do not know	0.0%	0
Other (please specify)		1
	answered question	10
	skipped question	0

The most notable finding here is that 70% of the colleges indicate that sustainability is only occasionally on the agenda of senior management and is not a core strategic consideration. A specific comment that was offered was “*Only on the agenda if raised by the Estates Office*”. However, no college reported that such initiatives were never considered or deliberately excluded from the agendas of senior management, so it is a case of competing priorities.

Two of the three colleges who stated that it was permanently on the agenda of senior management but was not a core consideration were colleges with a larger student population. One was in the 5000 – 10000 students and the other in the 10000 + categories indicating that size and scale of operation seem to have an influence.

Question 5:

Sustainability in Third Level Colleges

Do you currently have sustainability projects or initiatives ongoing at your college

Answer Options	Response Percent	Response Count
Yes, they are documented and integrated into our operations	50.0%	5
Yes, but if their project 'champions' leave, the efforts may not continue or expand	20.0%	2
No	30.0%	3
Other (please specify)		0
answered question		10
skipped question		0

70% of all colleges report that they currently have sustainability projects ongoing at their college. Of this number, 50% say that these projects are documented and integrated into their organisations with 20% indicating that if the particular champion of the initiative left the organisation, that the initiative would deteriorate. One of these colleges commented “*Yes, but if their project 'champions' leave, the efforts may not continue or expand*”. Of the three colleges who do not currently have sustainability projects ongoing at their college, all three indicate that a significant barrier to addressing sustainability in their college is that of competing priorities, a lack of knowledge of a system or model and a lack of resource (human and financial) to help them to address such initiatives . All three indicated a general lack of appreciation on sustainability issues among key decision makers as either partly or very significant. Of course this does not indicate that sustainability projects are or have never been undertaken at these colleges just that currently they are not on the agenda.

Question 6:

Sustainability in Third Level Colleges

How influential is each of the following in driving your college's attention to sustainability initiatives? (Please rate on a scale of 1 to 5, with 1 being the lowest)

Answer Options	1	2	3	4	5	N/A	Rating Average	Response Count
Senior Leadership / Champion	2	1	2	2	3	0	3.30	10
Employees	0	4	2	4	0	0	3.00	10
Students / Potential Students	1	2	5	0	2	0	3.00	10
Government / Regulators (Legislation / Policy Targets)	2	1	1	4	2	0	3.30	10
Grant Aid	2	2	1	2	2	1	3.00	10
Competitors	4	2	0	0	1	1	1.86	8
Other (please specify)								0
answered question								10
skipped question								0

The findings here show that the existence of a Senior Leadership / Champion in the college and the existence of legislation and policy targets issued by Government / Regulators are the two most influential drivers of college campus sustainability initiatives. These are closely followed by Employees, Students / Potential Students, and Grant Aid. The influence of Competitors as a driver received the lowest average rating of all the potential drivers. This is perhaps a unique difference between public sector organisations and private sector organisations as competitors would be considered as an important driver of management strategy in the private sector.

Question 7:

Sustainability in Third Level Colleges

How do you rate the benefits to your college from addressing sustainability issues? (Please rate on a scale of 1 to 5, with 1 being the lowest)

Answer Options	1	2	3	4	5	N/A	Rating Average	Response Count
Enhanced public image	0	1	1	4	3	0	4.00	9
Reduced cost due to energy efficiency	2	0	0	3	5	0	3.90	10
Reduced cost due to materials or waste efficiencies (e.g. waste)	1	1	0	3	5	0	4.00	10

management or water efficiency)								
Potential to attract students	1	2	3	3	0	0	2.89	9
Improved regulatory compliance	0	1	3	2	4	0	3.90	10
Better innovation of service offerings to students (e.g. curriculum development)	0	3	2	3	2	0	3.40	10
Reduced risk	0	1	4	3	2	0	3.60	10
Enhanced stakeholder relations	1	0	4	3	1	0	3.33	9
<i>answered question</i>								10
<i>skipped question</i>								0

In relation to the perceived benefits accruing to their college from addressing sustainability issues, the main finding here is that 80% of the responding colleges considered that reduced costs due to either energy efficiency or waste and water efficiencies were the significant benefits to them. 90% of respondents rated the benefit of improved regulatory compliance as being of moderate to significant benefit. The areas of enhanced public image, increased potential to attract students, better innovation of service offerings to students (e.g. curriculum development), reduced risk and enhanced stakeholder relations whilst not identified as being significant benefits nevertheless were all identified as having potential benefits to different colleges.

Question 8:

Sustainability in Third Level Colleges

To what extent is your college engaged in each of the following activities?					
Answer Options	Not at all	Sometimes	Always	Rating Average	Response Count
Improving efficiencies and reducing waste	0	4	6	2.60	10

Identifying opportunities to enhance or differentiate the brand image of your college through sustainability strategies	2	8	0	1.80	10
Building awareness of sustainability on your campus	1	7	2	2.10	10
Analysing risks associated with not fully addressing sustainability issues (e.g. environmental, legal, competitive or reputational risks)	2	6	2	2.00	10
Analysing existing and potential regulations or policies (e.g. public sector energy efficiency targets, climate change targets), and preparing an appropriate response	0	7	3	2.30	10
Analysing stakeholder expectations relating to sustainability	4	4	2	1.80	10
Reducing or eliminating CO2 or other greenhouse gas emissions	1	6	3	2.20	10
Benchmarking sustainability practices of competitors and sustainability leaders	4	6	0	1.60	10
answered question					10
skipped question					0

This question sought to establish the extent to which various environmental sustainability initiatives were being undertaken in the different colleges. The activity, *Improving efficiencies and reducing waste*, came out on top. Of the ten colleges surveyed, four were sometimes engaged in the activity and the other six stated that this was an activity that they were always engaged in. The activity, *Benchmarking sustainability practices of competitors and sustainability leaders*, is never undertaken by four of the ten colleges and only sometimes undertaken by the other six. This would indicate that perhaps there is some scope for networking between colleges to share best practice and information in the environmental sustainability area.

Question 9:

Sustainability in Third Level Colleges

How significant an obstacle is each of the following in addressing sustainability in your college?

