The Environmental, Health and Safety Implications of the EU Emissions Trading Scheme (EU ETS) in Ireland.

by:

Mary Louise Martin B.A, H.DIP I.T

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Supervised by: Ossian Geraghty

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Abstract

The overall aim of this dissertation was to establish if the European Union Emissions Trading Scheme had been successful in reducing Carbon Dioxide emissions in Ireland since the scheme came into force on 1st January 2005. In addition, this study also identifies whether any notable benefits have being experienced in issues related to Environmental, Health and Safety management within Organisations who are obliged to participate in the scheme.

All participating companies in the scheme had to have a report submitted to the EPA in March 2006 detailing their progression since the scheme began. This information was submitted to the European Commission later in the year and the Commission published a report. The report detailed the success of emission reduction attempts in all EU participating companies. From this it could be seen that Ireland did not manage to reduce emissions as a whole, but that approximately half of participating companies did reduce emissions.

This study also examines how the scheme has been managed at installation level and whether formal Management Systems enhance the chances of reducing of emissions. The results indicate that those companies managing the scheme within some kind of management systems had overall better success in operating within their quota of allowances in Carbon Dioxide. The results also identified problems experienced by Companies and illustrated some dissatisfaction with the scheme.

Finally, this study sought to establish if there have been any additional EHS benefits observed by the Companies that are part of the scheme. Results illustrated a

variety of benefits for the environment and for Health and Safety, but showed that the scheme had little effect on Quality.

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Chapter 1. Introduction

The European Union Emissions Trading Scheme (EU ETS) is designed as a mechanism to reduce Carbon Dioxide emissions in the EU member states in order to meet the requirements set down by the Kyoto Protocol (to reach an 8% reduction in EU Greenhouse gas emissions in comparison to 1990 levels by 2012).

The scheme came into force in Ireland on the 1st January 2005. For those companies in Ireland that emit significant amounts of Carbon Dioxide (CO_2) every year, the scheme means that applications for a permit to emit CO_2 must be made to the competent authority for the scheme in Ireland (The Environmental Protection Agency (EPA)). If the application is successful, a permit is granted which is essentially a licence to emit a pre-determined amount of CO_2 (CO_2 Allowances). Companies can trade in these allowances if they emit more or less CO_2 than allocated. In order to prove compliance with EU ETS legislation (European Communities (Greenhouse Gas Emissions Trading) Regulations, 2004), all companies holding permits have to monitor their emissions and report emissions to the EPA every year.

The EU ETS is designed to have significant direct impact on the environment. It is intended that the scheme will prove to be a cost effective solution to atmospheric greenhouse gas pollution. The scheme initially focuses on CO_2 but will be expanded to include other gases in the future. Ireland will need to achieve significant reductions in industrial CO_2 emissions in order to meet targets set by the Kyoto Protocol. If the scheme is successful in Europe, then the EU should meet its Kyoto Protocol obligations and possibly inspire other nations to engage in a global scheme. If worldwide industry can operate in such a way as to limit Greenhouse gas emissions then it is hoped we can slow down Climate change and Global warming. However, it must be noted that there is much

political and scientific debate as how best to solve global warming and as to whether Anthropogenic greenhouse gas emissions are the causing factor.

Indirectly, the scheme may also have an impact on other Environmental, Health and Safety (EHS) issues. In managing compliance to the scheme, companies may find added EHS and Quality benefits. This study would like to determine if there have been any such benefits in companies in Ireland as well as establishing the success of the scheme in the first year of its

running(2005).

Chapter 2. Literature Review

There is currently a wealth of information surrounding Climate Change, the effect of anthropogenic activates on Global warming and solutions now being deployed to address the issue. In addition there is much information available specifically on the EU ETS and how it is implemented and what it hopes to achieve in a European and global context. It is not possible to review all of this material so I have selected key documents, books, journals, websites and legislation which I have read during my research in order to provide an informative Literature Review and set the scene for this study. This Literature Review explains the concerns existing in relation to Greenhouse gases, global warming and the economic and practical concerns of encouraging Europe's key polluters to reduce emissions. In addition, this chapter will set the scene for examining the first year of the EU ETS (2005) and whether it has succeeded in reducing emissions to date and whether there have been indirect EHS effects experienced by industry in their attempts to comply to EU ETS.

2.1 Global Warming and Climate Change

2.1.1 What is Global Warming?

Global warming is one of the most controversial scientific, social, economic and political issues facing the world in the 21st century. Scientists say that global warming and climate change are inextricably linked. As the Earth's surface heats up, the resulting direct impact will be a change in climate as we know it. In fact the IPCC (Intergovernmental Panel on Climate Change) believe our climate is already changing as a result of an average global warming of 0.6°C during the 20th Century (Maslin, 2004), Europe experienced an increase of 1°C and the Artic region saw an increase of 5°C (European Commission, 2005). The IPCC have reported that there is clear evidence that global temperatures could rise by 1.4°C to 5.8°C and that sea levels could rise by as much as 88 cm by the year 2100. Maslin (2004) states that as a result we can expect frequent extreme climate events, such as storms, floods, hurricanes and droughts.

The potentially devastating effects of global warming on human society are anticipated to include drastic changes in health, agriculture, economies, water resources and biodiversity. Maslin (2004) describes the possibility of Europe being subjected to extremely cold winters, severe rises in sea levels, an increase in infectious diseases and the extinction of many species. Events also suggested are Amazonian forest fires that would release vast amounts of Carbon Dioxide into the atmosphere and the release of methane reserves locked away in our oceans (The former and the latter would further accelerate

global warming as both Carbon Dioxide and methane are potent Greenhouse gases). There are those who argue that some of these impacts are already underway. Global warming has been linked to Hurricane Katrina that devastated New Orleans in 2005 and the expansive melting of the Greenland ice sheet. Melting Ice sheets not only affect the ecosystems in the poles but contribute to raising sea levels and possibly interfere with the Gulf Stream that protects Western Europe from drastic winters (UNFCCC and UNEP, 2002).

2.1.2 The Greenhouse effect

The temperature of the Earth is controlled by a balance between the input from energy of the sun and the loss of this back to space. Certain atmospheric gases are fundamental to this balance. These gases and are known as Greenhouse gases (Maslin, 2004). The key Greenhouse gases naturally present in the atmosphere are water vapour, Carbon Dioxide (CO_2), Methane (CH_4) and Nitrous Oxide (N_2O) and they act as a blanket or a greenhouse by trapping heat and slowing down its loss to space, thus keeping the Earth's surface warm.

Solar energy arrives to Earth in the form of short wavelength radiation. Some of this radiation is reflected back to space, but the majority is absorbed in the Earth's atmosphere, land and oceans. The Earth's surface then emits this energy as long wavelength radiation but this radiation is absorbed in the atmosphere by the Greenhouse gases, preventing all the energy or heat from radiating back out to space too quickly. Air currents, evaporation, cloud formation, rainfall and other weather activities in the atmosphere interact with the trapped energy and help it to make its way to upper levels of the atmosphere and eventually out to space. This slower process of energy loss is fortunate

for life on Earth. Without Greenhouse gases the Earth would loose its heat too quickly and be too cold to inhabit (some 30°C cooler)(UNFCCC and UNEP, 2002). Incoming solar radiation energy is balanced approximately by the outgoing terrestrial radiation. The IPPC (2001) state that "any factor that alters the radiation received from the sun or lost to space, or that alters the re-distribution of energy within the atmosphere and between the atmosphere, land, and ocean, can affect climate".

Anthropogenic activities are being blamed for disturbing the way in which the climate maintains the balance between incoming and outgoing energy. A doubling in the concentration of Greenhouse gases (which is projected to occur in the early part of the 21st century) would reduce the rate at which the atmosphere releases the energy emitted from the Earth's surface back out to space (UNFCCC and UNEP, 2002). The greater the increase in Greenhouse gases like Carbon Dioxide, the greater the accumulation of energy and heat that will exist in the atmosphere. In order for the Earth to maintain its energy balance something will have to give. Scientists argue that the Earth's climate will somehow have to adjust to get rid of the extra trapped energy and mankind will have to face the challenge of reducing Greenhouse gases emissions to the atmosphere.

2.1.3 Linking Global Warming to Climate Change

The relationship between global warming and climate change is complicated and is subject to controversy and disparity amongst scientists and palaeoclimatologists. The history of the planet and its climate shows that the Earth has experienced many changes in climate from warm periods to ice ages. Since there has been life on Earth, the fluctuations in global temperatures and weather patterns meant life either had to adapt or perish. In the

last 10,000 years climate changes have brought an end to many classical civilisations (Maslin, 2004). Scientists now believe that we are entering a new period of drastic climate change (UNFCCC, 2003). While some scientists endorse the theory that man has caused this, other scientists argue otherwise. Although they accept that global warming may cause some climatic changes, they believe that natural climate changes occur and we are most likely entering one now.

Climate changes occur as responses to external and/or internal forcing mechanisms. An internal forcing be for example, might be an increase in Greenhouse gases in the atmosphere. An external forcing might be a shift in the angle of the Earth on its axis as it orbits the sun, which can alter the distribution of solar energy to Earth (The Irish Independant, 2006). The "sunspot cycle" which causes a variation in energy output from the sun is another theory put forward to explain regional cooler periods on Earth. The "Little ice-age" that occurred in the 17th and 18th centuries caused a fall in Greenland temperatures and frozen winters in Northern Europe and is believed to have been a natural climatic change.

It is difficult to disentangle natural climate change from man-induced global warming. However, studies into past climate changes have revealed a link between rising temperatures and Carbon Dioxide atmospheric levels. Scientists can drill deep into ice cores in Antarctica and Greenland and extract samples of ice that have been compacted since the Ice ages. These ice samples contain trapped atmospheric air from that period from which scientists can determine the level of Carbon Dioxide present. Scientists can also determine the temperature of when the ice was formed. From these studies, it has been concluded that there was a distinct relationship between atmospheric carbon dioxide

and global temperatures in the past. The evidence supports the theory that as atmospheric Carbon dioxide levels increase, temperature is found to increase and vice versa (Maslin, 2004).

According to Professor James Zachos of the University of California Santa Cruz, the Earth experienced a cataclysmic climate change about 55 million years ago when global temperatures shot up by 5°C. The rise melted most of the ice caps and wiped out countless species of plants and animals. Zachos's scientific research revealed that over the 10,000 year period of that climate change, 4.5 trillion tonnes of Carbon Dioxide had entered the atmosphere. Zachos also predicts that if we continue on current trends, humans will release the same 4.5 million tonnes of Carbon Dioxide over the next 300 years (The Sunday Times, 2006).

While some scientists resist this evidence in the relation to current global warming, there is little scientific disagreement that global warming is happening. It is however, a more difficult issue to determine the exact climatic changes we can expect and how drastic they will be. The burning questions are: Is there a threshold we could reach in relation to Greenhouse gas levels that would bring such climatic changes that would be detrimental to life on Earth?, Is the damage done to date irreversible? How will humanity and other species cope with the changes?

2.1.4 Indications of current Global Warming

The three main indications of global warming are temperature, precipitation and sea level. The IPCC believe that the 1990s were the warmest decade since instrumental

records began in the 1860s (IPPC, 2001). Indirect observations such as the melting of ice sheets are also evidence of temperature increase. In relation to precipitation there has been an increase in precipitation over land in the northern hemisphere as well as an increase in the amount of rain falling in heavy rain events that occur in USA China and Russia (IPPC, 2001). However according to Maslin (2004) precipitation globally has decreased since 1980. Both Maslin (2004) and the IPPC (2001) believe that in regions where rainfall has increased it will continue to do so.

The IPCC has also put together information on sea levels that show that in general the global sea level has risen by about 4cm to 14cm in the last 100 years (Maslin, 2004). As ocean water heats it expands (known as Thermal Expansion) and this contributes to rising sea levels. The melting ice caps also contribute to increasing sea levels (IPPC, 2001). More recent research is claiming that sea levels are rising quicker than previously thought due to the speed in which Greenland's glaciers are melting and as a result, the current estimate of a rise in seas levels of up to 88cm by 2100 is grossly underestimated (The Irish Independent, 2006). It has been observed that there is a worrying thinning of the ice caps in both North and South Polar Regions. In 2000, a large hole, which can be seen from space has been identified in sea ice above the North Pole and measurements of Greenland reveal that it is shrinking by 200 cubic km every year (The Sunday Times, 2006).

Other indications of global warming include the thawing of permafrost in particularly cold regions. Permafrost exists in high altitude and high latitude areas where it is so cold that the ground freezes solid to great depths. In summer there is a slight thawing of the top meter or so of permafrost but in Alaska for example, thawing has recently begun

much deeper into the permafrost (Maslin, 2004). This is very problematic to local areas where the disappearing permafrost means the ground will is less stable, increasing the possibility of mud slides and avalanches.

Worrying weather patterns have already been experienced. Massive storms and floods have been experienced in Bangladesh, Europe (England 2000, Central Europe 2001) and the USA (Hurricane Katrina). Western Europe has seen stark increases in summer temperatures (Paris in 2003 claimed temperatures of up to 40°C and the UK had the hottest summer in 500 years) (Haines, Lester, 2004). Glaciers are retreating in the Alps (20% or alpine glaciers have disappeared since 1850) (The Sunday Times, 2006) and even Kilimanjaro in Africa is loosing its famous snow cover.

2.1.5 Future impact of climate change

Sophisticated computer models are being used to attempt to determine the kind of climatic changes we can expect as a result of global warming (Maslin, 2004). Despite this, there are huge uncertainties about the future in respect to both global and regional effects of climate change and what happens if our predicted impacts are exceeded and humanity cannot cope. The affect that climate change will have on nations will depend on the ability of our economies to adapt to the changes. Unfortunately this implies that poorer economies will struggle and suffer the most.

With rising sea levels, coastlines will either have to be protected or vulnerable land will be lost to the sea. Developed countries can build higher protective walls around property on the coast, but for developing countries and very small nations the threat of rising seas is more worrying. The Maldives could become uninhabitable (a one metre rise in the sea level there would engulf 75% of the island)(The Sunday Times, 2006). Flooding that is already common in Bangladesh will increase. Over half of the population in Bangladesh lives in a Delta region, an increase in sea levels will greatly upset the delicate balance between the monsoon floods, the Delta and how the people extract a livelihood from the region. The Nile region in Egypt would be similarly affected. Climate models suggest that there will be an increase in the strength of summer monsoons as a result of global warming over the next 100 years (Maslin, 2004). This is likely to have serious effects on the vast communities living in delta regions and monsoon areas.

It is also predicted that there will be an increase in the ferocity and frequency of storms. Europe may need to prepare for increasingly hotter summers too (intense summer temperatures have already caused increased mortality rates). Again developing countries will most likely suffer the most, they generally have little infrastructure, resources or access to medicines and technology to withstand adverse weather patterns and natural disasters.

Considered the most significant threat to humanity is the future availability of and access to fresh water. With growing populations there is already increasing stress on water supplies globally. Increases in temperature, sea level and precipitation will all affect fresh water supply. Surface water evaporation will be accelerated and rising sea levels could contaminate fresh water river systems and aquifers with saline water (Maslin, 2004). An

increase in the transmission of infectious diseases is also predicted. The mosquito that carries malaria will thrive in new areas that become warmer and moist enough to provide the perfect home for breeding, subsequently causing the spread of the disease to new regions.

In addition to the effects predicted for humans, Climate change is also predicted to affect many other species. The Polar bear is already in decline due to the ice sheets melting in the Artic and penguins and humpback whales populations in Antarctica are threatened. With an increase in ocean heat content marine life, coral reefs and mangroves would also be affected. Essentially any species or ecosystem than cannot migrate in response to climate change may face extinction. According to (Nature Publishing Group, 2006), there is new analysis suggesting that 15–37% of a sample of 1,103 land plants and animals would eventually become extinct as a result of climate changes expected by 2050.

There is an increasing body of observations giving a collective picture of a warming world, with new studies and improved analysis leading to a greater understanding of the issue. The finger is been pointed at humanity's role in bringing about these changes. By elevating the levels of Greenhouse gases in the atmosphere, mankind may have brought about the fastest warming up of the planet ever with climatic changes that are already taking place (Maslin, 2004).

2.2 The Carbon Dilemma

2.2.1 Carbon Dioxide as a Greenhouse Gas

In the opinion of the IPCC, "Emissions of CO_2 due to fossil fuels burning are virtually certain to be the dominant influence on the trends in atmospheric CO_2 concentration during the 21st Century" (IPPC, 2001. p. 13). CO_2 is the most important greenhouse gas released by human activities in terms of quantity and is emitted by the combustion of fossil fuels, wood or anything else containing carbon. It accounted for over four fifths of total greenhouse gas emissions from developed countries in 1995 (UNFCCC and UNEP, 2002). After fossil fuel combustion, deforestation is the second most significant contribution.

The second most important greenhouse gas is methane (CH_4). Releases of methane come from natural sources and human activities including rice cultivation, waste management and domesticated animals (cattle) (European Commission, 2005). Nitrous Oxide (N_2O) is the third key greenhouse gas. Sources include fertilisers and industrial chemical processes that include nitrogen (European Commission, 2005). According to UNFCCC and UNEP (2002), emissions of both these gases have stabilised and to some extent declined. The Global Warming potential (GWP) of both these gases is significantly greater than CO_2. Methane is thought to be 21 times more potent than CO_2 as a greenhouse gas and N_2O is approximately 310 times the potency of CO_2 (GWP is a measure of the cumulative warming over 100 years (EPA, 2004). Despite this, CO_2 is considered the most important gas of the three because of the quantity of the gas being emitted and is thus considered to be the most immediate threat.

A continuous record of atmospheric CO_2 concentration data from the Mauna Loa observatory in Hawaii is the strongest evidence currently for the vast build-up of this gas in the atmosphere. Recordings in Hawaii began in 1958 and show a steady annual increase in concentrations of the gas. This information has been used in conjunction with information gathered from samples of CO_2 locked in ice-cores (as discussed previously) and illustrates that there has been a steady increase in atmospheric CO_2 since the Industrial revolution. The industrial revolution was the birth of fossil fuel combustion on a large scale and there has been an increase in 160 billion tonnes of atmospheric CO_2 since the start of the Industrial revolution (Maslin, 2004).

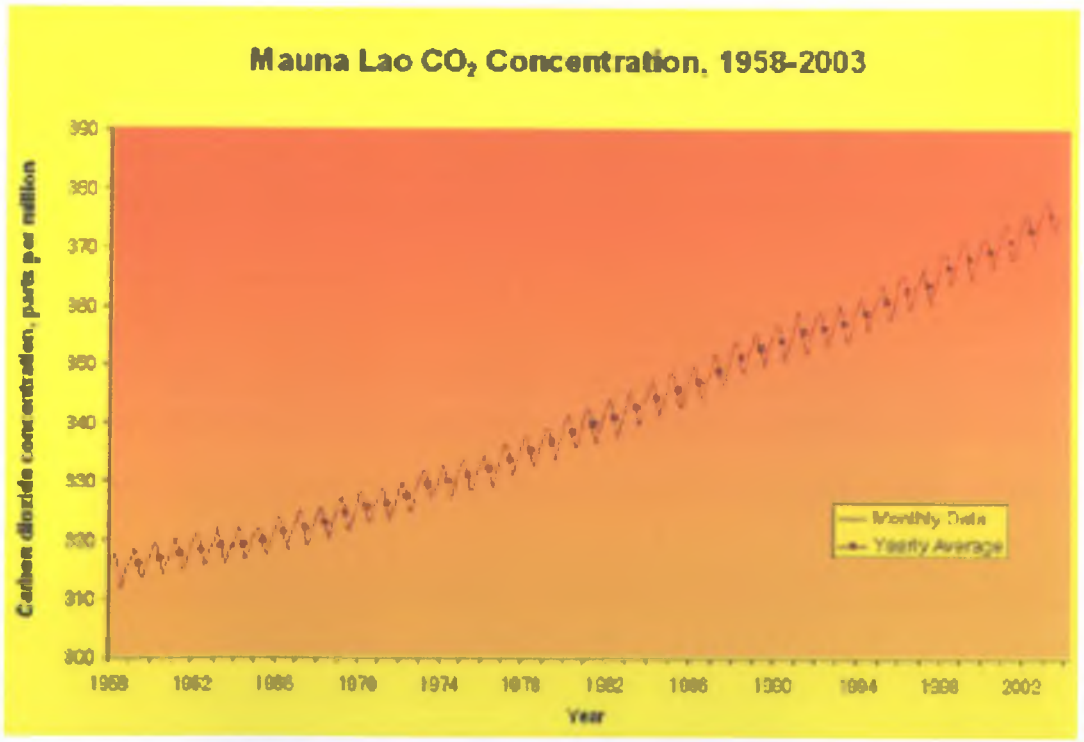


Figure 2.1 Recorded armospheric CO_2 Concentrations
Source: http://www.sierraclub.org/globalwarming/overview/overview4.asp

2.2.2 The Carbon cycle

One of the fundamental considerations in the global warming debate is the extent in which CO_2 influences temperature. To determine this, scientists need to establish how much anthropogenic CO_2 makes it into the atmosphere (Maslin, 2004). The increase in atmospheric CO_2 is only about half of the total CO_2 expected to exist in the atmosphere, as a result of fossil fuel combustion and forest burning which has occurred to date. Kimball (2006) explains that there is evidence that the missing CO_2 can be explained by the natural carbon cycle.

The Carbon cycle is thought of as "four main reservoirs of Carbon that are interconnected by pathways of exchange"(Wikipedia, 2006). The reservoirs are the atmosphere, terrestrial biosphere, oceans and sediments (fossil fuels)(Wikipedia, 2006). These act as both sources and sinks of Carbon. The Oceans and forests like the Amazon Rain forest are vast sinks of CO_2. Sources are anthropogenic activities such as burning fossil fuels that are rich in Carbon as well as animal respiration and the decay of organic matter.

Due to the exchanges in the cycle, Carbon from our CO_2 emissions is being absorbed by the oceans and by the terrestrial biomass where CO_2 is a vital part of the photosynthesis process in plants (Barry, Clinch and Convey, 2001). As the Carbon cycle is helping to protect us from global warming, there is concern about how long it will be able to continue to do so. The uptake and return of CO_2 may no longer be in balance (Kimball, 2006). There is evidence that the Carbon sinks are being saturated with the extra CO_2 they absorb from the atmosphere. The Sunday Times reported that there is a serious threat to

European shellfish as the acidity of European seas has risen. The rise in acidity is a result of increased levels of Carbonic Acid in Europe's seas and this is being attributed to the increased dissolved CO_2 present in the waters. Therefore due to increased levels of atmospheric CO_2, the chemical make-up of the oceans is being altered (The Sunday Times, 2006).

The ongoing vast removal of biomass is another problem in the natural Carbon Cycle. The cutting down of rainforests means that these natural sinks are been depleted so there is simply less vegetation to make use of the extra CO_2. A future solution being considered for global warming is to grow more forests to help absorb the emissions or to stimulate the oceans to take up more (Maslin, 2004). There is also the concept of Carbon Neutrality where an organisation or individuals can balance out their CO_2 emissions by planting vegetation. However the current solution that is being adopted in dealing with our increase in atmospheric CO_2 is the very difficult challenge of cutting anthropogenic emissions.

