

**BARRIERS AND DRIVERS TO THE IMPLEMENTATION OF THE  
“CLEAN DEVELOPMENT MECHANISM” WITHIN THE  
NELSON MANDELA BAY MUNICIPALITY:  
A CASE STUDY**

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**CRAIG MICHAEL WILSON**

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NELSON MANDELA BAY MUNICIPALITY:  
A CASE STUDY**

A thesis submitted in partial fulfillment of the requirements for the degree of

**MASTERS IN BUSINESS ADMINISTRATION (MBA)**

of

Rhodes Investec Business School

**RHODES UNIVERSITY**

by

**CRAIG MICHAEL WILSON**

**DECEMBER 2007**

**DECLARATION**

I, Craig Michael Wilson, hereby declare that this research thesis is my own work; that all references have been reported accurately and acknowledged appropriately; and that this document has not, either in its entirety or in part, previously been submitted to any university.

.....  
**Craig Michael Wilson**

10 December 2007

## **ABSTRACT**

The global threat of climate change is one of the most crucial environmental issues facing the world in modern times. In response to this threat, international governments have drafted the Kyoto Protocol which included the Clean Development Mechanism (CDM). The CDM is a scheme which invited developing countries, like South Africa, to become involved in climate change mitigation projects. While South Africa has been identified as an attractive host country for CDM projects, research has revealed that it lags behind other developing countries in this regard.

This study provides a theoretical background to the CDM and grounds the subject within the field of Environmental Economics. Following a literature review of factors that could influence the involvement of a municipality in CDM projects, this thesis undertook a case study of the barriers and drivers to CDM implementation within the Nelson Mandela Bay Municipality (NMBM).

Use was made of semi-structured interviews, where a questionnaire was used to guide the researcher's interview process. Five NMBM officers, who were likely to have been involved with CDM project implementation, were interviewed. Data collected was analyzed using a coding technique and was compared and contrasted to the literature in a process of explanation building. It was possible to elicit 14 factors that acted as CDM-barriers; seven that acted as CDM-drivers; and 10 that were required to change within the NMBM to encourage greater CDM involvement. Of the barriers, lack of awareness, poor political will and lack of funding emerged as the most inhibiting. Of the CDM-drivers, the potential financial benefits; ownership of infrastructure capable of producing carbon assets; and technology transfer emerged as the factors most likely to promote CDM involvement. With regards the factors that require change, it emerged that a positive response would result from a proactive stance by National Government on the CDM; the use of Public-Private-Partnerships to facilitate CDM projects; and improved communication and capacity building within the NMBM and the Nelson Mandela Bay business community.

The main recommendation offered to the NMBM was for it to draft a Sustainable Development Policy as well as a formal sustainable development strategy to drive a coherent and consolidated approach to the Municipality's involvement with CDM projects. Further, it was proposed that the NMBM should, lobby National Government for it to promulgate enabling legislation and a framework which would encourage CDM investment in South Africa; and engage with local business to promote the active involvement of the Nelson Mandela Bay with the implementation of CDM projects.

**Keywords:** Global Warming, Kyoto Protocol, Clean Development Mechanism, Sustainable Development, Environmental Economics, Public Sector, Nelson Mandela Bay Municipality.

## **DEDICATION**

When I once asked about a Harley Davidson Motorcycle, I was informed that the “cheapest thing about a Harley Davidson Motorcycle was buying the motorcycle”. Being an expensive item, the thought of what was still to come was daunting. Similarly, when distilling an MBA qualification into its unspoken components, a similar logic can be held where I propose that an MBA is easier for the person completing the degree than what it is for the family spectators.

I therefore dedicate this thesis to my loving wife **Sharon** and daughter **Jodi** for the sacrifices and compromises that they made for me. I am eternally grateful.

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## LIST OF ABBREVIATIONS

AAU	-	Assigned Amount Units
CAPEX	-	Capital Expenditure
CDM	-	Clean Development Mechanism
CER	-	Certified Emission Reductions
CFC	-	Chlorofluorocarbons
CH <sub>4</sub>	-	Methane
CO <sub>2</sub>	-	Carbon Dioxide
CO <sub>2</sub> e	-	Carbon Dioxide equivalent
COP	-	Conference of the Parties
DEAT	-	Department of Environmental Affairs and Tourism
DME	-	Department of Mineral and Energy
DNA	-	Designated National Authority
DOE	-	Designated Operational Authority
EB	-	Executive Board of the CDM
EIA	-	Environmental Impact Assessment
ERU	-	Emission Reducing Units
EU	-	European Union
EU-ETS	-	European Union Emission Trading Scheme
FDI	-	Foreign Direct Investment
GHG	-	Greenhouse gas
Gwh	-	Giga watt hours
HFC	-	Hydrofluorocarbons
IPCC	-	Intergovernmental Panel on Climate Change
IPP	-	Independent Power Producers
JI	-	Joint Implementation
LULUCF	-	Land-use, Land-use Change and Forestry
MFMA	-	Municipal Finance Management Act
Mw	-	Mega watt
N <sub>2</sub> O	-	Nitrous Oxide
NAP	-	National Allocation Plan
NCCRS	-	National Climate Change Response Strategy for South Africa
NMBM	-	Nelson Mandela Bay Municipality
PCF	-	Prototype Carbon Fund
PDD	-	Project Design Document
PFC	-	Perfluorocarbons

PPMV	-	Parts per million by volume
PPP	-	Public-Private-Partnerships
PWC	-	PricewaterhouseCoopers
RMU	-	Removal Units
SF <sub>6</sub>	-	Sulphur Hexafluoride
UNFCCC	-	United Nations Framework Convention on Climate Change
US-ETS	-	United States Emission Trading Scheme

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## CHAPTER ONE INTRODUCTION

*An overwhelming body of scientific evidence indicates that the Earth's climate is rapidly changing, predominantly as a result of increases in greenhouse gasses caused by human activity.*

(Stern, 2006:4).

### 1.1. Introduction

The concepts of Global Warming and Climate Change are commonly spoken about by people at social gatherings, most of the time without fully understanding the impacts of global warming but it makes for good speculative conversation. Is global warming and climate change real? Why should I worry about global warming? As a country at the tip of Africa are we really affected? These are the types of questions debated and then discounted.

For the skeptics, significant evidence supports the hypothesis that global warming and climate change are real (Dessler and Parson, 2006). Stiles (2006) challenges South African decision makers, or those responsible for strategic planning, to proactively consider the impacts of and response measures to climate change to understand how it will affect their respective organizations. While it is important to understand the risks, opportunities are also presented to organizations through the creation of carbon credits, which are essentially the financial benefits that organizations stand to gain from proactively mitigating climate change.

This chapter will create an outline of the study by providing a brief description of the relevant concepts and create a context for understanding the Clean Development Mechanism (CDM) and its relevance to South African organizations.

### 1.2. Background – Global Phenomena

There is a cause-and-effect relationship between the concepts of Global Warming and Climate Change, with global warming causing a change in climate. The rhetorical question in a readers mind should be “but what causes Global Warming?”

#### 1.2.1. Global Warming and Climate Change

In brief, Global Warming refers to the gradual warming of the earth's surface over time through the increase in the level of greenhouse gases (GHGs) in the atmosphere by the burning of fossil fuels including coal, gas and oil and clearing natural forests, while Climate Change refers to the extreme weather patterns and climate responses to this warming (Stiles, 2006). To ground the phenomenon of global warming in science, significant evidence exists to prove that the

temperature of the earth's surface has increased over the past century (Common and Stagl, 2005; Dessler and Parson, 2006). Further, other evidence confirms that there is a positive correlation between the level of GHGs in the atmosphere and the anthropogenic effect of GHG emissions, leading to the conclusion that the rapid warming of the earth's surface over the latter part of the twentieth century can be ascribed to human-related emissions.

The existence of the greenhouse effect is universally accepted by the scientific world and is responsible for making the earth's climate habitable (Common and Stagl, 2005). Without the presence of the greenhouse effect, the average temperature of the Earth's surface would be  $-20^{\circ}\text{C}$  rather than the actual  $15^{\circ}\text{C}$  (Dessler and Parson, 2006). In essence, the greenhouse effect is the process by which the sun's radiation penetrates the Earth's atmosphere and is absorbed by the Earth, thereby warming the Earth (Sathiendrakumar, 2003). In turn, the Earth is cooled by it emitting radiation back into space. The GHGs in the atmosphere absorb some of the sun's radiation and re-emit infrared in all directions, with some of the radiation being refracted back towards the earth which is then trapped in the atmosphere. It is the enhanced greenhouse effect, as a consequence of anthropogenic activity, that is creating the problem (Common and Stagl, 2005). Victor and House (2004:56) describe the problem of climate change as both "global and long-term" because GHGs are "stock pollutants" that have long life times.

It is important to note that Carbon Dioxide ( $\text{CO}_2$ ) is not the only GHG emitted by humans but does account for 60 % of the enhanced greenhouse effect (Common and Stagl, 2005). Other GHGs that are emitted by humans, mainly through fossil fuel use, land-use changes and agriculture include, water vapour, Nitrous Oxide ( $\text{N}_2\text{O}$ ), Methane ( $\text{CH}_4$ ), Chlorofluorocarbons (CFCs), Perfluorocarbons (PFCs) and Sulphur Hexafluoride ( $\text{SF}_6$ ) (United Nations, 1998).

Common and Stagl (2005) explain that with climate change, developing countries would be net losers while developed countries would have a mix of gainers and losers. There are two reasons for this; firstly the economies of developing countries are heavily dependant on climate sensitive sectors e.g. agriculture, and secondly developing countries have lower levels of human, financial and natural resources coupled with less institutional and technological capability (Common and Stagl, 2005).

To address the issue of the enhanced greenhouse effect, humans may respond in three ways, namely; through adaptation, offsetting or mitigation. In the long-run, Stern (2006) explains that

both adaptation and mitigation will be required to address the negative effects of climate change in a cost efficient and sustainable manner.

### **1.2.2. Kyoto Protocol – Global Response**

In response to the aspect of climate change, governments established an international body to assess the scientific knowledge on climate change, in the form of the Intergovernmental Panel on Climate Change (IPCC). This organization has published three reports since its formation, in 1990, 1995 and 2001, which have been instrumental in leading governments' respective responses to climate change (Dessler and Parson, 2006).

In 1992, The United Nations Framework Convention on Climate Change (UNFCCC) was tabled at the Earth summit in Rio de Janeiro and has subsequently been ratified by approximately 190 nations (Dessler and Parson, 2006). With sustainable development as an objective, the UNFCCC sought to stabilize GHG emissions, but due to insincere efforts to address climate change and the weak measures to enforce objectives, the UNFCCC was unable to achieve its specific aim to reduce emissions of 1990 levels by 2000 (Dessler and Parsons, 2006).

Building on the UNFCCC, the Kyoto Protocol was negotiated in 1997 which only applied to developed nations and imposed emission reduction targets on these countries to reduce emission levels below 1990 levels and covered a five year commitment period (2008 – 2012). The net effect would be a 5.2 % reduction relative to 1990 levels. This agreement needed to be ratified by 55 nations before it would become effective. With Russia ratifying the agreement in November 2004, it became effective from 16 February 2005 (Point Carbon, 2006). While being one of the major polluting nations, the United States of America has not joined the Kyoto Protocol.

Adding to its credibility, the Kyoto Protocol is founded on numerous internationally accepted principles including; the Precautionary Principle, Preventative Principle, Common but Differentiated Principle, Polluter Pays Principle, the Principle of Sustainable Development and the Principle of Intergenerational Equity.

In essence, those countries that have ratified the Protocol, have undertaken not to exceed their “assigned amounts” for the first “commitment period” 2008-2012 (UNFCCC, 2006). To achieve their target, countries need to implement domestic policies and measures that mitigate climate change and support sustainable development. The Protocol makes provision for these countries to reduce emissions through carbon sinks and / or through emission trading.

A carbon dioxide sink may be defined as “any process, activity or mechanism which removes greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere” (United Nations, 1992). The Kyoto Protocol allows parties to offset their emissions through carbon sinks.

To facilitate emission trading, the Kyoto Protocol has three innovative mechanisms being the Joint Implementation (JI), Clean Development Mechanism (CDM) and Emission Trading mechanisms to allow for the trade in carbon credits. Recently a fourth mechanism has been acknowledged being the Regional/ Domestic emission trading scheme (Point Carbon, 2007). In terms of the Kyoto Protocol, those countries that have been listed on Annex I may “jointly implement” GHG reduction projects to earn credits which may be used to offset current emissions or to trade. Similarly, the CDM allows those developing countries that have ratified the Kyoto Protocol to implement GHG reduction projects with those developed countries that have ratified the Kyoto Protocol to earn credits. The two emission trading schemes allow for the movement of assigned amounts between those countries cited on Annex I of the Protocol.

South Africa, as a developing country, ratified the UNFCCC on 21 August 1997 and subsequently acceded to the Kyoto Protocol on 31 July 2002. Further, South Africa has promulgated legislation in the form of a progressive Constitution and the National Environmental Management Air Quality Act which acknowledges the environment and the reduction of GHGs respectively.

To complement emission trading within South Africa, a financial instrument known as a “Carbon Credit Note’ was developed which allows an investor exposure to the upside of CDM projects without having to become involved in such projects. This market operates like a commodity market but the commodity that is being traded does not exist – “Not Carbon” (Economist, 2007a).

The Kyoto Protocol will be using the market mechanism to assist it with achieving its objectives of reducing GHG emissions and promoting greater sustainable development. However, the underlying problem, that the Kyoto Protocol is attempting to solve, is an environmental and social problem rather than a market-based one. To contextualize the problem, Economics provides a vast body of knowledge which may be applied to assessing and managing the risks of climate change as well as to the design of national and international responses to the reduction of emissions and adaptation to the impacts of climate change (Stern, 2006).