Answer Options	Not significant	Partly significant	Very significant	N/A	Rating Average	Response Count
Difficulty considering sustainability at all given competing priorities	0	3	7	0	2.70	10
Difficulty quantifying and valuing effects of sustainability related strategies on the brand image of the college	2	4	4	0	2.20	10
Difficulty of predicting value of sustainability related strategies to attracting potential students	4	4	2	0	1.80	10
Lack of knowledge of a model, system or methodology to address sustainability related issues	1	4	5	0	2.40	10
Lack of resources (human or financial) to address sustainability related issues	1	0	9	0	2.80	10
General lack of appreciation on sustainability issues among key decision makers	3	5	2	0	1.90	10
answered question						10
skipped question						0

In this, the final question in the Strategic / Management category, the focus was on establishing the obstacles to addressing sustainability in each college.

The leading obstacle that emerged was *Lack of resources (human or financial) to address sustainability related issues*. 90% of respondents cited this obstacle as being very significant. Another critical obstacle to emerge from the survey was *Difficulty considering sustainability at all given competing priorities*, which 70% of respondents cited as being very significant and the other 30% as being partly significant. *Lack of knowledge of a model, system or methodology to address sustainability related issues* is another obstacle that came out of the survey as being

important with 90% of respondents cited it as being either a partly or a very significant obstacle to addressing sustainability. Of the others, *Difficulty of predicting value of sustainability related strategies to attracting potential students* and *General lack of appreciation on sustainability issues among key decision makers* had most mentions for not being significant obstacles to addressing environmental sustainability, at 40% and 30% respectively.

4.3.3 Policy / Legislation Awareness

Four questions in total were posed in this category and the findings were as follows.

Question 10:

Sustainability in Third Level Colleges

Are you aware of the national sustainability policy targets in the areas such as climate change, energy efficiency and waste management that apply to your college's activities?

Answer Options	Response Percent	Response Count
Yes, and there are system(s) in place to manage them	40.0%	4
Yes, but there is no system in place to actively manage them	60.0%	6
No / Don't know	0.0%	0
answered question		10
skipped question		0

The immediate observation here is that 100% of colleges surveyed are aware of the national sustainability policy targets in the areas such as climate change, energy efficiency and waste management that apply to your college's activities. However 60% of them state that even though they are aware of the existence of policy targets, they do not have any system(s) in place to actively manage them pointing to an absence of carbon reduction programs, energy management programs, waste management programs and / or environmental management systems.

Question 11:

Sustainability in Third Level Colleges

Are you aware of your responsibilities under the European Communities (Energy End-Use Efficiency and Energy Services) Regulations 2009 (S.I. No. 542 of 2009) which places a number of obligations on public bodies (including schools and colleges) relating to energy efficiency savings targets, the use of energy audits, energy efficient public procurement, and the use of energy efficient buildings?

Answer Options	Response Percent	Response Count
Yes and there is a system to actively manage them	30.0%	3
Yes but there is no system in place to actively manage them	70.0%	7
No / don't know	0.0%	0
<i>answered question</i>		10
<i>skipped question</i>		0

This question was a specific reference to the European Communities (Energy End-Use Efficiency and Energy Services) Regulations 2009 (S.I. No. 542 of 2009) which places a number of obligations on public bodies (including schools and colleges) relating to energy efficiency savings targets, the use of energy audits, energy efficient public procurement, and the use of energy efficient buildings. Once again 100% of respondents are aware of its existence and what their responsibilities were under the legislation, however, like the previous question, 70% do not have a system in place to actively manage these responsibilities, such as an energy management system and/or an environmental management system.

Question 12:

Sustainability in Third Level Colleges

Do you know what legal / regulatory environmental requirements apply to the operations in your college?

Answer Options	Response Percent	Response Count
Yes and there is a system to keep us up to date on them	20.0%	2
Yes but there is no system to keep us up to date on them	70.0%	7
No, but I know who does	0.0%	0
No / don't know	10.0%	1
<i>answered question</i>		10
<i>skipped question</i>		0

In this question, 90% of respondents have indicated that they know what legal / regulatory environmental requirements apply to the operations of the college. This is a requirement for an organisation who wishes to seek certification to the ISO 14001 Environmental Management System standard.

Question 13:

Sustainability in Third Level Colleges

Are the operations in your college in compliance with the legal and regulatory environmental requirements?

Answer Options	Response Percent	Response Count
Yes	10.0%	1
More than 50% are	90.0%	9
Less than 50% are	0.0%	0
No / don't know	0.0%	0
<i>answered question</i>		10
<i>skipped question</i>		0

This question is somewhat linked to the previous question and it establishes that 90% of respondents believe that more than 50% of their operations are in compliance

with legal and regulatory environmental requirements while the remain 10% believe that all of their operations are in compliance.

4.3.4 Operations

The final category of question put to the respondents in the survey covered their operations, and the responses to these are presented in the following section.

Question 14:

Sustainability in Third Level Colleges

Do you know or do you have access to the annual energy use for your college campus?

Answer Options	Response Percent	Response Count
Yes	100.0%	10
No / don't know	0.0%	0
<i>answered question</i>		10
<i>skipped question</i>		0

The first question in this category relates to energy consumption. It asks whether or not respondent has access to the college's annual energy consumption figures and the survey shows that 100% of the respondents have access. This is important in that having energy usage figures are a prerequisite to establishing an energy management programme.

Question 15:

Sustainability in Third Level Colleges

If you answered Yes above, do you meter, monitor, report and manage your energy use and costs as well as potential ways to reduce them?

Answer Options	Response Percent	Response Count
Meter only	20.0%	2
Meter, monitor, report	20.0%	2
Meter, monitor, report and manage	60.0%	6
No / don't know	0.0%	0
<i>answered question</i>		10
<i>skipped question</i>		0

Again this question is linked to the previous question in that it seeks to establish for those colleges that have access to energy consumption figures, whether or not they meter, monitor report and manage energy usage and costs as well as energy cost reductions. 60% of colleges indicate that they meter, monitor, report and manage their energy consumption – the essentials of an energy management program. 20% meter monitor and report while the remaining 20% meter only, showing varying levels of sophistication of energy management within these colleges.

Question 16:

Sustainability in Third Level Colleges

What is your overall annual energy cost?