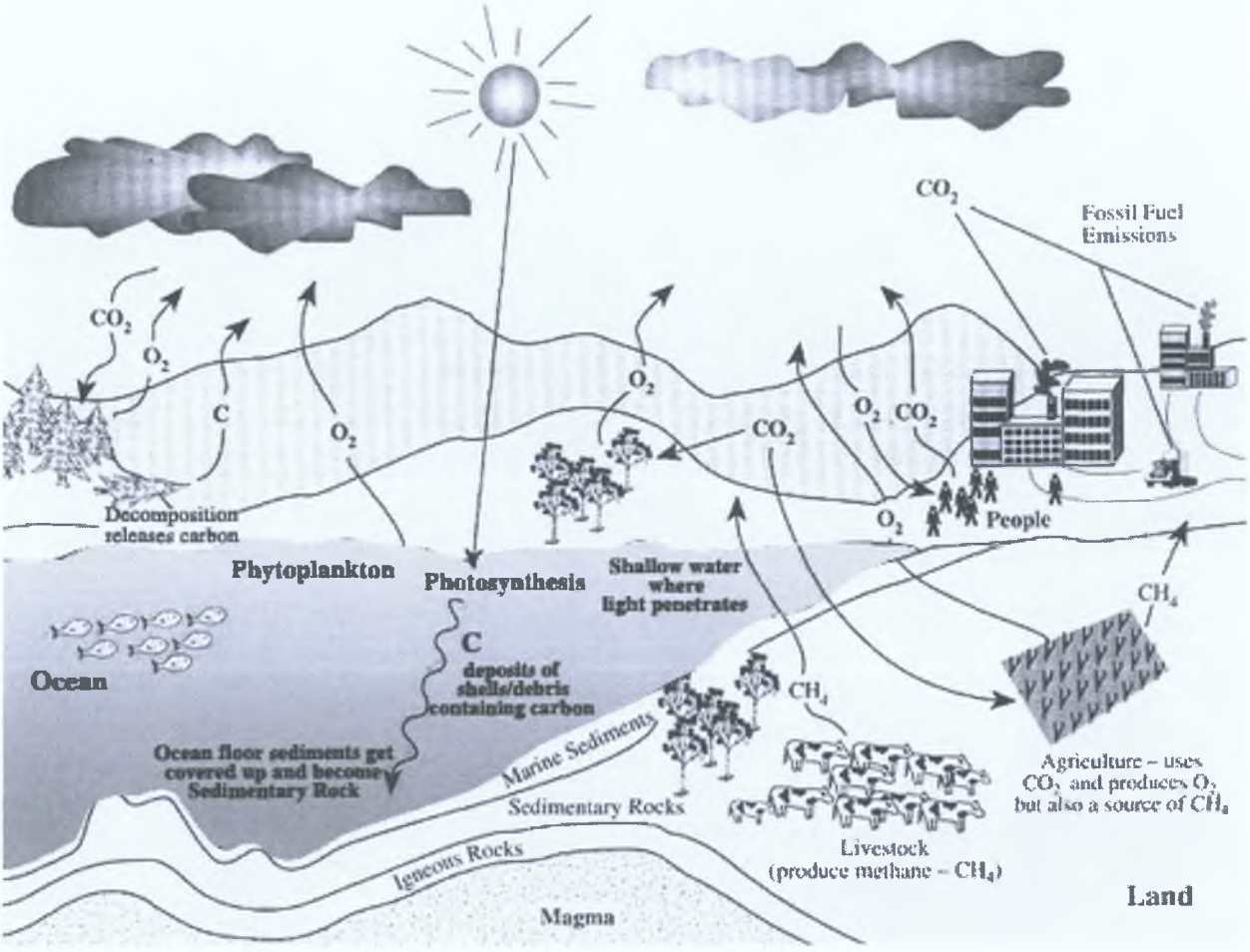


Figure 2.2 The Carbon Cycle
Source: www.bigelow.org/foodweb/carbon_cycle.jpg

2.3 Coping with interesting times

2.3.1 Politics

The concept of global warming and concern for rising levels in atmospheric CO_2, have attracted growing scientific attention since the 1950s (Maslin, 2004). In 1998, The United Nations set up the IPCC to address the issue. This organisation comprises of top experts in the global warming field and has the role of producing authoritative assessments of the state of knowledge on climate change (European Commission, 2005). Based on the IPPC's increasing certainty that climate change is occurring as a result of human emissions of CO_2, two agreements have come about, the 1992 UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol (1997)(European Commission, 2005). Both advocate that efforts must be made by the industrialised world to curb Greenhouse gas emissions because these nations are chiefly responsible for the enhanced greenhouse effect.

Currently world economies are emitting almost 7 billion tonnes of CO_2 into the atmosphere every year (Pearce, 2006). Scientists are arguing that up to 60% cuts are required in CO_2 emissions by 2050 to contain global warming (Pearce, 2006). Maslin points out that "this has major implications for the world economy, and how much cutting emissions costs compared with potential damage that climate change may cause is a hugely contentious issue." (Maslin, 2004. p. 118). Therefore Global warming requires serious consideration from leading world political leaders as well as scientists. The key issue is that the world's developed and developing economies rely heavily on burning

fossil fuels which is the primary source of GHG emissions. In the opinion of (UNEP, 1987) fossil fuels currently provide about 80% of world energy. The challenge for world leaders is how to reduce the burning of fossil fuels which is so desperately relied on to run economies. The first step towards this was the Rio Earth summit in 1992 where negotiations took place to try to establish a worldwide Leffler, 2005). The protocol is a worldwide treaty that sets legally binding specific targets and deadlines for approximately 40 developed nations in relation to their emissions (Pearce, 2006). Kyoto also recognises that the developing world has a role to play but did not impose targets on developing nations (Pearce, 2006).

The politics involved in addressing the global warming issue will be a major factor in determinig if mankind will be able to achieve a fix to the global warming problem. UNFCCC and UNEP (2002) explain that agreeing to share the responsibility of reducing emissions amongst 40 developed nations is a major challenge. Every country has different energy resources, energy consumption rates, population densities, political culture and economy growth rates. The USA emits approximately 20 metric tonnes of CO_2 per person per year, the EU emits 8 metric tonnes per person per year and China is emitting 2 metric tonnes person per year (Gilardin, 2006). UNFCCC and UNEP (2002) suggests that Western European emission levels have stabilised since 1990 (the base year used to measure emissions under the Kyoto Protocol) while developing nations have rising emissions. While big developing nations like China and India have low emissions per head of population at the moment, there is concern that this will steadily increase as they both have rapidly growing economies with increasingly larger demand for burning fossil fuels.

Relations between rich and poor nations are put under extra strain when addressing the problem. Countries with high standards of living are chiefly responsible for the rise in GHGs to date (UNFCCC and UNEP, 2002). Industrialised countries have created their wealth to a large degree from burning fossil fuels. Developing countries are following suit and are trying to build their economies from the same energy source. They now fear being told that they most curtail their fledgling economies and desire for a better standard of living in order to save the planet. By agreeing to cut back CO_2 emissions, poorer countries will be cutting back on the cheapest and most convenient source of energy and this would seriously affect their development (UNFCCC and UNEP, 2002).

Industrialised nations are also in dispute amongst each other on the issue. As discussed previously there is much scientific disagreement about the global warming problem. Some scientists argue the effects of climate change will be very serious and others believe there is insufficient proof of this. The uncertainty surrounding the issue has being widely used to imply that things might not get as bad as expected. This uncertainty and the cost of emissions reduction to an economy has led to hesitation on behalf of some political leaders to commit to emission reduction targets. Despite the fact that the USA is estimated to be responsible for roughly 24% of global CO_2 emissions, the USA have to date refrained from participating in any global agreements to limit CO_2 (Gilardin, 2006). The US government has declined to accept national emissions targets because of the risk this could pose to the US economy and has stated that cleaner technology is needed, not legal targets (Pearce, 2006). US President George Bush believes funding should go to clean technology research. Many disagree and believe that legal emission reduction targets will not cause economic damage but will encourage countries to invest in researching clean technology in order to meet targets (The Irish Times, 2005).

This difference in opinion was very evident in UN Climate Summit in Montreal in 2005. The objective in Montreal was to attain agreement from industrialised nations to enter into dialogue on the future of global emissions targets. The USA refused to be involved in the setting of any emissions targets for the future but agreed on the last day to "non-binding discussions" in the future (Gilardin, 2006). The American representatives were accused of trying to undermine the Kyoto protocol and isolating themselves from a process where ideas and solutions and being shared by both the EU and the G77 countries (Coalition of approximately 130 developing nations)(The Irish Times, 2005).

The long-term global solution to reducing emissions is to find an alternative energy source to fossil fuels. In order to achieve emission reduction targets, countries will have to research and develop renewable energy such as wind power, solar power, tidal and wave power. Energy efficiency also needs to be promoted with individuals doing their bit to conserve. Britain currently believes that nuclear power is their primary national solution but there are huge safety concerns (The Irish Times, 2005). Other solutions being considered are reforestation to increase the ability of the natural Carbon cycle to absorb atmospheric CO_2. The removal of CO_2 emissions during industrial processes is suggested but this is costly and that the storage of CO_2 has huge safety issues (Maslin, 2004).

The Kyoto protocol is the first legal mechanism to deal with the problem on a global level and will require those nations who ratified it to investigate and implement some or all the above solutions in order to meet Kyoto targets and to sustain emissions beyond the date of when Kyoto expires. The success or failure of the protocol will depend on the joint efforts of the entire global community.

2.3.2 The birth of The Kyoto Protocol

The UNFCCC (United Nations Framework Convention on Climate Change) has provided an international structure for actions to address climate change issues, with its ultimate objective being the stabilisation of atmospheric GHG concentration at levels that will not be dangerous. Since it entered into force, the UNFCCC has been ratified by 188 countries plus the EU, making it one of the most universally supported of all international environmental agreements (UNFCCC, 2005). The countries (or parties) meet annually at the Conference of Parties (COP) to discuss how best to tackle climate change.

The third of these meetings (COP 3) was held in Kyoto, Japan in December 1997. After over two years of intense negotiations by the parties, outlines for legally binding commitments to cut emissions were established. This decision to bind industrialised countries to cut emissions would require a separate formal ratification process to the Convention itself and thus governments would have to formally agree to the Kyoto Protocol before it could enter into force. Continuous COP meetings ironed out how the protocol would be implemented, and finally in 2001 it was agreed that at least 55 countries who had ratified the UNFCCC would have to sign the Kyoto agreement to bring it into force. This had to include enough industrialised nations to encompass 55% of global CO_2 emissions as measured in 1990 (UNFCCC, 2005). On the 16th February 2005 enough countries had ratified the protocol and it became legally binding (Skea and Sorrell, 1998). It was ratified by a total of 186 countries but with the notable exception of the USA and Australia.

The protocol sets legally binding targets for industrialised countries to reduce or limit their emissions of a basket of 6 Greenhouse gases (including methane, Nitrous Oxide and Carbon Dioxide) by 2012. It is supported by the IPCC on scientific, technical and methodological matters (UNFCCC, 2005). For 38 industrialised countries emissions quotas have been agreed under Article 3 of the protocol. This group of countries must achieve a reduction of at least 5% in net emissions in the period from 1990 to 2012 (1990 is the baseline year used for all emission reduction targets). Within this requirement of 5%, national targets ranged broadly: 6% for Japan, 0% for Russia, and the USA had they not opted out, would have been assigned 7% (Leffler, 2005). The EU-15 (15 older member states) has agreed to reduce emissions by 8% compared to 1990 levels. This overall target has been translated into specific legally binding targets for each member state. Ireland has a national reduction target of 13% above our 1990 emission levels. Achieving this target will mean Irish industry would have to run an estimated 24% below "business as usual", not an easy task in a country with a such a fast economic growth rate (The Department of the Environment, Heritage and Local Government, 2000). Most of the 10 countries that joined the EU in 2004 also have reduction targets of 6-8%. By the end of 2003, EU-25 emissions stood at 5.5% below 1990 levels and EU-15 averaged 2.95 lower than 1990 (European Commission, 2005).

2.3.3 Cost concerns

In the opinion of (Maslin, 2004) the costs associated with the implementation of the Kyoto Protocol may cause its failure. (Maslin, 2004) states that the implementation of Kyoto could cost the world 2% of its total GDP, roughly the same as is spent on worldwide military annually. If steps are taken to stabilise Carbon Dioxide emissions to

1990 levels worldwide, (Maslin, 2004) points out that this would cost $8.6 trillion dollars which is $1.6 trillion dollars greater than the GDP of the USA. The costs therefore associated are substantial. Arguments exist that say that this kind of money would be better spent on current human suffering relief where it would bring substantial benefits to the world's poorer nations (Maslin, 2004).

In Ireland, high economic growth over the last 15 years has resulted in a rapid growth in emissions (EPA, 2004). This has been attributed to the vast increase in vehicle ownership and usage as well as Industrial and Agricultural sources. Ireland is rated as one of the countries that is furthest from its national Kyoto target. Significant plans are required to reverse this but they will be costly to the Irish economy. The National Climate Change strategy (NCCS) is striving to ensure that Ireland will meet its Kyoto obligations and has to consider cost above all else in trying to achieve this (EPA, 2004).

However, it is suggested by (UNFCCC and UNEP, 2002) that the costs of climate change policies can be minimised. Boosting energy efficiency for example will not only lower emissions but lowers the cost in energy and fuel being consumed by industry. UNFCCC and UNEP (2002) are also of the opinion that it is better to pay now than pay later, when the damage of potential climate change will be far more costly both in terms of money and loss of life.

Since the protocol came into being, many private and state-run enterprises have invested in climate-friendly technologies and activities (UNFCCC, 2005). In addition, cuts in emissions have been achieved from some sources at relatively low costs and in some cases at no cost, where efficiency savings have outweighed the cost of implementing the

climate-friendly measures. Countries have also the opportunity to offset their emissions by increasing the amount of CO_2 removed from the atmosphere by reforestation or other increases in natural Carbon sinks. There have also been several mechanisms built into the protocol to facilitate a cost-effective implementation of the protocol for all parties concerned (UNFCCC, 2005). These "flexible mechanisms" include Emissions Trading, Joint Implementation (JI) and Clean Development Mechansim (CDM). These allow flexibility in reaching emission reduction targets by creating a tradable commodity: CO_2 emissions reduction credits (Leffler, 2005).

2.4 The Kyoto Mechanisms

2.4.1 Emissions trading, Joint Implementation and Clean Development Mechanism

The Kyoto protocol has three innovative mechanisms to aid in its implementation. Article 6 of the protocol allows for Joint Implementation (JI), Article 12 makes provision for Clean Development Mechanism (CDM) and Article 17 provides for Emissions trading (Barry, Clinch and Convey, 2001). These mechanisms allow parties to cut emissions and/or enhance carbon sinks by investing in projects abroad. As the cost of limiting emissions and expanding the removal of CO_2 varies greatly from country to country, parties can offset their own CO_2 emission targets by partaking in CO_2 reducing projects in other countries where the cost is cheaper to do so than at home. This is based on the principle that the atmosphere will respond the same to reductions in CO_2 regardless of where the reductions are being made (UNFCCC, 2005).

With JI, industrialised countries (those parties in Annex 1 of UNFCCC and Annex B of the Kyoto protocol) can implement projects that reduce emissions or remove carbon in other industrialised countries in return for ERUs (Emission Reduction Units). ERUs can then be used by the sponsoring country to help meet their national targets. The ERUs acquired reflect the saving in emissions that have been achieved by the project. Examples of JI projects are the investment into more energy efficient power plants or investment in forestry (The Department of Environment, Heritage and Local Government, 2000). It is expected that most of the JI projects will occur in Eastern Europe states where economies are in transition and are cheaper for Western European states to invest in (Leffler, 2005).

CDM is similar to JI, except investment is made by industrialised nations (UNFCCC Annex 1 parties) in developing nations (countries that are not part of UNFCCC Annex 1 or Kyoto). However, in addition to what JI accomplishes, CDM requires that some of the proceeds of CDM projects must be used to assist developing countries. A portion of funds earned from all CDM projects will help developing countries to meet the cost of adapting to the adverse affects of climate change (The Department of the Environment, Heritage and Local Government 2002). Again the industrialised countries can use CERs (Certified Emission Reductions) to contribute to their own compliance to Kyoto targets (Leffler, 2005).

Emissions Trading is a scheme whereby polluting entities such as companies are given an emission allowance i.e. a fixed amount of CO_2 that they are allowed to emit to atmosphere every year. The allocated allowances are consistent with the overall emission targets set by a country's government, which is based on that country's Kyoto obligations. These allowances are also referred to as "permits" or "quotas". A market in CO_2 credits is created where companies can purchase tonnes of CO_2 should they be unable to operate within their quota. The opportunity is also created for companies to sell their excess CO_2 allowances should they manage to operate under their quota. The basic idea is that the national quota of CO_2 credits is distributed amongst all polluting companies and they can then trade in the credits amongst themselves.

It has hoped that the opportunity to generate income from selling credits on the market will encourage companies to reduce their annual emissions and become greener. The cost of carbon credits will be based on demand and will fluctuate in value like any

other commodity on the market (The Department of the Environment, Heritage and Local Government, 2002).

2.4.2 Carbon as a commodity

The carbon market became possible when 38 major nations voluntarily adopted greenhouse gas emission reduction schedules at a UNFCCC conference in Kyoto, Japan, in December 1997. Emissions trading was then designed as one of the mechanisms to allow flexibility in achieving emissions reductions and was hoped to lower the costs for a broad range of participants, making it attractive for utilities, industries and individuals when considering options such as increasing efficiency, switching to renewable energy use, harvesting carbons, or conserving energy use in other ways. The basic approach in emissions trading is to fix the quantity of emissions and then to allow those who have quantities allocated to them to trade. From trading, a price then emerges which expresses the scarcity value of CO_2. The economic power of emissions trading stems from two basic principals:

- Different emitters will experience different costs when trying to reduce emissions. It will be cheaper for some industries than for others and those finding it cheaper will be able to sell their pollution rights to those companies having more difficulty.

- The price of Carbon will continuously signal that there is money to be made in reducing emissions by being able to sell credits on the carbon

market. This should act as an incentive for industry to innovate and reduce pollution

(Barry, Clinch and Convey, 2001).

In the opinion of Kakakhel, UNEP Executive Director (2004), emissions trading schemes allocate a price to the ecosystem services of earth's atmosphere. Essentially the right to pollute beyond permitted limits will now come with a price tag. The allocating of emission allowances had to be done in a manner that ensured that permitted emission levels would be significantly below "business as usual levels" in order to create scarcity. Scarcity is the basic prerequisite to creating a functioning market system for Carbon (Kakakhel, 2004). Some Analysts argue that allocations were overly generous initially in the European Scheme leading to prices of CO_2 being too low to have any affect (Kakakhel, 2004), but countries such as the UK have requested greater allowances (Watts, 2004). Getting the right balance is consistently difficult.

According to William Fry Solicitors (2005), larger companies will be better placed than smaller companies to utilise their holdings of CO_2 and fully engage in trading. It is also suggested that multi-national companies may have more options for trade and longer-term trading alliances. The decision by a company to trade and the success of the carbon market will also depend on the cost of CO_2 credits relative to pollution abatement technology, reduced production and the penalties for exceeding permitted emissions. Currently in the EU this penalty is €40 per tonne excess tonne of CO_2 emitted (EC (Emissions Trading) Regulations, 2004).

Significant market infrastructure is required in order for the trading system to operate (Sustainability Think Tank, 2006). Protocols are required to monitor, report and verify emissions, registers that record individual companies and their respective allowances need to be kept and there will need to be guidance on how to participate in trading. In addition to the affected industries, other players will exist within the market. Anyone can effectively get involved (Climate Change Projects Office, 2005). A company can set up a trading account even if it does not have an emissions cap with which it needs to comply. The company can then speculatively buy and sell carbon credits and provide services to other companies with a cap. Consultancies have been set up to advise participating companies. Auditors are required to examine the accuracy of monitoring and reporting emissions to ensure the validity of carbon credits. Lawyers and Accountants review the legal and financial implications. The overall cost of carbon is calculated in real time and will be inclusive of the activities of all the aforementioned (Sustainability Think Tank, 2006).

The introduction of the EU ETS (EU Emissions trading scheme) which began in January 2005 has created a market for the Carbon credit or EU allowance . The scheme also allows CDM and JI credits to be used for compliance in the first commitment period of Kyoto (2008 - 2012)(Climate Change projects office, 2005).

According to the Enterprise Ireland report "Fifth annual World Bank carbon market intelligence study" (Enterprise Ireland, 2006) trading in Carbon to date has been good and prices have risen substantially. Prices on the early trades carbon credits were between €7 and €9 euros in 2004, but had increased substantially to €17 in March and April 2005, to approximately €27 a tonne at the beginning of March 2006. In its first year

of 2005, the scheme transacted a total of 230 million tonnes of CO_2, worth about €4 billion. Enterprise Ireland predicts that increased activity on the carbon market is extremely likely in the coming years and that the worldwide market in CO_2 could be worth tens of billions of dollars (euros) in a few decades, as we belatedly wake up to the threat of global warming.

2.4.3 EU Emissions Trading Scheme (EU ETS)

The concept of emissions trading is not a new idea and although the EU scheme is the first international emissions trading scheme, similar schemes have operated in a domestic context in the USA, United Kingdom and Denmark in the past (Sustainability Think Tank, 2006). Using tradable rights as a means to achieving pollution control was first suggested in 1968 and the United States set up the first emissions trading schemes in the 1970's to contain air pollution such as particulates, sulphates or hydrocarbons at city, state and federal level (Kakakhel, 2004). The UK emissions trading scheme was the world's first economy-wide greenhouse gas emissions trading scheme. The scheme was launched in March 2002, and will run until December 2006. Thirty-three UK organisations voluntarily took on emission reduction targets to reduce their emissions by 3.96m tonnes of carbon dioxide equivalent (CO_{2e}) by the end of the Scheme (Defra, 2006). The 2005 results show that the scheme has actually achieved emissions reductions of over 7 million tonnes of CO_2e since the scheme began.

EU ETS commenced on 1st January 2005. There are two distinct phases to EU ETS, the first "pilot phase" runs from 2005-2007 and the second phase will run from

2008-2012 to coincide with the first Kyoto Commitment Period (Byrne O'Cleirigh, 2005). Further five-year periods are expected subsequently.

The scheme is currently being implemented in Europe by the **EU Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community** (Byrne O'Cleirigh, 2005). According to this Directive, the scheme will work on a "Cap and Trade" basis and each of the 25 EU Member State governments are required to set an total emission cap for the installations covered by the Scheme and agree these with the European Commission (International Emissions Trading Association, 2006). Article 4 of the above Directive states that;

> *"Member States shall ensure that, from 1 January 2005, no installation undertakes any activity listed in Annex I resulting in emissions specified in relation to that activity unless its operator holds a permit issued by a competent authority"*

(EU Directive 2003/87/EC).

Therefore Member states must ensure that each installation covered by the Scheme holds a greenhouse gas emissions trading permit (in effect, a licence to operate and to emit CO_2). Each permitted installation will receive an allocation of allowances. The number of allowances allocated to each installation will be based on the Member State's National Allocation Plan (NAP).

The NAP for each member state distinguishes between two sectors:

- The trading sector – estimated to be responsible for roughly 50% of a state's national CO_2 emissions and refers to energy and industrial sectors that must participate in the scheme.

- The non-trading sector – represents the rest of a state's national emissions and covers transport and domestic emissions, both of which are excluded from participating in the scheme

(Leffler, 2005).

Based on this structure, Member states can increase their emission allowances by investing in CDM and JI projects and by trying to reduce emissions in the non-trading sector (Leffler, 2005).

In the first pilot phase (2005-2007), the scheme covers an estimated 12,000 installations across Europe (International Emissions Trading Association, 2006). Member states must allocate allowances to installations by 28th February each year. As laid down in Article 12 of the EU directive (EU Directive 2003/87/EC), Member States must ensure that by 30th April each year at the latest, the operator of each installation surrenders a number of allowances equal to the total emissions produced by that installation during the preceding calendar year. Installations first surrendered allowances on the 30th April in 2006 equal to their emissions for the first year of the scheme, 2005. Surrendered allowances are cancelled. If an installation does not submit enough allowances to cover their emissions for the previous year, they will face a penalty of €40 per non-delivered

allowance (EU Directive 2003/87/EC). This fine will increase to €100 per tonne of CO_2 in the second Kyoto phase of the scheme (2008-2012). Installations will be required under Article 14 and 15 of the directive, to have their annual emissions verified and a report on this verification opinion must be submitted to their Competent Authority (The Environmental Protection Agency in Ireland) by the 31st of March each year (EU Directive 2003/87/EC).

In addition to the EU Directive 2003/87/EC, the EU's **"Linking Directive" (2004/101/EC)** amends the initial Emissions Trading Directive and effectively creates a link between the flexible Kyoto mechanisms (JI and CDM) and the EU ETS. This directive allows companies who take part in emission reducing projects outside of the EU, to convert the credits earned into allowances that can be used in complying to EU ETS.

2.5 Implementing EU ETS in Ireland

2.5.1 Enabling Legislation for ETS in Ireland

The legal instruments establishing ETS are implemented in Ireland by the **EC (Greenhouse Gas Emissions Trading) Regulations 2004** (William Fry Solicitors, 2005). Under these Regulations Irish installations are legally permitted to partake in the EU ETS in order to reach Ireland's Kyoto target to reduce CO_2 emissions to 13% above 1990 levels by 2012.