### **1.2.3. Theoretical Grounding**

The phenomena of Global Warming and Climate Change are grounded in the principles of Environmental Economics – a branch of economics concerned with the economic analysis of environmental problems. While the economy and the environment is interrelated, with the environment supporting human activity (Blignaut and de Wit, 2004), the environmental problems come to the fore when considering the questions – how is value defined and how is value determined? From an economic perspective, value is an anthropocentric concept where value is determined by people and not natural laws or policy (Kahn, 1995). When interpreting value, economists have acknowledged that both use-values and non-use-values are prevalent (Turner, 1999) with value being determined by understanding the monetary trade-offs that people are willing to make.

Environmental problems arise due to the inefficient allocation of resources i.e. market failure, and the optimal state of the environment would be the position where this market failure is corrected (Bowers, 1997). Three main causes of market failure have been identified in the existence of monopolies, public goods and externalities.

The foundation of environmental economics rests on the theory of negative externalities (Sankar, 2004). With negative externalities, the marginal social cost exceeds the marginal private costs (price) with the result being that the private optimal level will exceed the social optimal level (Sankar, 2004). By nature, global warming and climate change are negative externalities. Economic solutions to control negative externalities include accurately defining property rights, taxes on pollution, quotas on pollution and environmental regulation (Goulder and Pizer, 2006).

In addressing the externality of global climate change, the importance of a technology-push policy has also been acknowledged (Goulder and Pizer, 2006). Such a policy involves technology and research and development initiatives which mitigate climate change. Both the CDM and JI initiatives encourage technology-push. For a developing country, such as South Africa, the CDM is the relevant mechanism for the country to become engaged in projects that reduce GHG and mitigate climate change.

### **1.2.4. Clean Development Mechanism**

Article 12 of the Kyoto Protocol, sets out the framework of the CDM which allows both public and private entities in developed countries to initiate and implement emission reduction projects in developing countries and receive carbon credits in the form of Certified Emission Reductions

(CER) (Sterling Waterford, 2004). The CDM innovation allows the investor and host countries to share the economic surplus, being the difference between the marginal reduction costs of the two nations, i.e. avoided costs – host costs = surplus (Sterling Waterford, 2004). It is due to this surplus that it is possible to create a financial instrument that monetizes this surplus into an asset (Sterling Waterford, 2004).

An important feature of the CDM is that of “Additionality” which refers to the issue of which projects will qualify for CERs. In terms of this concept, only projects which would not have been undertaken in the normal course of business (Business-as-usual) or in the absence of a carbon credit scheme are eligible to be registered as CERs (Stiles, 2006).

An internationally accepted procedure has been designed by the UNFCCC for the registration of CDM projects. Domestic involvement will be through a country’s respective Designated National Authority (DNA) for project registration and through the Designated Operational Entity (DOE) for project validation and CER verification. In South Africa, the Department of Minerals and Energy (DME) is the DNA, and the accounting firm PricewaterhouseCoopers (PWC) the DOE.

The CDM architecture, acknowledges large-scale and small-scale projects which address either the concern of GHG reduction or carbon sequestration through carbon-sinks. While there are many approved modalities for GHG reduction projects, due to the uncertainty of the permanence of the CERs from carbon sinks, there are less approved modalities for carbon sequestration projects (Ellis and Kamel, 2007). As at September 2007, research conducted by Financial Mail (2007a) showed that there were 781 projects registered under the CDM. India, Brazil, China and Mexico have emerged as the countries with the most registered projects with 267, 104, 104 and 90 projects respectively (Financial Mail, 2007a). For the same period, South Africa had only registered 10 projects.

While the CDM has an objective of facilitating compliance with emission reduction commitments of developed countries, it has a second obligation of facilitating sustainable development in host countries (Jung, 2006). At present, the CDM is focused on producing a tradable commodity at the lowest financial cost which aggravates the desire for an “environmentally superior” outcome as both investors and buyers are directed away from projects that offer the most benefits to the host nation (Pearson, 2007). Developing countries therefore face the dilemma of enforcing their respective national sustainability criteria and being perceived as being an attractive location for CDM investment.

Jung (2006) argues that while there are many exogenous aspects that will influence host country selection, the distribution of CDM projects depends on the attractiveness of host countries for CDM investment. Frankhauser and Larvic (2003, in Jung, 2006) identify three factors that may be used to determine host country attractiveness for both non-sink CDM and JI projects:

- the scope for cheap carbon credits;
- institutional capacity within host countries to process CDM deals; and
- the country's general investment climate.

Using the above mentioned dimensions, Jung (2006:2178) categorized South Africa as being a "very attractive" CDM host country. However, research by Point Carbon (2007) suggested that South Africa was a relatively insignificant player in the CDM market.

Against this background and the relative void in the literature regarding public sector involvement in the CDM, the researcher sought to explore why the Nelson Mandela Bay Municipality (NMBM) was not proactively pursuing CDM projects by examining the factors that may influence the NMBM's involvement in CDM projects. The intention of this research was to provide insights into the factors that either constrain or promote the involvement of the NMBM. Further, the research sought to identify factors that need to change to improve the future involvement on the NMBM in CDM projects.

### **1.3. Nelson Mandela Bay Municipality**

From the literature review, it became apparent that certain Municipalities within South Africa (eThekweni, Ekurhuleni and The City of Cape Town) were progressive in registering CDM projects (Greene, 2006). The study therefore sought to investigate why this was not the case in the NMBM with the intention that the findings be made available to the NMBM for consideration.

The NMBM is the only metropolitan Municipality in the Eastern Cape Province and includes Port Elizabeth, Uitenhage, Despatch, Seaview and Blue Horizon Bay (IDP, 2007). The Nelson Mandela Bay spans over an area of 1 950 km<sup>2</sup> and has a population of approximately 1.3 million (IDP, 2007). Relative to the greater Eastern Cape Province, this area contributes approximately 44 % to the Provincial Gross Geographical Product (IDP, 2007). Notwithstanding the high level of economic activity in the Nelson Mandela Bay region, a review of South Africa's CDM Project Portfolio revealed that the NMBM did not have any projects registered (DME, 2007).

According to the DME (2007), to date, 54 CDM projects have been submitted to the DNA – 34 as Project Idea Notes and 20 as Project Design Documents. Of the 20 Project Design Documents, 10 have been registered as CDM projects by the CDM Executive Board, three have requested registration and seven are awaiting validation by the DOE (DME, 2007). To date, only one project has been rejected by the DNA. An array of projects has been submitted to the South African DNA and includes “bio-fuels, energy efficiency, waste management, cogeneration, fuel switching and hydro power (DME, 2007:1). Further, projects have been submitted from different sectors, including, “manufacturing, mining, agriculture, energy, waste management and housing and residential” (DME, 2007:1).

A review of South Africa’s CDM Project Portfolio revealed that The City of Cape Town and the eThekweni Municipalities each had one CDM project registered. Further, The City of Cape Town and the Ekurhuleni Municipalities each had one project at the Project Idea Approval stage (DME, 2007). While the NMBM did not have any CDM projects currently listed, the Nelson Mandela Bay region did have two projects at the Project Idea Approval stage - the one being the Kouga Wind Farm and the other the Coega Combined Cycle Gas Turbine Plant with each project being initiated by private sector project developers. With regard to the Wind Farm project, the NMBM has agreed to purchase the renewable energy generated by the project (Greene, 2006) which was confirmed by the study.

The NMBM prides itself as having a vision to be “A globally competitive city that works together with people” (IDP, 2007). With the CDM being a developing country response mechanism to a global problem, this study hopes to contribute to the City’s global competitive position.

#### **1.4. Vision**

The researcher’s vision is:

- for the Eastern Cape, in general, and Port Elizabeth, in particular, to be regarded, by investors, as the preferred destination for CDM projects, within South Africa; and
- for Port Elizabeth to be perceived as a progressive “Clean Technology” zone, attracting sustainable Foreign Domestic Investment into CDM initiatives fostering the National principles of Sustainable Development.

In pursuit of this, it was the intention of this study to make the findings available to the NMBM to encourage greater thought and debate on how the Municipality can proactively become involved in, or positively influence CDM projects.

## **1.5. Research Objectives**

The goal of the research is to develop an understanding of the factors that would either constrain or promote the active involvement of the NMBM in the implementation of CDM projects. Further, this research sought to explore what needs to change, within the municipal context, to encourage the NMBM to proactively pursue CDM investment.

To explore the topic, the following research objectives were defined:

- Understand the level of awareness of and perception towards the CDM initiatives amongst selected municipal officials within the NMBM;
- Ascertain the current Institutional Capacity with regards to CDM;
- Determine the current obstacles prevalent in the Municipality preventing it from proactively pursuing CDM initiatives;
- Determine the enablers required to facilitate CDM project initiation; and
- Ascertain Future Prospects and Developments required within the NMBM to promote greater involvement in CDM initiatives.

The recommendations made are presented in Chapter 7.

## **1.6. Thesis Outline**

The research is divided into seven chapters with this being the introductory chapter. Set out below is an outline of each of the remaining chapters.

**Chapter 2** provides an elaborate literature review on the background to the study which includes discussions on Climate Change, Global Warming, the Greenhouse effect, the Kyoto Protocol and the South African Context to the study. Further, a literature review on the theoretical grounding of the study in Environmental Economics is presented.

**Chapter 3** extends the literature review by focusing specifically on the CDM. In this chapter, certain cautions are discussed; host country attractiveness is elaborated on; factors that either constrain or promote CDM involvement from a public sector perspective are discussed; and factors that need to change to encourage greater involvement are elaborated on.

**Chapter 4** describes and justifies the research methodology adopted in this study.

**Chapter 5** presents the findings of the research.

**Chapter 6** discusses the findings relative to the propositions and factors that are hypothesized in Chapter 4.

**Chapter 7** includes a summary of the study, followed by recommendations to the NMBM based on the findings of the study, as well as recommendations for future research on this topic.

## **CHAPTER TWO**

### **LITERATURE REVIEW: THEORETICAL GROUNDING**

*Continued global warming is in nobody's interest, but the simple facts of the matter are that developing countries will suffer the most damage and their poor will be at an even greater disadvantage.*  
*James D. Wolfensohn, President, The World Bank Group*

(The World Bank, 2005).

#### **2.1. Climate Change**

##### **2.1.1. Introduction**

The phenomenon of climate change refers to the change in climate that can be directly or indirectly ascribed to anthropogenic activity which alters the composition of the atmosphere, with these contributions being in addition to the natural climate variability observed over a period of time (Eskom, 2003). Research has shown that the rising concentrations of GHGs in the Earth's atmosphere are a significant contributing factor. Due to the unpredictability and severity of its impacts, this phenomenon has become one of the most crucial environmental issues facing the world in modern times (Eskom, 2003).

This chapter serves to create a context for understanding the CDM. Firstly the chapters discusses important concepts relative to global warming it then proceeds with a discussion on the Kyoto Protocol, the CDM and then links the study to the South African context. The last section of this chapter grounds the study in Environmental Economics.

##### **2.1.2. Positive and Normative Statements**

In order to support or oppose an argument, people may advance support for two kinds of arguments – positive or normative claims (Dessler and Parson, 2006). A positive claim relates to what is known and concerns the way things are. In contrast, a normative claim relates to what one values, or should value and is concerned with how things should be (Dessler and Parson, 2006). Arguments on the climate change issue, intertwine positive and normative claims. Such statements may contain positive claims about the nature and extent of expected impacts and the efficacy of society's response, with normative claims about the acceptability of mitigation costs (Dessler and Parson, 2006). An example of such a statement could be, the resultant impact of climate change on resources, ecosystems and society are likely to be unacceptably severe but the future impacts of climate change can be limited at an acceptable cost. Dessler and Parson (2006) argue that with regard to policy debates, it is important to separate positive and normative claims on environmental issues because of the central role that positive claims play in policy formulation.

### **2.1.3. Global Warming**

In order to ground the concept of global warming in science it is important to establish whether there is evidence that proves that the climate is changing and also to establish the cause and effect of such change if prevalent. In assuming the question of whether climate is changing or not, Dessler and Parson (2006) refined their assessments in three ways. Firstly, the meaning of climate was enlarged to include other factors, besides temperature, such as humidity, precipitation, cloudiness and wind. Temperature became the climate characteristic used in their analysis, because the best data existed for this factor and temperature is most influenced by GHG emissions. Secondly, the time period since the industrial revolution was selected as the relevant period to test for human-induced climate change. Lastly, measures of temperature used in the study assessed the change in average surface temperature of the earth which was averaged over a period of a year.

Dessler and Parson (2006) argue that the evidence presented (Table 2.1) is scientifically correct in that it has been peer reviewed and multiply verified by other scientists. The data (Table 2.1) indicates that the earth's surface temperature has increased over the selected time period. While it is acknowledged that no data set is perfectly reliable Dessler and Parson (2006) argue that it is not possible for all the data sets selected in the study to be wrong and in the same direction, to reject the conclusion of substantial global warming in the twentieth century. It may therefore be concluded that with the prevalence of the relevant abundant, consistent and verified data that the earth's surface has warmed over the past century (Dessler and Parson, 2006).

The second aspect investigated in Dessler and Parson's (2006) study was the cause and effect of natural and anthropogenic interference with the climate system. They assessed six potential causes of global warming over the twentieth century which included human emission and five natural processes. Immediately, orbital variations and tectonic processes (geological distribution of continents and mountain ranges) were eliminated as potential causes because such processes are too slow to significantly effect global warming over a short period (Dessler and Parson, 2006). The remaining three natural processes being volcanic eruptions, change in solar output and internal variability may have contributed to the global warming but only marginally in extent.