Answer Options	Response Percent	Response Count
€0 - €200,000	0.0%	0
€200,000 - €400,000	20.0%	2
€400,000 - €600,000	40.0%	4
€600000 - €800,000	20.0%	2
€800,000 +	20.0%	2
Don't know	0.0%	0
<i>answered question</i>		10
<i>skipped question</i>		0

Again, a question related to energy management, this time seeking information on annual energy consumption figures. All colleges have annual energy consumption figures of over €200,000 per annum, 20% have consumption figures between €200,000 and €400,000, 40% have consumption figures between €400,000 and €600,000, 20% have consumption figures between €600,000 and €800,000 and 20% have consumption figures over €800,000. It is no surprise to find that the two colleges that have an annual energy spend over €800,000 are colleges with large student populations, one with between 5000 and 10,000 students and the other the one college that has more than 10,000 students. A more potent metric here would be the energy consumption figure per student and / or energy consumption per meter squared of building, in order that each college's relative energy performance could be benchmarked against others. This information was not sought in the survey.

Question 17

Sustainability in Third Level Colleges

Do you have a formal Energy Management System (e.g. an energy policy, objectives and targets, procedures, responsibilities assigned) in place?

Answer Options	Response Percent	Response Count
Yes	10.0%	1
No, but we have plans to implement one	80.0%	8
No / don't know	10.0%	1
answered question		10
skipped question		0

The most telling finding to emerge from this question is that 90% of colleges surveyed do not have a formal energy management system. This is significant given the obligations that arise under the European Communities (Energy End-Use

Efficiency and Energy Services) Regulations 2009 (S.I. No. 542 of 2009) which places a number of obligations on public bodies (including schools and colleges) relating to energy efficiency savings targets and the use of energy audits among other things as outlined earlier in this document. Eight of the nine colleges who do not have a formal system however have intentions of implementing one. The Sustainable Energy Authority of Ireland, among others, have promulgated the benefits to an organisation from implementing an energy management system; “Companies who have committed resources to energy management see savings of 10-20% in the first year”. For the colleges surveyed, this could amount to savings of between €40,000 and €80,000 in the first year alone. Only one college out of the ten surveys received, confirm the existence of a formal energy management system. They also confirmed that they have a dedicated person responsible for managing energy. This college is not the largest college in the survey student numbers wise, coming in the 3000 to 5000 student category and had an annual energy spend of €400,000 to €600,000. This college however highlighted the existence of a champion or senior management leader for sustainability projects as being highly significant for them.

Question 18:

Sustainability in Third Level Colleges

If you answered No above, is it because of:

Answer Options	Response Percent	Response Count
Human or financial resources constraints	100.0%	6
Do not see the need for one	0.0%	0
Don't know	0.0%	0
answered question		6
skipped question		4

Question 19:

Sustainability in Third Level Colleges

Do you have a dedicated person responsible for managing energy?

Answer Options	Response Percent	Response Count
Yes	40.0%	4
No, but we have plans to appoint someone	0.0%	0
No / don't know	60.0%	6
	answered question	10
	skipped question	0

Question 18 and 19 are linked to the previous question 17. In seeking to establish the reason why the colleges who do not currently have a formal energy management system in place, question 18 finds that 100% of the respondents state that the human or financial resource constraints are the reasons why such as system is not in existence. Question 19 finds that 40% or four out of the ten colleges have a dedicated person responsible for managing energy. So we can conclude that of the ten colleges; one college have a dedicated person for managing energy and have developed a formal energy management system, three colleges have a dedicated person for managing energy but do not have a formal energy management system in place, and the remaining six do not have a dedicated person or a formal system in place. All of those who do not have a formal system in place state that human or financial resource constraints are the reason why. One college made the following comment *“have a dedicated person to managing energy and environmental matters -all this is the estates managers responsibility - along with all other estates management roles so very little time is available. Have an in house M&E services supervisor who schedules the BMS however, he is due to retire this year and no replacement guaranteed. Plans to undertake a detailed energy audit by outsourcing consultants.*

This will identify improvements to be made and will seek finance to implement same through grant/loan/ESCO. Plan also to partner with SEAI for technical assistance and support”

The previous three questions on energy management indicate scope for education within the colleges on the benefits both financial and regulatory attached to implementing an energy management program. The kind of savings possible in the first year alone, outlined above, would suggest that the development of a formal role for an environmental / sustainability specialist, part of whose remit would be energy management would make sense. The case outlined in the comment above, whereby the dedicated environmental / energy person also has other general estates management responsibilities is not the ideal situation in that not enough of time is available to develop proper practice in these areas.

Question 20:

Sustainability in Third Level Colleges

Do you know, or do you have access to, your annual water use?		
Answer Options	Response Percent	Response Count
Yes	100.0%	10
No / don't know	0.0%	0
<i>answered question</i>		10
<i>skipped question</i>		0

Question 21:

Sustainability in Third Level Colleges

If you answered Yes above, do you meter, monitor, report and manage your annual water use and costs as well as potential ways to reduce them?

Answer Options	Response Percent	Response Count
Meter only	20.0%	2
Meter, monitor, report	10.0%	1
Meter, monitor, report and manage	70.0%	7
No / don't know	0.0%	0
<i>answered question</i>		10
<i>skipped question</i>		0

Both Questions 20 and 21 deal with water usage and management. A familiar pattern emerges in that 100% of respondents have access to water usage figures, and of this 70% meter monitor report and manage their water consumption. The other three colleges have the figures but are not actively managing their water consumption.

Question 22:

Sustainability in Third Level Colleges

Do you manage your waste?

Answer Options	Response Percent	Response Count
Yes	100.0%	10
No	0.0%	0
<i>answered question</i>		10
<i>skipped question</i>		0

Question 23:

Sustainability in Third Level Colleges

If you answered Yes above, do you (Please choose all that apply)

Answer Options	Response Percent	Response Count
Segregate and quantify the different waste categories yourselves,	50.0%	5
Have your waste segregated and different waste categories quantified on your behalf by your waste collection contractor,	70.0%	7
Monitor and report your waste figures,	20.0%	2
Explore potential ways to reduce the volume, toxicity and associated disposal costs?	40.0%	4
None of the above	0.0%	0
<i>answered question</i>		10
<i>skipped question</i>		0

Both questions 22 and 23 deal with the area of waste management. 100% or all ten colleges report that they are managing their waste. While the vast majority of the colleges report that they segregate and quantify their waste streams, only two colleges monitor and report their waste figures and four colleges of the ten report exploring potential ways to manage their waste i.e. reduce volumes, toxicity and costs – in other words formally managing their waste.