According to Regulation 4 of these regulations, no person is allowed to carry out any activity listed in Schedule 1 of the regulations without a Greenhouse Gas Emissions Permit. The activities or sectors listed in Schedule 1 are Cement, Glass, Bricks, Ceramics and Paper production. In addition mineral oil refineries and Energy activities (Power Generation) are included (EC (Emissions Trading) Regulations 2004). Regulation 5 and 6 provide for applications to the EPA for a permit and details what information needs to be provided by an operator of an installation and the conditions that are needed to be satisfied in order to be granted a permit. Regulation 8 allows for coordination of a permit with an existing IPPC (Integrated Pollution & Prevention Control) licence that an installation may already hold in relation to other environmental emissions that must be managed under the 1992 EPA Act and 1996 Waste Management Act.

Regulation 9 provides for a National Allocation Plan (NAP) that needs to be developed in order to set out the total quality of allowances to be allocated and how these are to be allocated in Ireland. A NAP must be drawn up for both periods of the scheme. These are laid down in Regulation 9 as the three year pilot period beginning on the 1st

January 2005 and the five year Kyoto period beginning on the 1st January 2008. Under sub-article 3 of this regulation, the EPA must publish draft NAPs for public comment and consider these comments in the final draft that was to be submitted to the EU Commission no later than 31st March 2004 for the pilot phase and 18 months before the beginning of the second Kyoto phase. Should the Commission require amendments to the submitted NAP, than this must be done.

Regulation 10 states that the EPA who is to be the enforcing Authority for the scheme in Ireland (given these powers by Regulation 18) must allocate 95% of allowances free of charge for the first phase. Regulation 11 states that the EPA shall decide what number of allowances will be given to each installation every year,

> *"the agency shall issue to greenhouse gas emissions permit holders a proportion of the total quantity of allowances for each year of each period referred to at sub-article 1 by 28th February of that year"*

(EC (Emissions Trading) Regulations 2004).

Regulation 12 and 13 allows for the transfer, surrender and cancellation of allowances. Allowances are transferable between persons within the EU Community and every operator must surrender a number of allowances (by the 30th April every year) equal to the amount of CO_2 emitted in the previous year, where 1 Allowance = 1 metric tonne of CO_2.

Regulation 14 and 15 state that emissions must be monitored reported and verified by all installations. Regulation 16 describes the penalties for non-compliance to the regulations (fines of €40 per tonne of CO_2 that an installation emits without allowances).

Regulation 19 provides for a registry to be maintained by the EPA in order to ensure the accurate accounting, transfer, holding and cancellation of allowances amongst installations. This registry can be kept in a consolidated manner with the registries of other member states. This regulation gives permissions to any person to own and trade allowances and the registry will be available to the public and shows records of allowances held and transferred.

The remaining regulations allow for irregularities and additional activities and gases to be added to the scheme from 2008 and for reports to be sent to the Commission from the EPA (EC (Emissions Trading) Regulations 2004). There are 5 schedules in total. In addition to Schedule 1 that lists the activities covered by the regulations, the other 4 schedules provide information on allocating, monitoring, reporting and verification of allowances.

These regulations were issued by the Minister for the Environment, Heritage and Local Government in July 2004 and gave effect in Ireland to the 2003/87/EC Directive establishing EU ETS. The procedures for managing Ireland's participation in EU ETS were now established and Ireland was to work towards the launch of the scheme in January 2005 by developing the NAP for allowance distribution and giving the EPA the powers to enforce the regulations.

2.5.2 Key Players in Ireland

The Key players for implementing EU ETS in Ireland can be summarised as the Government, the EPA, installations engaged in any of the activities listed in Schedule 1 of

the Regulations, Consultancy groups, EU ETS accredited Auditors and persons who do not have a greenhouse emissions permit but who are registered to buy and sell CO_2 allowances on the market. The Minister for the Environment, Heritage and Local Government's role is to decide on the total amount of allowances to be distributed amongst the trading sector (participating installations). This figure will be based on the historical number of emissions in previous years as well as projections for what is required to meet Ireland's target for emission reductions within the EU. The Minister will also give other directions to the EPA regarding new installations or entrants into the scheme (Macken, 2005).

The EPA are the enforcing body and have the following responsibilities:

- Design a methodology for the allocation of allowances to sectors and installations.
- Develop NAP according to requirements of the Regulations
- Submit an annual report to the EU Commission on the application of the Directive and regulations
- Provide guidance on issues relating to the scheme such as Monitoring and Reporting of emissions and how to apply for a permit.
- Allocate, cancel and manage distribution of allowances every year for all installations
- Set up and maintain a register of all installations and persons holding and transferring allowances

(EC (Emissions Trading) Regulations 2004).

In total, there are 109 installations operating in Ireland since 2005 with greenhouse gas emission permits and the EPA register for all those holding and trading in allowances is fully operational. Numerous consultancy groups are involved providing guidance and expertise to the Government, EPA and installations. One such consultancy is Byrne O'Cleirigh who are active consultants in the climate change field since the early 1990s. They have conducted climate change studies for the Irish government in the past as well as assisting companies with issues relating to operating within a carbon constraint economy and how to manage participation in the EU ETS (Byrne O'Cleirigh, 2005). An accredited verification scheme also provides for Auditors to carry out verification of installations' reporting of emissions, which ensures that accurate information in submitted to the EPA by installations every year.

2.5.3 The National Allocation Plan 1 of EU ETS – "Pilot Phase"

Under the EU Directive establishing a scheme for Emissions Trading, the 15 EU Member state Governments and the Accession States had to deliver 'National Allocation Plans' for the first pilot phase of the scheme to the European Commission in March 2004. Under the EC (Greenhouse Gas Emissions Trading) Regulations 2004 in Ireland, the EPA developed the National Allocation Methodology 2005-2007 which defines the basis on which allocations of greenhouse gas emission allowances to individual installations were to be made (EPA, 2004). Using this methodology, the EPA allocated a maximum 66,960,000 allowances (which equates to 66,960,000 tonnes of CO_2). These were allocated as follows:

Recipients	Allowances
Installations permitted before 31st Mar 2004	65,006,999
New Entrants Set Aside	1,004,400
CHP (Combined Heat and Power) Set Aside	446,400
Auction (To help fund Administration of the scheme)	502,201
Total	**66,960,000**

Table 2.1 Allowances allocated under Ireland's NAP 1 for pilot phase
Source: www.epa.ie

From the table above, it can be seen that from the total 66,960,000 allowances created for Ireland, some were set aside for Energy Generating Plants who engage in CHP technology, for newly established installations who need to enter the scheme and just over 500,000 allowances are retained by the Agency to be sold by Auction in order to assist with the costs of administering the scheme. The remaining 65,006,999 allowances were allocated free of charge to installations. The Agency allocated allowances based on a two-stage approach. Firstly an allocation was determined at the sector level and subsequently allocations were calculated for all of the installations within each sector. To determine how many allowances each permitted installation would receive, an historical baseline was calculated from the average of actual emissions in 2002 and 2003 except where this

equals less than 90% of the average emissions in the highest 3 years of 2000 to 2003. In this scenario, an average was calculated for the three years of 2000 to 2003 and this value is referred to as the "Relevant Emission" (EPA, 2004). New installations that were not yet in operation before 31st March 2004 or had only commenced operations in 2002 to 2003 were treated differently. From the "Relevant Emission" for each installation, a sector total of Relevant Emissions for all sectors was calculated. From these figures the NAP methodology uses the following calculation to determine the allocation of allowances for each installation:

$$AI = RE * SA / STRE$$

where:

AI – Allocation of Allowances

RE – Relevant Emission

SA – Sector Allowance (the annual average allocation to each sector)

STRE – Total RE for a sector

Once the "Allocation of Allowances" for each installation had been calculated it was divided into 3 equal parts to be issued in a permit to operators by the 28th February for each of the 3 years of the pilot phase of the scheme (EPA, 2004). Effectively Ireland had 19,236,747 allowances to distribute amongst the 109 installations for each year of the scheme. If an installation is no longer in operation its allowances are retained by the EPA and auctioned (EPA 2004).

The NAP for the pilot phase (NAP 1) underwent two rounds of public consultation before being approved by the Commission. The first public consultation was in February 2004 and second was in September 2004 and the NAP methodology resulting was

submitted to the Commission. With some minor revisions made by the Commission, that included a reduction of 180,000 allowances per annum, the NAP was approved in January 2005. The final allocation decision was made on the 8th March 2005 by the EPA board and participants and the Commission were notified as such (Macken, 2005). The first approximately 20 million allowances were distributed in late March 2005. Ireland at this point had and remains to have 109 installations with permits (William Fry Solicitors, 2005). NAP1 also provided for "New Entrants". The total allocation of 66.96 million allowances represents 97% of the average projected emissions for 3 year pilot phase (Byrne O'Cleirigh, 2005).

2.5.3 National Allocation Plan 2 – "First Commitment Period"

Currently a second NAP determining allowances for the first commitment period of EU ETS (2008 - 2012) is in development. Again a draft NAP2 was published for public consultation so the public could express their views. All submissions received were considered with a view to improving and finalising the plan before sending it on to the Commission by 30th June 2006. In designing the Draft Plan full recognition has been given to the increasingly important role of renewable energy in electricity generation (power generation accounts for two thirds of the available national allowances). In this regard, the EPA is proposing to continue the approach in NAP1 by setting aside dedicated emissions allowances designed to promote Combined Heat and Power (CHP) facilities in the power generation sector (EPA, 2006).

A National Allocation Advisory Group (NAAG) was appointed by Government to advise the EPA on how best to discharge its obligations in formulating the National

Allocation Plan. In addition the EPA had previously appointed *Indecon International Economic Consultants* and *ENVIROS Consulting* to assist it in determining the distribution of national greenhouse gas emissions for NAP1 (EPA, 2004). Their services were deployed again to update the previous report to cover the 2008-2012 period. Again 109 major industrial sites in Ireland fall within the emissions trading scheme including power generation, cement and general combustion (lime, glass and ceramics plants, oil refining and other large companies in areas such as food & drink or pharmaceuticals) (EPA, 2006).

When Directive 2004/101/EC (The Linking Directive) was transposed into Irish law by the European Communities (Greenhouse Gas Emissions Trading) (Amendment) Regulations 2005, S.I. 706 of 2005), further communication from the Commission was issued in December 2005 in relation to incorporating this change in legislation into NAP2 where NAP2 has to specify the maximum amount of allowances from the project mechanisms that may be used by operators (EPA, 2006).

Key Elements of the draft second National Allocation Plan are:

- the total allocation of allowances is to be 115.07 million for the second emissions trading period (2008 – 2012).
- Allocations at installation level will be issued annually and will be made on the basis of average historic emissions in 2003 and 2004 except where this is less than 90% of the average of the emissions in the four years of 2001-2004. In this case the average of the emissions in the four years of 2001-2004 will be applied.
- Over 94% of the these allowances will be allocated free of charge to existing installations

- The Minister for the Environment, Heritage and Local Government, following consultation with the EPA, will decide on the total amount of credits from the Kyoto Protocol flexible mechanisms, expressed as a percentage of the allocation to each installation, which can be used by operators in the scheme for the period 2008 – 2012. The amount specified shall not exceed 50% of the allocation to each installation.
- Approximately 5% of the available allowances will be held back by the EPA for issue to new entrants not in the scheme as existing installations on 30 June 2006, when the National Allocation Plan is notified to the European Commission
- 0.5% of allowances are to be kept by EPA to auction to cover costs
- Adjustment for increased use of renewables in electricity production (Combined Heat and Power (CHP) to receive special treatment)

(EPA, 2006).

According to (Byrne O'Cleirigh, 2005) who have issued a report also acted on this issue, emissions are expected to exceed Ireland's Kyoto target significantly over 2008 to 2012, (Byrne O'Cleirigh, 2005) state that it is estimated that the government will have to purchase 18.5 million allowances to help close the gap between projected emissions and Ireland's Kyoto target. In addition (Byrne O'Cleirigh, 2005) forecast that installation will need to purchase as much as 10.5 million allowances in order to operate over this 5 year period.

2.6 Monitoring and Reporting for EU ETS

2.6.1 Demonstrating Legal compliance

For all participating installations of EU ETS, monitoring, reporting and verification of emissions is mandatory under the 2003/87/EC Directive and the subsequent Irish Regulations implementing this directive. According to this legislation, Operator's must:

- Monitor emissions from their installation in accordance with the principals set out in Schedule 4 of the Regulations and the requirements of the "***EC decision establishing guidelines for monitoring and reporting of greenhouse gas emissions pursuant to the Directive 2003/87/EC of the European Parliament.***
- The Operator must report the emissions as specified in their permit no later than the 31st March every year and the report must be in accordance with Schedule 4 of the Regulations and the aforementioned EC guidance document.
- The report must be verified in accordance with Schedule 5 of the Regulations.

(Macken, 2005).

The first report of annual emissions (for January to December 2005) was submitted to the EPA in March 2006. In addition by April 2006, all installations had to surrender allowances equal to those reported in March or face the €40 fine per excess tonne of CO_2.

The process of monitoring and reporting emissions to the EPA is an expensive and time consuming process for many of the installations. This aspect of ETS participation may involve significant investment in specialised CO_2 measurement technology, as well as personnel time devoted to continuous monitoring, checking and conducting CO_2 calculations, as well as report compilation (William Fry Solicitors, 2005). In addition all CO_2 emissions and reporting data must be independently verified annually for the EPA. This involves effort and cost in terms of preparing for Audits and professional fees for the verifiers. Monitoring and reporting requires new skills and training of personnel and in the first year was difficult and unfamiliar to most installations.

2.6.2 The Monitoring and Reporting Proposal

According to the European Commission in their guidelines document for monitoring and reporting of emissions (2004), "the complete, transparent and accurate monitoring of greenhouse gas emissions requires decisions to be taken when determining appropriate monitoring methodologies." Effectively the methodology includes deciding between calculation and measurement of emissions and what tier to select. The different tiers allow installations to decide how specifically they will determine activity data, emission, oxidation and conversion factors when monitoring their emissions. The EPA must approve a detailed description of the monitoring methodology chosen by all installations before the start of the reporting period and again after any changes are made

by an Operator to their respective methodology. Operators therefore must submit a Monitoring and Reporting Proposal to the EPA. To assist Operators, the EPA developed a Monitoring & Reporting template proposal form with guidance notes on how to complete the form (EPA, 2006).

The proposal form begins with requesting the details of the installation's permit and the individual responsible for monitoring and reporting emissions in the installation. According to EPA guidelines, this individual is responsible for the accuracy of information going to the EPA. They need to be competent in their role and assist the EPA where necessary (EPA, 2004).

The second issue to be considered by the installation in their proposal is the Tier designation. For the pilot phase of the scheme, operators have to monitor and report emissions based on the tiers set out in Table 1 of the EC Guidelines for monitoring and reporting unless this is technically unfeasible (EPA, 2004). The different tiers allow for the determining of variables such as the activity data, emission factors and oxidation factors. These variables are used to calculate the amount of CO_2 that is emitted through activities such as fuel combustion and/or manufacturing processes in an installation. The increasing numbering of tiers in Table 1 of the EC guidelines, (starting from 1 to 4b) reflects increasing levels in accuracy for the variables. The highest tier is the most accurate and is preferred by the EPA.

Based on Table 1 of the Guidelines (EPA, 2004), Column A contains tier values for installations with total annual CO_2 emissions of less than or equal to 50 kilotonnes. Column B contains tier values for installations with total annual CO_2 emissions of more

than 50 kilotonnes and up to 500 kilotonnes. Finally Column C contains tier values for installations producing more than 500 kilotonnes of CO_2 per year. Operators are required to demonstrate the basis on which a tier was chosen. The highest tiers listed in the columns must be chosen by installations, unless the installation proves this is impossible or will lead to unreasonable costs. An Operator can change from one tier to another if they demonstrate to the EPA that this change will lead to more accurate monitoring and reporting results (European Commission, 2004).

Table 2.2 is taken from the EC guidelines for monitoring and reporting of emissions. It lays out the Tiers for each activity.

Column A: total annual emissions ≤ 50 ktonnes
Column B: 50 ktonnes < total annual emissions ≤ 500 ktonnes
Column C: total annual emissions > 500 ktonnes

	Activity data			Net calorific value			Emission factor			Composition data			Oxidation factor			Conversion factor		
Annex/Activity	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
II: Combustion																		
Combustion (gaseous, liquid)	2a/2b	3a/3b	4a/4b	2	2	3	2a/2b	2a/2b	3	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.
Combustion (solid)	1	2a/2b	3a/3b	2	3	3	2a/2b	3	3	n.a.	n.a.	n.a.	1	2	2	n.a.	n.a.	n.a.
Flares	2	3	3	n.a.	n.a.	n.a.	1	2	2	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.
Scrubbing																		
carbonate	1	1	1	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1	1
Gypsum	1	1	1	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1	1
III: Refineries																		
Mass balance	4	4	4	1	1	1	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Catalytic cracker regeneration	1	2	2	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1	1
Cokers	1	2	2	n.a.	n.a.	n.a.	1	2	2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Hydrogen production	1	2	2	n.a.	n.a.	n.a.	1	2	2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
IV: Coke ovens																		
Mass balance	3	3	3	1	1	1	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Table 2.2: Table 1 of EC Monitoring and Reporting Guidelines.

	Activity data			Net calorific value			Emission factor			Composition data			Oxidation factor			Conversion factor		
Annex/Activity	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Fuel as process input	2	2	3	2	2	3	1	2	2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
V: MO roasting and sintering																		
Mass balance	2	2	3	1	1	1	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Carbonate input	1	1	2	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1	1
VI: Iron and steel																		
Mass balance	2	2	3	1	1	1	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Fuel as process input	2	2	3	2	2	3	1	2	2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
VII: Cement																		
Carbonates	1	2	2	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1	1
Clinker output	1	2a/2b	2a/2b	n.a.	n.a.	n.a.	1	2	2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1	1
CKD	1	2	2	n.a.	n.a.	n.a.	1	2	2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1	1
VIII: Lime																		
Carbonates	1	1	2	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1	1
Alkali oxide	1	1	2	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1	1
IX: Glass																		
Carbonates	1	2	2	n.a.	n.a.	n.a.	1	1	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1	1

Once a tier is decided, the Operator must list in their proposal form all fuels and materials that give rise to CO_2 emissions. The fuel type is given a unique code to identify this fuel throughout the monitoring and reporting period. Operators then need to choose either Calculation or Measurement as a method to determine emissions. Calculation is the preferred method, where Operators can determine their total annual CO_2 emissions by calculating how much fuel they consume through combustion, what the carbon content of the fuel is and how much carbon may not be oxidised to CO_2 during the combustion reaction. Installations may also need to calculate how much process CO_2 is produced through chemical reactions in their manufacturing processes. This can be calculated by working out the carbon content in the raw materials being used and how much of the raw material is used per year. The EC guidelines provide the mathematical formulas for the calculations (European Commission, 2004). The following formula is most commonly used:

CO_2 emissions = Activity data * Emission Factor * Oxidation factor

where:

Activity data is the amount and type of fuel used.

Emission factor is the amount of CO_2 that the fuel will emit when combusted.

Oxidation factor allows for any carbon in the fuel that was not oxidised in the combustion reaction (EPA, 2004).

The Measurement method can also be used, where air emissions can be tested to determine how much CO_2 exists in the air stream. However it is more difficult to gain accurate figures using the Measurement methodology and if an installation chooses to measure emissions, they need to support the findings by calculating the emissions also.

The Proposal form also requests information from those installations that use the calculation methodology, on the metering devices that are required to measure fuel and material usage that lead to Carbon emissions. Examples of metering devices are gas mains meters, weigh bridges (used to weigh solid fuel or limestone deliveries to a site) or tank meters. A description of the type, range, measuring units and level of accuracy of the meter must be also provided in the form (EPA, 2004).

The form also requires a list of the sources ("Emission point reference") in the installation where the emissions arise, and the fuel or material causing the emissions, for example a boiler stack where gas is the fuel or a rotary kiln where coal is the fuel (EPA, 2004).

The final sections to be completed by the Operator in the proposal form are related to management and quality assurance. It requires detail on the Quality and Environmental Management Systems used within the organisation and whether monitoring of CO_2 emissions is carried out as part of these systems. Information required here includes details on the procedures used within the organisation to identify emissions, information on relevant roles and responsibilities, data management and corrective and preventative actions taken to ensure a high standard of monitoring and reporting. The organisation is also asked whether they are formally certified to any Management Systems and whether they have integrated the monitoring and reporting of greenhouse gas emissions into their Management Systems (EPA, 2003).

2.6.3 Annual Installation Emissions Report

As discussed previously every installation is required to submit a report (Verified Annual Installation Emissions Report (AIER)) to the Agency by no later than 31st March each year, detailing their emissions of the previous calendar year. Again the EPA provides a report template and recommends that Installations use this for their reports. Installations are advised to complete the form using the EPA guidance document (AIER Guidance notes) and have it verified by their accredited Verifier (EPA, 2006).

There are four parts to the report (Please see Appendix III), parts A through to D. Part A requires data identifying the installation itself. Part B requires detailed information on all fuel types used, and how emissions resulting from the combustion of each fuel were calculated, including the specific parameters used for the calculations (activity data, emissions factor etc.). Part C is similar to B but is requesting information on the process emissions of an installation. The material types are requested and again the parameters used for calculated CO_2 emissions are to be detailed. Part D as suggested in the diagram leaves room for the Operator to give details of a mass balance approach to calculating emissions (EPA, 2003).

By examining the level of information required in both the Proposal and AIER forms, it can be seen that there is a significant amount of detail required to complete the forms. To succeed in achieving precise and effective monitoring and reporting of emissions, all installations need competent personnel with sufficient time to provide the level of detail and accuracy required and support from the EPA. Accurate and consistent

monitoring and reporting of emissions is fundamental for the operation and success of the trading scheme (European Commission, 2004).

2.7 Critical factors for the success of EU ETS

2.7.1 Issues concerning National Allocation Plans

According to Kakakhel (2004), at least three requirements are essential in order to ensure an "economically effective and environmentally integrated emissions trading scheme". These are:

- A strong and consistent national and international policy framework
- An effective monitoring and compliance mechanisms
- Absolute emission reduction targets.

Kakakhel re-iterates that the size of the cap that is fixed before implementing the trading scheme is vital to the success of the scheme. He endorses that allocations of allowances must aim primarily at reducing emissions significantly below "business as usual" levels in order to cause scarcity and encourage trade.

However, there are concerns in Europe that allocations for the initial phase of EU ETS have been too generous to be effective and there has been much wrangling between member states and the Commission. Some countries were very late submitting NAPs and some national carbon credit registries were not up and running until the middle of 2005. Countries such as Italy, Greece, the UK and Poland were late submitting their NAPs and were therefore unable to begin trading when the scheme was launched in January 2005 (Pearse, 2006). The UK after finalising their NAP, went back to the Commission in late 2004 and requested more allowances. When rejected the UK went to the Court of First

Instance in Europe and won the right to less strict allocations despite concerns in the British government as to whether the UK will meet their 2012 Kyoto targets (International Emissions Trading Association, 2006).

Many governments have been accused by analysts of destroying the scheme in its early days by giving over generous allocations, which could force prices down and not encourage industries to become greener. A lack of stringent rules governing allocations for the pilot phase, there has been opportunity for governments to over allocate allowances to industries to protect them in the market place (Pearse, 2006). Some member states also feel they have been allocated too strict allocations in comparison to others states which will put their industries at a competitive disadvantage (International Emissions Trading Association, 2006).

The basing of allowances on an installations' past performance has meant that the allowances allocated should not have been too much under "business as usual" emissions. However if the scheme is to be effective in what it sets out to achieve, stricter allocations will be required. The second phase in 2008 will require far stricter allocations and is anticipated to cause further allocation disputes in Europe.

2.7.2 Effectiveness of EU ETS without the non- trading sector

The burden of carbon abatement is currently focused on only the trading sector of member states. It is not shared fairly amongst all greenhouse gas producing activities or the non-trading sector. Domestic, transport and agricultural emissions are not included in the scheme despite accounting for about half of all Carbon emitted in the EU. Leffler

(2005) claims that all sectors would need to be participating in the scheme, in order to achieve overall enough emission reductions.

One of the key negotiations in relation to EU ETS currently underway in Europe is how to introduce the Aviation sector into EU ETS. Air travel is likely to be the first non-trading sector to be introduced to the scheme. The Aviation sector, in particular frequent low-cost flights and long haul flights have come under increased scrutiny as burning jet fuel high in the atmosphere has meant that air travel now contributes approximately to 12% of all Greenhouse gases being emitted to the atmosphere (The Irish Times, 2006). It is estimated that an average 600 mile flight produces up to 0.1 tonnes of CO_2 per passenger.