To test the effect of the cause and effect relationship on global warming Dessler and Parson (2006) made use of multi-variable models. Figure 2.1 shows the relationship between observed temperature change and a climate model using three alternative variations of climate factors.

Table 2.1: A summary of the measurements of change in the Earth's temperature.

Type of Data	Direction of twentieth century change	Size of change, comments
Direct surface air temperature	Warming	Average surface air temperature increased about 0.6 °C (1 °F) over the twentieth century, with about half this warming occurring between 1980 and 2000.
Glaciers	Warming	Glaciers have been reducing on average for a few centuries, with evidence of faster retreat in the twentieth century. The warming implied by this recession is about two-thirds of a degree Celsius per century, consistent with the surface record.
Sea-level change	Warming	Sea level rose about 15cm total over the twentieth century. About half this rise probably came from the expansion of ocean water as it has warmed.
Sea Ice	Warming	The area of Arctic sea ice in spring and summer has decreased by 10-15 percent over the past 50 years. Average thickness of Arctic sea ice has decreased by 40 percent over the same period.
Ocean Temperature	Warming	The top 300m of the ocean has warmed 0.18 °C over the past 50 years.
Climate proxies	Warming	Combined data from many climate proxies show gradual Northern Hemisphere cooling from the year 1000 to the nineteenth century, then strong warming during the twentieth century.
Satellite temperature measurements	Warming	Satellite instruments show warming of 0.06-0.26 °C per decade.

(Source: Dessler and Parson, 2006:65).

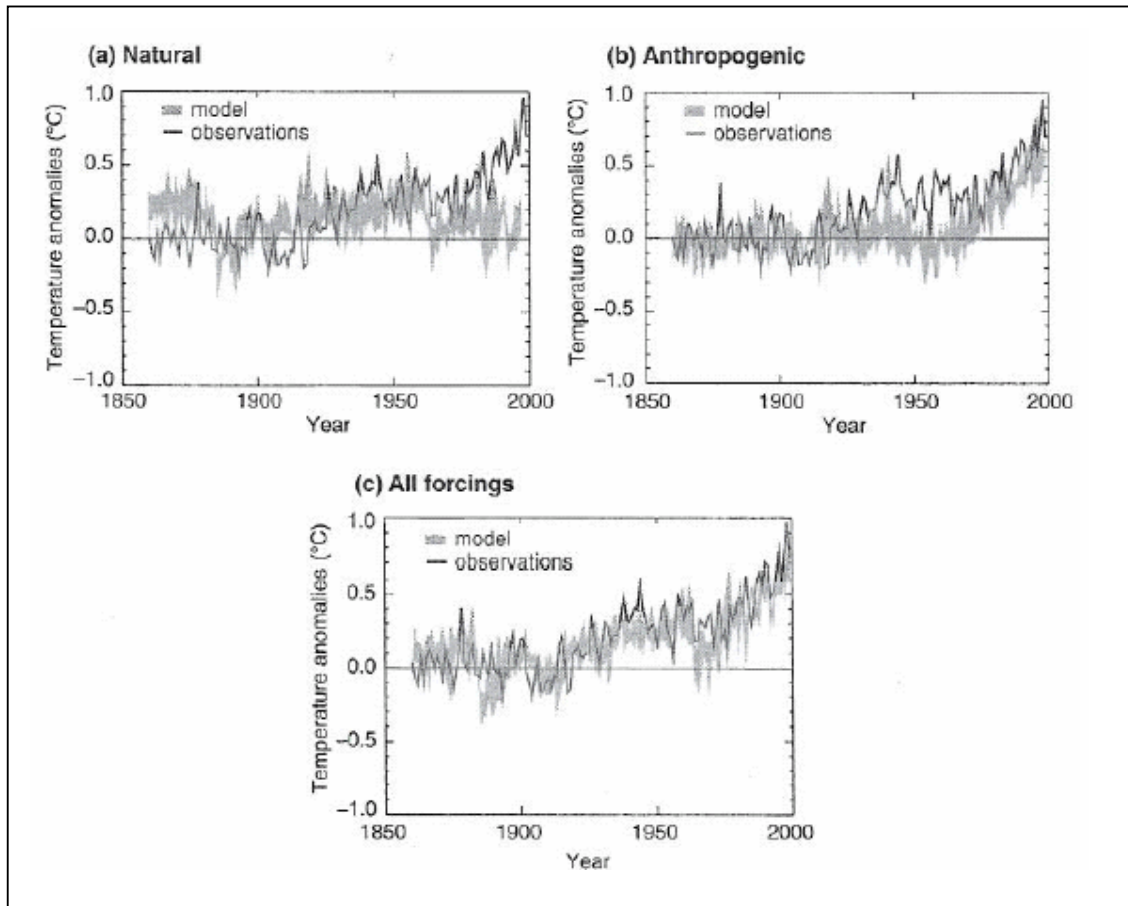


Figure 2.1: The simulated annual global mean surface temperature for the period 1850 to 2000, showing a) the natural effects, b) the anthropogenic effects and c) the combined natural and anthropogenic effects on the recorded temperature.

(Source: Dessler and Parson, 2006:74).

The first panel plots the relationship between observations and the natural forces of volcanic activity and solar variability (Figure 2.1). The second panel plots the anthropogenic effect of GHG emissions and sulphur emissions from the burning of fossil fuels (Figure 2.1). The last panel includes both the natural and anthropogenic effects and can be used to explain the historical observations (Figure 2.1). Dessler and Parson (2006) argue that global warming in the early part of the century can mostly be ascribed to the solar effects while the cooling in the mid-century period is mostly due to sulphur emissions.

The conclusion that can be drawn from Dessler and Parson (2006) is that while the Earth has been warming for centuries, the rapid warming over the latter part of the twentieth century can be ascribed to the anthropogenic effect. It is acknowledge that other causes could account for a small

fraction of the change but the extent and timing of the warming correlates with human emissions (Dessler and Parson, 2006). Common and Stagl (2005) highlighted that research done by the IPCC show that over the course of the twentieth century the Earth's mean surface temperature increased by approximately  $0.6 \pm 0.2$  °C. This  $\pm 0.2$  °C band represents a 95% confidence interval which may be interpreted as the Earth's mean temperature increasing between 0.4 °C and 0.8 °C. Dessler and Parson (2006) conclude, with a high degree of confidence that the recent rapid rate of global warming is due to human GHG emissions.

#### **2.1.4. The Greenhouse Effect**

Greenhouse gas emissions are neither visible nor malodorous but have a warming impact on the Earth (The World Bank, 2006). The existence of the greenhouse effect is universally accepted by the scientific world. It is this phenomenon that has made life, as we know it, possible on planet Earth (Common and Stagl, 2005). In essence, the greenhouse effect is the process by which the sun's radiation penetrates the Earth's atmosphere and is absorbed by the Earth, thereby warming the Earth (Sathiendrakumar, 2003). In turn, the Earth is cooled by it emitting radiation back into space. Without the presence of the greenhouse effect, the average temperature of the Earth's surface would be -20 °C rather than the actual 15 °C (Dessler and Parson, 2006).

The sun's radiation may be described as short-wavelength radiation or near-infrared while the cooler Earth emits a longer-wavelength radiation, lying in the infrared region of the electromagnetic spectrum (Dessler and Parson, 2006). Approximately 60 % of the solar radiation that penetrates the atmosphere reaches the Earth's surface, of which approximately 18 % is reflected back (Common and Stagl, 2005). The GHGs in the atmosphere, which include water vapour, CO<sub>2</sub>, chlorofluorocarbons (CFCs), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) absorb some of the radiation and re-emit infrared in all directions. Some of this infrared is reflected back to the earth's surface, thereby trapping the sun's heat from escaping and warming the lower atmosphere of the earth's surface (Sathiendrakumar, 2003; Common and Stagl, 2005; Dessler and Parson, 2006). The term greenhouse has been used because the GHGs act like a blanket around the earth, like the glass top of a gardener's greenhouse (Common and Stagl, 2005). Dessler and Parson (2006) argue that such analogies refer more to the slow physical escape of warm air as opposed to the real phenomenon of disruption of the passage of radiation. These authors highlight the significance of the GHGs by pointing out that while these gases are only present in minute concentrations, they have warmed the earth's surface by approximately 35 °C. It is therefore logical to expect an increase in the GHGs to relate to a positive increase in the global temperature.

It is the enhanced greenhouse effect, as a consequence of anthropogenic activity, that is creating the problem (Common and Stagl, 2005). Victor and House (2004:56) describe the problem of climate change as both “global and long-term” because GHGs are “stock pollutants” that have long life times. Further, they highlight that the main concern is the concentration of GHGs in the atmosphere and not the geographical location of the sources of emission. The concentration depends on the relationship between emissions and processes that remove such gases from the atmosphere known as sinks (Common and Stagl, 2005). Since the period prior to the industrial revolution (up to the year 1750) and the year 2000, the concentration of GHGs have increased from approximately 275 ppmv (parts per million by volume) to 368 ppmv – being a 34 % increase (Winkler, 2005). According to a study concluded by the IPCC, Winkler (2005) highlights that if emissions continue rising then it can be reasonably expected that the global temperature will increase between 1.4 and 5.8 °C by the end of the twenty first century.

It is important to note that CO<sub>2</sub> is not the only GHG emitted by humans but does account for 60 % of the enhanced greenhouse effect (Common and Stagl, 2005). Other GHGs that are emitted by humans, mainly through fossil fuel use, land-use changes and agriculture include N<sub>2</sub>O and CH<sub>4</sub> (Lorey, 2003). Methane is emitted through the paddy cultivation of rice, ruminant animals, the burning of fossil fuel and the disposal of waste in landfills. Humans influence the level of N<sub>2</sub>O through fossil fuel combustion and the use of Nitrogen fertilizers in agriculture. A synthetically manufactured chemical that adds to the GHGs is Chlorofluorocarbons (CFCs) which are used in refrigerators, solvents and aerosol propellants (Common and Stagl, 2005; Dessler and Parson, 2006). However, not all GHGs are caused by human emissions. Dessler and Parson (2006) identify water vapour as being the most powerful GHG which is controlled by the worldwide balance between evaporation and precipitation. Set out in Table 2.2 is a list of the GHGs that are regulated and monitored by the UNFCCC.

Table 2.2: The greenhouse gases currently monitored and their respective CO<sub>2</sub> equivalents.

Greenhouse Gas	Global Warming Potential (100 year time horizon)
Carbon Dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	21
Nitrous Oxide (N <sub>2</sub> O)	310
Hydrofluorocarbon 23	11700
Hydrofluorocarbon 134a	1300
Hydrofluorocarbon 152a	140
Hydrofluorocarbon 125	2800
Sulphur Hexafluoride (SF <sub>6</sub> )	23900

(Source: Greene, 2006:4, as cited in UNFCCC, 1995).

Global warming over the last 50 years is due to industrialization and intensive agriculture where the atmosphere was treated as a “free good and not a composite asset” (Sathiendrakumar, 2003). The fault is not with development *per se* but with the way in which business has treated the environment.

Already some evidence exists that global warming is impacting on the social and economic systems with the increase in flooding and drought in certain regions being cited as examples (Common and Stagl, 2005). Examples of natural eco-systems at risk include “glaciers, coral reefs and atolls, mangroves, boreal and tropical forests, polar and alpine eco systems, prairie wetlands and remnant native grass lands” (Common and Stagl, 2005: 493). These same authors include that human systems at potential risk include “water resources, agriculture (especially food security) and forestry, coastal zones and marine systems (fisheries); human settlements; energy and industry; insurance and other financial services and human health.”

While global warming poses numerous threats, it also offers certain benefits in the form of more moderate climates in extremely cold areas but in terms of current scientific knowledge it is generally held that the potential adverse affects outweighs the benefits. Common and Stagl (2005) explain that with climate change, developing countries would be net losers while developed countries would have a mix of gainers and losers. Further it is indicated that the anticipated economic impact would increase the disparities between developed and developing nations. There are two reasons for this, firstly for developing countries their economies are heavily dependant on climate sensitive sectors, and secondly due to the lower levels of human, financial and natural resources coupled with less institutional and technological capability (Common and Stagl, 2005). Stern (2006) concurs with this logic where the author acknowledges that developing countries are particularly vulnerable to the physical impacts of climate change, that their respective economies are sensitive to adverse climate change and have low incomes which restrain their respective abilities to adapt.

Stern (2006) acknowledges that the effects of climate change will affect countries to varying degrees – dependent on their respective socio-economic and environmental conditions. Figure 2.2 illustrates the factors that influence the vulnerability of a country to climate change. Stern (2006) highlights that the current status of these factors will determine the scope of the impacts of climate change on a country’s social, economic and environmental conditions. He further describes vulnerability to climate change as consisting of *exposure* to climate change, the *sensitivity* - being

the responsiveness of a system to climate change and *adaptive capacity* – relating to a country’s ability to prepare for and address the negative effects of climate change (Stern 2006:106).