The remaining questions, 24, 25, 26 and 27 all deal with the existence or otherwise of an environmental management system in the colleges, the findings of which are detailed below.

Question 24:

Sustainability in Third Level Colleges

Do you have a formal Environmental Management System (e.g. an environmental policy, objectives and targets, procedures, responsibilities assigned) in place?

Answer Options	Response Percent	Response Count
Yes	20.0%	2
No, but we have plans to implement one	30.0%	3
No / don't know	50.0%	5
<i>answered question</i>		10
<i>skipped question</i>		0

Question 25:

Sustainability in Third Level Colleges

If you answered No above, is it because of

Answer Options	Response Percent	Response Count
Human or financial resources constraints	85.7%	6
Do not see the need for one	0.0%	0
Don't know	14.3%	1
<i>answered question</i>		7
<i>skipped question</i>		3

Question 26:

Sustainability in Third Level Colleges

If you answered either, Yes, or No, but we have plans to implement one, which of the following have you implemented or do you intend to implement?

Answer Options	Response Percent	Response Count
ISO 14001	14.3%	1
An Taisce Green Flag College	71.4%	5
Neither of the above (please supply details)	14.3%	1
Other (please specify)		1
<i>answered question</i>		7
<i>skipped question</i>		3

Question 27:

Sustainability in Third Level Colleges

Do you have a dedicated person responsible for managing environmental matters?

Answer Options	Response Percent	Response Count
Yes	30.0%	3
No, but we have plans to appoint someone	10.0%	1
No / don't know	60.0%	6
	<i>answered question</i>	10
	<i>skipped question</i>	0

These questions sought information regarding the existence or otherwise of an Environmental Management System (EMS) in the colleges. The findings here are important because, as was postulated earlier in this document, a properly designed, resourced and implemented EMS can be an effective tool to help a college achieve the goal of college campus sustainability. It will encompass such areas as energy consumption, water consumption, waste management, greenhouse gas emissions as well as other environmental impacts.

Question 24 indicates that only 20% of the colleges have a formal EMS in place. Of the remaining 80%, only 30% indicate that they intend to implement one while the remaining 50% responded No / don't know as to their intentions to implement an EMS in the future. Of the colleges that do not currently have an EMS in place, Question 25 indicates that almost 86% of them cite human or financial resources constraints as the reason why, once again a familiar pattern. For these colleges, it would appear that the many benefits that would accrue to them from taking this course of action may not be apparent. Question 26 seeks information from the respondents on which kind of EMS they would intend to implement if they were to go that route. 71% of the respondents, or five of the colleges, selected the An Taisce

Green Flag College system, one college selected the ISO 14001 system and one college selected neither of the above but made this comment “*Don’t know. Ideally ISO 14001 given personnel to develop it*”. Three colleges skipped this question. The final question, Question 27, asks if the college has a dedicated person responsible for managing environmental matters, and 70% of them, or seven colleges, responded No, they do not. The remaining three colleges responding that Yes, they do.

4.3 Conclusion

Whilst the detailed findings of the survey have been presented in the previous section, it is important to summarise the important findings and present the picture that has emerged as a result of the survey. It emerges very clearly, that even though individual colleges are addressing environmental sustainability issues, they do so, for the most part, only on an ad-hoc basis. There appears to be a dearth of deployment of formal environmental or energy management systems in the Institutes of Technology sector in Ireland. Those that do have formal systems in place, also appear to have a dedicated person responsible for environmental matters and also have senior management commitment and support for sustainability. The barriers to the implementation of formal energy or environmental management systems have also clearly been highlighted as being a lack of human and financial resources, competing priorities, and the non-existence of a senior management environmental sustainability champion or leader. The next and final chapter evaluates these findings and offers a discussion on them.

Chapter 5: Discussion and Conclusion

The issue of corporate environmental sustainability is gaining in importance. In recent years, both private and public institutions are becoming more aware of their responsibilities as far as the environment is concerned. Many environmental and sustainability challenges face the world, and these challenges are no less important in Ireland. This is reflected in the many policy documents and regulations that have been promulgated in recent years, which present challenges and opportunities to organisations, both public and private.

The focus of this work was on examining the role that third level colleges in Ireland, as part of the wider public service, have to play in protecting the environment and promoting sustainability. It has been established that, in general, a college campus has many diverse operations and activities that can impact the environment. These operations and activities include laboratories, sports facilities, power generation, energy use, grounds maintenance, drinking water supplies, construction and demolition activities, waste management activities and transport in addition to their central roles as education providers. It has also been established that there are many incentives and benefits for universities and colleges to adopt environmental and sustainable practices. These include an enhanced reputation, better management, enhanced legal compliance, cost reduction and avoidance, better community relations and achieving educational excellence. In light of this, the central theme of this work was an examination of the level of integration of environmental initiatives at third level colleges in Ireland, and their readiness or otherwise to address these environmental sustainability challenges. The study was focussed on the Institutes of Technology sector.

Climate change is but one of many global environmental challenges that need to be addressed. These are challenges that require both a global and a local response in addition to a concerted effort by all stakeholders in order to combat its effects. As part of its contribution to the international response to these environmental challenges, Ireland will need to adopt more environmentally sustainable practices at every level in society from both the public and private sector down to the individual citizen. What is also clear is that government and public bodies will need to show example and take the lead in these matters if progress is to be made. Third level institutions in Ireland need to address, involve and promote, on a local, regional national and even a global level, environmental sustainability. These third level institutions need to fulfil their functions of teaching, research and community outreach and partnership in ways that can help society to move towards more sustainable lifestyles.