The EU had hoped initially to introduce the aviation sector to the scheme by 2008 for the second phase but 2013 looks likely (The Ends Report, 2005). There have been many issues on how to include the industry, for example whether fuel providers, airports or the airlines are responsible for the emissions. There is concern on how introducing Aviation into the market will affect the price of Carbon. In addition the Commission needs to decide whether all fights that leave EU airports will be included or if just those travelling between EU airports are to be affected. Critical design issues are due to be ironed out and set in a report in the Commission by June 2006. Most Airlines are concerned about the extra costs incurred by their introduction to the scheme but have stated that the cost will be passed onto the passenger and the Commission have stated that an increase in ticket prices should be minimal if Carbon remains at a price of between €10 to €30 per tonne (The Irish Times, 2006).

No approaches have yet been made to introduce vehicles or domestic homes into the scheme. This will be a very difficult task and may take some time to be addressed. Other methods of reducing emissions in these sectors may need to be deployed such as Carbon taxing or changes to less polluting fuel types (International Emissions Trading Association 2006).

2.7.3 The effect of EU ETS on business and the EU economy

Studies have been carried out by the Commission to assess what the costs of complying with the Kyoto protocol will be. One of the studies revealed that without the EU ETS the cost of compliance would be in the region of €6.8 billion. However the implementation of the scheme is estimated to reduce this figure to between €2.9 and €3.7 billion. This represents less than 0.1% of the GDP of the 15 initial member states of the EU (Kakakhel, 2004). Leffler, (2005) argues that for this reason the scheme protects the EU economy rather than jeopardises it.

Whether or not EU ETS will have potential negative impacts on business has been discussed at length. It is accepted that some sectors will adapt easier than others. The size of an installation's allowance deficit, the size of the company, whether the company is multi-national and the price of Carbon will all affect how each installation individually copes with complying with the scheme. Companies will have been allocated just short of historic levels for the pilot phase. However if a company wishes to expand, the costs of extra allowances will have to be considered. Larger companies will be able to afford consultants and brokers in their trading activities and may have more experience with the

open markets and those companies with sites abroad may find it easier to engage in CDM or JI projects as well as trading. Central to any company's decision to trade in Carbon will be the cost of the allowances especially in comparison to pollution abatement and clean technologies (William Fry Solicitors, 2005). Energy intensive industries and those with significant process emissions will experience increased costs initially and there are concerns that these companies might consider it easier and cheaper to leave the EU and relocate where they are not affected by the scheme. In addition, companies that sell their products or services in the global market may find it difficult to compete on equal terms with those companies not in the EU. European industries may have to attach the costs of complying to the scheme to their products, making them more expensive than competitors not engaging in carbon reductions. For this reason, Companies may not be able to pass the cost onto the customer (Leffler, 2005).

However there is income to be gained by those who succeed in reducing their emissions and selling their allowances. Some companies may engage in extra trading adjunct to their core businesses (William Fry Solicitors, 2005). There is also new market potential for suppliers of green and clean technologies.

2.7.4 The future of EU ETS and the global carbon market

While the EU ETS has had a relatively successful start there is much discussion as to whether it has a secure future. There is still political debate in relation to allowances for the commitment phase of the scheme, and there is little clarity on what will happen to the scheme post 2012. Companies are therefore wary of making long-term commitments in expansion or investments in new technology (International Emissions Trading

Association, 2006). There is also much political dispute in relation to whether the scheme will succeed in helping Europe to meet its Kyoto targets. To date there are concerns in Ireland and the UK for example as to whether their national targets can be met by 2012 (The Irish Times, 2006).

Leffler (2005) states that the scheme is a good attempt at starting the drive to get the energy intensive industrial sectors to begin managing their operations in a low carbon economy. It is predicted that the trading scheme will extend beyond European borders when in the second phase (Pearse, 2006). It is also hoped that if the scheme becomes global, the US and other countries who have not ratified the Kyoto Protocol may become involved. There are already cap and trade schemes for emissions trading in numerous states in the US. These could serve as a foundation for a domestic US market and participation in an international scheme. Many American companies are already seeing great earning potential for inclusion in the scheme (Kakakhel, 2004). In future developing countries with growing greenhouse emissions will also be urged to take measures to tackle their emissions, and their decision to engage in emissions trading will also determine the future of EU ETS and a global emissions trading scheme beyond 2012 (Kakakhel, 2004).

Chapter 3. Methodology

3.1 Focus of Questionnaire

While there is a lot of information available on the background, organisation and launch of EU ETS and its implementation at a national level, there is little information available as yet as to how industry is managing participation in the scheme. The first Annual Reports (AIER) were submitted to the EPA a few months prior to writing this study, and information on whether CO_2 emissions have been reduced nationally became available from the EPA in the summer of 2006. However in addition to this information, this study sought to determine whether installations had struggled with the extra costs and other difficulties in an attempt to reduce emissions in the first year of the scheme (2005). While monitoring and reporting is extremely important for the success of the scheme there is little information as yet on how this is being carried out at installation level. The objective of this study was to identify how companies were monitoring and reporting emissions, as well as determining if management of the scheme had led to any other EHS implications at installation level. These issues were the key focus of a questionnaire which was sent to the individual responsible for managing EU ETS compliance in each installation.

There are 109 registered installations that all need to comply with EU ETS. It was not difficult to identify these companies as the EPA have published the name and addresses of all installations with Greenhouse Gas Permits for 2005 on their website. As there were only 109 installations in Ireland, it was decided that the questionnaire should be sent to all participating installations. It was hoped that the responses received would be enough to give a valid picture on how installations are managing and benefiting from the scheme.

3.2 Questionnaire Design

When drawing up the questionnaire it was hoped that the questions asked would reveal trends in information that has not been previously investigated. It was decided to avoid any direct questions in relation to the amount of Carbon allowances received by installations or whether installations had succeeded in reducing emissions in to date. This was based on the advice of Dr. Maria Martin of the EPA who advised that companies would be very protective about this type of data. This information was also to be made public by the EPA in mid 2006. Therefore, the questions asked required generic answers and related to management issues of EU ETS as opposed to an installation's individual performance in the scheme.

All the questions asked had tick box answers. This made the information easy to collect and quantify. It also made the questionnaire user friendly and quick to complete. The majority of questions asked gave the respondent a choice of '*Yes/No*' answers with a number of these questions having a '*Don't know*' or '*Other,Please specify*' option. The '*Other, Please specify*' option gave the respondent an opportunity to elaborate further. A small selection of questions gave the respondent a different range of terms to use such as '*Extensively*', '*Somewha't*, '*Not at all*', '*Don't know*'. Some questions also gave the respondent options using terminology that were specific to the question asked.

Opinion questions were avoided at the beginning of the questionnaire in order to gather some facts about the issue. While opinion questions are more difficult analyse and

collate, it was necessary to include some opinion type questions in order to gain information regarding the benefits and/or negatives experienced by Operators, in relation to complying with EU ETS. Opinion type questions were also asked to gain an insight into whether EU ETS is perceived positively or negatively by those who have to manage it at installation level. The final question (Question 14) was made up of numerous parts requesting the respondent's opinion.

Question 14 requested the Operator's opinion on the whether EU ETS had influenced the management of other issues on their site. The Question was subdivided into three parts, *Environmental Implications, Health and Safety Implications and Quality Implications* with each part containing questions on that area. This helped to keep the questions ordered and easy for the respondent to answer. Some questions in this section slightly overlapped with factual questions asked earlier in the questionnaire. This helped to evaluate if the opinion of the Operator given in the final question corresponded with the factual answer given earlier. These questions were of particular interest and it was important to have a reliable answer.

The questionnaire finished with a *Comments* section so the Operator could volunteer any other information they wished to present in relation to the issues raised in the questionnaire.

3.3 EU ETS Questionnaire, Questions asked and why?

In total the questionnaire consisted of 14 questions and Question 14 had a selection of questions within it. The Questions asked are listed below with an explanation as to why they were asked.

1. Does your Organisation have an EMS, SMS, QMS? If Yes, are you certified to a formal system?

This question was asked to identify trends in how management of all EHS issues are conducted in Installations participating in the scheme. The question had a simple Yes/No answer. The question also aimed to identify how many installations are certified to Management System standards.

2. Does your Organisation have an integrated Management System for Environmental, Safety and Quality?

This question sought to determine if installations integrated their Management Systems. The question again had a *Yes/No* answer. If answered '*Yes*', the respondent was asked to elaborate further on which Management Systems were integrated.

3. In your installation what are the sources of CO_2 emissions?

This question served to identify where Carbon emissions arise within installations. The respondent could choose more than one answer from the options of '*Combustion of fuel*', '*Process emissions*' or '*Other*'.

4. In accordance with the EU guidelines for monitoring and reporting on CO_2 emissions how does your organisation monitor and report its CO_2 emissions?

This question was posed to determine trends in how installations decided to monitor their Carbon emissions, either through '*Calculation*' or '*Measurement*'.

5. Is monitoring and reporting of CO_2 integrated into your organisation's Management Systems?

This question identified whether the monitoring of CO_2 emissions is incorporated into companies EHS Management Systems. This sough to determine if whether installations were taking a systematic proactive approach to managing compliance to EU ETS.

6. Is the measurement or calculation methodologies used by your organisation using standards such as ISO, CEN?

This question was posed to gain data on how many Operators are monitoring emissions to with certified systems. Calculation or measurement methodologies and

equipment should be certified to quality standards. This question recognized trends in how thorough and accurately installations are monitoring their emissions of CO_2.

7. Is there a CO_2 emission reduction programme currently in place in your Organisation?

This question was aimed at determining the long-term future plans of installations to reduce CO_2 emissions and if installations were making plans for operating in a future low carbon environment.

8. From the organisation's EMS and/or QMS or equivalent, has there been a noticeable increase in the efficiency of fuel consumption in order to comply with emission allowances for CO_2 that your installation was allocated for 2005?

This question was posed to assess whether installations have reduced their use of fossil fuel as a measure to cut down on CO_2 emissions. This question might also indirectly indicate whether installations were succeeding in cutting emissions. In addition, one of the key indirect environmental benefits of EU ETS maybe the combustion of less fossil fuels and therefore better conservation of natural resources.

9. In your opinion, has complying with the EU ETS been costly to your Organisation?

This questions attempts to establish a trend in how costly installations have found complying with the scheme.

10. In order to comply has any technology/equipment had to be purchased?

This question was attempted to identify where costs might have been incurred when attempting to comply with the scheme. This question would also show trends in whether Irish installations saw the scheme as a long-term consideration and were investing in cleaner technology to aid future compliance.

11. Has the Organisation had to, or is it anticipated that the organisation will have to purchase Carbon Credits, in order to fulfil its obligations under EU ETS?

Again, this question was posed to identify where costs might have been incurred by the scheme on installations. In addition it would also indirectly reveal whether an installation had operated in 2005 in excess of the allowances they were allocated.

12. Did the Organisation sell, or is it anticipated that the organisation will be in a position to sell any Carbon Credits in the future?

The objective of this question was to illustrate whether an installation had reduced emissions and in fact benefited financially from the scheme. The question would show trends in how many installations were selling allowances and making money by participating in the scheme.

13. Have there been savings made as a result of purchasing less fuel and/or having strict controls on how fuel on-site is being stored and used?

This question was designed to indicate whether cutbacks in emissions have affected how fossil fuels are managed on site. For the monitoring and reporting of emissions, installations should be knowledgeable on exactly how much fuel is coming on site in order to calculate the CO_2 emissions that will result from its combustion. Strict purchase, handling and consumption are important in order to ensure accurate calculations. Answers to this questions would not only show that an installation had made savings by purchasing less fuel but it could also be concluded that fuel is being managed and consumed efficiently.

14. In addition to reducing CO_2 emissions, it has been suggested that compliance with the scheme may result in other Environmental, Health and Safety or Quality implications been experienced by organisations. In your opinion, has your organisation experienced any of the benefits listed below as a result of its inclusion in the EU ETS?

- A reduction in Energy consumption?

- Less consumption of natural resources?

- Easier to comply with other legislative requirements and licenses?

- A reduction in the amount of waste produced?

- Improved employee awareness on the issues of CO_2 pollution and global warming?

- Managing the scheme is allowing for continuous improvement in other aspects of Environmental management in your Organisation?

- Increased understanding amongst employees of the manufacturing process, in relation to where sources of pollution and waste arises throughout the process, and how to mitigate these?

- Increased efficiency in the manufacturing process as a result of complying with the scheme?
- Have the effects on productivity been positive or negative?
- Quality of the end product enhanced due to the tighter controls on the manufacturing process in order to meet emission targets?

- Better housekeeping on site as a result of strict storage and handling of fuel (or other substances being monitored for complying to scheme) since the scheme was introduced?
- The introduction of new Operating procedures and/ or modifications to current Operating procedures in order to reduce CO_2 emissions has led to a safer working environment?
- Any other Health and Safety improvements?

Question 14 is a collection of questions that request the respondents' opinion on some indirect benefits that may have been experienced by installations since the scheme began. The benefits are environmental, health and safety and quality related. Previous questions in the questionnaire would have established whether many installations manage their EHS and Quality affairs under certified Management Systems or in an integrated Management System.

This question hopes to establish whether changes made by installations to their respective EHS and Quality procedures, in order to achieve reductions in emissions, has led to other benefits in all three of these areas. This is of key interest to this study and it was hoped that the information resulting from these questions would reveal if the scheme has had positive, negative or no implications for EHS and quality aspects in the participating companies.

In addition it was intended that the questions would give an insight into how the respondent feels about the impact the scheme has had on their installation. A majority of '*Yes*' answers would indicate that the respondent felt positive about the scheme, '*No*' and '*Don't Know*' answers would suggest indifference or negativity about the scheme.

3.4 Conducting the Questionnaire

Conducting the Questionnaire was relatively straight forward. All names and addresses of the 109 participating companies were listed on the EPA website. When checking the addresses of the participating companies, it appeared that some companies held more than one permit, as they owned and operated more than one site emitting CO_2. For each such company, it was not clear whether one EHS manager might manage all of the sites or whether there would be a separate manager for each site. There were also no personnel contact names given by the EPA for any of the companies. It was decided to make contact with these companies by telephone to establish who was the individual to contact in relation to each site. In some cases one manager managed all sites belonging to the company and these all agreed to complete a questionnaire for each site under their care. In other cases there was a separate Environmental Manager for each site who had to be contacted individually. For the remaining companies who held only one permit, the questionnaire was addressed to the Environmental Manager. I asked all companies to return the Questionnaire within a two week timeframe.

It was anticipated that it was very unlikely to have a 100% return on questionnaires. By making contact with some companies, it was learnt that there was an interest in the topic and this suggested that there should be a relatively positive response rate. While telephoning all 109 companies was not feasible, the companies that were contacted agreed to participate. By designing the questionnaire with a limited number of specific questions, requesting only tick box answers and giving a completion time of no more than 10 minutes, it was hoped that the response rate would be good.

3.5 Results Analysis

The questionnaire was designed to allow for easy analysis of information, which could be represented using a computer application. Microsoft Excel was the application best suitable to facilitate analysis and illustrate the results from the questionnaire. Microsoft Excel allows tables to be drawn up from the gathered information and results can then be presented graphically using different types of graphs and charts. This allows for comparisons and conclusions to be drawn from all of the returned questionnaires.

Chapter 4. Results

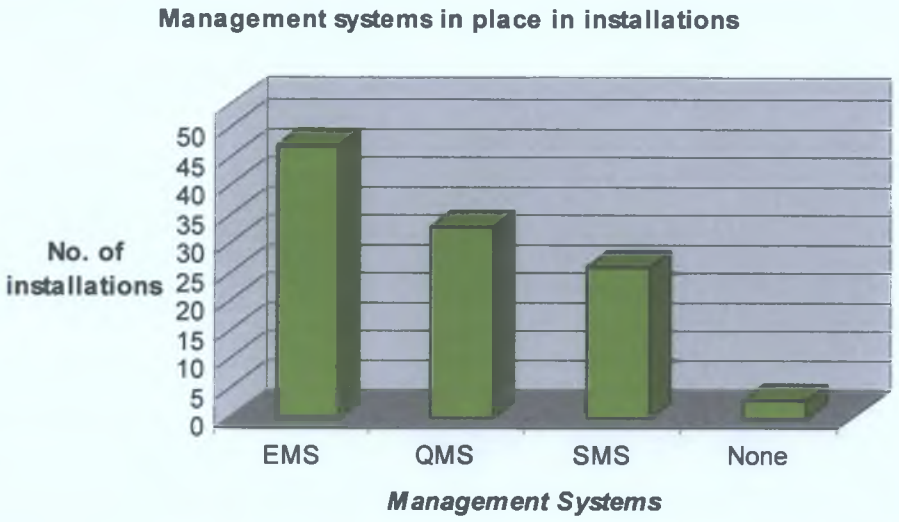
4.1 Questionnaire Results

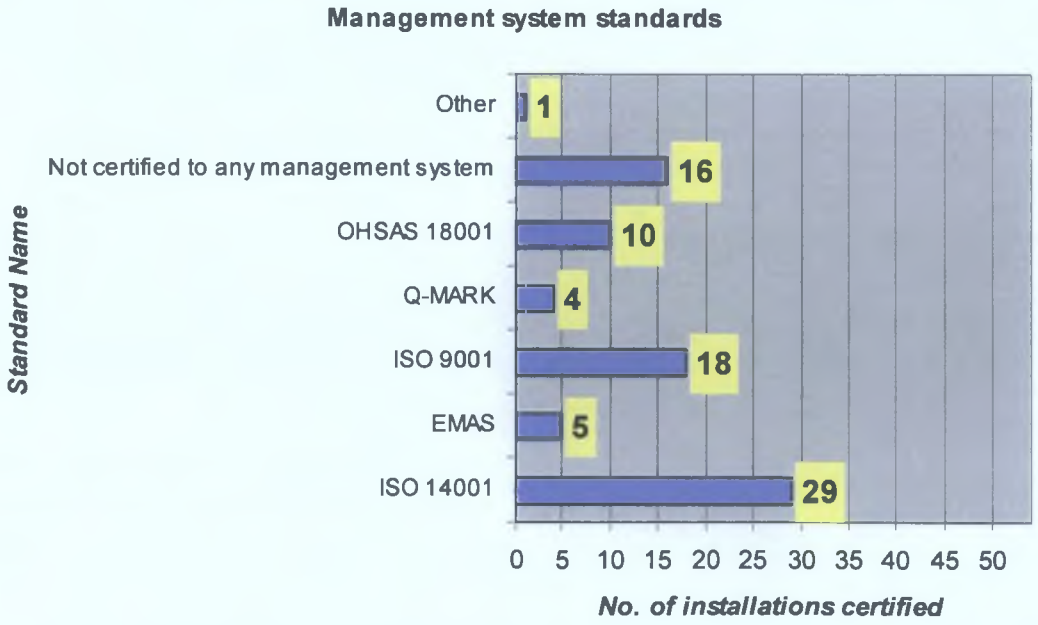
No. of questionnaires issued: 109

No. of responses: 54

Question 1

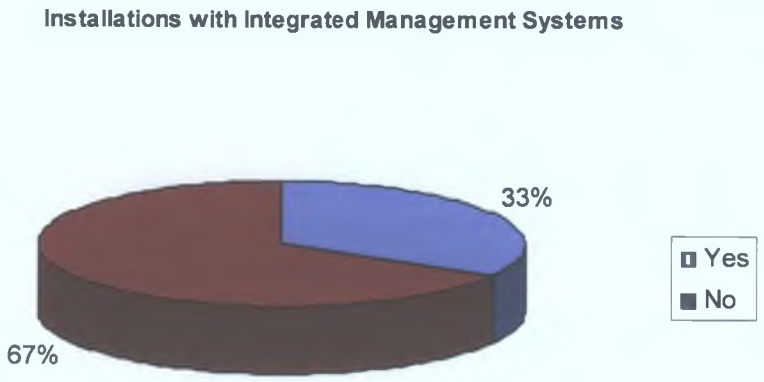
- Determined if installations have Management Systems and what standards they are certified to.



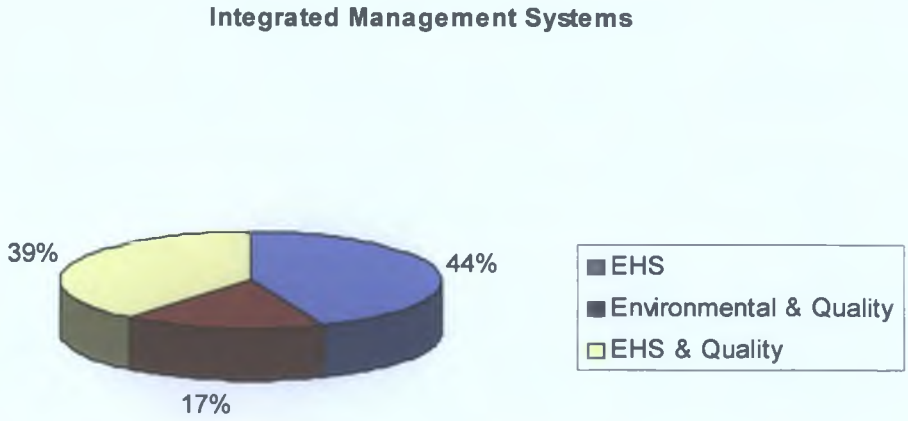


Question 2

- Identified how many installations have integrated Management Systems.

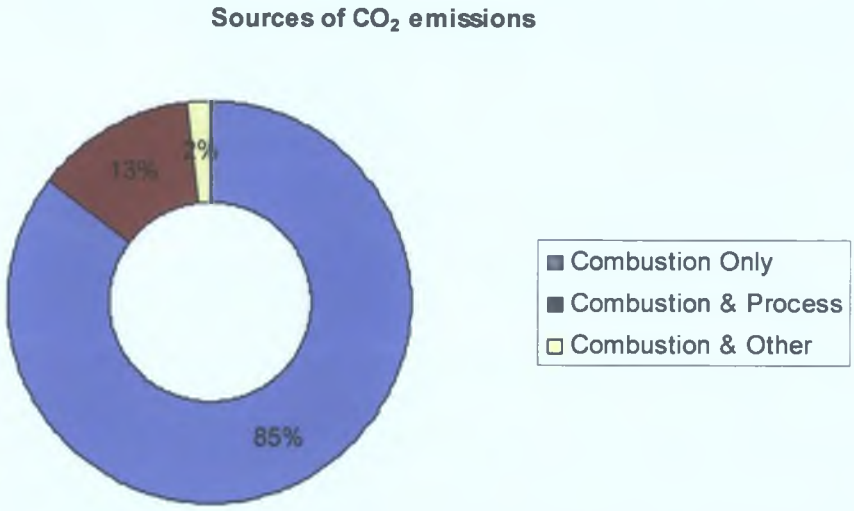


- This question also illustrated how Installations integrate their Management Systems.



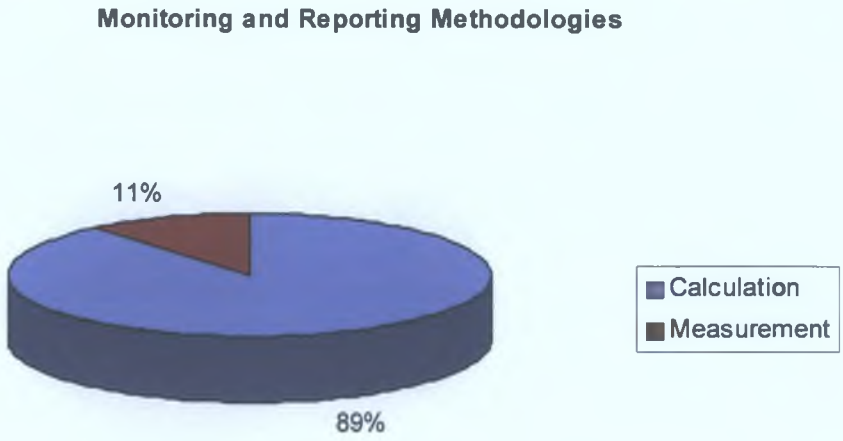
Question 3

- Identified CO_2 emission sources in installations.