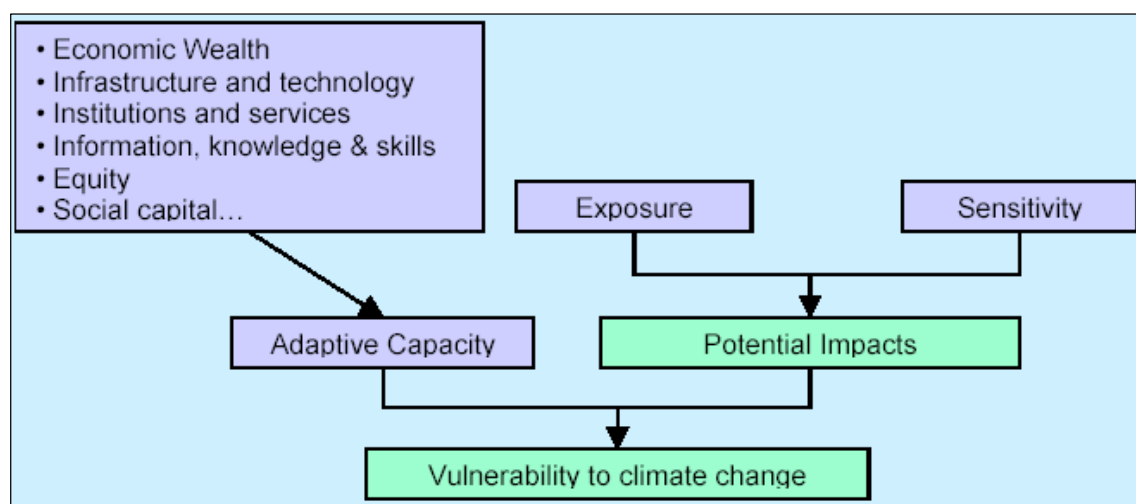


Figure 2.2: Factors influencing the vulnerability of a country to climate change. (Source: Stern, 2006:107, as adapted from Lonescu, 2005).

To address the issue of the enhanced greenhouse effect, society may respond in three ways: namely; through adaptation, offsetting or mitigation. Adaptation would entail simply allowing the enhanced greenhouse effect to continue and to adjust human intervention with climate change accordingly. Offsetting would involve humans acting against the build-up of GHGs in the atmosphere while mitigation would involve proactively reducing the rate of increase and concentration of GHGs through either reducing the rate of emissions or enhancing the sinks that sequester these gases (Common and Stagl, 2005).

In the long-run, Stern (2006) explains that both adaptation and mitigation will be required to address the negative effects of climate change in a cost efficient and sustainable manner. This author states that adaptation would not be an adequate response as ecosystems would not be able to cope with the change in climate and remaining adaptation will be more costly. Further, this author contends that while adaptation does reduce the damage cost of climate change, it does not directly prevent climate change, thereby indirectly forming part of the costs of climate change. Stern (2006) emphasizes that mitigation reduces damage costs through preventing climate change and therefore proposes a strategy of mitigation plus adaptation to reduce the probability of dangerous effects of climate change.

Similarly, Stiles (2006) encourages organizations to understand the direct physical effects of climate change on their respective business activities, to understand the response measures undertaken by other organizations within the organization's value chain and to create carbon assets through mitigation. Carbon assets refer to an organizations ability to reduce GHG emissions and generate a tradable asset which can be used to generate revenue and offset part of the mitigation costs (Stiles, 2006).

### **2.1.5. Economic Tools to Control Greenhouse Gases**

Sathiendrakumar (2003:1236) postulates that CO<sub>2</sub> emissions depend on four factors, which include:

- "Population size
- Gross domestic product (GDP) per capita
- Energy efficiency – energy utilized per unit of GDP, and
- Carbon dioxide generated per unit of energy utilized".

This author proposes that CO<sub>2</sub> production in any country can be represented in the following equation:

$$\begin{aligned} &\text{"Total carbon dioxide production} \\ &= (\text{population}) (\text{GDP} / \text{population}) (\text{energy} / \text{GDP}) (\text{Carbon dioxide} / \text{energy})" \end{aligned}$$

From the above function, it can be deduced that in order to reduce total CO<sub>2</sub> production without affecting the quality of life, reduction should be made to "population size, energy required per production and emission of CO<sub>2</sub> per unit of energy utilised" (Sathiendrakumar, 2003:1236). Realistically, a reduction in the population is unlikely. Poor countries are generally over-populated but this phenomenon is not isolated to only developing countries and includes developed nations of the world (Sathiendrakumar, 2003).

With regard to improving energy efficiency, Sathiendrakumar (2003) argues that this is not possible in the short-term but through technological progress may become possible in the long-run. With energy production and the change in land-use being responsible for most of the enhanced greenhouse effect, energy consumption is expected to rise with future population growth and urbanization. However, in the long-run the use of clean technology and renewable energy sources such as "wave, hydro and geothermal power" can be applied to reduce GHG emissions (Sathiendrakumar, 2003). Focus should therefore be placed in reducing CO<sub>2</sub> per unit of energy utilized.

In order to achieve global warming targets, two types of policy instruments are available namely; command and control regulations such as standard setting as proposed by the Kyoto Protocol, and economic instruments which include carbon taxes and tradable permits. These concepts are elaborated on later in this chapter.

## **2.2 The Kyoto Protocol**

### **2.2.1. Framework Introduction**

The environmental issue of global climate change did not receive political support from national governments until 1988 when the world faced a series of adverse climate incidents (Dessler and Parson, 2006). In response, governments established an international body (in the form of the IPCC) to assess the scientific knowledge on climate change. This organization has published three reports (in 1990, 1995 and 2001) since its formation, which have been instrumental in leading governments' respective responses to climate change (Dessler and Parson, 2006).

In 1992, UNFCCC was tabled at the Earth summit in Rio de Janeiro. This treaty has since been ratified by nearly a 190 nations, including the United States of America, and has been established as law in these countries (Dessler and Parson, 2006). The mentioned summit was an off spring of the Brundtland Report and was intended to promote sustainable development, bringing together concerns about the global environment and poverty in developing countries (Common and Stagl, 2005). The UNFCCC now forms part of a larger process – that being sustainable development and to this end, as set out in Article 2, has its stated objective as the “stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner” (United Nations, 1992).

The UNFCCC served as the starting point to further action required to address global climate change. While only aimed at industrialized nations, commitment was shown to support research on climate change and report on current and projected national emissions (Dessler and Parsons, 2006). It can be argued that due to insincere efforts to address climate change and the weak measures to enforce objectives, the UNFCCC was unable to achieve its specific aim to reduce emissions of 1990 levels by 2000 (Dessler and Parsons, 2006).

In 1995, negotiations focused proactively on addressing the issue of climate change by seeking binding national GHG emissions targets. These negotiations culminated in the Kyoto Protocol being signed in December 1997. In essence, the agreement reached only applied to developed nations and imposed specific emission reduction targets on these countries and covered a five year commitment period 2008-2012 (United Nations, 1998). Set out in Appendix A, of this document, are the reduction commitments as referred to in the Kyoto Protocol. These commitments range from a reduction of 10 % in some nations to an increase of 10 % in others, with the net effect being a 5.2 % reduction relative to 1990 levels.

Following on from the UNFCCC, industrialized countries needed to take the lead and bear the initial burden. These parties were committed to an important and novel feature of the UNFCCC being the provision for subsequent annual conferences of the parties (COP). These COP's were mandated to resolve issues not addressed in the UNFCCC and in the light of changing knowledge, to review progress toward the UNFCCC objectives (Common and Stagl, 2005).

In order for the Kyoto Protocol to become effective, Article 25 of the Protocol required ratification by 55 countries, including those parties cited on Annex B who contributed at least 55 % of total CO<sub>2</sub> emissions in the base-year of 1990. This threshold meant that without the United States' participation, all other major industrialised nations would need to ratify the agreement. This ideal was reached in November 2004 when Russia ratified the agreement allowing the Protocol coming into force on 16 February 2005 (Point Carbon, 2006).

### **2.2.2. Guiding International Principles**

Reviewing the Kyoto Protocol, international principles are identified namely; the Precautionary Principle, Preventative Principle, Common but Differentiated Principle, Polluter Pays Principle, the Principle of Sustainable Development and Intergenerational Equity. The intention of the Precautionary Principle is to provide guidance in the development and application of environmental law, particularly in cases where there is uncertainty (Sands, 2003). Principle 15 of the Rio Declaration, as cited in Sands (2003), provides that where there are threats of serious irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation. Principle 15 requires that this principle be applied widely by different countries according to their capabilities (Sands, 2003). The Preventative Principle relates to the obligation to prevent damaging the environment and prohibits activities which cause, or have the potential to cause, damage to the environment (Sands,

2003). This principle suggests that action should be taken early before damage occurs, but where damage has occurred, those damages should be minimized (Sands, 2003).

With regard to international environmental law, the basic ideology of the Common but Differentiated Principle is the recognition that the peculiar needs of developing countries must be taken into consideration in the development, application and interpretation of international law. This principle essentially has two elements, the first being the common responsibility for the protection of the environment and the second relates to the contribution to a particular environmental problem and the country's ability to minimize the threat (Sands, 2003).

The Polluter Pays Principle maintains that the person responsible for causing the pollution should bear the cost of that pollution (Sands, 2003). From the economic perspective, the negative externality costs of pollution typically borne by society at large should be internalized by the perpetrator.

The Principle of Intergenerational Equity is described by Brown, (1989 in Sands, 2003) as the present generation holding the earth in trust for future generations and is closely associated with the idea of sustainability development. Sustainability may be defined as a dynamic condition where the economic, environmental and social systems meet the needs and wants of the present generation, while maintaining or increasing the resource and productive capacities that are bequeathed to the future generations (Flynn, Berry and Heintz, 2002). It follows that sustainable development is a positive change which does not occur at the expense of the environment or social systems on which humans depend (Sustainability Measures, 1998). A coordinated approach to the planning and policy making is therefore required which draws on public participation (Sustainability Measures, 1998).

### **2.2.3. Framework Discussion**

Annex B parties that have ratified the Protocol, have undertaken not to exceed their "assigned amounts" for the first "commitment period" 2008-2012 (UNFCCC, 2006). To achieve their target, countries need to implement domestic policies and measures that mitigate climate change and support sustainable development. There are two methods of dealing with GHG emissions. The one is through carbon sinks and the other through emission trading.

A CO<sub>2</sub> sink may be defined as "any process, activity or mechanism which removes greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere" (United Nations, 1992).

The Kyoto Protocol allows parties to offset their emissions through carbon sinks. The Protocol refers to carbon sinks in the “land-use, land-use change and forestry sector (LULUCF) and identifies afforestation and reforestation as eligible activities (UNFCCC, 2006). However, the Marrakesh Accords which were adopted in 2001, includes four additional categories namely; forest management, cropland management, grazing land management and revegetation (Sathiendrakumar, 2003).

To assist countries in achieving their emission target, the Protocol established three innovative “mechanisms” known as “Joint Implementation, Clean Development Mechanism and Emission Trading”. However, these mechanisms are “supplemental to domestic action” and such mechanisms are only available to parties who have ratified the Protocol and who comply with the methodological and reporting obligations of the Protocol (UNFCCC, 2006). Point Carbon (2007:3) lists a fourth mechanism being “Regional/Domestic Emission Trading” with the European Union Emission Trading Scheme (EU-ETS) being the only operational regional CO<sub>2</sub> scheme.

Victor (2001:4) describes the three mechanisms as interrelated trading systems which will allow “Firms to shop the world for the least costly way to reduce emissions”. While nations will have the ultimate responsibility to comply with the Protocol under international law most of the trading will be concluded by firms and individuals (Victor, 2001).

In terms of Article 6 of the Kyoto Protocol, countries listed on Annex I of the UNFCCC may jointly implement projects that either reduce emission or increase sequestration through sinks. The resulting Emission Reducing Units (ERU) may be applied against the countries own targets (UNFCCC, 2006).

Similarly, the CDM, as discussed in Article 12 of the Kyoto Protocol, allows Annex I countries to implement projects in non-Annex I countries which address reducing GHG emissions. In terms of the Protocol, Annex I countries may use the resulting certified emission reductions (CER) to offset their own targets (UNFCCC, 2006). It may be argued that while contributing to the ultimate objective of the Protocol, the CDM also contributes toward sustainable development in non-Annex I countries (UNFCCC, 2006).

The third mechanism of emission trading, allows for the movement of Assigned Amount Units (AAU) between Annex I countries, where one party may find it relatively more difficult to meet

its targets. The efficiency of this mechanism is that it also allows for the CERs, ERUs or removal units (RMU) achieved through the CDM, JI and carbon sink project respectively to be transferred (UNFCCC, 2006). To address the issue where some countries may over-sell their carbon credits and then be unable to meet their own targets, the Marrakesh Accords require that Annex I countries hold a minimum level of AAUs, CERs, ERUs and or RMUs in the commitment period that cannot be traded.

Victor (2001:11) is sceptical of the Kyoto Protocol and argues that “the Kyoto Protocol is based on a fundamentally wrong assumption that it is the best to slow global warming by setting strict targets and timetables for regulating the quantity of GHGs emitted”. The author continues to argue that the factors such as technology change and economic growth are responsible for growing emissions and therefore difficult to regulate. By imposing limits on emission quantities, a system of trading credit and debits is required. However, before trading can begin, governments need to allocate permits.

In his criticism of the Protocol, Victor (2001:3) identifies three problems which he calls the “cold start” problem. First, “emission permits are semi permanent property rights” which Victor (2001) argues are more valuable, in an efficient market, than the annual flow of income from these assets. Emission permits will have an immediate economic value which compounds the problem of allocation – this being the second issue. A system of “Grandfathering” i.e. where allowances are issued free to emitting polluters (Economist, 2006) is according to Victor (2001) inappropriate for an international trading system because such a system does not make provision for new entrants, being the developing countries. The last issue of concern relates to the integrity of the emission permits, which encapsulates the property rights, as it is difficult to secure property rights in international law (Victor, 2001).