The business case for environmental sustainability is also compelling. This business case applies to all organisations, whether in the private or public sector. Focusing on the public sector, and in particular third level colleges, they can expect to achieve the following business benefits by embracing environmental sustainability; an improved brand image, improved employee relations, proactive legislative compliance, attainment / retention of a licence to operate, as well as achieving improved operating efficiencies and enhanced productivity leading to cost savings arising from energy, water, and waste management improvements among others. This is particularly important given the growing pressure on colleges, as part of the wider public sector, to do “more for less”. Colleges can also expect improved market penetration in that students interested in environmental matters are now including environmental aspects as part of their decision making process in choosing a college.

In addition to the environmental and business cases for environmental sustainability, there is also a very compelling regulatory / policy case for third level colleges, as part of the wider public service, to adopt environmental sustainability initiatives. We have seen that national policy and regulatory initiatives exist, in the areas of green procurement, greenhouse gas emissions reduction, energy efficiency. In particular this document has focussed on energy savings targets for the public sector. The target which repeatedly crops up across several policy documents is a 33% reduction in energy consumption and greenhouse emissions throughout the public sector by the year 2020. This target repeatedly appears in The Energy White Paper, The National Climate Change Strategy, The National Energy Efficiency Action Plan through to Statutory Instrument No. 542 of 2009 on Energy End Use Efficiency and Energy Services. These targets apply to every third level college in Ireland. These policy documents state that the public sector will lead by example in these areas. They will be expected to play an “*exemplary*” role with respect to energy savings. They will be expected to do this through the use of energy audits, energy efficient procurement, use of energy efficient buildings, their energy management practices, use of financial instruments for energy savings and annual reporting on the actions being taken to improve energy efficiency. The Sustainable Energy Authority of Ireland have stated “*further organisation-level targets will be developedtargets will be ambitious and will stretch organisations..... They will use a baseline period 2001-2005.....*”. The SEAI suggests that public sector organisations should develop and implement a structured Energy Management Programme. This will enable them to deliver sustainable energy savings in the short term and, importantly, to identify strategic initiatives to work towards more significant longer term savings, i.e. to 2020. Other areas and aspects of

environmental legislation also influence behaviour and include, waste management, air pollution and water pollution.

So what can colleges do to respond to the challenges and embrace and capitalise on the opportunities that present themselves in the area of environmental sustainability?

This thesis, having considered the drivers for environmental sustainability and reviewed the various models and programs that were being used in various colleges and universities internationally to achieve this goal, proposes that the implementation of an Environmental Management System is the most effective response to these opportunities and challenges. This system, should by its very nature incorporate and address energy management as one of its key activities, in addition to the management of water, waste and other potential environmental aspects. In order for a third level college to fully embrace environmental sustainability, it will need to move beyond addressing operational issues that affect its ecological footprint and also seek to incorporate education for sustainability. This will involve incorporating sustainability issues in campus administration and the organisational culture, as well as into college curricula in all disciplines. The ISO 14001 Environmental Management System (EMS) model is an internationally known EMS model that has been implemented in many organisations worldwide. However, it has certain limitations when applied to third level colleges. Criticisms include that it is managerial, focussed on documentation, and on the development and maintenance of management systems. It is isolated from the wider community in which the college campus is located, is not inclusive of the student community and has no facility for incorporating links with the college curriculum. What is required and recommended by this author is an EMS that is tailored to a third level college and one such system that has been developed and implemented in Ireland is the An

Taisce Green Flag for Colleges system. This system follows a seven step approach and is an entirely holistic approach to achieving campus environmental sustainability. All of the elements of a traditional environmental management system are contained in the model in addition to the application of the program to augment curriculum development and the involvement of the wider community in the initiative. There is more of an emphasis on a partnership approach and a move away from the more traditional management driven approach of environmental management systems. The central themes to the program are litter and waste prevention/reduction/management; energy conservation / reduction, water conservation; travel; biodiversity; procurement, and environmental risk analysis. The suggested benefits to a college of achieving the green flag include benefits to the college, benefits to the students and learning and benefits to the local and wider community.

A survey was conducted to investigate the level of integration of environmental sustainability initiatives in the Institute of Technology Sector and to establish the barriers to implementation that exist as reported by that sector. It targeted the estates office in these colleges as it is recognised by this author that the drive and implementation of sustainability initiatives is currently coming from this quarter, and will continue to do so. The clear finding of the survey was that the sector, with a few notable exceptions, does not have formal environmental or energy management systems in place. How much a phenomenon that is unique to public sector organisations this is, has been beyond the scope of this work, but would form the basis of an interesting further evaluation a future date. The survey showed that the majority of colleges would like to implement an EMS to help it to address its environmental sustainability responsibilities, and that the An Taisce Green Flag for

Colleges system model was their preferred model, given a choice. This model has already been implemented in one University, one Institute of Technology campus and one College of Further Education in Ireland. The survey also clearly highlighted the challenges and barriers to achieving environmental sustainability on their college campuses. These included limited time and resources, both human and financial, competing priorities, and a lack of in-house expertise in these matters. The survey also found that respondents indicated that the existence of a senior management leader or champion of sustainability initiatives on the college was very significant to the effort. These barriers and challenges are not unique to Ireland or indeed to third level colleges, nevertheless they are the issues that need to be addressed. To achieve the goal of environmental sustainability, the college needs to embrace sustainability as a key part of its mission. The drive needs to come from the very top with a champion from the executive management team emerging to lead the initiative. Colleges should consider creating a dedicated role in the college for an environmental sustainability specialist. This position would require a skill set that would include energy management, water and waste management, environmental impact assessment and management as well as system implementation, leadership, communication and project management skills. Collaboration between colleges should be considered. Given the financial pressures that colleges are facing, neighbouring colleges should investigate the option of addressing these challenges collaboratively by perhaps sharing the post of the environmental sustainability specialist between them. In this way, each college gets to gain the benefits whilst sharing the costs. One thing is certain however, the college that gets a head start and embraces the concept of achieving environmental sustainability can look to the future with confidence.

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Appendix 1: Survey of Environmental Sustainability in the Institutes of Technology Sector

Sustainability in Third Level Colleges

1.

1. What is the size of your college?

- 0 - 3000 students
- 3000 - 5000 students
- 5000 - 10000 students
- More than 10000 students

2. Do sustainability issues form part of your college's mission statement (e.g. concerns and responsibilities for the environment)?