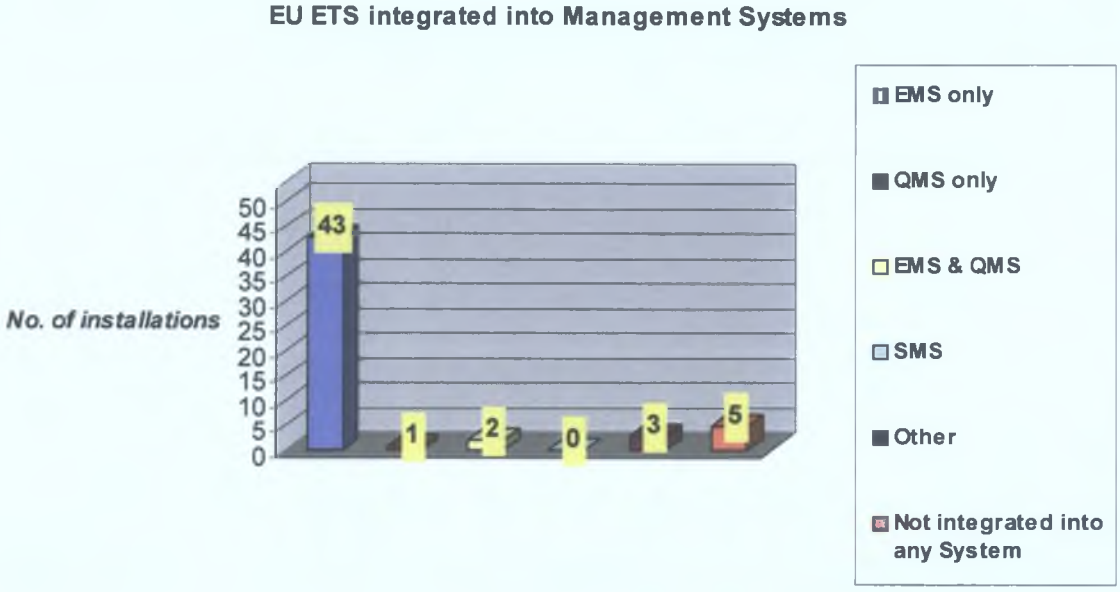
Question 4

- Identified how installations are monitoring and reporting emissions



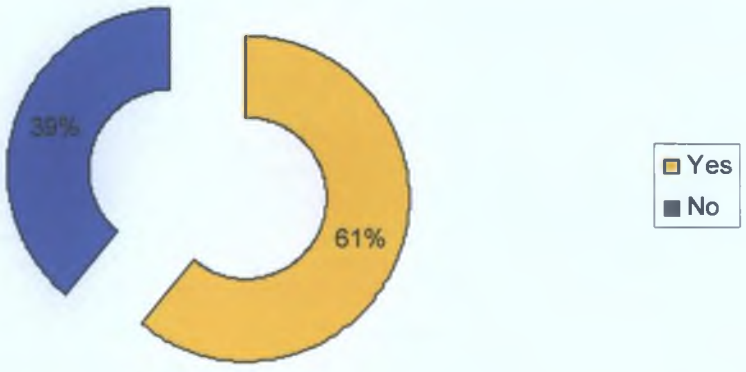
Question 5

- Established where EUETS management is incorporated into particular Management Systems.



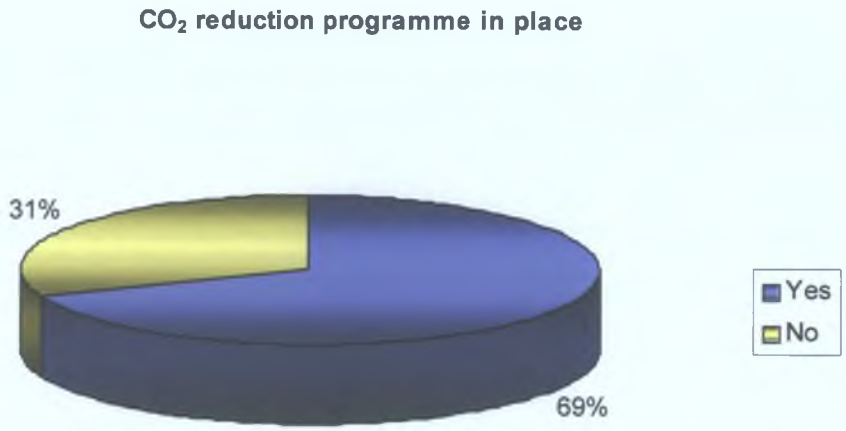
Question 6

- Assessed whether calculation and measurement techniques are based on any standards (such as ISO or CEN).



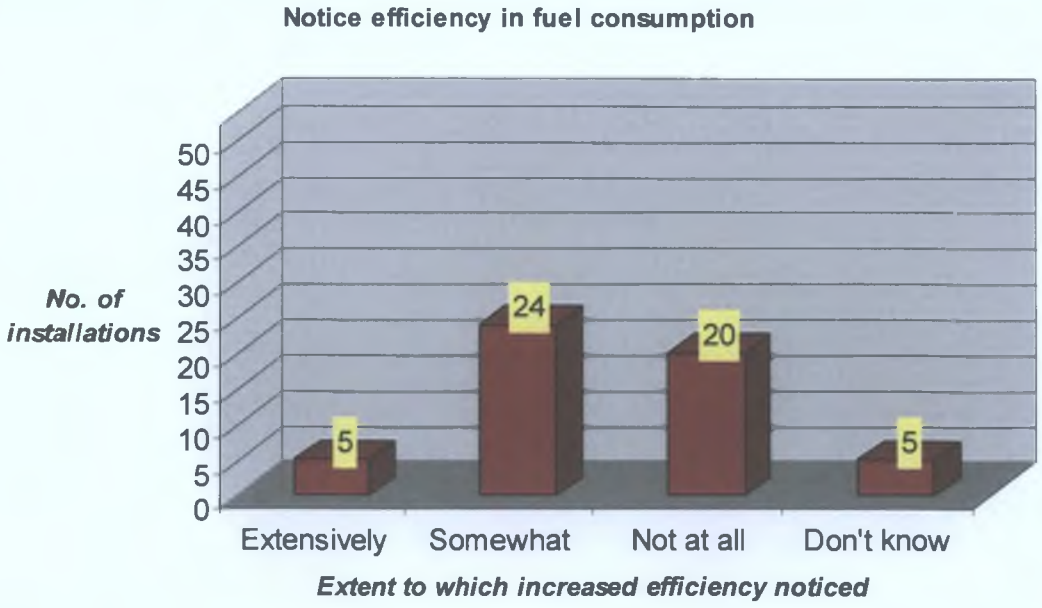
Question 7

- Established whether installations have a CO_2 emissions reduction programme in place.



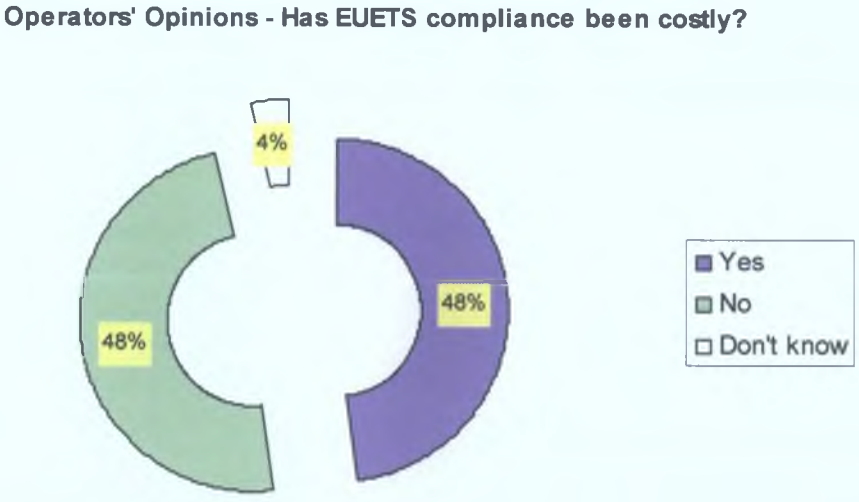
Question 8

- Determined if Operators have noticed increased efficiency in fuel consumption by complying with EU ETS.



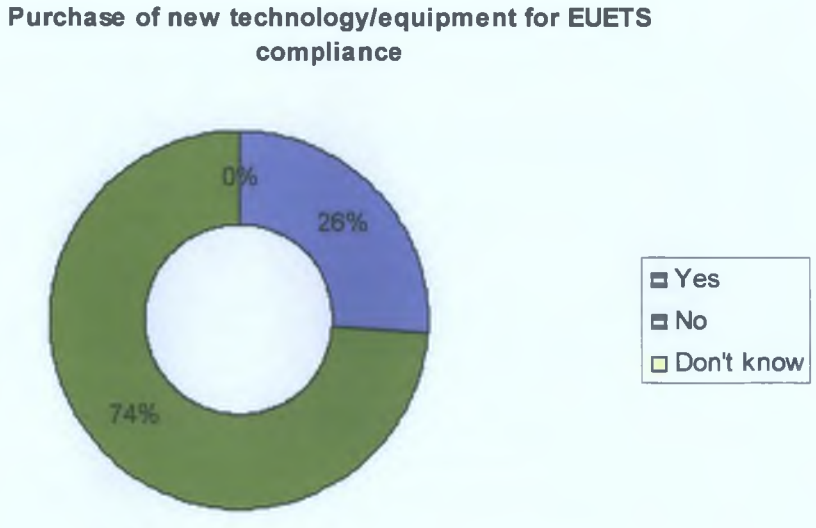
Question 9

- Assessed the business implications of EU ETS, and whether Operators found the scheme costly.



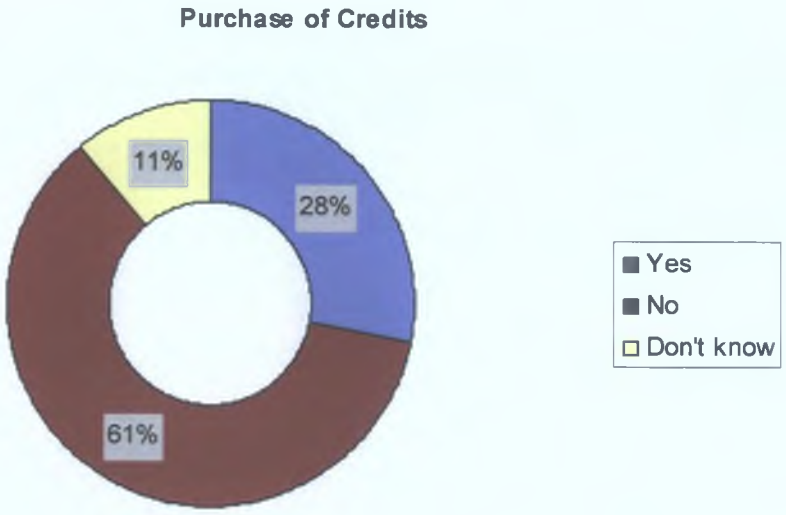
Question 10

- Identifying trends in whether installations have purchased or plan to purchase new technology for compliance.



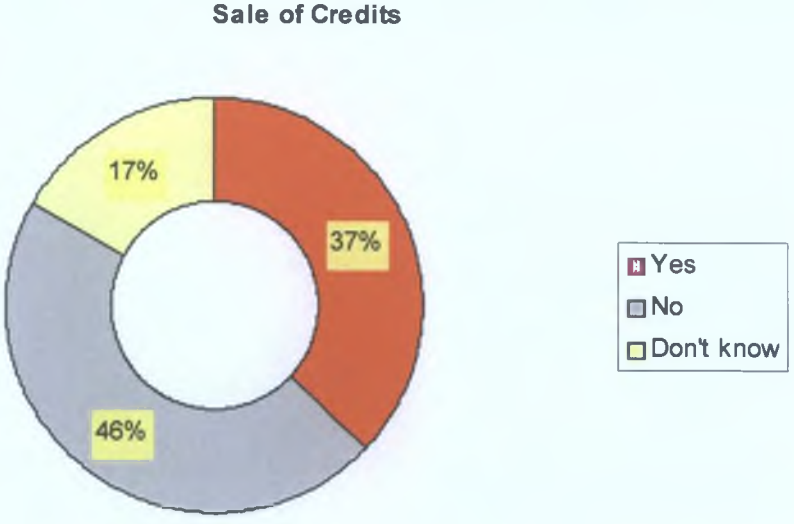
Question 11

- Identified trends in whether installations have purchased Carbon Credits.



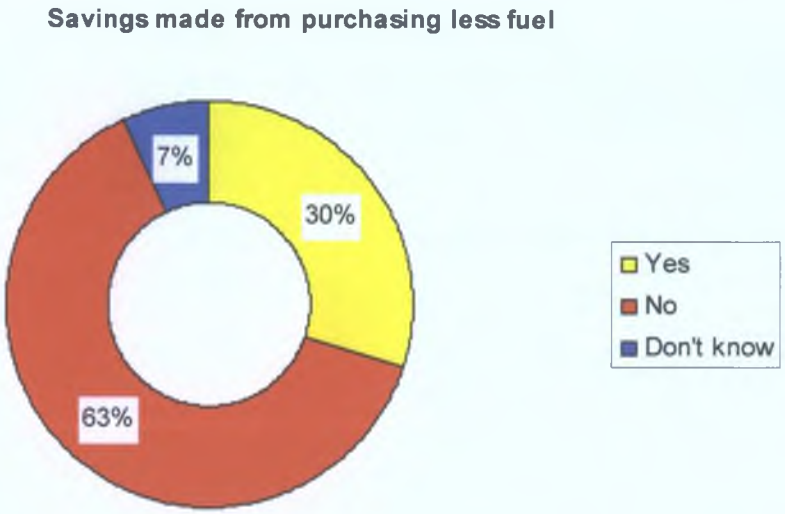
Question 12

- Identified trends in sales in Carbon Credits by installations.



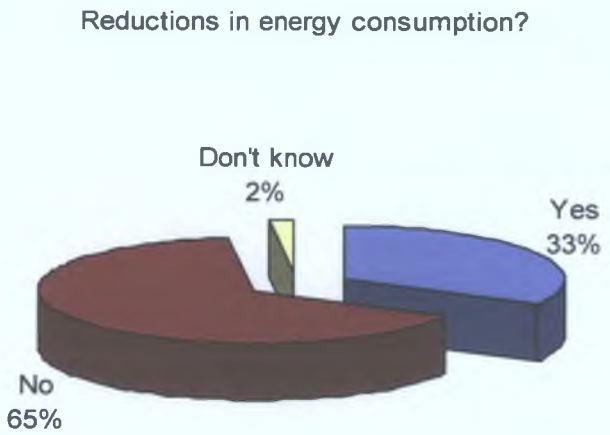
Question 13

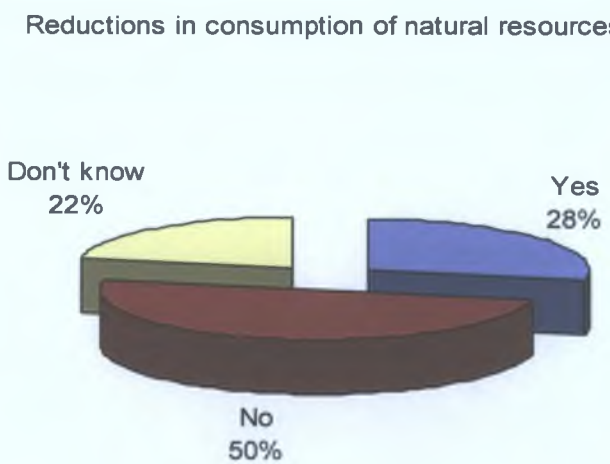
- Determining if installations are making some savings in fuel (from compliance with EU ETS).



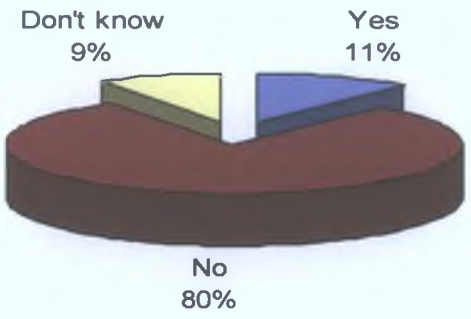
Question 14

- Established if, in the opinion of Operators, there are any added benefits for EHS and Quality by complying with EU ETS.

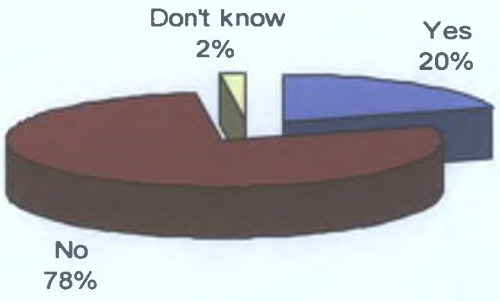




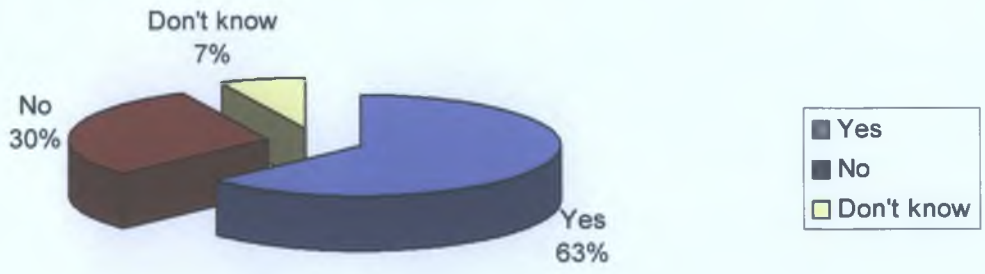
Easier compliance with other legislation?



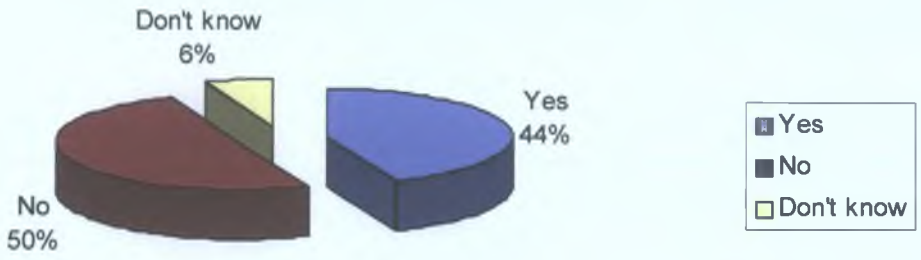
Less waste produced?



Improved employee awareness of the issue?

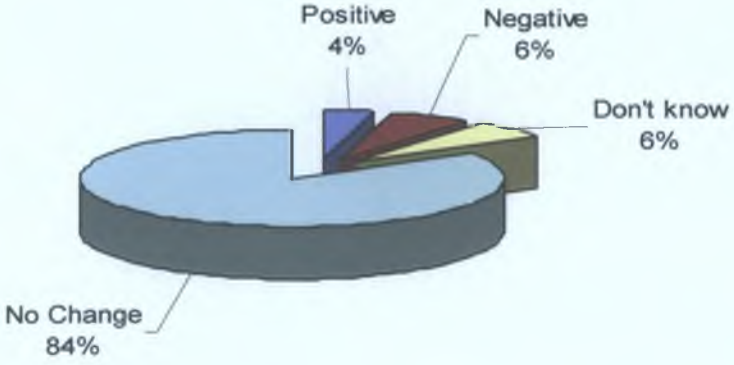


Continous improvement in other aspects of environment management?

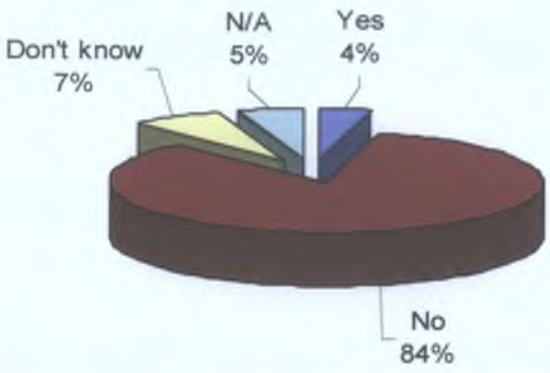


Increased efficiency in manufacturing processes?

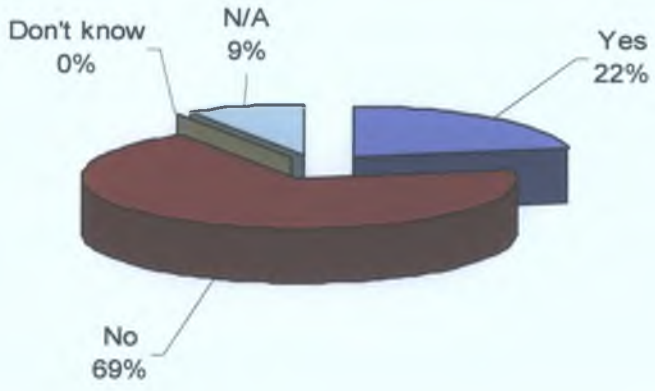
Effect of EUETS on productivity



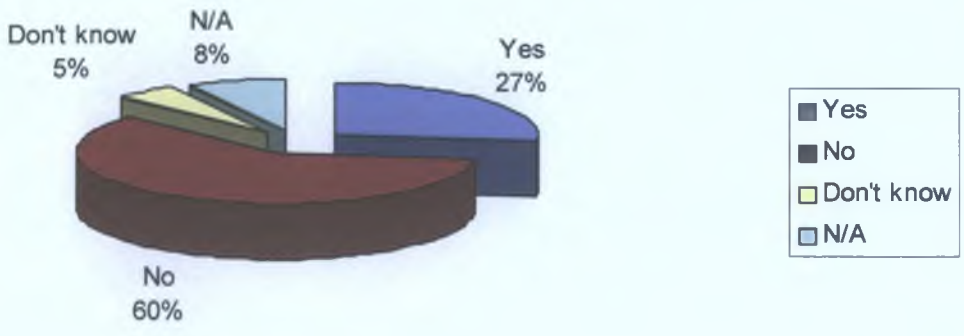
Enhanced quality in end product?



Better Housekeeping?



Safer working environment?



Chapter 5. Discussion

5.1 Discussion on Questionnaire Results

The results obtained from the questionnaire have highlighted some basic aspects of how installations are managing the EU ETS in Ireland. The questionnaire has also identified whether there have been EHS and Quality implications in installations that are partaking in the scheme.

There is much debate and opinion as to whether this first example of an operating international trading scheme will be successful in reducing CO_2 emissions in a manner that does not jeopardise business and the European economy. While this study is based solely on the first year of the pilot phase of the scheme, the results of the questionnaire give an indication on how successful the scheme has been so far in Ireland in relation to emission management, the costs of achieving reductions and the implications the scheme has had for other aspects of Environmental Health and Safety.

The questionnaire results however, do not indicate whether installations in Ireland succeeded in reducing emissions, as no direct questions were asked relating to this. This information became available to the public in May 2006. As discussed previously, the EPA receive an AIER from every installation participating in the scheme before the 31st March every year, with the first issue of this report being submitted by each installation in March 2006 (EPA, 2005). These reports contained verified information on the amount of CO_2 emitted by each installation for 2005. In addition to this report, the EC (Emissions Trading) Regulations 2004 required every operator to surrender a number of allowances (by the 30th April) to cover their emissions for 2005. This information was collated by the EPA and submitted to the European Commission. The Commission have recorded this information in the Community Independent Transaction Log (European Commission,

2006) and published "The National Reports on verified emissions and surrendered allowances".

This public document shows verified emissions and the compliance status of all installations in Member States. It contains an individual report for each member state showing the allowances allocated and surrendered by every installation for 2005. From here it is possible to deduct whether or not the Irish trading sector succeeded in operating within the national quota of allowances of CO_2.

According to Ireland's NAP, Ireland had a total of 19,236,747 allowances to distribute amongst the 109 installations for 2005. The EC report shows that the total number of surrendered allowances for that year was 22,400,788. Therefore Ireland has not succeeded in operating within its national emission quota for the first year of the scheme so has not reduced CO_2 emissions. Despite this, it can be seen from the report that 55 out of the 109 installations did manage to reduce emissions. From comparing the questionnaire responses to the EC report, it could be seen that 28 out the 54 installations that responded had succeeded in reducing emissions. Therefore the questionnaire results provide a good range of responses from installations did and did not succeed in reducing emissions.