Victor and House (2004) argue that the Kyoto Protocol is in “trouble”. The United States of America withdrew from negotiation on the Kyoto Protocol in 2001, due to the disagreement in the provisions of the CDM that carbon sink enhancement be restricted to emission reductions and the restricted use of the flexible mechanisms (Victor and House, 2004; Common and Stagl, 2005). Other reasons cited for the USA’s withdrawal include the potentially high abatement costs of the USA economy and the absence of emission targets for developing countries (Dessler and Parson, 2006). Conventional economic theory suggest that to continue without the United States would be futile (Pizer, 2006). Kyoto parties were faced with the dilemma of convincing the USA to adopt future action. Pizer (2006) suggests that the Kyoto parties tacitly agreed to reject the

prisoner's dilemma – a condition where the United States would benefit from the Kyoto parties' respective actions and incur no costs for the benefits. However, in 2002 USA announced plans to decarbonize the environment and suggested several components which include; a plan to decrease the GHG emissions by 18 % by 2012 (relationship between emission and GDP); offer a tax incentives for renewable energy initiatives; increase funding for climate change research and to promote emissions through business (Dessler and Parson, 2006).

At the time of writing (November 2007) at least “175 states and 1 regional economic integration organizations” have either ratified or acceded to the Kyoto Protocol (UNFCCC, 2007). Nations that have ratified the Protocol include Russia and the Ukraine who stand to make large windfall gains through bargaining under the Kyoto Protocol structure (Victor and House, 2004). This will be made possible due to the collapse of these respective economies since the 1990 base year and the “Grandfathering “ approach towards awarding carbon credits.

While the Kyoto Protocol is in force, two contentious issues still need to be resolved, these being the inclusion of developing countries and the form and limit of GHG emissions after 2012. No progress has yet been made on these issues (Dessler and Parson, 2006).

Parties that fail to meet their respective emission targets, will need to make up the short fall in future years and will also face a penalty of 30 % (UNFCCC, 2006). The treaty also imposes fines of 100 Euros per ton on parties not meeting their respective targets (The South African Institute of International Affairs (SAIIA), 2006).

#### **2.2.4. Emission Trading**

The practice of emission trading can be regarded as a new form of risk management in the contemporary environment (Rosenberg and Geysler, 2005). Emission trading or (cap-and-trade) is a key policy instrument used to deal with increasing greenhouse gas emission levels (Point Carbon, 2006). In such a structure, a limit on the emission of a pollutant is set and parties currently responsible for pollution are given credits, representing their respective rights to emit. Companies are required to implement carbon management strategies but where they pollute more than their allowances, they are required to buy credits from those parties that have surplus units through a market system (Point Carbon, 2006). To prevent a country from overselling emission rights, parties are required to hold a commitment period reserve which may not drop below 90 % of the emission target (Fenhann, 2005). This reserve may consist of AAUs, ERUs and CERs but if the reserve is too low, countries are forbidden to trade. To add clarity to the instruments traded,

Rosenberg and Geysler (2005:14) draw on Rozenzweig, Varilek and Janssen's (2002) distinction between allowances and credits. An allowance has been described as a "government-sanctioned right to emit" within a cap-and-trade system while a "credit is a government-recognized right to emit" under the same system. Setout in Table 2.3 is the difference between the two instruments as referred to by Paterson-Jones (2005 in Rosenberg and Geysler, 2005).

Table 2.3: A summary of the differences between the emission trading instruments of allowances and carbon credits.

<b>Allowances</b>	<b>Carbon Credits</b>
Prospective	Retrospective
Currently Limited to Allowance Scheme	International from inception
Not bankable across EU/Kyoto periods	Bankable across EU/Kyoto periods

(Source: Paterson-Jones, 2005 in Rosenberg and Geysler, 2005).

Point Carbon (2006:iv) have identified that "carbon is acting as a hard currency" and that the carbon market can work albeit with asymmetric information. This organization's research has revealed that the international carbon market will grow from an estimated 1.6 billion tonnes of CO<sub>2</sub> equivalent (Bt CO<sub>2</sub> e) worth approximately €22.5 billion in 2006 to a forecast 2.4 (Bt CO<sub>2</sub> e) worth approximately €23.6 billion in 2007 (Point Carbon, 2007).

Carbon transactions can be classified into two groups, these being:

- 1) "Allowance-based transactions" such as the cap-and-trade systems created through the Kyoto Protocol in the form of "AAUs". The World Bank (2006) argues that these markets have high environmental credibility because they promote a structure which facilitates that the desired level of environmental performance is reached.
  
- 2) "Project-based transactions" relates to the trade in emission credits that are created through credible and verifiable projects which demonstrate that they do reduce GHG emissions beyond levels that would have occurred in the normal course of business. Such credits are derived from the CDM and JI initiatives in the Kyoto Protocol framework. These projects are independently certified and are created using approved methodologies, these factors contribute to the strong environmental credibility that these projects enjoy (The World Bank, 2006).

The allocation process is the most crucial process as it will have a significant impact on the supply and demand of market operations. In order to achieve long-term stabilization of GHGs in the environment, all countries will be required to follow a low carbon pathway in future economic development. A key issue in achieving this ideal will be to ensure that appropriate targets are set and emission rights are allocated equitably – thereby acknowledging the Common but Differentiated Responsibility Principle (The World Bank, 2004). Allowances will be allocated to countries, and in turn to companies, free of charge but such credits will have an immediate economic value (Dornau, 2004). Permits therefore need to be allocated so that scarcity is created thereby facilitating the functioning of the market system. From the emissions quotas that are assigned to nations under the Kyoto Protocol, countries need to complete a register of polluting companies. These companies in turn need to apply for emissions rights i.e., rights to pollute, and are awarded quotas on a Grandfathering-basis year-to-year. Where a country's targets have been determined by accounting for the value of fossil fuel consumed, a company's quota is determined by its current emission levels and the scope for improvement (SAIIA, 2006). By derivative, it may be accepted that due to nations having to pay a penalty for non-compliance, so too will domestic offenders be required to pay a penalty.

The EU acknowledged this requirement and established the European Commission which made it a requirement that member states submit a National Allocation Plan (NAP). Each of these NAPs are required to contain a list of offending organizations and more importantly, the quantity of the intended allocation that the organization is to receive in the relevant commitment period (Dornau, 2004). Simply put the EU-ETS functions by the commission agreeing to allocate emission targets to a number of organizations within specific sectors and allows for these targets to be met through the trade of emission allowances.

Therefore, theoretically, it follows that if the prices of carbon credits are higher than the internal abatement costs, then the incentive exists to reduce emissions and sell unused allowance in the market (Point Carbon, 2006). As a penalty for not meeting the EU-ETS's first commitment period (2005-2007) targets, the commission has imposed a fine of €40 per ton CO<sub>2</sub> on such a shortfall but in addition, offending organizations will be required to purchase the deficit in the market (Point Carbon, 2006). The enforcement of compliance is essential because a cap is not an effective motivator if the market is not convinced that the regulators are serious about compliance (The World Bank, 2006). The World Bank (2006) is confident that the Kyoto Protocol Compliance Commission and the EU Commission will be able to effectively administer their respective responsibilities to ensure compliance as evidence that such action has already been

detected in the EU-ETS. Victor and House (2004) noted that the EU has forced firms to spend real money on emission abatement and not rely on the opening “meaningless Russian credits” that will be made available to Russia in terms of the Kyoto Protocol. As an analogy, the same logic applied to the development of the Euro, where governments were not allowed to join the Union unless real efforts were made to address the deficits and public debt. The reason being, if one government failed all parties would pay the price of a less valuable currency (Victor and House, 2004). The tension to an effective response to climate change lies in compliance because long-term stabilization of GHGs is a global response (Victor and House, 2004). Further, the developing countries and those who have experienced economic shrinkages, such as Russia and the Ukraine, have the greatest opportunity for low cost emission control but due to weak internal control, are unlikely to monitor and enforce mitigation efforts (Victor and House, 2004).

Mendelsohn (2004:4) challenges Victor and House’s (2004) criticism of the Kyoto Protocol in arguing that these authors have “forgotten a basic principle of global pollutants”. While the cost of reducing emissions is borne by a country with regulations, the benefit is a global benefit. There is therefore no incentive for a single country to champion the cause and allow another to remain passive – every country needs to protect the global common (Mendelsohn, 2004).

Victor (2001:7) states that “trading is the keystone of the architecture adopted in Kyoto” and that emission trading offers developing countries an opportunity to benefit from the global efforts to mitigate global warming.

### **2.3. Clean Development Mechanism**

Article 12 of the Kyoto Protocol sets out the framework of the CDM which allows both public and private entities in developed countries to initiate and implement emission reduction projects in developing countries and receive carbon credits in the form of CERs (Sterling Waterford, 2004). These CERs may be used by Annex I countries to offset national reduction targets and further, once these CERs have been registered, they can be traded. This mechanism affords industrialized countries greater flexibility to meet their emission targets and simultaneously transfer cleaner technology to developing countries (SAIIA, 2006).

Victor (2001) has argued that it is a fundamental flaw in the Kyoto Protocol to exclude developing countries with regard to imposing emission reduction targets, while Point Carbon (2006) identify that such nations have a crucial role in the international carbon market. Due to the indiscriminate effect of the greenhouse effect, Sterling Waterford (2004:2) suggest that economic justification

exists for international co-operation on climate change projects and “project-based emission trading”. It is suggested that this economic justification is due to the lower costs of emission projects in developing countries, compared with those of developed countries (Sterling Waterford, 2004). In order for developing countries to participate in the CDM initiative, they need to ratify the Kyoto Protocol and establish a DNA which will have a regulatory responsibility (Fenhann, 2005). This body will be responsible to ensure that the CDM project supports the country’s sustainable development criteria and that the country agrees to host the project (Fenhann, 2005). In South Africa, this responsibility has been assign to the DME (Salgado, 2005).

The CDM innovation allows the investor and host countries to share the economic surplus, being the difference between the marginal reduction costs of the two nations, i.e. avoided costs – host costs = surplus (Sterling Waterford, 2004). It is due to this surplus that it is possible to create a financial instrument that monetizes this surplus into an asset (Sterling Waterford, 2004).

An important feature of a CDM project is that of “Additionality”. What this means is that CER units generated through CDMs will only be recognized if emission reductions are additional to what would have occurred in the normal course of business (Point Carbon, 2006). Rosenberg and Geysler (2005) perceive additionality as a barrier to the CDM due to the complexity of having to quantify “additionality”. The tests for “additionality” include:

- “Is the project an obligation, or are other scenarios prohibited ?
- Is the project less financially feasible than another ?
- Are there barriers to the project ?
- Is the technology used in the project readily available within the country ?” (Rosenberg and Geysler, 2005).

In summary, it is important to establish if the project is the best possible alternative, and if not, the CERs generated may not be traded. Other barriers that may be present are high transaction costs in the form of project development, seeking investors, following the protracted approval process, project validation and registration (Rosenberg and Geysler, 2005). This aspect of CDM barriers will be explored further in Chapter 3.

Figure 2.3 below, details the different stages of a CDM project and the potential risk factors associated with each of these stages which may present barriers to CDM project implementation.

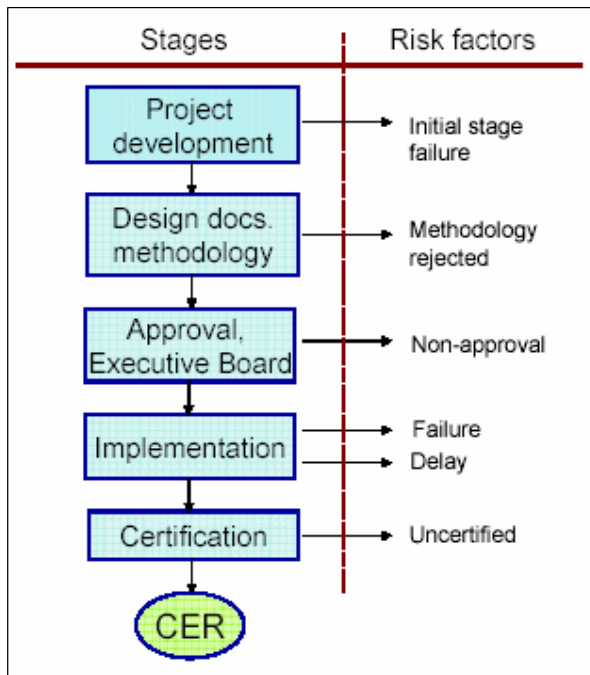


Figure2.3: The stages of a CDM project and potential risks corresponding to the different stages. (Source: Point Carbon, 2006:12).

In terms of eligibility, CERs derived from projects initiated from the year 2000 – 2012 can be used against emission targets in the first commitment period (Fenhann, 2005). However, existing projects initiated after 1 January 2000 and before 10 November 2001 (adoption of Marrakesh Accord) will only be eligible if these projects were registered before 31 December 2005. In terms of the Marrakesh Accord, CDM projects were to focus on emission reduction initiatives but this accord also declared afforestation and reforestation activities as being eligible under the CDM and may be considered for the first commitment period (Maréchal and Hecq, 2005).

Following on from the COP-7 in November 2001, an Executive Board was established to facilitate the roll-out of the CDM. The first phase looked at accrediting Operational Entities which are independent organizations that will be responsible for validating proposed projects, CERs and RMUs (UNFCCC, 2006). A Project Design Document (PDD) was also drafted, which is the template that project participants (investor and host countries) need to follow. As part of the process, Operational Entities need to validate the PDDs who then send the documents to the Executive Board for registration. Fenhann (2005:6) suggests that PDD should include:

- “General description of project activity
- Application of baseline methodology
- Duration of the project activity/Crediting period

- Application of a monitoring methodology and plan
- Calculation of GNG emission by source
- Environmental impacts
- Stakeholders' Comments
- Contract information on participants in the project activity
- Information regarding public funding
- Baseline data".