- Yes
- No/Don't know

3. In your opinion, how do the general public view your college's commitment to the environment and sustainability?

- Very responsible & committed
- Neutral
- Irresponsible & not committed

4. In your opinion, what is the status of sustainability on the agenda of senior management at your college?

- Permanently on the agenda and a core strategic consideration
- Permanently on the agenda but not a core strategic consideration
- Occasionally or temporarily on the agenda but not a core strategic consideration
- Never considered on the agenda
- Deliberately excluded from the agenda because viewed as a passing fad
- Do not know

Other: (please specify)

Sustainability in Third Level Colleges

5. Do you currently have sustainability projects or initiatives ongoing at your college

- Yes, they are documented and integrated into our operations
- Yes, but if their project 'champions' leave, the efforts may not continue or expand
- No

Other (please specify)

6. How influential is each of the following in driving your college's attention to sustainability initiatives?

(Please rate on a scale of 1 to 5, with 1 being the lowest)

	1	2	3	4	5	N/A
Senior Leadership / Champion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students / Potential Students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government / Regulators (Legislation / Policy Targets)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grant Aid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consultants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)						



Sustainability in Third Level Colleges

7. How do you rate the benefits to your college from addressing sustainability issues?

(Please rate on a scale of 1 to 5, with 1 being the lowest)

	1	2	3	4	5	N/A
Enhanced public image	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced cost due to energy efficiency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced cost due to materials or waste efficiencies (e.g. waste management or water efficiency)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Potential to attract students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved regulatory compliance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Better innovation of service offerings to students (e.g. curriculum development)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced risk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhanced stakeholder relations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Sustainability in Third Level Colleges

8. To what extent is your college engaged in each of the following activities?

	Not at all	Sometimes	Always
Improving efficiency and reducing waste	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identifying opportunities to enhance or differentiate the brand image of your college through sustainability strategies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Building awareness of sustainability on your campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Analysing risks associated with not fully addressing sustainability issues (e.g. environmental, legal, competitive or reputational risks)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Analysing existing and potential regulations or policies (e.g. public sector energy efficiency targets, climate change targets), and preparing an appropriate response	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Analysing stakeholder expectations relating to sustainability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reducing or eliminating CO ₂ or other greenhouse gas emissions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Benchmarking sustainability practices of competitors and sustainability leaders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Sustainability in Third Level Colleges

9. How significant an obstacle is each of the following in addressing sustainability in your college?

	Not significant	Partly significant	Very significant	NA
Difficulty considering sustainability at all given competing priorities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulty quantifying and valuing effects of sustainability related strategies on the brand image of the college	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulty of predicting value of sustainability related strategies to attracting potential students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of knowledge of a model, system or methodology to address sustainability related issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of resources (human or financial) to address sustainability related issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
General lack of appreciation on sustainability issues among key decision makers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Are you aware of the national sustainability policy targets in the areas such as climate change, energy efficiency and waste management that apply to your college's activities?

- Yes, and there are system(s) in place to manage them
- Yes, but there is no system in place to actively manage them
- No / Don't know

11. Are you aware of your responsibilities under the European Communities (Energy End-Use Efficiency and Energy Services) Regulations 2009 (S.I. No. 542 of 2009) which places a number of obligations on public bodies (including schools and colleges) relating to energy efficiency savings targets, the use of energy audits, energy efficient public procurement, and the use of energy efficient buildings?

- Yes and there is a system to actively manage them
- Yes but there is no system in place to actively manage them
- No / don't know

Sustainability in Third Level Colleges

12. Do you know what legal / regulatory environmental requirements apply to the operations in your college?

- Yes and there is a system to keep us up to date on them
- Yes but there is no system to keep us up to date on them
- No, but I know who does
- No / don't know

13. Are the operations in your college in compliance with the legal and regulatory environmental requirements?

- Yes
- More than 50% are
- Less than 50% are
- No / don't know

14. Do you know, or do you have access to, the annual energy use for your college campus?

- Yes
- No / don't know

15. If you answered Yes above, do you meter, monitor, report and manage your energy use and costs as well as potential ways to reduce them?

- Meter only
- Meter, monitor, report
- Meter, monitor, report and manage
- No / don't know

16. What is your overall annual energy cost?

- €0 – €200,000
- €200,000 – €400,000
- €400,000 – €600,000
- €600,000 – €800,000
- €800,000 +
- Don't know

Sustainability in Third Level Colleges

17. Do you have a formal Energy Management System (e.g. an energy policy, objectives and targets, procedures, responsibilities assigned) in place?

- Yes
- No, but we have plans to implement one
- No / don't know

18. If you answered No above, is it because of:

- Human or financial resources constraints
- Do not see the need for one
- Don't know

19. Do you have a dedicated person responsible for managing energy?

- Yes
- No, but we have plans to appoint someone
- No / don't know

20. Do you know, or do you have access to, your annual water use?

- Yes
- No / don't know

21. If you answered Yes above, do you meter, monitor, report and manage your annual water use and costs as well as potential ways to reduce them?

- Meter only
- Meter, monitor, report
- Meter, monitor, report and manage
- No / don't know

22. Do you manage your waste?

- Yes
- No

Sustainability in Third Level Colleges

23. If you answered Yes above, do you (Please choose all that apply)

- Segregate and quantify the different waste categories yourselves.
- Have your waste segregated and different waste categories quantified on your behalf by your waste collection contractor.
- Monitor and report your waste figures.
- Explore potential ways to reduce the volume, toxicity and associated disposal costs?
- None of the above

24. Do you have a formal Environmental Management System (e.g. an environmental policy, objectives and targets, procedures, responsibilities assigned) in place?

- Yes
- No, but we have plans to implement one
- No I don't know

25. If you answered No above, is it because of

- Human or financial resource constraints
- Do not see the need for one
- Don't know

26. If you answered either, Yes, or No, but we have plans to implement one, which of the following have you implemented or do you intend to implement?