Initial questions in the questionnaire related to Management Systems and helped establish if installations have certified or other kinds of Management Systems for their EHS and Quality concerns. The results show that only 5.5% of respondents did not have any kind of Management System in place. The Management Systems deployed ranged from ISO 14001 and EMAS for Environmental Management, ISO 9001 and Q-Mark for

Quality and OHSAS 18001 being the most popular Safety system. EMS and QMS emerged as the most common systems in place and over 90% of installations with an EMS and/or QMS had EU ETS management integrated into the systems. As monitoring and reporting of emissions is vital to the success of EU ETS (EC Decision on establishing monitoring and reporting guidelines for EU ETS 2004 44), it is important that all installations have a structured and thorough approach to managing monitoring and reporting of emissions. By integrating the monitoring & reporting of CO_2 emissions into a Management System it better assures that monitoring and reporting is conducted effectively and makes emission verification easier for installations when completing their annual reports. The EPA also places emphasis on this in their *Monitoring and Reporting Proposal* where installations are requested to state whether or not they integrate EU ETS into their Management Systems and detail how this is done.

It was considered whether the questionnaire would reveal a link between the installations that manage EU ETS as part of their Management Systems and those that succeeded in reducing emissions. The results indicate that 71% of those surveyed who reduced emissions integrated EU ETS into their Management Systems; however 96% of respondents who did not succeed in reducing emissions also had EU ETS integrated into their Management Systems so it is not possible to make a link between the two.

In relation to monitoring and reporting of emissions, the questionnaire also looked for details on the methodologies used. Calculation emerged by far the most popular methodology, which was as expected. The EC Decision on establishing monitoring and reporting guidelines for EU ETS 2004 that states that Measurement requires the approval of the competent Authority and should be verified by Calculation, so it is not surprising

that only 11% of installations chose the Measurement Methodology. Question 6 established if these methodologies are certified to any standards. This also helped to establish if installations are using accurate and thorough methods in measuring or calculating emissions and 61% of those surveyed said they did use standard methods.

Combustion of fuel is the most common form of emissions in Ireland with 85% of installation burning oil, diesel, peat and/or coal. A very small amount of installations had process emissions. These were mostly in the cement manufacture industry where the chemical reaction that occurs when heating Limestone and Clay to produce Clinker results in emissions of CO_2. The results from this question show that fuel combustion is by far the most common source of trading sector emissions in Ireland.

A significant number (69%)of respondents stated that they had an emissions reduction programme of some kind in place. This shows that these installations are making efforts to reduce emissions and displays that they are committing themselves to striving towards operating in a low carbon economy. When the results were divided into installations that did and did not reduce emissions, it was seen that 75% of those who succeeded in reducing emissions had an emissions reduction programme in place. Only 57% of those without reduced emissions had such a programme. It could be concluded then, that those with a programme in place were more likely to succeed in reducing emissions. In time it is possible that these programmes will exist in all installations and may increase the rate of compliance.

The questionnaire contained five questions (Question 9 to 13) that had the objective of identifying if installations found the scheme costly and where costs or savings

arose. The results showed divided opinions. For example, 48% of respondents found the scheme to be costly, but 48% also found the scheme not to be, with 4% not knowing the affect of the scheme on the company budget. Only 26% of respondents bought new equipment or technology to help compliance and only 38.5% of those who operated in excess of their allowances in 2005 admitted to purchasing carbon credits. However it must be deduced that all installations who operated in excess of their allowances would have had to purchase credits to comply as no installation was fined for non-compliance and no Irish installations earned ERUs or CERs from Kyoto mechanism projects in 2005 (European Commission, 2006). As expected none of these installations were in a position to sell credits but 57% of the installations who operated below their allowances sold their excess credits on the market.

These questions attracted a lot of additional comments by respondents. Some installations stated that the increased costs were not significant, but others stated that the "soft costs" were considerable, with extra costs arising in overtime wages for personnel and administration costs. Some of the installations that were in a position to sell allowances decided to keep them and add them to their allowances for 2006.

When asked if they had noticed any increase in the efficiency with which fuel is used, 53.7% of respondents said they had *somewhat* to *extensively* noticed an increase in efficiency. When asked if savings had been made by the purchase of less fuel and better handling and/ or storage of fuel when attempting to comply with EU ETS, only 30% agreed that they had experienced such savings. This leads to discrepancy, as one would expect that all those with better fuel efficiency would also experience savings. It is possible that these respondents did not consider the question fully, or that the increasing

price of fuel has not allowed for significant savings to be made. Again there are many additional comments in relation to this question. Almost 10% of respondents commented that the current high costs of energy have led to energy conservation measures. They stated that this is the driver behind better fuel efficiency and not EU ETS. They also commented that CO_2 emissions have been reduced as a knock on effect to coping with higher energy costs rather than due to EU ETS. However one Operator remarked that "the EU ETS has sharpened the focus on energy usage and energy reduction".

As discussed previously, energy intensive industries and those with significant process emissions will experience increased costs initially (William Fry Solicitors, 2005). William Fry Solicitors also states that the size of an installation's allowance deficit, the size of the company, whether the company is multi-national and the price of Carbon will all affect how each installation individually copes with complying with the scheme. These factors may explain why results on those questions relating to the costs of compliance have such an equal divide in responses.

Since EU ETS compliance began in January 2005, it was hoped that from the monitoring and reporting of CO_2 emissions and the integration of EU ETS into EHS and Quality Management Systems, that installations would notice some supplementary benefits to other EHS and Quality aspects of their organisations. The final question in the questionnaire sought to establish if Operators were of the opinion that EU ETS did contribute to enhancing other aspects of EHS and Quality Management. Again this question revealed a mixture of opinions from the 54 respondents and gave some insight into how the Operators view the scheme.

The responses to the initial set of questions in relation to environmental benefits showed reasonably positive results. Approximately one third of respondents stated that they have experienced reductions in the usage of energy and natural resources. Some installations (11%) found it easier to comply with other licences such as water, air and waste licences, while 20% stated that in trying to reduce emissions they had also cut back on the amount of waste produced. Almost two thirds of respondents stated that there was better awareness amongst their employees of the issue of man-induced global warming and the role that CO_2 emissions play. Further to earlier discussions regarding global warming, educating individuals on the dangers posed by Greenhouse Gas emissions and on topics such as EU ETS and the Kyoto Protocol could increase support for efforts being made to combat global warming.

Questions relating to Quality Management did not show that EU ETS had any major impact on this topic in installations. Only 7% noticed increased efficiency in their processes and only 4% felt the scheme led to an enhanced end product. In relation to the effect that EU ETS had on productivity as a whole, 4% said *'negative'*, 84% stated '*No Change'* and 6% actually felt it was '*positive'*. Based on these results, it can be concluded that EU ETS had very little impact on productivity or the quality of products. A small percentage of respondents stated that these questions were not applicable or that they did not know if the scheme had benefited Quality. Installations whose core activity is electricity generation mostly answered this section as '*Non Applicable'* as they do not have a manufacturing process or end product.

Figures were more positive for the questions relating to Health and Safety, where 22% experienced better housekeeping on site due to tighter controls on fuels and materials

and 27% stated that the scheme had led to a safer working environment. A small percentage (8 – 9%) said the question was '*Non Applicable*' but did not state why. Operators commented in this section that the scheme led to better controls in how to store and handle fuel. They also reported that new procedures had been introduced for the recording of fuel oil usages which included Health and Safety considerations, with the scheme leading to better general awareness and knowledge amongst employees.

Some installations commented that Quality and Health and Safety were managed entirely separately from EU ETS, so they could not identify any direct impact of EU ETS on these areas. It was hoped to identify from the questionnaire whether installations having EU ETS integrated into EHS and Quality Management Systems were more likely to experience additional benefits. Figures show that 49 out of the 54 respondents (90.7%) had EU ETS integrated into their EHS and/or Quality Management Systems. Most of these installations had noticed one or more of the additional benefits listed in the final question whereas none of the 9.3% that did not have EU ETS compliance in any Management System had noticed any of these benefits. It may be concluded that by not having EU ETS management within any EHS or Quality Management System, Operators did not see where the scheme could have proved beneficial in these areas.

The results to the final question also gave an insight into how Operator's generally perceive the scheme. A total of 72% of those who reduced emissions said they had additional EHS and quality benefits. Only 50% of those that did not manage to reduce emissions had agreed to any additional benefits. These figures suggest that those succeeding in reducing emissions are viewing the scheme more favourably than those who did not.

However, additional comments provided by many Operators at the end of the questionnaire give further insight into how the scheme is perceived at installation level. Comments were provided by approximately 20% of those that completed the questionnaire. Only two Operators commented positively on the scheme, one stating that they had found the scheme very straight forward, and another stating that the scheme had helped focus on energy conservation. The vast majority of those that gave comments were negative. They suggested that they had been under allocated in 2005 and had therefore struggled to comply and had to purchase credits. Others presented the argument that energy conservation as a result of higher energy costs led to emissions reductions rather than the scheme itself.

One third of the comments complained that the administration required by EU ETS was excessive, time consuming and costly with minimal rewards or benefits in the end. Some perceived EU ETS as a threat to their expansion and growth possibilities and one Operator stated that EU ETS had had a negative impact on Quality and Health and Safety because it diverted attention and resources from these issues.

Overall the results show that there is a degree of ambiguity in relation to the overall success of the scheme. The results that are shown display varying trends in how Operators conduct and manage their monitoring and reporting of EU ETS, whether or not they succeeded in reducing emissions in 2005 and to what extent they experienced additional EHS and Quality benefits. The results for the first year show that while the Irish trading sector as a whole operated in excess of its National Allocation Plan, over half of

the participating installations did succeed in reducing emissions and a significant number experienced additional EHS and Quality benefits.

Chapter 6. Conclusion

It is clear from the results of this study that the EU Emissions Trading scheme has had mixed success in Ireland in the first year of its pilot phase. Although Ireland failed to reduce emissions as a whole, with 55 out of the 109 installations managing to reduce emissions the scheme shows promise for the future reduction of CO_2 emissions in Ireland. Should these installations continue to reduce emissions and if additional Operators follow suit then perhaps Ireland may succeed in reaching the necessary targets. Ireland's National Allocation Plan 1 has set out the same number of allowances for 2006 and 2007. With what has been achieved in the first year alone, it is hoped that not only will more installations reduce emissions but that they will experience additional benefits from compliance in the future, as they gain familiarity and experience with the managing of the scheme.

Installations that did not succeed in reducing emissions expressed their concerns regarding allocations and costs. It would be hoped that they can adapt and learn to operate within the requirements of EU ETS. With issues such as NAP 2 providing less allocations, EU ETS expanding to include more gases and the possibility that governments will auction allowances (as opposed to distributing them freely), there are growing concerns that those organisations that cannot operate under the rules of EU ETS could close up and/or relocate. However if EU ETS becomes global as is predicted from 2008, there may be no escaping a low carbon future.

Some analysts claim that EU ETS may not solve anything. At a local level some participating installations claim that the scheme will hinder business and economic

development. At a higher level it has been argued that the allocations have been too generous to create scarcity in the carbon commodity and that without the inclusion of the non-trading sectors, Greenhouse gas emissions will not be significantly reduced. As the scheme is so far only set to be in place until 2012, there is also ambiguity as to what will happen then.

Nonetheless, the scheme should be viewed as a positive initial step in tackling the issue of global warming and greenhouse gas emissions. Like most new projects, the scheme is bound to have its teething problems. It will take time and substantial efforts at EU, national and local levels for the scheme to operate to its full potential. It is be very much hoped that the scheme will have the success of previous emission trading schemes (Emissions trading for SO in USA in 1970s) in cost effectively reducing emissions in Europe. In addition it is hoped that EU ETS might become the foundation of a global programme to curb Greenhouse gas emissions and help create a future low carbon global economy.

Chapter 7. Recommendations

A. The first recommendation is that further research be carried out in relation to the success of EU ETS across all EU member states. It would be interesting to establish if other countries reduced CO_2 emissions and if Europe as a whole succeeded in reducing emissions in 2005.

B. A study could be undertaken to establish what the additional Environmental, Health and Safety implications are with EU ETS on a European level.

C. Further research could be conducted in relation to the business implications of the scheme and evaluate if any companies plan to relocate as a consequence of the scheme. It may be possible to establish more trends in where costs arise and identify a means of reducing these.

D. A study could be undertaken to identify the success factors and inhibitors that contributed to why installations did or did not succeed in reducing emissions in Ireland.

E. As many Operators commented on the excessive administration requirements and costs in complying with the scheme, the EPA or the government could establish an advisory group that could provide advice and guidance to EHS managers on handling the administrative issues in relation to the scheme. A training programme or a website could be established.

F. Installations should also have the option of outsourcing the administration of the scheme to a specialist company. The availability of consultants that could carry out the initial set up and administration of the scheme until an installation finds their feet would be advantageous to new entrants and existing installations that are experiencing difficulties. Ideally, installations could receive Government subsidies for this.

G. All installations should have EU ETS integrated into an Environmental Management System or an integrated Management System, preferably certified. Management of EU ETS compliance in this way would be more comprehensive and may lead to continual improvements in other aspects of environmental, health and safety. It would also provide a more structured approach to planning, training, competence, implementation and checking and corrective actions for the management of the scheme.

H. A comparative study could be carried out comparing EU ETS to other mechanisms for reducing emissions. This study could examine the possibilities in Carbon sequestration, Carbon storage, the development of greener technology, alternative energy sources and the Kyoto mechanisms (Joint Implementation and CDM).

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Appendices

Appendix I

Operator Name:

Installation Site Address:

1. Does your organisation have an EMS Yes ☐ No ☐
   SMS Yes ☐ No ☐
   QMS Yes ☐ No ☐

   If you have answered 'Yes' to any of the above, are these Management Systems certified to any formal standards? Please specify:

   _____

2. Does your organisation have an integrated management system for Environmental, Safety and Quality? (or any other combination of the aforementioned?).
   If 'yes', Please specify below (for example EHS, Safety & Quality, Quality & Environmental)

   Yes ☐ No ☐

   Please specify:

   _____

3. In your installation, what are the sources of CO_2 emissions?

   - Combustion of fuel (oil, diesel, coal and/or gas) ☐
   - Process emissions ☐
   - Other ☐

   If 'Other', Please specify:

   _____

4. In accordance with the EU guidelines for monitoring and reporting on CO_2 emissions, how does your organisation monitor and report its CO_2 emissions?

   Calculation ☐
   Measurement ☐

5. Is monitoring and reporting of CO_2 integrated into your organisation's management systems?

EMS ☐ QMS ☐ SMS ☐ Other ☐

If 'Other', Please specify:

_____

6. Are the measurement or calculation methodologies used by your organisation using standards such as ISO or CEN?

Yes ☐ No ☐

7. Is there a CO_2 emission reduction programme currently in place in your Organisation?

Yes ☐ No ☐

8. From the organisation's EMS and/or QMS or equivalent, has there been a noticeable increase in the efficiency of fuel consumption in order to comply with the CO_2 emission allowances allocated to your organisation for 2005?

Extensively ☐ Somewhat ☐ Not at all ☐ Don't Know ☐

9. In your opinion, has complying with the EUETS been costly to your Organisation?

Yes ☐ No ☐ Don't know ☐

10. In order to comply has any technology/equipment had to be purchased?

Yes ☐ No ☐ Don't know ☐

11. Has the Organisation had to, or is it anticipated that the organisation will have to purchase Carbon Credits, in order to fulfil its obligations under EUETS?

Yes ☐ No ☐ Don't know ☐

12. Did the Organisation sell, or is it anticipated that the organisation will be in a position to sell any Carbon Credits in the future?

Yes ☐ No ☐ Don't know ☐

13. Have there been savings made as a result of purchasing less fuel and/or having strict controls on how fuel on-site is being stored and handled?

Yes ☐ No ☐ Don't know ☐

14. In addition to reducing CO_2 emissions, it has been suggested that compliance with the scheme may result in other Environmental, Health and Safety or Quality implications been experienced by organisations.

In your opinion, has your organisation experienced any of the benefits listed below as a result of its inclusion in the EUETS?

- A reduction in Energy consumption?

Yes ☐ No ☐ Don't know ☐

- Less consumption of natural resources?

Yes ☐ No ☐ Don't know ☐

- Easier to comply with other legislative requirements and licenses (for example water, air and noise emission limits)?

Yes ☐ No ☐ Don't know ☐

- A reduction in the amount of waste produced?

Yes ☐ No ☐ Don't know ☐

- Improved employee awareness on the issues of CO_2 pollution and Global Warming?

Yes ☐ No ☐ Don't know ☐

- Managing the scheme is allowing for continuous improvement in other aspects of Environmental management in your Organisation?

Yes ☐ No ☐ Don't know ☐

- Increased understanding amongst employees of the manufacturing process, in relation to where sources of pollution and waste arises throughout the process, and how to mitigate these?

Yes ☐ No ☐ Don't know ☐

Quality Implications:

- Increased efficiency in the manufacturing process as a result of complying with the scheme?

Yes ☐ No ☐ Don't know ☐

- Have the effects on productivity been positive or negative?

Positive ☐ Negative ☐ No change ☐ Don't know ☐

- Quality of the end product enhanced due to the tighter controls on the manufacturing process in order to meet emission targets?

Yes ☐ No ☐ Don't know ☐

- Other (Please comment):

_____

Health and Safety Implications:

- Better housekeeping on site as a result of strict storage and handling of fuel (or other substances being monitored for complying with scheme) since the scheme was introduced?

Yes ☐ No ☐ Don't know ☐

- The introduction of new Operating procedures and/ or modifications to current Operating procedures in order to reduce CO_2 emissions has led to a safer working environment?

Yes ☐ No ☐ Don't know ☐

If YES, could you please comment further?

_____

- Any other Health and Safety improvements? (Please comment):

_____

Additional Comments: (Please feel free to add below, any comments you might have on any of the issues raised in this questionnaire).

Appendix II

For Agency Use Only

Date Received		
Date Approved & signature		

A1 Identification of installation (M&R Decision Section 11.1)

A1.1 GHG Permit and installation numbers.

You must use the numbers stated on page 3 of your GHG permit.

	Number		*Version*	
IE-GHG				Greenhouse Gas Emissions Permit Number
IE-				Installation Number

A1.2 Operator name.

You must use the Operator name stated on page 3 of your GHG permit.

Operator Name

A1.3 Installation name and location of site.

You must use details as stated in your current GHG permit. Both cells must be completed even if the information is the same.

Installation Name

Site Name

Location of Site

Street/Road

Town

County

1.4 Contact details for report of annual emissions.

Whom may the Agency contact with questions about this annual report?

Contact Person (Title, First name, Last name)

Job Title

Telephone Number

Facsimile Number

Email Address

A1.5 Schedule 1 activities at your installation.

You must only use the activity as stated on page 3 of your GHG permit.

Activity One

Select

Activity Two

Select

A1.6 Report year.

Select the year for which the emissions are being reported. select

A2 Overview of activities and emissions within an installation (M&R Decision Section 11.2)

The purpose of this section is to identify your CO_2 emissions for each Schedule 1 activity together with the applied monitoring approach.

A2.1 Summary table of emissions from fossil fuels and/or materials for each type of Schedule 1 activity.

You must identify, for each type of activity, the relevant reporting categories, the monitoring methodology employed, whether a monitoring tier was changed during the reporting year and the emissions of carbon dioxide.

Category of activity	IPCC CRF category [Note 1]	EPER category [Note 2]	Approach	Uncertainty for CEMS [Note 3]	Tiers changed [Note 4]	Emissions (tonnes of CO_2) [Note 5]
Select		N/A	select		select	
Select		N/A	select		select	
Select		N/A	select		select	
Select		N/A	select		select	
Select		N/A	select		select	
		Total carbon dioxide emissions (tonnes)				0

Note 1 *Please apply the appropriate IPCC common reporting format (CRF) codes as listed in Annex 1 to this form. For some processes two codes may be appropriate and these should be listed on separate lines. E.g. for cement production the code associated with the fuel burned (i.e. 1. Energy, A. Fuel combustion, 2. Manufacturing, f. cement) must be applied in addition to the code for the process emissions (i.e. 2. Processes, A. Minerals, 1. Cement).*

Note 2 *Please select the appropriate EPER code as described in Annex II. Select N/A if there is no applicable EPER code provided in Annex II.*

Note 3 *Specification of the uncertainty is only required where a measurement method has been applied i.e. where continuous emission monitoring equipment is used.*

Note 4 *If tiers have changed (upwards or downwards) during the reporting period then these changes must be detailed in section A3.*

Note 5 *Please input your emissions rounded to the nearest metric tonne.*

A2.2 Biomass use during the reporting year.

Has biomass been used at the installation during the reporting year? Please select one of the following that applies.

If "yes" please complete the following table select

If "no" please proceed directly to A2.3

Category of activity	Biomass employed in combustion (TJ)	Biomass employed in process	Units	Emissions of tonnes of CO_2. If measured by CEMS [*Note 1*]
E1.1 Combustion	82.52	5,482.00	tonnes	n/a - calculation method
Select			select	
Select			select	
Select			select	
Select			select	
Select			select	
Totals	0.00			0

[Note 1] Only report CO_2 emissions if determined by direct measurement using continuous emission monitoring systems (CEMS)

A2.3 Transfer of carbon dioxide from the installation as a pure substance, part of a fuel, feedstock or by-product or product.

*Has CO_2 been **transferred or exported out** of the installation during the reporting year? If no CO_2 was transferred please confirm this by selecting **'No'** from the box below. If carbon dioxide was transferred then please confirm this by selecting **'Yes'** from the box below and complete the following table.*

If "No" please proceed directly to section A3 select

Category of activity	Amount transferred (tonnes CO_2)	Transferred material (description)
E1.1 Combustion	22.00	99% pure CO_2 sold as a compressed gas
Select		
Select		
Select		
Select		
Total	0.00	

A3 Change of tiers and other relevant changes to the installation (M&R Decision Section 5)

A3.1 Changes to the approved monitoring tiers in the reporting year.

*Select from below '**yes** or **no**' if any of the monitoring tiers have changed during the reporting period. This is to include any instances where, in the opinion of the Verifier, an applied tier is different to that stated in the approved monitoring and reporting proposal. Approved changes to tiers must also be identified.*

If "yes" please ensure that this has been reflected in Section A2.1 and complete Section A3.2. select

If "no" please proceed directly to Section A3.3

3.2 Description of changes during the reporting year to the approved monitoring tiers.

Your description should be succinct and include identification of the relevant activity, source, the change(s) made, the reasons for the changes, the starting date and/or the starting and end date for any temporary changes.

e.g. Mineral processes, sources S1 and S2, CV and emission factors for fuels F1 and F2 upgraded from Tier 2 to Tier 3 from 14 April 2005 due to ISO 17025 accreditation received for on-site analysis.(letter to ETS permitting team, ABC ref: xlg dated 5 March 2005)

A3.3 Changes to the installation during the reporting year relevant to this emissions report.

Have there been any changes to the permitted installation during the reporting year? Has any permitted plant been on shut down or been temporarily removed for maintenance, have proposed KPD start dates passed?

If "yes" please complete Section A3.4,
If "no" please proceed directly to Part B for Combustion processes and/or Part C for process emissions as appropriate

select

A3.4 Description of changes to the installation during the reporting year and effect on the emissions report.

Your description should be succinct and include identification of the relevant activity, source, the change(s) made, the reasons for the changes, the starting date and/or the starting and end date for any temporary changes.

e.g Unexpected outage of principal boiler (Boiler No. 1) occurred between February and November resulting in increased dependence upon mains supplied electricity use and accordingly lower carbon dioxide emissions . Ref: Energy, Source S1.

A 3.5 Declaration

I hereby confirm that every attempt has been made to ensure that the information provided in this Annual Installation Emissions Report is complete, consistent, transparent, accurate, free from material error, faithful and in compliance with the requirements of Condition 3 of the GHG permit, unless otherwise noted in this report.

Signed by :
(on behalf of the Operator) _____

Print signature name: _____

Date : _____

Position in organisation : _____

Company stamp or seal:

END OF SHEET A>

B1 Combustion emissions data (M&R Decision Section 11.3)

Please complete the following pages for each Schedule 1 combustion process within your installation. Emissions occurring from different sources within a single installation belonging to the same type of activity may be reported in an aggregate manner for the type of activity provided that the emission factors and the oxidation factors are identical.

If additional sheets are required then please contact the Agency with the number of extra sheets required.