An important consideration that a PDD needs to address is the time span of the project. Two options are available in terms of the PDD:

- A maximum period of ten years (30 years for forestry)
- A maximum period of seven years with an option to renew for two additional periods of seven years (twenty one years) (3 x twenty years for forestry) (Fenhann, 2005).

The CDM project is then monitored by the project participants for the duration of the crediting period. The emission reductions claimed by the participants need to be verified by an Operational Entity who will issue a letter of confirmation to the Executive Board. This body will in-turn, issue the project with CERs. Provision has been made for CERs to be claimed in a period shorter than that mentioned above but due to the high cost of validation it is expected that this will be the exception rather than the norm (Fenhann, 2005).

The CDM architecture also acknowledges small-scale CDM projects and has distinguished three types of such projects. The first two are limited by the maximum size of the activity that reduces emissions, while the third type sets a maximum limit on the total emission of the project over the crediting period. These projects are;

- "Renewable energy project activities with a maximum output capacity equivalent of up to 15 MW,
- Energy efficiency improvement project activities which reduce energy consumption on the supply and/or demand side, by up to 15 GWH per year, and
- Other project activities that both reduce anthropogenic emissions by source and directly emit less than 15 kilotonnes of CO<sub>2</sub> equivalent annually" (Fenhann, 2005:7).

With regard to small-scale afforestation and reforestation projects, absorption from such sinks has been limited to a maximum of 8 ktCO<sub>2</sub> annually (Fenhann, 2005:7).

Previously listed as one of the barriers for CDM projects was the search for an investor but Carbon Finance can lower this barrier. Carbon Finance relates to resources that are provided to fund projects to purchase GHG emissions (The World Bank, 2005). As an extension of the World Bank's mission to alleviate poverty and promote sustainable development, the World Bank has been instrumental in "crowding-in" the private sector to participate in environmentally sound CDM projects seeking funding. The World Bank launched the Prototype Carbon Fund (PCF) in April 2000 which was a public-private partnership that had the aim of investing in emission reduction projects which promoted sustainable development and an opportunity for stakeholders to "learn-by-doing". These funds were made available to both companies and governments thereby including organizations that may not have been able to secure funding without such a fund (The World Bank, 2005). Other such funds are available on the international market to facilitate the development of the CDM initiative and to mitigate climate change.

The first CDM project was registered on 18 November 2004 with activity in the CDM project market increasing substantially since that date (Point Carbon, 2006). As at September 2007, research conducted by Financial Mail (2007a) showed that there were 781 projects registered under the CDM. India, Brazil, China and Mexico have emerged as the countries with the most registered projects with 267, 104, 104 and 90 projects respectively (Financial Mail, 2007a). These countries are the main selling countries with China having large volumes of CO<sub>2</sub>e chiefly due to it having numerous Hydrofluorocarbon (HFC) reduction projects (Point Carbon, 2006).

According to Point Carbon (2006), the high private sector investment in the CDM market and the substantial investment into both the CDM and JI implies that the project-based mechanisms will be used significantly to contribute towards compliance under the Kyoto Protocol. This organization argues that their research has revealed that the CDM is the mechanism of choice, thereby proving that developing countries are taking their participation seriously. Further, Point Carbon (2006) argue that due to the market potential the CDM will survive even without a successor to the Kyoto Protocol for a post-2012 commitment period. Helm and Hepburn (2005) point out that due to the uncertainty with regard to the stance that governments will take of future targets, investors are forced to assume political risk. These investors need to make predictions now about the future actions that governments will take. This speculation transfers political risk from governments to the private sector, being an inefficient risk allocation, because it violates the fundamental principle that risk be assigned to whoever can best manage the risk (Helm and Hepburn, 2005).

Notwithstanding this risk, the CDM has been argued as being essential to the Kyoto Protocol as well as to any successor because this mechanism engages developing countries and offers the opportunity for low cost abatement initiatives (Victor, 2001).

Victor (2001) describes the PCF as being the single most important development in the evolution of the CDM because funds are pooled, thereby reducing transaction costs and increasing the opportunity to apply lessons learnt on one project to that of another. While sceptical about the extent to which transaction costs can be reduced, Victor (2001) acknowledges that the CDM is an important innovation that needs to be preserved.

#### **2.4. The South African Context**

In terms of the Constitution of the Republic of South Africa, drafted by the first democratically elected government, South Africa acknowledges the environment in Section 24, this being the environmental clause. This clause states:

*“Everyone has the right:*

*(a) to an environment that is not harmful to their health or well-being; and*

*(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that*

*(i) prevent pollution and ecological degradation;*

*(ii) promote conservation; and*

*(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”*

(The Constitution of South Africa, 2004).

The South African Constitution is the supreme law of the democratic South Africa. It follows that any law that is inconsistent with the Constitution is invalid and of no force or effect. In terms of international law, with globalization, international trends and pressures, countries have drafted national environmental laws. Environmental problems are not governed by political boundaries and so, developed and developing countries have a greater influence over each others environmental issues (Glazewski, 2005). Consequently, environmental norms and standards have claimed their rightful place as a unique branch of international law. Chapter 14 of the South African Constitution accedes to customary international law, provided that such law is consistent with the Constitution. More specifically, Section 233 of the Constitution (2004) stipulates that when interpreting legislation, courts must prefer interpretations that are consistent with international law over any alternative interpretation that is inconsistent with international law.

Being guided by the Constitution, South Africa ratified the UNFCCC on 21 August 1997 and subsequently has acceded to the Kyoto Protocol on 31 July 2002. Through this accession, South Africa committed to incorporating climate change considerations in relevant social and economic policies and to promoting sustainable development and the transfer of clean technology (Eskom, 2003).

As a developing country, South Africa is not obliged to fulfill any targets but in terms of the Environmental Clause in the Constitution and the accession to the Kyoto Protocol, the South African government and its people have a fiduciary responsibility to ensure sustainable development.

#### **2.4.1. Atmospheric Pollution**

Air pollution may be defined as the anthropogenic discharge of matter, which includes gas, liquid or solids, into the atmosphere, the extent of which has an undesirable effect on the human natural and physical environment (Glazewski, 2005). However, before legal consequences can be considered, scientifically determined acceptable limits and permissible thresholds need to be determined. Air pollution can be classified according to the type or substance emitted, the activity responsible for the pollution or the effect of the pollution on general health or the environment (Glazewski, 2005). South African law does not adopt a particular classification of air pollution but rather encompasses a combination thereof.

In South Africa, the National Environmental Management Air Quality Act 39 of 2004 (NEMAQA) has been promulgated and this act repeals the Atmospheric Pollution Prevention Act 54 of 1965. The NEMAQA is therefore the regulating legislation for the management and control measures for the prevention of pollution and environmental degradation. This act has as its objective, the protection of the environment by providing reasonable measures for:

- (i) The protection and enhancement of the quality of air in the Republic;*
- (ii) The prevention of air pollution and ecological degradation; and*
- (iii) Securing ecological sustainable development while promoting justifiable economic and social development.* (NEMAQA, 2004). Further, this act “gives effect to Section 24(b) of the Constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people” (NEMAQA, 2004).

In this act, reference is made to GHGs which are defined in the same way as the definition contained within the UNFCCC documentation as being “gaseous constituents of the atmosphere,

both natural and anthropogenic, that absorb and re-emit infrared radiation” (Glazewski, 2005). In South Africa the main sources of air pollution that contribute to GHG emissions include; energy generation, industrial processes, domestic energy generation and vehicular exhaust emissions (Glazewski, 2005). According to Section 63 of NEMAQA, ambient air quality standards are prescribed but no mention is made of CO<sub>2</sub> – being the main GHG.

Chapter 5 of this Act charges metropolitan and district municipalities with implementing the atmospheric emission licensing system referred to in Section 22 of the act. This section requires the Minister or relevant Member of the Executive Council (MEC) to publish a list of national or provincial activities which result in atmospheric emissions and which can reasonably be construed to have a detrimental effect on the environment (Glazewski, 2005). In terms of this act, no listed activity may be conducted without an atmospheric emission license supplied by a competent authority. Failure to comply with this regulation is an offence and if convicted, offenders will be liable for a fine or imprisonment (NEMAQA, 2004).

It may be argued that South Africa through its accession to the Kyoto Protocol and national legislation is proactively structuring itself to become involved in the CDM initiative.

#### **2.4.2. The South African Market**

Environmental markets have evolved in a similar manner to that of established or mature markets (Swingland, 2003). To explain the occurrence, Swingland (2003) refers to the renowned economist Joseph Schumpeter who identified three phases of the inventive process namely; invention, innovation and imitation. The first concept relates to the creation of an idea, the second to the commercialization of the idea and the last to the replication of the idea. Swingland (2003) infers that trade in GHGs represents the replication or imitation phase of the process.

The Carbon Market is innovative in that while operating like a commodity market, the economic good being traded does not exist (Economist, 2007a). “The trade is actually not in carbon, but in not-carbon” (Economist, 2007a:10). Certificates are created by establishing that a certain amount of GHGs have not been emitted by the seller and may therefore be emitted by the buyer (Economist, 2007a).

Building on the experience of existing markets, South Africa has developed a financial instrument called a “Carbon Credit Note”. This instrument essentially allows an investor exposure to the upside of CDM projects, without having to become directly involved in the project management

and administration. The mechanics of the instrument is that the instrument is a “fully underwritten obligation to deliver a carbon credit (a CDM registered Certified Emission Reduction) to the purchaser, at a date in the future” (Sterling Waterford, 2004). The delivery risk of the carbon credit is hedged by the instrument owner contracting with specific projects in a number of countries, making use of established intermediaries in the emission reduction market so that the CERs delivered correspond with the notes issued. Further, insurance policies can also be taken on the individual projects, to cover the contingency of project failure, ensuring full delivery on the due date (Sterling Waterford, 2004).

Point Carbon (2006) have developed a forward CER categorization so as to provide a tool to structure price and forward CERs according to consistent criteria. In their categorization, they have identified that the JSE Carbon Credit Note is in a category of its own. The unique features of this instrument is that, they offer firm volumes or delivery and there are no preconditions such as the underlying project qualifying for CERs because the notes are not project specific but cover a pool of qualifying projects. The insurance element also mitigates the risk of non delivery. With regard to market activity, Point Carbon (2006) identify that just below 20 000 tonnes of carbon was traded on the JSE in 2005 with an estimated value of €200 000.

Economic theory suggests that the price for carbon credits should reach equilibrium when the marginal cost of abatement is equal to the market price for credits (Sterling Waterford, 2004). However, the pricing in the carbon credit market is not determined exclusively by the forces of supply and demand given that emission targets are prescribed and penalties exist for non-compliance (Sterling Waterford, 2004). It is argued that nations will not be able to reach their emission targets by exclusively investing in clean technology and this deficit created will in turn create liquidity in the secondary credit market (Sterling Waterford, 2004). Due to CERs being fungible with other secondary market credits the total supply of these credits will influence price. Further, the “hot air” credits from Russia and the Ukraine, add uncertainty to pricing mechanisms. The demand side is influenced by the rate at which nations are able to reduce emissions, economic growth, the USA’s stance on the Kyoto Protocol, future commitment volumes adopted by nations and associated CDM transaction costs (Sterling Waterford, 2004).

An opportunity for developing countries involved in CDM projects is that it is anticipated that as the first commitment period draws to an end (2008 – 2012) the demand for carbon credits has the potential to outstrip supply and significantly affect the price (Sterling Waterford, 2004).

## **2.5. Economic Theory**

Economics provides a vast body of knowledge which may be applied to assessing and managing the risks of climate change as well as to the design of national and international responses to the reduction of emissions and adaptation to the impacts of climate change (Stern, 2006). Set out below is an overview of certain economic concepts which serves to ground the aspect of climate change in economics.

### **2.5.1. Economic Theory and Sustainability**

Economic activity influences the environment and in turn is influenced by the environment. In producing and consuming goods and services, society modifies its environment by changing the chemical composition of its components including the atmosphere, soil, fresh water and oceans; all through land use change (Bowers, 1997). However, not all environmental modifications are intentional. Some are incidental and may take the form of a by-product from an intentional economic activity (Bowers, 1997).

The growing concern for the environment rests on the premise that environmental modification has reached its threshold and now threatens current and future generations. Consideration therefore needs to be given to both intentional and incidental environmental activities so that their impacts are either reduced or ameliorated (Bowers, 1997). This view underlies the view of sustainable development. Common and Stagl (2005) have adopted the Brundtland definition of sustainable development as being a form of economic growth that would meet the needs and desires of the present generation without compromising the future generations ability to meet their respective needs and desires.

Two forms of sustainability are prevalent: weak and strong. Weak sustainability requires maintaining a non-declining stock of economic capital into the indefinite future (Norton, 2005). Proponents of weak sustainability are therefore willing to accept a trade-off of a decline in natural capital for a compensatory increase in man-made capital of equal value (Bowers, 1997). Weak sustainability is therefore weak in the sense that due to the fungibility of asset classes, no particular asset class is preferred over another so sustainability is achieved when aggregate social wealth is maintained across generations (Norton, 2005).

In contrast, strong sustainability requires that the aggregate national capital does not decrease (Bowers, 1997). This form of sustainability advocates that there must be a limit to natural assets

being replaced by man-made assets. This view takes a stronger approach in that it also requires that all actions that destroy natural capital be delegitimated (Norton, 2005).