- ISO 14001
- An Taisec Green Flag College
- Neither of the above (please specify details)

Other (please specify)

27. Do you have a dedicated person responsible for managing environmental matters?

- Yes
- No, but we have plans to appoint someone
- No I don't know

Sustainability in Third Level Colleges

28. Please include any additional comments here

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Appendix 2: Summary of Survey Results

Sustainability in Third Level Colleges





1. What is the size of your college?

		Response Percent	Response Count
0 - 3000 students		20.0%	2
3000 - 5000 students		40.0%	4
5000 - 10000 students		30.0%	3
More than 10000 students		10.0%	1
answered question			10
skipped question			0




2. Do sustainability issues form part of your college's mission statement (e.g. concerns and responsibilities for the environment)?

		Response Percent	Response Count
Yes		60.0%	6
No/Don't know		40.0%	4
answered question			10
skipped question			0




3. In your opinion, how do the general public view your college's commitment to the environment and sustainability

	Response Percent	Response Count
Very responsible & committed 	10.0%	1
Neutral 	90.0%	9
Irresponsible & not committed	0.0%	0
answered question		10
skipped question		0

4. In your opinion, what is the status of sustainability on the agenda of senior management at your college

	Response Percent	Response Count
Permanently on the agenda and a core strategic consideration 	10.0%	1
Permanently on the agenda but not a core strategic consideration 	20.0%	2
Occasionally or temporarily on the agenda but not a core strategic consideration 	70.0%	7
Never considered on the agenda	0.0%	0
Deliberately excluded from the agenda because viewed as a passing fad	0.0%	0
Do not know	0.0%	0
Other (please specify)		1
answered question		10
skipped question		0

5. Do you currently have sustainability projects or initiatives ongoing at your college

		Response Percent	Response Count
Yes, they are documented and integrated into our operations		50.0%	5
Yes, but if their project 'champions' leave, the efforts may not continue or expand		20.0%	2
No		30.0%	3
		Other (please specify)	0
		answered question	10
		skipped question	0

6. How influential is each of the following in driving your college's attention to sustainability Initiatives? (Please rate on a scale of 1 to 5, with 1 being the lowest)

	1	2	3	4	5	N/A	Rating Average	Response Count
Senior Leadership / Champion	20.0% (2)	10.0% (1)	20.0% (2)	20.0% (2)	30.0% (3)	0.0% (0)	3.30	10
Employees	0.0% (0)	40.0% (4)	20.0% (2)	40.0% (4)	0.0% (0)	0.0% (0)	3.00	10
Students / Potential Students	10.0% (1)	20.0% (2)	50.0% (5)	0.0% (0)	20.0% (2)	0.0% (0)	3.00	10
Government / Regulators (Legislation / Policy Targets)	20.0% (2)	10.0% (1)	10.0% (1)	40.0% (4)	20.0% (2)	0.0% (0)	3.30	10
Grant Aid	20.0% (2)	20.0% (2)	10.0% (1)	20.0% (2)	20.0% (2)	10.0% (1)	3.00	10
Competitors	50.0% (4)	25.0% (2)	0.0% (0)	0.0% (0)	12.5% (1)	12.5% (1)	1.86	8
							Other (please specify)	0
							answered question	10
							skipped question	0

**7. How do you rate the benefits to your college from addressing sustainability issues?
(Please rate on a scale of 1 to 5, with 1 being the lowest)**

	1	2	3	4	5	N/A	Rating Average	Response Count
Enhanced public image	0.0% {0}	11.1% (1)	11.1% (1)	44.4% (4)	33.3% (3)	0.0% (0)	4.00	9
Reduced cost due to energy efficiency	20.0% (2)	0.0% (0)	0.0% (0)	30.0% (3)	50.0% (5)	0.0% (0)	3.90	10
Reduced cost due to materials or waste efficiencies (e.g. waste management or water efficiency)	10.0% (1)	10.0% (1)	0.0% (0)	30.0% (3)	50.0% (5)	0.0% (0)	4.00	10
Potential to attract students	11.1% (1)	22.2% (2)	33.3% (3)	33.3% (3)	0.0% (0)	0.0% (0)	2.89	9
Improved regulatory compliance	0.0% (0)	10.0% (1)	30.0% (3)	20.0% (2)	40.0% (4)	0.0% (0)	3.90	10
Better innovation of service offerings to students (e.g. curriculum development)	0.0% (0)	30.0% (3)	20.0% (2)	30.0% (3)	20.0% (2)	0.0% (0)	3.40	10
Reduced risk	0.0% (0)	10.0% (1)	40.0% (4)	30.0% (3)	20.0% (2)	0.0% (0)	3.60	10
Enhanced stakeholder relations	11.1% (1)	0.0% (0)	44.4% (4)	33.3% (3)	11.1% (1)	0.0% (0)	3.33	9
							answered question	10
							skipped question	0



8. To what extent is your college engaged in each of the following activities?

	Not at all	Sometimes	Always	Rating Average	Response Count
Improving efficiencies and reducing waste	0.0% (0)	40.0% (4)	60.0% (6)	2.60	10
Identifying opportunities to enhance or differentiate the brand image of your college through sustainability strategies	20.0% (2)	80.0% (8)	0.0% (0)	1.80	10
Building awareness of sustainability on your campus	10.0% (1)	70.0% (7)	20.0% (2)	2.10	10
Analysing risks associated with not fully addressing sustainability issues (e.g. environmental, legal, competitive or reputational risks)	20.0% (2)	60.0% (6)	20.0% (2)	2.00	10
Analysing existing and potential regulations or policies (e.g. public sector energy efficiency targets, climate change targets), and preparing an appropriate response	0.0% (0)	70.0% (7)	30.0% (3)	2.30	10
Analysing stakeholder expectations relating to sustainability	40.0% (4)	40.0% (4)	20.0% (2)	1.80	10
Reducing or eliminating CO2 or other greenhouse gas emissions	10.0% (1)	60.0% (6)	30.0% (3)	2.20	10
Benchmarking sustainability practices of competitors and sustainability leaders	40.0% (4)	60.0% (6)	0.0% (0)	1.60	10
			answered question		10
			skipped question		0



9. How significant an obstacle is each of the following in addressing sustainability in your college?

	Not significant	Partly significant	Very significant	N/A	Rating Average	Response Count
Difficulty considering sustainability at all given competing priorities	0.0% (0)	30.0% (3)	70.0% (7)	0.0% (0)	2.70	10
Difficulty quantifying and valuing effects of sustainability related strategies on the brand image of the college	20.0% (2)	40.0% (4)	40.0% (4)	0.0% (0)	2.20	10
Difficulty of predicting value of sustainability related strategies to attracting potential students	40.0% (4)	40.0% (4)	20.0% (2)	0.0% (0)	1.80	10
Lack of knowledge of a model, system or methodology to address sustainability related issues	10.0% (1)	40.0% (4)	50.0% (5)	0.0% (0)	2.40	10
Lack of resources (human or financial) to address sustainability related issues	10.0% (1)	0.0% (0)	90.0% (9)	0.0% (0)	2.80	10
General lack of appreciation on sustainability issues among key decision makers	30.0% (3)	50.0% (5)	20.0% (2)	0.0% (0)	1.90	10
					answered question	10
					skipped question	0




10. Are you aware of the national sustainability policy targets in the areas such as climate change, energy efficiency and waste management that apply to your college's activities?