B1.1 Summary table of carbon dioxide emissions from fossil fuel combustion

Type of Schedule 1 activity:	Select
Description of activity:	

Fuel type	Activity data	Units	Weighted Net Calorific Value (Note 1)	Units	Weighted Emission factor (Note 2)	Units	Oxidation factor	Total CO_2 as tonnes (Note 3)
Coal	5,482.00	tonnes	31.00	TJ/ktonne	100.80	tCO2/TJ	0.99	16,959
select		select		select		select	select	
select		select		select		select	select	
select		select		select		select	select	
select		select		select		select	select	
select		select		select		select	select	
select		select		select		select	select	
ect		select		select		select	select	
ect		select		select		select	select	
ect		select		select		select	select	
ect		select		select		select	select	
ect		select		select		select	select	
ect		select		select		select	select	
ect		select		select		select	select	
ect		select		select		select	select	
ect		select		select		select	select	
ect		select		select		select	select	
Total emissions (sum of fossil fuel emissions & fossil fraction of mixed fuels)						**Tonnes of CO_2**		0

Note 1: Weighted average Net Calorific Value is to be used here or net energy as TJ for natural gas
Note 2: Weighted average Emission Factor is to be used here
Note 3: Actual total of carbon dixoide released for each fuel to be used here

B1.2 Summary table of biomass used in combustion

Type of Schedule 1 activity:	Select
Description of activity:	

Biomass type	Activity data	Units	Weighted Net Calorific Value (Note 1)	Units	Total energy as TJ (Note 2)
Meat & Bone Meal	5,482.00	tonnes	15.6	TJ/ktonne	82.519
select		select		select	
select		select		select	
select		select		select	
select		select		select	
select		select		select	
select		select		select	
Total biomass used (energy content of pure biomass and biomass content of mixed fuels) in TJ					0.000

Note 1: Weighted average Net Calorific Value is to be used here
Note 2: Actual total of biomass used as TJ

B1.3 Individual fuel data information.

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

* CV - Net Calorific value

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

* NCV - Net Calorific value

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

* NCV - Net Calorific value

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

* NCV - Net Calorific value

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

* NCV - Net Calorific value

ype of fuel:	select		
ission pt. reference			
rameter	Units	Data	Tier applied
ivity data (mass/vol.)	select		select
(NCV)*	select		select
ergy as tera joules			
ission factor	select		select
idation factor	no units		select
issions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

CV - Net Calorific value

ype of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

* NCV - Net Calorific value

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

* NCV - Net Calorific value

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
ission pt. reference			
ameter	Units	Data	Tier applied
vity data (mass/vol.)	select		select
(NCV)*	select		select
ergy as tera joules			
ission factor	select		select
dation factor	no units		select
issions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Activity data (mass/vol.)	select		select
(NCV)*	select		select
ergy as tera joules			
ission factor	select		select
idation factor	no units		select
issions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

pe of fuel:	select		
ission pt. reference			
ivity data (mass/vol.)	select		select
(NCV)*	select		select
ergy as tera joules			
ission factor	select		select
xidation factor	no units		select
Emissions	tCO_2		

Type of fuel:	select		
Emission pt. reference			
Activity data (mass/vol.)	select		select
(NCV)*	select		select
Energy as tera joules			
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

B1.3 Calculation of carbon dioxide emissions from biomass and mixed fuel combustion.

Only complete this section if you have used fuels that contain a proportion of biomass.

Type of biomass/mixed fuel:	select		
Emission pt. reference			
Fraction of biomass (0 - 100% of carbon content)			%
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)	select		select
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of biomass/mixed fuel:	select		
Emission pt. reference			
Fraction of biomass (0 - 100% of carbon content)			%
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)	select		select
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of biomass/mixed fuel:	select		
Emission pt. reference			
Fraction of biomass (0 - 100% of carbon content)			%
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)	select		select
ission factor	select		select
idation factor	no units		select
issions	tCO_2		

Type of biomass/mixed fuel:	select		
Emission pt. reference			
Fraction of biomass (0 - 100% of carbon content)			%
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)	select		select
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

pe of biomass/mixed l:	select		
ission pt. reference			
ction of biomass (0 - 100% of carbon tent)			%
ameter	Units	Data	Tier applied
ivity data (mass/vol.)	select		select
(NCV)	select		select
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of biomass/mixed fuel:	select		
Emission pt. reference			
Fraction of biomass (0 - 100% of carbon content)			%
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)	select		select
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of biomass/mixed fuel:	select		
Emission pt. reference			
Fraction of biomass (0 - 100% of carbon content)			%
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)	select		select
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

Type of biomass/mixed fuel:	select		
Emission pt. reference			
Fraction of biomass (0 - 100% of carbon content)			%
Parameter	Units	Data	Tier applied
Activity data (mass/vol.)	select		select
(NCV)	select		select
Emission factor	select		select
Oxidation factor	no units		select
Emissions	tCO_2		

< END OF SHEET B >

C1 Process emissions data (M&R Decison Section 11.4)

Please complete the following pages for each Schedule 1 activity within your installation. Emissions occurring from different sources within a single installation belonging to the same type of activity may be reported in an aggregate manner for the type of activity provided that the emission factors and the conversion factors are identical.

If additional sheets are required (e.g. for additional activities) then click onto the tab at the bottom of the page and create a copy of this sheet.

C1.1 Summary table of the calculation of carbon dioxide emissions from processes using only fossil input material (for M&R Decision ANNEX III to XI processes)

Type of Schedule 1 activity:	Select
Description of activity:	

Material type	Activity data	Units	Emission factor (Note 1)	Units	Conversion factor (Note 2)	Total CO_2 as tonnes (Note 3)
CaCO3	5,482	tonnes	0.4400	tCO2/t	1.00	2,412
select		select		select		
select		select		select		
select		select		select		
select		select		select		
select		select		select		
select		select		select		
ect		select		select		
ect		select		select		
ect		select		select		
ect		select		select		
ect		select		select		
ect		select		select		
ect		select		select		
ect		select		select		
ect		select		select		
ect		select		select		
Total emissions (sum of pure fossil & fossil fraction of mixed inputs)					**tonnes of CO_2**	0

Note 1: Weighted average emission factor is to be used here
Note 2: Weighted average conversion factor to be used here
Note 3: Actual total of carbon dixoide released for each fuel to be used here

C1.2 Summary table of biomass used in the process

Type of Schedule 1 activity:	Select
Description of activity:	

Biomass type	Activity data	Units	Emission factor (Note 1)	Units	Conversion factor (Note 2)	Total biomass used tonnes (Note 3)
Keuper Marl clay	5,482	tonnes	0	tCO2/t	1	5,482
select		select		select		
select		select		select		
select		select		select		
select		select		select		
select		select		select		
select		select		select		

Note 1: Weighted average emission factor is to be used here
Note 2: Weighted average conversion factor to be used here
Note 3: Actual total of biomass to be used here

C1.3	Detailed calculation of carbon dioxide emissions from processes using only fossil input material (for M&R Decision ANNEX III to XI processes)

Type of Schedule 1 activity:	Select
Description of activity:	

Type of process:			
Emission pt. Ref.			
Description of activity data	select		
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

Type of process:			
Emission pt. Ref.			
Description of activity data	select		
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

Type of process:			
Emission pt. Ref.			
Description of activity data	select		
Calculation method plied (only if specified ne guidelines)			
rameter	Units	Data	Tier applied
tivity data	select		select
iission factor	select		select
nversion factor	no units		select
iissions	tCO_2		

Type of process:			
Emission pt. Ref.			
Description of activity data	select		
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

pe of process:			
iission pt. Ref.			
scription of activity data	select		
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

Type of process:			
Emission pt. Ref.			
Description of activity data	select		
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

Type of process:			
Emission pt. Ref.			
Description of activity data	select		
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

Type of process:			
Emission pt. Ref.			
Description of activity data	select		
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

Type of process:			
Emission pt. Ref.			
Description of activity data	select		
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

Type of process:			
Emission pt. Ref.			
Description of activity data	select		
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

Type of process:			
Emission pt. Ref.			
Description of activity data	select		
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
issions	tCO_2		

Type of process:			
Emission pt. Ref.			
Description of activity data	select		
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

pe of process:			
ission pt. Ref.			
scription of ivity data	select		
lculation method plied (only if specified e guidelines)			
rameter	Units	Data	Tier applied
tivity data	select		select
...ission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

Type of process:			
Emission pt. Ref.			
Description of activity data	select		
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

C1.4 Calculation of carbon dioxide emissions from processes using biomass/mixed input material

Type of process:			
Description of process:			
Description of input material	select		
Fraction of biomass			% carbon
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

Type of process:			
Description of process:			
Description of input material	select		
Fraction of biomass			% carbon
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

Type of process:			
Description of process:			
Description of input material	select		
Fraction of biomass		% carbon	
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

Type of process:			
Description of process:			
Description of input material	select		
Fraction of biomass		% carbon	
Calculation method applied (only if specified in the guidelines)			
Parameter	Units	Data	Tier applied
Activity data	select		select
Emission factor	select		select
Conversion factor	no units		select
Emissions	tCO_2		

<END OF SHEET C>

Appendix III

STATUTORY INSTRUMENTS

S.I. No. 437 of 2004

EUROPEAN COMMUNITIES (GREENHOUSE GAS EMISSIONS TRADING) REGULATIONS 2004

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S.I. NO. 437 OF 2004

EUROPEAN COMMUNITIES (GREENHOUSE GAS EMISSIONS TRADING) REGULATIONS 2004

The Minister for the Environment, Heritage and Local Government, in exercise of the powers conferred on him by section 3 of the European Communities Act 1972 (No. 27 of 1972) and for the purpose of giving effect to Directive 2003/87/EC[1], of the European Parliament and of the Council of 13th October 2003, establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC[2], hereby makes the following Regulations:–

Citation

1. These Regulations may be cited as the European Communities (Greenhouse Gas Emissions Trading) Regulations 2004.

Definitions

2 (1) In these Regulations –

"the 1992 Act" means the Environmental Protection Agency Act 1992 (No. 7 of 1992);

"the 1996 Act" means the Waste Management Act 1996 (No. 10 of 1996);

"the 2003 Act" means the Protection of the Environment Act 2003 (No. 27 of 2003);

"the Agency" means the Environmental Protection Agency established under Section 19 of the Environmental Protection Agency Act, 1992 (No. 7 of 1992);

"allocate" means the intention to issue allowances as indicated in the final decision as notified to the Commission under article 9;

"allowance" means an allowance to emit 1 tonne of carbon dioxide equivalent during a specified period, which shall be valid only for the purposes of meeting the requirements of these Regulations and shall be transferable in accordance with the provisions of these Regulations;

"the Commission" means the Commission of the European Communities;

"Commission's Monitoring and Reporting Guidelines" means Commission Decision 2004/156/EC establishing guidelines for the monitoring and

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1 OJ L 275/32 of 25.10.2003

2 OJ L 257/26 of 10.10.1996

reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council; [3]

"Community scheme" means the scheme for greenhouse gas emission allowance trading within the European Community provided for in the Directive;

"competent authority" means, in respect of Ireland, the Agency, and in respect of other Member States of the European Communities, any competent authority specified in the national law of that State as notified by the Commission;

"directive" means Directive 2003/87/EC of the European Parliament and of the Council of 13th October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC;

"emissions" means the release of greenhouse gases into the atmosphere from sources in an installation;

"greenhouse gases" means the gases listed in Schedule 2;

"greenhouse gas emissions permit" means a permit granted under article 6;

"installation" means a stationary technical unit where one or more activities listed in Schedule 1 may be carried out on or after 1st January 2005 and any other directly associated activities which have a technical connection with the said activities on that site and which could have an effect on emissions and pollution, and references to an installation include references to part of an installation;

"the Minister" means the Minister for the Environment, Heritage and Local Government;

"new entrant" means any installation carrying out one or more of the activities indicated in Schedule 1 which has obtained a greenhouse gas emissions permit or an update of its greenhouse gas emissions permit because of a change in the nature or functioning or an extension of the installation subsequent to the notification to the Commission of the national allocation plan in accordance with article 9;

"operator" means any person who operates or controls an installation or to whom decisive economic power over the technical functioning of the installation has been delegated;

"person" means any natural or legal person;

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3 OJ L 59/1 of 26.2.2004

"pilot period" means the three-year period beginning on 1st January 2005;

"Kyoto period" mean the five-year period beginning on 1st January 2008;

"the public" means one or more persons and associations, organisations or groups of persons; and

"tonne of carbon dioxide equivalent" means one metric tonne of carbon dioxide (CO_2) or an amount of any other greenhouse gas listed in Schedule 2 with an equivalent global-warming potential.

(2) In these Regulations –

(a) where an installation has not been put into operation, the person who will have control over the operation of the installation when it is put into operation shall be treated as the operator of the installation; and
(b) where an installation has ceased to be in operation, the person who holds the greenhouse gas emissions permit which applies to the Schedule 1 activities carried out in the installation shall be treated as the operator of the installation.

(3) In these Regulations –

(a) a reference to an article or sub-article which is not otherwise identified is a reference to an article or sub-article of these Regulations;
(b) a reference to a Schedule which is not otherwise identified is a reference to a Schedule to these Regulations; and
(c) a letter, word, phrase or symbol which has been assigned a meaning by the Directive, or is used in the Directive, has that meaning where the context requires except where otherwise indicated.

(4) In these Regulations, a reference to an enactment shall be construed as a reference to that enactment as amended by a subsequent enactment, including these Regulations.

(5) Installations or parts of installations used exclusively for research, development and testing of new products and processes are not covered by these Regulations.

Objective & Scope

3 (1) These Regulations provide for the implementation in Ireland of a scheme for greenhouse gas emission allowance trading within the European Community in order to promote reductions of greenhouse gas emissions in a cost effective and economically efficient manner.

(2) These Regulations apply to emissions from the activities listed in Schedule 1 and greenhouse gases listed in Schedule 2.

Greenhouse Gas Emissions Permits

4 No person shall carry out an activity listed in Schedule 1 resulting in emissions specified therein on or after 1st January 2005, except under and to the extent authorised by a greenhouse gas emissions permit issued by the Agency pursuant to these Regulations.

Applications for Greenhouse Gas Emissions Permits

5 An application to the Agency for a greenhouse gas emissions permit shall include a description of:–

(a) the installation and its activities, including the technology used;
(b) the raw and auxiliary materials, the use of which is likely to lead to emissions of gases listed in Schedule 1;
(c) the sources of emissions of gases listed in Schedule 1 from the installation;
(d) the measures planned to monitor and report emissions in accordance with article 14;
(e) any other appropriate information requested by the Agency; and
(f) a non-technical summary of the details referred to in the preceding paragraphs of this article.

Conditions for and Contents of Greenhouse Gas Emissions Permits

6 (1) As soon as practicable after receipt of an application in accordance with article 5, the Agency shall issue a greenhouse gas emissions permit to the operator granting authorisation to emit greenhouse gases from an installation if the Agency is satisfied the operator complies with the conditions of these Regulations and is capable of monitoring and reporting emissions.

(2) A greenhouse gas emissions permit may cover one or more installations on the same site operated by the same operator.

(3) Greenhouse gas emissions permits shall contain the following:–

(a) the name and address of the operator;
(b) a description of the activities at and emissions from the installation;
(c) monitoring requirements, specifying monitoring methodology and frequency;
(d) reporting requirements;
(e) requirements to notify the Agency;
(f) an obligation to surrender allowances equal to the total emissions of the installation in each calendar year, commencing on 1st January 2005, as verified in accordance with article 15, within four months following the end of that year; and
(g) requirements to pay penalties for non-compliance under paragraph (f) above.

Changes relating to installations

7 (1) The operator shall inform the Agency of any changes planned in the nature or functioning, or an extension, of the installation which may require updating of

the greenhouse gas emissions permit and where appropriate, the Agency shall update the greenhouse gas emissions permit accordingly.

(2) Where there is a change in the identity of the installation's operator, the Agency shall update the greenhouse gas emissions permit to include the name and address of the new operator.

Coordination with Integrated Pollution Prevention and Control Licensing

8 (1) The Agency shall ensure that where installations carry out activities that are included in Schedule 1 to the 2003 Act, the conditions of, and procedure for the issue of, a greenhouse gas emissions permit are coordinated with those for integrated pollution prevention and control licences provided for in the 1992 Act and the 1996 Act.

(2) The Agency may integrate the requirements of articles 5, 6 and 7 into the procedures for integrated pollution prevention and control licensing provided for in the 1992 Act and the 1996 Act.

National Allocation Plan

9 (1) In respect of each period specified in sub-article 2, the Agency shall develop a National Allocation Plan setting out the total quantity of allowances to be allocated for that period and how such allowances are to be allocated, in accordance with any direction provided by the Minister, including in relation to the total quantity of allowances available for allocation, and on the basis of objective and transparent criteria, including those listed in Schedule 3.

(2) The periods in respect of which national allocation plans shall be developed shall be:–

(a) the three year pilot period beginning on 1st January 2005; and
(b) the five-year Kyoto period beginning on 1st January 2008 and each subsequent five-year period.

(3) The Agency shall publish draft plans for public comment and having taken due account of any such comments, notify the plans to the Commission and to other Member States of the European Communities:–

(a) in respect of the pilot period, by 31st March 2004; and
(b) in respect of the Kyoto period, and each subsequent five year period, at least 18 months before the beginning of the relevant period.

(4) The Agency may, following public consultation and any necessary consultation with the Minister in respect of directions provided by him, amend a national allocation plan in the light of any decision by the Commission to reject the plan or any aspect of the plan, as soon as practicable after being advised of such acceptance or rejection, and shall notify such amended plan to the Commission forthwith.

Method of Allocation

10 For the pilot period, the Agency shall allocate at least 95% of the allowances free of charge and for the Kyoto period, the Agency shall allocate at least 90% of the allowances free of charge.

Allocation and Issue of Allowances

11 (1) For each period referred to in article 9(2), the Agency shall decide upon the allocation of allowances to the operator of each installation including the number of those allowances to be issued in each year of that period.

(2) Decisions under sub-article 1 shall –

(a) be based upon the national allocation plan for the relevant period as accepted by the European Commission;
(b) take due account of comments from the public;
(c) be taken at least three months before the beginning of the pilot period and initiated at least 12 months before the beginning of the Kyoto period and each subsequent five year period; and
(d) be published as soon as practicable.

(3) The Agency shall issue to greenhouse gas emissions permit holders a proportion of the total quantity of allowances for each year of each period referred to at sub-article 1 by 28th February of that year.

Transfer, Surrender and Cancellation of Allowances

12 (1) Subject to Articles 15, 20 and 24, allowances shall be transferable between persons within the Community.

(2) Only allowances issued by a competent authority shall be recognised for the purpose of meeting an operator's obligations under sub-article 3.

(3) The operator of each installation shall surrender, by 30th April each year at the latest, a number of allowances equal to the total emissions from that installation during the preceding calendar year, as verified in accordance with article 15.

(4) The Agency shall cancel or cause to be cancelled allowances surrendered in accordance with sub-article 3.

(5) The Agency shall cancel or cause to be cancelled allowances at any time at the request of the person holding them.

Validity of Allowances

13 (1) Allowances shall only be valid for emissions during the periods referred to in Article 9(2) for which they are issued.

(2) (a) Four months after the end of the pilot period, allowances which are no longer valid and have not been surrendered and cancelled in accordance with articles 12(3) and 12(4), or cancelled in accordance with article

12(5), shall be cancelled or be caused to be cancelled by the Agency; and

(b) the Agency shall not issue allowances to persons for the current period to replace any allowances held by them which are cancelled or caused to be cancelled in accordance with the preceding paragraph of this sub-article.

(3) (a) Four months after the beginning of each five year period subsequent to the Kyoto period, allowances which are no longer valid and have not been surrendered and cancelled in accordance with articles 12(3) and 12(4), or cancelled in accordance with article 12(5), shall be cancelled or be caused to be cancelled by the Agency; and

(b) the Agency shall as soon as practicable issue allowances to persons for the current period to replace any allowances held by them which are cancelled or caused to be cancelled in accordance with the preceding paragraph of this sub-article.

Monitoring, Reporting and Verification of Emissions

14 (1) The operator of an installation shall monitor emissions from that installation in accordance with the principles set out at Schedule 4 and the requirements of the Commission's Monitoring and Reporting Guidelines.

(2) The operator shall report the emissions as specified in the greenhouse gas emissions permit from each installation during each calendar year commencing on 1st January 2005, to the Agency, not later than 31st March of the following year in accordance with:–

(a) the conditions specified in the greenhouse gas emissions permit;
(b) the principles set out in Schedule 4; and
(c) the detailed requirements of the Commission's Monitoring and Reporting Guidelines.

(3) The operator shall ensure that the report referred to in sub-article 2 is verified in accordance with the criteria set out in Schedule 5, to the satisfaction of the Agency, and shall provide a copy of the said verification report to the Agency when submitting the report specified in sub-article 2.

Reports of Emissions that have not been Verified

15 An operator whose report has not been verified or has not submitted a verification report to the satisfaction of the Agency by 31st March each year, for emissions during the proceeding year, cannot make further transfers of allowances until a report from that operator has been verified as satisfactory.

Penalties

16 (1) An operator who fails to comply with his obligations under these Regulations shall be guilty of an offence within the meaning of section 8 of the 1992 Act and shall be liable to the penalties laid down in section 9 of the said Act.

(2) The Agency shall publish the names of operators who are in breach of the requirements to surrender allowances as required by article 12(3), and the details of such breach.

(3) An operator who fails to surrender allowances as required by article 12(3) by 30th April of each year to cover its emissions during the preceding year shall be liable for payment to the Agency of an excess emissions penalty in the amount of:–

(a) €40 for each tonne of carbon dioxide equivalent emitted by that installation during the pilot period for which the operator has not surrendered allowances; and

(b) €100 for each tonne of carbon dioxide equivalent emitted by that installation during the Kyoto period and each subsequent five year period for which the operator has not surrendered allowances.

(4) Payment of the excess emissions penalty specified in this article shall not release the operator from the obligation to surrender an amount of allowances equal to those excess emissions in the following calendar year.

(5) This article shall in all respects be enforced in accordance with the provisions of the 1992 Act.

Access to information

17 The Agency shall make available to the public decisions on the allocation of allowances and the reports of emissions submitted to it by operators in accordance with the provisions of the European Communities Act 1972 (Access to Information on the Environment) Regulations 1998 (S.I. No. 125 of 1998).

Competent Authority

18 The Environmental Protection Agency is the designated competent authority for the purposes of the Directive.

Registry

19 (1) The Agency shall establish and maintain, or cause to be established and maintained, a registry in order to ensure the accurate accounting of the issue, holding, transfer and cancellation of allowances, and may do so in a consolidated manner with the registry of one or more Member States of the European Communities.

(2) Any person may hold allowances.

(3) The Registry shall be accessible to the public and shall contain separate accounts to record the allowances held by each person to whom and from whom allowances are issued or transferred.

Irregularities

20 Where irregularities are identified by or to the Agency, it shall not register, or allow to be registered as appropriate, the transactions in question or any further

transactions relating to the allowances concerned until the irregularities have been resolved.

Reporting to the Commission

21 (1) The Agency shall submit to the Commission an annual report on the application of these Regulations, providing information on the allocation of allowances, the operation of the registry, the application of the Commission's Monitoring and Reporting Guidelines, the verification of reports on emissions, compliance with these Regulations, and the fiscal treatment of allowances, if any.

(2) The first report shall be sent to the Commission by 30th June 2005, and shall be drawn up on the basis of a questionnaire or outline drafted by the Commission.

Procedures for inclusion of additional activities and gases

22 (1) From 2008, the Agency may, with the approval of the Minister, apply emissions allowance trading in accordance with these Regulations to activities, installations and greenhouse gases which are not listed in Schedule 1, provided that inclusion of such activities, installations and greenhouse gases is approved by the Commission.

(2) Allocations to installations carrying out activities referred to in sub-article 1 shall be specified in national allocation plans referred to in article 9.

Amendment of Procedures for Integrated Pollution Prevention and Control Licensing

23 The 1992 Act shall apply to installations under these Regulations with the following modifications and with any other necessary modifications to that Act arising from the implementation of these Regulations, and references in that Act or to the provisions of that Act shall, unless the context otherwise requires, be construed as including references to these Regulations or the provisions of these Regulations:–

(1) the Agency in issuing a licence pursuant to Part IV of the 1992 Act :–

(a) shall not have regard to Sections 83(4)(a), 83(5)(a)(vi), 86(1)(a)(i), 86(1)(b)(i) and 90(4)(a)(i) in respect of greenhouse gas emissions, unless it is necessary to ensure that no significant local pollution is caused; and

(b) may choose not to impose the requirements of Sections 83 5(a)(viii), 86(1)(b)(vii) and 86(1)(b)(ix) in respect of greenhouse gas emissions;

and shall amend any licence issued as appropriate.

Force Majeure

24 The Agency may, following consultation with the Minister, apply to the Commission for certain installations to be issued with additional allowances in respect of the pilot period in cases of *force majeure*, and where approved by the Commission, shall issue additional and non-transferable allowances to the operators of those installations.