### **2.5.2. Economic Value**

The economy and environment are interrelated, with the environment supporting human activity through:

- “the provision of life-support systems (environmental services)
- the supply of land, raw material and energy (environmental resources) and
- the absorption of pollution and waste (environmental sinks)” (Blignaut and de Wit, 2004:54).

While these environmental interrelationships are important for human welfare, the problems that come to the fore are contained within the questions of – how is value defined and how is value determined? When considering value, Sagoff (2004) argues that three kinds of judgment need to be made. The first judgment relates to individual utility in what is considered good and benefits the individual. The second judgment has a moral perspective and seeks to test what is good in general, correct as a matter of principle or appropriate in a certain situation. The third judgment relates to aesthetics, where consideration is given to intrinsic beauty or the act of protecting an environment for its “expressive, symbolic and formal properties” (Sagoff, 2004:2).

Value can therefore be defined from different perspectives but from an economic perspective, value is an anthropocentric concept where value is determined by people and not natural laws or policy (Kahn, 1995). Further, value is best determined by understanding the trade-offs that people are willing to make, i.e. placing a monetary value on a good. Remaining consistent with economic theory, environmental valuation is based on utility theory (Grafton, Adamowicz, Dupont, Nelson, Hill and Renzetti, 2004). Kahn (1995) highlights that people are not only willing to make monetary trade-offs for goods but time and other opportunities are sacrificed to obtain market and non-market goods.

In the taxonomy of total environmental value, which is interpreted as total economic value, economists have acknowledged that both use values and non-use values are prevalent (Turner, 1999). Non-market goods include both use and non-use values, where use values are associated with the tangible use of environmental resources while non-use values are associated with the intangible use of the environment (Kahn, 1995). These values can be broken down into “direct use, indirect use, option, existence and bequest values” (Blignaut and de Wit, 2004:56). Direct use values can be further classified as having consumption and non-consumption values, while

indirect uses relate to the ecological functions that an environment provides (Blignaut and de Wit, 2004). Option values are closely related to preservation values for future use by the individual, while bequest value relates to the individuals willingness-to-pay for the preservation of the environment for future generations (Kahn, 1995; Blignaut and de Wit, 2004). Existence value is argued to be the only true non-use value where the environment is preserved for its intrinsic value (Blignaut and de Wit, 2004). Kahn (1995) describes altruistic value as an individuals concern for another, where a value is placed on the environment because the individual values the opportunity for others to enjoy the environment and emphasizes that none of the values described are mutually exclusive. Kahn (1995) mentions that non-use values are values derived from the pure public good perspective, while use values are derived from the private or mixed good perspective of resource economics.

### **2.5.3. Environmental Economic Perspective**

Bowers (1997) states that economics has three important roles in the debate on sustainable development. Firstly, economic theory needs to examine the cost: benefit relationship of pursuing a particular sustainability objective. The second role is to test the effectiveness of alternative policy instruments. The final role is to assess the cost: benefit relationship of the alternative policy instruments.

The body of Environmental Economics is the economic analysis of environmental problems. In seeking to understand the economic causes of environmental problems, neoclassical microeconomics – being the theory of the operation of markets – is applied. According to the neoclassical approach environmental problems arise from failures of markets to properly allocate resources (Bowers, 1997). Therefore, it can be argued that if economic activity is not sustainable then the markets are not making adequate provision for future generations (Bowers, 1997). However, the neoclassical view is that markets are powerful and efficient mechanisms for resource allocation and can be applied in the environmental context.

Offering support for the neoclassical framework, Pearce (1998) identifies that the current approach of creating property rights in environmental assets, formalizing markets, creating economic incentives and removing perverse subsidies have a grounding in neoclassical economics. Based on the neoclassical environmental economics approach, it can be argued that environmental problems arise due to the inefficient allocation of resources i.e. market failure, and the optimal state of the environment would be the position where this market failure is corrected

(Bowers, 1997). Three main causes of market failure have been identified in the existence of monopolies, public goods and externalities.

While a monopoly is a market failure, it is rarely cited in the analysis of environmental problems while the public good problem and existence of externalities are commonly cited (Bowers, 1997). Markets only operate efficiently with private goods because these goods are excludable and rivalrous. However, public goods are non-rivalrous and non-excludable. A characteristic of a non-excludable good is that one can not prevent an agent from consuming the good, while a characteristic of a non-rivalrous good is that an increase in one's consumption of a good does not reduce another's consumption of the good (Common and Stagl, 2005). Stern (2006:21) states that "climate is a public good" and climate change is a market failure encompassing externalities and public goods.

If a seller can not transfer exclusive use rights to the buyer, then rational self-centered consumers will have no incentive to disclose their true valuation of the good and will consume the good without paying for it (Bowers, 1997; Common and Stagl, 2005). This is called the "free rider problem". Free riding causes markets to fail and due to people concealing their true willingness to pay for goods, such goods will either be under-supplied or not supplied at all (Bowers, 1997). Neoclassical economists have constructed systems to supply public goods whereby people are enticed to state their willingness-to-pay for a good but such systems have had limited success (Common and Stagl, 2005).

Through the production and consumption of certain products, either some harmful or beneficial side effects will be transferred to third parties not directly involved in the production or consumption of the product. These are called externalities (Salvatore, 2004). This unintended effect may either be positive or negative i.e. beneficial or harmful. In the case of a negative externality, the market failure will result in more of the good being produced while in the case of a positive externality less of a good is produced (Common and Stagl, 2005). The reason for this phenomenon is because of the "lack of intentionality" which is a result of no bargaining process due to the lack of exclusive use property rights (Common and Stagl, 2005:327).

The foundation of environmental economics rests on the theory of negative externalities (Sankar, 2004). With negative externalities, the marginal social cost exceeds the marginal private costs (price) with the result being that the private optimal level will exceed the social optimal level (Sankar, 2004). To regulate the corresponding output levels, external intervention is suggested so

as to internalize the costs of externalities in production and consumption decisions. Sankar (2004) maintains that markets only function efficiently when property rights are well defined and when transactions costs of exchange are small. Victor (2001) questioned the likelihood of low transaction costs with regard to CDM projects and cited these costs as potential barriers to the success of the initiative.

With regard to environmental resources such as clean air, property rights are not well defined. It follows that rational self-centered parties consider this resource as “free” or an “unpaid” factor of production (Sankar, 2004). Where specific pollution control policies are not in place which assign property rights, those rights then reside *de facto*, with the polluter (Bowers, 1997). Two reasons for the non-existence of environmental markets are firstly the “difficulty in defining, distributing and enforcing property rights” and secondly, the high costs of creating and operating the markets (Sankar, 2004:3).

Common property regimes do exist, but in the absence of binding agreements on the sharing of costs and benefits, will result in overuse as each party will focus on their own respective interests without taking the other users similar actions into account (Sankar, 2004). This problem has been described as the “tragedy of the commons” by Garrett Hardin (1968 in Clarke, 2002:6), who was of the opinion that “freedom in the commons brings ruin to all”. Clarke (2002) criticizes Hardin as being too pessimistic and argues that at a particular threshold of environmental degradation, the human instinct of co-operation is evoked which results in a set of laws to control human greed and self interest. The Kyoto Protocol has been cited as one such initiative.

Solutions advocated to control negative externalities include, accurately defining property rights, taxes on pollution, quotas on pollution and environmental regulation (Goulder and Pizer, 2006). With regard to taxes on pollution, neoclassical economists draw on the work of the economist Arthur Cecil Pigou. This economist’s solution to correct the resultant negative externality of emissions, was to impose a per unit tax on the firm generating the negative externality. The per unit tax on the output must be equal to the difference between the social marginal cost and the private marginal cost – this yields the social optimal point of pollution (Sankar, 2004). Bowers (1997) highlights the point that it is irrelevant which party receives the right under a Pigouvian Tax because market forces will yield the same results. However, what will differ, will be the flow of funds i.e. polluter to sufferer or sufferer to polluter. Common and Stagl (2005) argue that by increasing the price of pollution to incorporate the social costs, polluters are forced to bear the full costs of their actions. By imposing a per unit tax on output, the price of that product will increase

which will be followed by a corresponding decrease in the demand for the good, thereby internalizing the external environmental cost (Sankar, 2004). The socially optimal level of pollution achieved through a Pigouvian Tax system is not equal to zero pollution, and offers potential gain in efficiency as production moves pollution to a point of optimum, but this economic notion of optimum does not take the relationship of the level of pollution and the environment into consideration (Bowers, 1997).

In addressing the problem of negative externalities through accurately defining and awarding property rights, Roland Coase published the following theorem: “Given well-defined property rights, low bargaining costs, perfect competition, perfect information and the absence of wealth and income effects, resources will be used efficiently and identically regardless of who owns them” (Chicago School of Economics, 1996). Simply put, this theorem states that regardless of who receives the property rights (polluter or sufferer), if transaction costs are low and there are a limited number of parties, an optimal solution will be achieved through assigning property rights. According to Sankar (2004), Coase is against government intervention in the form of specifying standards or imposing taxes to rectify externalities, but advocates that government take an active role in defining and enforcing property rights or environmental resources and eliminating transaction costs.

It has been argued that the problem with Coase’s theorem occurs when it is applied on a large scale i.e. where the scope of the externality affects a large number of people it becomes increasingly difficult to assign property rights (Dasgupta and Mäler, 1997). A second problem with the Coase theorem, in the environmental context, is the temporal effect of the rights. For example the emission of GHGs causes an externality on both present and future generations. Dasgupta and Mäler (1997) argue that just because the imposing of property rights cannot solve all environmental problems, such an approach should not be rejected.

With regard to applying quotas to production control, tradable emission permits have been proposed as being a feasible way to reduce pollution at least cost (Goulder and Pizer, 2006). Similar to taxes, tradable permits create incentives for polluters to follow more environmentally friendly production methods. Tradable permits do, however, differ fundamentally from taxes. With taxes, the polluter is faced with a fixed price per emission but the volume is not limited. With a tradable permit the volume is limited by the number of emission permits held, while the price is not regulated. Another feature, is that where shortages and excesses exist, the potential for trade exists (Common and Stagl, 2005).

Permits may either be allocated freely (grandfathering) or allocated on an auction basis. Under both allocation systems, profit-maximizing firms will increase their output prices based on the new costs associated with emission trading (Goulder and Pizer, 2006). However, firms that receive permits free of charge will retain a higher portion of the additional revenue compared to those who bid for permits. This additional revenue can be used to offset other compliance costs (Goulder and Pizer, 2006).

Goulder and Pizer (2006:7) identify that there may be a trade-off between “efficiency and political feasibility” when adopting a pollution control method. The policies that generate revenue (taxes and auction permits) for the state are argued to be more cost effective while the non-revenue raising policies (grandfathering) may reduce political resistance from polluters (Goulder and Pizer, 2006).

While carbon taxes apply the Pigouvian system to price externalities caused by emissions, tradable permits limit the quantity of the externality (emission) through a quota system (Sathiendrakumar, 2003). This author highlights that both of these systems embrace the Polluter Pays Principal. However, in reality, the additional emission costs incurred during the production process are transferred onto the ultimate consumer (Sathiendrakumar, 2003). Moreover, the extent of the transferred tax burden, is dependent on the elasticity of the product – the higher the price inelasticity the greater the tax burden borne by the consumer (Sathiendrakumar, 2003).

Sankar (2004) argues that environmental externalities in a market economy can voluntarily be fully internalized if polluters realize that compliance is better than non-compliance. This sentiment is supported by the Porter Hypothesis which proposes that strict environmental regulation can result in improved efficiency and foster innovations to create a competitive advantage for the firm (Gabel and Sinclair-Desgagné, 2001).

Goulder and Pizer (2006) acknowledge the importance of direct emission policies in the form of either emission trading or taxes, to address the negative externalities caused by GHGs, but also propose a technology-push policy. Such a policy involves technology and research and development initiatives which address climate-change-related-damage. These policies have gained support because although acknowledging that climate change is a global phenomenon, not all the social benefit that accrues from such research will be retained by the inventor (Goulder and Pizer, 2006). The CDM and JI initiatives of the Kyoto Protocol apply this stance to technology development and technology transfer.

The notions that: the externality of GHG emission requires global intervention; efficiency calls for global trading; and through a mechanism to correctly price emission credits, future climate saving technologies will emerge. All these beliefs have a foundation in economics and are encapsulated within the Kyoto Protocol's targets and its phased approach (Pizer, 2006).

## **2.6. Conclusion**

The global phenomenon of climate change has become one of the most crucial environmental issues facing the world in modern times. It has been scientifically verified that global warming is as a result of the enhanced greenhouse effect through the anthropogenic emission of GHGs. Scientific evidence has been set out in the chapter which indicates that the mean temperature of the Earth's surface has warmed over the twentieth century due to the greenhouse effect. In essence, the greenhouse effect is the process whereby the Earth's atmosphere absorbs the sun's radiation and warms the Earth's surface temperature. Of the GHGs, CO<sub>2</sub> has been identified as contributing at least 60 % to the enhanced greenhouse effect and that water vapour is the most powerful. The main concern with GHG emissions is the increasing concentrations in the atmosphere and not the point of emission. It has been suggested that the most plausible means of reducing CO<sub>2</sub> emissions is to reduce the CO<sub>2</sub> per unit of output of energy utilized.