		Response Percent	Response Count
Yes, and there are system(s) in place to manage them		40.0%	4
Yes, but there is no system in place to actively manage them		60.0%	6
No / Don't know		0.0%	0
		answered question	10
		skipped question	0

11. Are you aware of your responsibilities under the European Communities (Energy End-Use Efficiency and Energy Services) Regulations 2009 (S.I. No. 542 of 2009) which places a number of obligations on public bodies (including schools and colleges) relating to energy efficiency savings targets, the use of energy audits, energy efficient public procurement, and the use of energy efficient buildings?

		Response Percent	Response Count
Yes and there is a system to actively manage them		30.0%	3
Yes but there is no system in place to actively manage them		70.0%	7
No / don't know		0.0%	0
		answered question	10
		skipped question	0


12. Do you know what legal / regulatory environmental requirements apply to the operations in your college?

	Response Percent	Response Count
Yes and there is a system to keep us up to date on them 	20.0%	2
Yes but there is no system to keep us up to date on them 	70.0%	7
No, but I know who does	0.0%	0
No / don't know 	10.0%	1
answered question		10
skipped question		0




13. Are the operations in your college in compliance with the legal and regulatory environmental requirements?

	Response Percent	Response Count
Yes 	10.0%	1
More than 50% are 	90.0%	9
Less than 50% are	0.0%	0
No / don't know	0.0%	0
answered question		10
skipped question		0

14. Do you know, or do you have access to, the annual energy use for your college campus?

	Response Percent	Response Count
Yes 	100.0%	10
No / don't know	0.0%	0
answered question		10
skipped question		0




15. If you answered Yes above, do you meter, monitor, report and manage your energy use and costs as well as potential ways to reduce them?

	Response Percent	Response Count
Meter only 	20.0%	2
Meter, monitor, report 	20.0%	2
Meter, monitor, report and manage 	60.0%	6
No / don't know	0.0%	0
answered question		10
skipped question		0

16. What is your overall annual energy cost?

	Response Percent	Response Count
€0 – €200,000	0.0%	0
€200,000 – €400,000 	20.0%	2
€400,000 – €600,000 	40.0%	4
€600,000 – €800,000 	20.0%	2
€800,000 + 	20.0%	2
Don't know	0.0%	0
answered question		10
skipped question		0


17. Do you have a formal Energy Management System (e.g. an energy policy, objectives and targets, procedures, responsibilities assigned) in place?

	Response Percent	Response Count
Yes 	10.0%	1
No, but we have plans to implement one 	80.0%	8
No / don't know 	10.0%	1
answered question		10
skipped question		0

18. If you answered No above, is it because of:

	Response Percent	Response Count
Human or financial resources constraints 	100.0%	6
Do not see the need for one	0.0%	0
Don't know	0.0%	0
answered question		6
skipped question		4




19. Do you have a dedicated person responsible for managing energy?

	Response Percent	Response Count
Yes 	40.0%	4
No, but we have plans to appoint someone	0.0%	0
No / don't know 	60.0%	6
answered question		10
skipped question		0

20. Do you know, or do you have access to, your annual water use?

	Response Percent	Response Count
Yes 	100.0%	10
No / don't know	0.0%	0
answered question		10
skipped question		0

21. If you answered Yes above, do you meter, monitor, report and manage your annual water use and costs as well as potential ways to reduce them?

	Response Percent	Response Count
Meter only 	20.0%	2
Meter, monitor, report 	10.0%	1
Meter, monitor, report and manage 	70.0%	7
No / don't know	0.0%	0
answered question		10
skipped question		0

22. Do you manage your waste?

	Response Percent	Response Count
Yes 	100.0%	10
No	0.0%	0
answered question		10
skipped question		0


23. If you answered Yes above, do you (Please choose all that apply)

	Response Percent	Response Count
Segregate and quantify the different waste categories yourselves,	50.0%	5
Have your waste segregated and different waste categories quantified on your behalf by your waste collection contractor,	70.0%	7
Monitor and report your waste figures,	20.0%	2
Explore potential ways to reduce the volume, toxicity and associated disposal costs?	40.0%	4
None of the above	0.0%	0
answered question		10
skipped question		0




24. Do you have a formal Environmental Management System (e.g. an environmental policy, objectives and targets, procedures, responsibilities assigned) in place?

	Response Percent	Response Count
Yes	20.0%	2
No, but we have plans to implement one	30.0%	3
No / don't know	50.0%	5
answered question		10
skipped question		0




25. If you answered No above, is it because of

		Response Percent	Response Count
Human or financial resources constraints		85.7%	6
Do not see the need for one		0.0%	0
Don't know		14.3%	1
answered question			7
skipped question			3

26. If you answered either, Yes, or No, but we have plans to implement one, which of the following have you implemented or do you intend to implement?

		Response Percent	Response Count
ISO 14001		14.3%	1
An Talsce Green Flag College		71.4%	5
Neither of the above (please supply details)		14.3%	1
Other (please specify)			1
answered question			7
skipped question			3

27. Do you have a dedicated person responsible for managing environmental matters?

	Response Percent	Response Count
Yea 	30.0%	3
No, but we have plans to appoint someone 	10.0%	1
No / don't know 	60.0%	6
answered question		10
skipped question		0

28. Please include any additional comments here

	Response Count
	1
answered question	1
skipped question	9