SCHEDULE 1

CATEGORIES OF ACTIVITIES REFERRED TO IN ARTICLES 2(1), 3, 4 AND 14(1)

The threshold values given in this Schedule generally refer to production capacities or outputs. Where one operator carries out several activities falling under the same subheading in the same installation or on the same site, the capacities of such activities are added together.

	Activities	Greenhouse gases
	Energy activities	
E1.1	Combustion installations with a rated thermal input exceeding 20 MW (except hazardous or municipal waste installations)	Carbon dioxide
E1.2	Mineral oil refineries	Carbon dioxide
E1.3	Coke ovens	Carbon dioxide
	Production and processing of ferrous metals	
E2.1	Metal ore (including sulphide ore) roasting or sintering installations	Carbon dioxide
E2.2	Installations for the production of pig iron or steel (primary or secondary fusion) including continuous casting, with a capacity exceeding 2,5 tonnes per hour	Carbon dioxide
	Mineral industry	
E3.1	Installations for the production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or lime in rotary kilns with a production capacity exceeding 50 tonnes per day or in other furnaces with a production capacity exceeding 50 tonnes per day.	Carbon dioxide
E3.2	Installations for the manufacture of glass including glass fibre with a melting capacity exceeding 20 tonnes per day	Carbon dioxide
E3.3	Installations for the manufacture of ceramic products by firing, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain, with a production capacity exceeding 75 tonnes per day, and/or with a kiln capacity exceeding 4 m^3 and with a setting density per kiln exceeding 300 kg/m^3	Carbon dioxide
	Other activities	
E4.1	Industrial plants for the production of	
	(a) pulp from timber or other fibrous materials	Carbon dioxide
	(b) paper and board with a production capacity exceeding 20 tonnes per day	Carbon dioxide

SCHEDULE 2

GREENHOUSE GASES REFERRED TO IN ARTICLE 3

Carbon dioxide (CO_2)

Methane (CH_4)

Nitrous Oxide (N_2O)

Hydrofluorocarbons (HFCs)

Perfluorocarbons (PFCs)

Sulphur Hexafluoride (SF_6)

SCHEDULE 3

CRITERIA FOR NATIONAL ALLOCATION PLANS REFERRED TO IN ARTICLES 9 AND 22

1 The total quantity of allowances to be allocated for the relevant period shall be consistent with the national obligation to limit emissions pursuant to Decision 2002/358/EC concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfilment of commitments thereunder[4] and the Kyoto Protocol, taking into account, on the one hand, the proportion of overall emissions that these allowances represent in comparison with emissions from sources not covered by these Regulations and, on the other hand, national energy policies, and should be consistent with the National Climate Change Strategy. The total quantity of allowances to be allocated shall not be more than is likely to be needed for the strict application of the criteria of this Schedule. Prior to 2008, the quantity shall be consistent with a path towards achieving or over-achieving the national target under Decision 2002/358/EC concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfilment of commitments thereunder and the Kyoto Protocol.

2 The total quantity of allowances to be allocated shall be consistent with assessments of actual and projected progress towards fulfilling the national contributions to the European Community's commitments made pursuant to

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4 OJ L 130/1 of 15.5.2002

Decision 93/389/EEC for a monitoring mechanism of Community CO_2 and other greenhouse gas emissions, as amended by Decision 1999/296/EC[5].

3 Quantities of allowances to be allocated shall be consistent with the potential, including the technological potential, of activities covered by this scheme to reduce emissions. The distribution of allowances may be based on average emissions of greenhouse gases by product in each activity and achievable progress in each activity.

4 The plan shall be consistent with other Community legislative and policy instruments. Account should be taken of unavoidable increases in emissions resulting from new legislative requirements.

5 The plan shall not discriminate between companies or sectors in such a way as to unduly favour certain undertakings or activities in accordance with the requirements of the Treaty of the European Communities, in particular Articles 87 and 88 thereof.

6 The plan shall contain information on the manner in which new entrants will be able to begin participating in the Community scheme.

7 The plan may accommodate early action and shall contain information on the manner in which early action is taken into account. Benchmarks derived from reference documents concerning the best available technologies may be employed in developing national allocation plans, and these benchmarks can incorporate an element of accommodating early action.

8 The plan shall contain information on the manner in which clean technology, including energy efficient technologies, are taken into account.

9 The plan shall include provisions for comments to be expressed by the public, and contain information on the arrangements by which due account will be taken of these comments before a decision on the allocation of allowances is taken.

10 The plan shall contain a list of the installations covered by these Regulations with the quantities of allowances intended to be allocated to each.

11 The plan may contain information on the manner in which the existence of competition from countries or entities outside the European Union will be taken into account.

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5 OJ L 167/31 of 9.7.1993, as amended by Decision 1999/296/EC (O) L 117/35 of 5.5.1999

SCHEDULE 4

PRINCIPLES FOR MONITORING AND REPORTING REFERRED TO IN ARTICLE 14

This Schedule shall be construed in conjunction with the Commission's Monitoring and Reporting Guidelines.

Monitoring of carbon dioxide emissions
Emissions shall be monitored either by calculation or on the basis of measurement.

Calculation
Calculations of emissions shall be performed using the formula:–

Activity data × Emission factor × Oxidation factor

Activity data (fuel used, production rate etc.) shall be monitored on the basis of supply data or measurement.

Emission factors accepted or approved by the Agency shall be used. Activity-specific emission factors are acceptable for all fuels. Default factors are acceptable for all fuels except non-commercial ones (waste fuels such as tyres and industrial process gases). Seam-specific defaults for coal, and EU-specific or producer country-specific defaults for natural gas shall be further elaborated. IPCC default values are acceptable for refinery products. The emission factor for biomass shall be zero.

If the emission factor does not take account of the fact that some of the carbon is not oxidised, then an additional oxidation factor shall be used. If activity-specific emission factors have been calculated and already take oxidation into account, then an oxidation factor need not be applied.

Default oxidation factors developed by the InterGovernmental Panel on Climate Change shall be used, unless the operator can demonstrate that activity-specific factors are more accurate.

A separate calculation shall be made for each activity, installation and for each fuel.

Measurement
Measurement of emissions shall use standardised or accepted methods, and shall be corroborated by a supporting calculation of emissions.

Monitoring of emissions of other greenhouse gases
Standardised or accepted methods shall be used, developed by the Commission in collaboration with all relevant stakeholders and adopted in accordance with the procedure referred to in Article 23(2) of the Directive.

Reporting of emissions
Each operator shall including the following information in the report for an installation:

A. Data identifying the installation, including:–

- name of the installation;
- its address, including postcode where applicable, and country;
- type of number of activities specified in Schedule 1 carried out in the installation;
- address, telephone, fax and email details for a contact person; and
- name of the owner of the installation, and of any parent company.

B. For each activity specified in Schedule 1 carried out on the site for which emissions are calculated:–
- activity data;
- emission factors;
- oxidation factors;
- total emissions; and
- uncertainty.

C. For each activity specified in Schedule 1 carried out on the site for which emissions are measured:
- total emissions;
- information on the reliability of measurement methods; and
- uncertainty.

D. For emissions for combustion, the report shall also include the oxidation factor, unless oxidation has already been taken into account in the development of an activity-specific emission factor.

SCHEDULE 5
CRITERIA FOR VERIFICATION REFERRED TO IN ARTICLES 14 AND 15

General Principles

1. Emissions from each activity listed in Schedule 1 shall be subject to verification.

2. The verification process shall include consideration of the report submitted pursuant to article 14(2) and of monitoring during the preceding year. It shall address the reliability, credibility and accuracy of monitoring systems and the reported data and information relating to emissions, in particular:–

    a. the reported activity data and related measurements and calculations;
    b. the choice and the employment of emission factors;
    c. the calculations leading to the determination of the overall emissions; and
    d. if measurement is used, the appropriateness of the choice and the employment of measuring methods.

3. Reported emissions may only be validated if reliable and credible data and information allow the emissions to be determined with a high degree of certainty. A high degree of certainty requires the operator to show that:–

    a. the reported data is free of inconsistencies;
    b. the collection of the data has been carried out in accordance with the applicable scientific standards; and

c. the relevant records of the installation are complete and consistent.

4. The verifier shall be given access to all sites and information in relation to the subject of the verification.

5. The verifier shall take into account whether the installation is registered under the Community eco-management and audit scheme provided for in Regulation (EC) No 761/2001 of the European Parliament and of the Council of 19th March 2001 allowing voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)[6].

Methodology

Strategic analysis

6. The verification shall be based on a strategic analysis of all the activities carried out in the installation. This requires the verifier to have an overview of all the activities and their significance for emissions.

Process analysis

7. The verification of the information submitted shall, where appropriate, be carried out on the site of the installation. The verifier shall use spot-checks to determine the reliability of the reported data and information.

Risk analysis

8. The verifier shall submit all the sources of emissions in the installation to an evaluation with regard to the reliability of the data of each source contributing to the overall emissions of the installation.

9. On the basis of this analysis the verifier shall explicitly identify those sources with a high risk of error and other aspects of the monitoring and reporting procedure which are likely to contribute to errors in the determination of the overall emissions. This especially involves the choice of the emission factors and the calculations necessary to determine the level of the emissions from individual sources. Particular attention shall be given to those sources with a high risk of error and the abovementioned aspects of the monitoring procedure.

10. The verifier shall take into consideration any effective risk control methods applied by the operator with a view to minimising the degree of uncertainty.

Report

11. The verifier shall prepare a report on the validation process stating whether the report pursuant to article 14(2) is satisfactory. This report shall specify all issues relevant to the work carried out. A statement that the report pursuant to article 14(2) is satisfactory may be made if, in the opinion of the verifier, the total emissions are not materially misstated.

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6 OJ L 114/1 of 24.4.2001

Minimum competency requirements for the verifier

12. The verifier shall be independent of the operator, carry out his activities in a sound and objective professional manner, and understand:–

    a. the provisions of this Directive, as well as relevant standards and guidance in the Commission's Monitoring and Reporting Guidelines;
    b. the legislative, regulatory, and administrative requirements relevant to the activities being verified; and
    c. the generation of all information related to each source of emissions in the installation, in particular, relating to the collection, measurement, calculation and reporting of data.

Given under the Official Seal of the Minister for the Environment, Heritage and Local Government

this 14th day of July 2004

L.S.

MARTIN CULLEN

Minister for the Environment, Heritage and Local Government

EXPLANATORY NOTE

(This note is not part of the Regulations and does not purport to be a legal interpretation)

These Regulations establish the procedures in Ireland for participation by specified installations in the European Community greenhouse gas emissions trading scheme, in accordance with the provisions of Directive 2003/87/EC of the European Parliament and of the Council of 13th October 2003, establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC concerning integrated pollution prevention and control. The procedures include

- designation of the EPA as the national competent authority;
- application for and issue of greenhouse gas emissions permits to operators of installations, the appropriate conditions to attach thereto, and circumstances for their amendment;
- a requirement for operators of installations to be in possession of a greenhouse gas emissions permit;
- a requirement for operators to surrender allowances, each equivalent to 1 tonne of CO_2, within 4 months of each calendar year, equal to the verified quantity of emissions during that year, and their cancellation;
- the development of national allocation plans, in accordance with specified criteria, detailing the amount of allowances to issue to participating installations in each emissions trading period, the issue of these annually, and the amounts that are to be made available free of charge in the initial trading period and the 1st 5 year period thereafter;
- specified reporting, monitoring and verification obligations, to be complied with within 3 months of the end of each calendar year;

The Regulations provide for a bar on the transfer of allowances by installations that do not comply with the reporting and verification requirements, and the payment of penalties by operators who fail to surrender for cancellation allowances equal to emissions during the preceding year. The penalty payment is set at €40 per tonne of CO_2 during the initial trading period, rising to €100 for each period thereafter, with a continuing requirement to surrender allowances in the succeeding calendar year in respect of emissions for which penalty payments have been made.

The recognition of allowances issued by competent authorities in other Member States, for the transfer of allowances between persons within the European Community and for these to be held by any person is provided for. The accounting for the issue, holding, transfer and cancellation of allowances is to be through the establishment by the Agency of a registry for the purpose.

The Regulations specify that the initial national allocation plan shall be for 3 years from 1st January 2005, and thereafter for each 5-year period commencing on 1st January 2008.

Provision is made for public consultation during the preparation and finalisation of the national allocation plan, and for public access to the annual reports by operators on emissions. The public are also specified in the Regulations as having right of access to the information held in the registry.

The Regulations allow for the inclusion of additional activities and gases in the greenhouse gas emissions trading scheme from no earlier than 2008 and specify that this may only be done with the approval of the Minister and the European Commission. The Regulations amend the provisions in the Environmental Protection Agency Act 1992 (as amended) for integrated pollution prevention and control licensing, and for obligatory and optional provisions for the Agency to coordinate that code with the procedures for emissions trading.

The Regulations provide that unused allowances are to be cancelled within four months of the end of each trading period, that no allowances are to be issued by the Agency in respect of unused allowances issued in respect of the 1st three-year trading period during the next period, and that the Agency must issue replacement allowances after the end of each succeeding trading period to operators in respect of unused allowances during the 2nd and subsequent trading period.

Provision is made for the issue of additional and non-transferable allowances in the event of *force majeure*, with the approval of the European Commission.

The Agency is required by the Regulations to make annual reports to the European Commission on the operation of the greenhouse gas emissions trading.

Appendix IV

Ireland

Allocations, verified emissions and surrendered allowances and compliance status in the Community Independent Transaction Log as of 24:00 30 April 2006

Notes:

The "allocated allowances" coloumn does not include transfers from the new entrant reserve

The "surrendered allowances" coloumn includes surrenders for 2005, 2006, 2007

Installations with accounts:

Country Code	Installation Name ID	Installation ID	Permit ID	Allocated allowances for 2005	Verified emissions	Surrendered Units	Undersurrenders	Compliance status	COMMENTS
IE	Kingscourt Bricks	1	GHG001	13218	12442	12442	0	Y	
IE	Kingscourt Works	2	GHG002	40778	45592	45592	0	Y	
IE	Arrabawn Cooperative Society Limited	3	GHG003	22596	23299	23299	0	Y	
IE	Weyerhaeuser Europe Limited	4	GHG004	5963	6345	6345	0	Y	
IE	Midleton Distilleries	5	GHG005	20256	27192	27192	0	Y	
IE	Edenderry Power Plant	6	GHG007	627676	860660	860660	0	Y	
IE	Kerry Ingredients (Listowel)	7	GHG008	79841	72263	72263	0	Y	
IE	Carbery Milk Products Limited	8	GHG009	48677	41961	41961	0	Y	
IE	Elan	9	GHG011	11439	11840	11840	0	Y	
IE	Merck Sharp & Dohme (Ireland) Ltd.	10	GHG012	14448	11090	11090	0	Y	
IE	ConocoPhillips Whitegate Refinery	11	GHG013	398522	410802	411369	0	Y	
IE	Wyeth Nutritionals Ireland	12	GHG014	36392	40469	40469	0	Y	
IE	Bailieboro Foods Ltd	13	GHG015	17464	11162	11162	0	Y	

IE	Dublin Bay Power Plant	14	GHG016	929783	1131166	1131166	0	Y	
IE	Premier Proteins	15	GHG017	1530	30	30	0	Y	
IE	Schering-Plough (Brinny) Company	16	GHG018	11711	10889	10889	0	Y	
IE	Mallinckrodt Medical Imaging Ireland	17	GHG019	8874	8732	8732	0	Y	
IE	Kinsale Head Gas Field	18	GHG020	76841	60176	60176	0	Y	
IE	Beamish & Crawford	19	GHG021	3038	3322	3322	0	Y	
IE	Genzyme Ireland Limited	20	GHG022	6325	4510	4510	0	Y	
IE	Eli Lilly S.A.	21	GHG023	14366	10742	10742	0	Y	
IE	St. James's Gate Brewery	22	GHG024	71911	64514	64514	0	Y	
IE	Pfizer Ireland Pharmaceuticals	23	GHG025	7184	16838	16838	0	Y	
IE	Wyeth Medica BioPharama Campus	24	GHG026	16867	22348	22348	0	Y	
IE	St. Francis Abbey Brewery (Diageo Global Supply)	25	GHG027	7315	7741	7741	0	Y	
IE	Dundalk Brewery	26	GHG028	6228	6539	6539	0	Y	
IE	Killeshandra Site	27	GHG031	6668	5017	5017	0	Y	
IE	Lough Egish Site	28	GHG032	18930	22510	22510	0	Y	
IE	Schering-Plough (Avondale) Company	29	GHG035	10790	7023	7023	0	Y	
IE	Meath Proteins	30	GHG037	3247	460	460	0	Y	
IE	Aughinish Alumina	31	GHG038	1073318	1157505	1157505	0	Y	
IE	St. James's Hospital	32	GHG041	7643	8663	8663	0	Y	
IE	Irish Cement Ltd. (Limerick Works)	33	GHG042	824581	844873	844873	0	Y	

IE	Irish Cement Ltd., Platin Works	34	GHG043	1425029	1467121	1467121	0	Y	
IE	Clogrennane Lime Ltd.	35	GHG044	102938	102289	102289	0	Y	
IE	Premier Periclase Limited	36	GHG045	220343	223703	223703	0	Y	
IE	Ormonde Brick Ltd.	37	GHG047	11689	8746	8746	0	Y	
IE	United Fish Industries	38	GHG048	12265	11847	11847	0	Y	
IE	Cognis Ireland Ltd	39	GHG049	27656	32088	32088	0	Y	
IE	Dairygold Co-Operative Society Ltd	40	GHG050	56860	55223	55223	0	Y	
IE	Dairygold Co-Operative Society Ltd	41	GHG051	33372	28181	28181	0	Y	
IE	Swords Laboratories	42	GHG054	7743	8228	8228	0	Y	
IE	Smurfit Paper Mills	43	GHG055	17440	1815	1815	0	Y	
IE	Wyeth Medica Ireland	44	GHG057	16406	16218	16218	0	Y	
IE	Intel Ireland	45	GHG058	48006	37601	37601	0	Y	
IE	Bristol-Myers Squibb Cruiserath	46	GHG059	7415	2381	2381	0	Y	
IE	Midleton Compressor Station	47	GHG061	1269	5116	5116	0	Y	
IE	Lagan Cement	48	GHG062	486269	471772	471772	0	Y	
IE	ESB Aghada Generating Station	49	GHG063	730433	907525	907525	0	Y	
IE	Bellacorick Power Station	50	GHG064	167580	38465	38465	0	Y	
IE	ESB Great Island Generating Station	51	GHG066	487968	396788	396788	0	Y	

IE	ESB Lough Ree Power	52	GHG068	0	612694	612694	0	Y	
IE	ESB Marina Generating Station	53	GHG069	301596	152080	152080	0	Y	
IE	ESB Moneypoint Generating Station	54	GHG070	4181600	5692512	5692512	0	Y	
IE	ESB North Wall Generating Station	55	GHG071	390815	248184	248184	0	Y	
IE	ESB Poolbeg Generating Station	56	GHG072	1953404	2018121	2018121	0	Y	
IE	ESB Tarbert Generating Station	57	GHG075	1543852	1287355	1287355	0	Y	
IE	ESB Generating Station Tawnaghmore	58	GHG076	2866	24371	24371	0	Y	
IE	ESB West Offaly Power	59	GHG077	0	888107	888107	0	Y	
IE	Novartis Ringaskiddy Limited	60	GHG078	9634	11299	11299	0	Y	
IE	Pfizer Ireland Pharmaceuticals	61	GHG079	19770	12823	12823	0	Y	
IE	Huntstown Power Station	62	GHG080	781656	851847	851847	0	Y	
IE	Dublin City University	63	GHG081	3746	3524	3524	0	Y	
IE	Pfizer Ireland Pharmaceuticals, Little Island	64	GHG082	5373	3368	3368	0	Y	
IE	Flemings Fireclays Manufacturing Ltd.	65	GHG083	7672	8518	8518	0	Y	
IE	Kilbarry	66	GHG085	21089	14930	14930	0	Y	

IE	Tipperary Co Operative Creamery Ltd.	67	GHG086	20414	22045	22045	0	Y	
IE	Finsa Forest Products	68	GHG088	19123	16841	16841	0	Y	
IE	Masonite Ireland	69	GHG089	1031	582	582	0	Y	
IE	IBM Technology Campus	70	GHG090	4117	4649	4649	0	Y	
IE	Tynagh 400MW CCPP	71	GHG091	0	974	974	0	Y	
IE	Scotchtown Cement Works	72	GHG093	879739	1028010	1028010	0	Y	
IE	Dublin Airport	73	GHG094	20372	17300	17300	0	Y	
IE	SmithKline Beecham (Manufacturing)	74	GHG095	7597	3723	3723	0	Y	
IE	University of Dublin	75	GHG096	4633	4802	4802	0	Y	
IE	Cadbury Ireland Coolock Factory	76	GHG097	8059	6510	6510	0	Y	
IE	Cadbury Ireland Rathmore Factory	77	GHG098	12412	12364	12364	0	Y	
IE	Abbott Ireland Cootehill	78	GHG099	0	28761	28761	0	Y	
IE	Ballyragget	79	GHG101	79309	75778	75778	0	Y	
IE	Kilmeaden	80	GHG102	5468	6557	6557	0	Y	
IE	Virginia	81	GHG103	22354	24032	24032	0	Y	
IE	Bord na Mona Derrinlough Briquette Factory	82	GHG105	58501	64218	64218	0	Y	
IE	Bord na Mona Littleton Briquette Factory	83	GHG106	66092	46961	46961	0	Y	
IE	Smartply Europe	84	GHG108	3384	1352	1352	0	Y	
IE	Kerry Ingredients (Golden Vale plc)	85	GHG109	37370	33317	33317	0	Y	
IE	Irish Sugar Limited - Carlow	86	GHG121	64778	695	695	0	Y	

IE	Irish Sugar Limited - Mallow	87	GHG122	100457	111571	111571	0	Y	
IE	College Proteins Ltd.	88	GHG123	16778	296	296	0	Y	
IE	ADM Ringaskiddy	89	GHG124	105742	75914	75914	0	Y	
IE	Janssen Pharmaceutical Ltd.	90	GHG126	3786	4049	4049	0	Y	
IE	Belfield	91	GHG127	10096	8431	8431	0	Y	
IE	Moy Isover Ltd.	92	GHG128	10391	8650	8650	0	Y	
IE	Ballymacarry	93	GHG129	20194	25427	27970	0	Y	
IE	University College Cork	94	GHG130	7803	7924	7924	0	Y	
IE	Drogheda Concentrates	95	GHG131	5936	4113	4113	0	Y	
IE	Minch Malt Ltd.	96	GHG132	15151	14875	14875	0	Y	
IE	Baxter Healthcare SA	97	GHG133	20216	19740	19740	0	Y	
IE	Waterford Regional Hospital	98	GHG134	3198	3268	3268	0	Y	
IE	EMC Facilities Co. Cork	99	GHG136	3659	3670	3670	0	Y	
IE	Ballymun Boiler House	100	GHG137	14497	12278	12278	0	Y	
IE	University College Hospital Galway	101	GHG138	5708	6462	6462	0	Y	
IE	Cork University Hospital	102	GHG139	3486	4258	4258	0	Y	
IE	Nutricia Infant Nutrition Ltd Macroom	103	GHG140	16263	18617	18617	0	Y	
IE	Nutricia Infant Nutrition Ltd Rocklands	104	GHG141	16642	16080	16080	0	Y	
IE	Waterford Proteins / AIBP Waterford	105	GHG142	3212	2803	2803	0	Y	
IE	Munster Proteins / AIBP Cahir	106	GHG143	10605	5313	5313	0	Y	

IE	Dublin Products Ltd	107	GHG146	New entrant	1238	1238	0	Y	
IE	ESB Rhode Generating Station	108	GHG144	New entrant	29229	29229	0	Y	
IE	Slaney Proteins	109	GHG148	New entrant	446	446	0	Y	
IE Total				Allocated allowances for	Verified emissions	Surrendered Units	Undersurrenders		
				19 236 747	22 397 678	22 400 788	0		

Installations without verified emissions	0
Installations without sufficient quantity of allowances surrendered	0
Total no of installations not in compliance	**0**

Installations that have not opened their account

Country Code	Installation Name ID	Installation ID	Permit ID	Allocated allowances for 2005	Verified emissions	Surrendered Units	Undersurrenders	Compliance status	COMMENTS
	none								