In response to global climate change, the UNFCCC created an increased awareness of the problem and this treaty was adopted by at least 190 nations. The Kyoto Protocol was subsequently drafted which addresses the specific issue of GHG emissions and proposed emission reduction targets for developed nations. This protocol encompasses a number of international principles which are widely adopted. To assist nations in achieving their emission reduction targets, the Kyoto Protocol make provision for three flexible mechanisms, namely; the CDM, JI and Emission Trading initiatives. The emission trading system proposed is a cap-and-trade approach where polluting nations are allocated permits and are free to buy and sell permits in an international market during the first commitment period (2008 - 2012). The CDM initiative is an innovation that includes developing countries in the Kyoto Protocol through project-based initiatives. South Africa is involved in CDM projects but India, Brazil and China are the most significant players in this market.

In the South African context, the Environmental Clause in the Constitution acknowledges the environment, peoples' right to a clean environment and sustainable development. To address air pollution, the NEMAQA has been promulgated and shares definitions of concepts contained within the UNFCCC and Kyoto Protocol. A further development within South Africa is the

establishment of a formal trading market on the JSE Securities exchange and the establishment of financial instrument (Carbon Credit Note) to facilitate trade. South Africa is strategically positioning itself to become involved in, and benefit from, the CDM initiative.

With regard to academic theory, the anthropogenic forcing of global warming has been grounded in Environmental Economics. The theory of market failure in the form of public goods and externalities were discussed. It was identified that negative externalities could be internalized through Pigovian taxes, the assigning of Property rights, or through the allocation of tradable permits. Further, the concept of economic value was described highlighting the use and non-use values of the environment.

While emission reductions are important, the development and transfer of technology are equally important because the benefits that result from such development are shared globally. The phenomenon of global warming is very real and requires a global response. The CDM initiative allows developing countries an opportunity to share in, and contribute towards, the global common. While offering South Africa the opportunity to foster sustainable development, the CDM initiative also offers economic incentives to the country through the export of carbon credits and import of clean technology.

Having provided a theoretical context, the following chapter (Chapter 3) focuses specifically on the barriers and drivers to the implementation of CDM projects. This chapter discusses the factors, from a South African public sectors perspective, that influence the involvement of organizations in the CDM initiative.

## **CHAPTER THREE**

### **LITERATURE REVIEW: CDM IN PERSPECTIVE**

*If you think mitigated climate change is expensive, try unmitigated climate change.*  
*Dr Richard Gammon, University of Washington, June 28, 1999.*

(Stiles, 2006:7)

#### **3.1. Introduction**

The expectation of the CDM is to transform the environmental issue from an externality into a business opportunity for entrepreneurs (Reddy and Balachandra, 2006). Aligned to the principle of Common but Differentiated Responsibility, the Kyoto Protocol stipulates emission reduction targets only for countries cited on Annex I during the first commitment period from 2008 – 2012. The CDM is a scheme which invites developing countries to become involved in climate change mitigation by providing a mechanism where carbon credits are traded between developing and developed countries.

This chapter discusses the cautions that a developing country needs to take cognizance of when considering CDM involvement, as well as the aspects that make a country attractive for CDM projects. From a South African public sector perspective, the chapter then discusses the barriers, promoters and factors that can improve greater future involvement by Municipalities in the CDM.

#### **3.2. Non-sink Projects**

Carbon sequestration projects (sink projects) either remove carbon from the atmospheres through natural or artificial processes while non-sink projects aim to eliminate or reduce the level of GHGs in the atmosphere (these concepts were expanded on in Chapter 2). Aligned to previous studies by Jung (2006) and Little (2006), only non-sink projects were considered in this current study. The reasons for this were firstly, to build on and complement previous findings and secondly, that due to the relative uncertainty about the eligibility of carbon sequestration or CDM-sink related projects (Ellis and Kamel, 2007) such projects were excluded.

#### **3.3. Cautions to the CDM**

While the CDM has an objective of facilitating compliance with emission reduction commitments of developed countries, it has a second obligation of facilitating sustainable development in host countries (Jung, 2006). Lindow (2005) argues that the logic of the CDM is twofold. Firstly, developed countries are able to achieve their targets more cheaply by investing in developing countries where environmental standards are less sophisticated and cheaper to refine. Secondly, it creates the impetus for technology transfer between developed and developing countries, where

costly unaffordable technologies are transferred and allows developing countries to follow a cleaner, more sustainable development path.

Due to there being no universal or binding definition of sustainable development, the CDM seeks to preserve some form of national sovereignty and allows governments to define sustainable development criteria for their respective countries (Nelson, 2004). It then follows that it is the government's responsibility, in developing countries, to screen projects according to the nationally defined sustainable development criteria and to reject those that do not comply and facilitate the implementation of those that do (Spalding-Fecher, 2002). Referring to carbon trading as a mechanism to curb climate change, Lindow (2005) argues that ultimate responsibility vests with national governments who in turn engage the private sector to assist in achieving national emission reduction targets. Through the CDM a win-win relationship is achieved with the host country being assisted with the means to achieve sustainable development, the project owner receiving financial and technological assistance and the investor in the industrialized nation receiving the CERs (Spalding-Fecher, 2002; Nelson, 2004).

A further demand-side component of the CDM is that in terms of the Kyoto Protocol, the import of carbon credits acquired abroad should be supplementary to domestic reductions and may only amount to half the agreed commitment (Lindow, 2005; Point Carbon, 2007). Worthington (2005) criticizes the decision of allowing carbon trading to amount to half the agreed reduction as it was only negotiated four years after the Kyoto Protocol was agreed and essentially compromises the intention of the CDM being supplementary in nature. However, research done by Point Carbon (2007) reveals that nations can not solely rely on carbon credit imports but will also need to address the aspect of internal abatement. This is due to the supplementary nature of the credits generated under the CDM or JI and the relative scarcity of available credits. Within the context of a developing country, Lindow (2005:56) advocates that active involvement in the CDM initiative can have substantial positive impacts on South Africa which is challenged to achieve economic growth in an "environmentally sustainable manner".

When considering CDM investment project classification, Greiner and Michaelowa (2003:1010) identify four types of investments namely, "greenfields, capacity extension, replacement and rationalization investment". These authors explain that all these investment types have the potential to reduce emissions below the baseline level. The term greenfields investments are used to describe new projects that usually apply new or advanced technology. Capacity extension investments describe the application of new or advanced technology to complement an existing

operation. Replacement investments refer to the upgrade of capital goods, for example a production line, due to the goods having reached the end of their economic lifetime. Within the energy sector, demand side management i.e. energy saving measures (Greiner and Michaelowa, 2003) may be used to explain the concept of rationalization investment. Ellis, Winkler, Corfee-Morlot and Gagnon-Lebrun (2007:19) refer to end-of-pipe or “brownfield” operations which may be compared with capacity extension.

A warning to developing countries is to avoid the “race to the bottom”. Muller (2007:3210) describes the “race to the bottom” as being the phenomenon where competition between nations ultimately leads to lower regulatory standards for all as lower standards are more attractive to investors. In the context of climate change and the CDM, the result would be lower environmental standards and a compromise in achieving the sustainable development component of the CDM intent. At present, the CDM is focused on producing a tradable commodity at the lowest financial cost which aggravates the desire for an “environmentally superior” outcome as both investors and buyers are directed away from projects that offer the most benefits to the host nation (Pearson, 2007). Consequently, buyers and investors are attracted to projects that “require the least investment, least technology transfer and that provide the least sustainable co-benefits” due to these projects yielding the cheapest credits (Pearson, 2007). Worthington (2005) highlights that international competition in the CDM market will not stimulate a rigorous national process but may encourage the facilitation of negative environmental and social impacts where strict compliance to national sustainable development criteria has been ignored. When considering international trade, Copeland and Taylor (2004) caution against the pollution-haven hypothesis and the pollution effect. The former phenomenon hypothesizes that through globalization, polluting industries will tend to be relocated in (to) countries with lower environmental regulation in order to spend less on pollution control measures (Field and Field, 2006). The pollution effect suggests that due to less strict environmental regulations, developing countries tend to become attractive for the implementation of business projects (Muller, 2007). Copeland and Taylor (2004:67) conclude that there is “little convincing evidence to support the pollution haven hypothesis”, but argue that evidence of the pollution effect is prevalent. Stern (2006:283) acknowledges that it is likely that there will be a differentiation in a country’s relative attractiveness for less carbon intensive investment but argues that, “well designed policies and flexible institutions” can create new opportunities for a country that are not inconsistent with other national policies.

To compliment the understanding of the consequence of only focusing on cheap carbon credits, Moore (2004:1) argues that projects that offer multiple benefits are “frozen-out of the market”. With trading only focusing on reducing “a single pollutant by an exact date and a precise amount at least cost”, Moore (2004:1) suggest that those projects that offer multiple benefits including “new ways of energy conversion, as well as conservation, and renewable forms of energy – are frozen out of the market”. Ellis *et al.* (2007) argue that end-of-pipe “brownfield” projects will dominate the CDM market in the initial phase due to small changes to existing facilities resulting in a large amount of cheap credits. These authors concur that costly projects, including renewable energy projects, will only constitute a small portion of the market – acknowledging the phenomenon of large sustainability projects being frozen-out.

Within the context of the risks mentioned above, developing countries face a dilemma in enforcing national sustainability criteria and being perceived as being an attractive location for CDM investment. Muller (2007) argues that host countries only have hypothetical freedom when setting sustainability criteria, unless they accept they may lose their relative attractiveness for CDM investments.

Building on the uncertainty surrounding the successor to the Kyoto Protocol, the second commitment period from 2013, and the probability of developing countries being given targets, Muller (2007) suggests that countries that did not actively pursue CDM investment that harvested cheap options with little technology transfer and sustainability benefits, could offer the country better aggregate welfare by using the credits to offset its own targets.

While it has been acknowledged that sustainable development is one of the two components of the CDM, and a focal point for developing countries, currently, the CDM only provides a financial incentive for GHG-reduction (Ellis, *et al.*, 2007). In arguing the altruistic point, Worthington (2005:53) highlights that if the CDM is to benefit both local communities and polluting industries, “national project approval should require inherent and guaranteed social and environmental benefits”, thereby tacitly shifting responsibility to government. This brings to the fore, the dilemma, of the trade-off decisions, that governments will face when either accepting or rejecting CDM projects. The trade-off decisions, between the social, financial and environmental components, will be based on the projects sustainability components and its alignment to a country’s national sustainability development goals.

While the CDM is an opportunity for developing countries to become involved in climate change mitigation and to benefit from the trade of carbon credits and technology transfer, not all developing countries are equally attractive to investors. The next section explores those factors that makes a country attractive to CDM-investors and highlights South Africa's position relative to other developing countries.

### **3.4. Host Country Attractiveness**

Amongst other things, the externality in the form of the stock of a country's GHGs essentially makes a developing country attractive. Ironically it is a country's abundance of dirty industries that makes it relatively more attractive as a host nation for CDM investments (Lindow, 2005). Further, the carbon stock i.e. the amount of carbon pollution of a developing nation, can be regarded as a global public good that is vulnerable to exploitation by developed nations. This introduces the second externality, being the potential exploitation of generating cheap carbon credits by developed nations within developing nations, without "technology transfer or learning-by-doing and other sustainability benefits" being accomplished (Muller, 2007:3207). This author argues further that this phenomenon can be interpreted as an undersupply of a public good. Developing countries are not allocated emission credits so these countries can only obtain carbon credits through the CDM process, thereby restricting these countries to the secondary market (Nelson, 2004). This may induce developing countries to accept CDM projects which compromise national sustainability goals in pursuit of financial reward and ability to trade.

From the perspective of an Annex I country seeking to identify the most attractive CDM investment opportunity, consideration needs to be given to three questions: Which country to invest in? What kind of project to pursue? Considering the country's sustainability goals, what could be the environmental and economic return on the investment? (Diakoulaki, Georgiou, Tourkolias, Georgopoulou, Lalas, Mirasgedis and Sarafidis, 2007). These authors propose an integrative approach to answering these questions and have developed a three stage process.

In step one, the pre-selected candidate host countries are evaluated and screened according to criteria that reflect their economic and geographical association with the investing country; the host country's sustainability to foster development projects; the country's eligibility to host projects; and the country's competitive advantage relative to other developing countries (Diakoulaki, *et al.*, 2007). In step two, the investment opportunity identified in the respective host countries is then evaluated in terms of the technological, political and legal aspects of the investment (Diakoulaki, *et al.*, 2007). The third step is to apply conventional financial analysis to

account for the CER revenue that the project will generate. The purpose of this is to ascertain the financial return and the extent to which the revenue generated from the sale of the CERs improves the financial viability of the project (Diakoulaki, *et al.*, 2007).

Bearing the above aspects in mind, Jung (2006) argues that while there are many exogenous aspects that will influence host country selection, the distribution of CDM projects depends on the attractiveness of host countries for CDM investment. Frankhauser and Larvic (2003, in Jung, 2006) identify three factors that may be used to determine host country attractiveness for both non-sink CDM and JI projects:

- the scope for cheap carbon credits;
- institutional capacity within host countries to process CDM deals; and
- the country's general investment climate.

Using the above mentioned dimensions, Jung (2006) made use of cluster analysis to classify 114 potential CDM host countries. South Africa scored high in all three dimensions, resulting in it being clustered together with Argentina, Brazil, India, Mexico, Thailand, China and Indonesia (Jung, 2006). This cluster was accorded the status of "CDM-Star" and classified as being "very attractive" in terms of potential CDM host country attractiveness (Jung, 2006:2178). Based on this research, Jung (2006) purports that those countries that have been identified as "attractive or very attractive" will be favoured to host CDM projects thereby resulting in a small proportion of potential host countries receiving most of the CDM investment and a geographic concentration of CDM investments (Jung, 2006).

South Africa has been identified as an ideal host nation for CDM projects as it has an abundance of dirty industry in the energy and electricity sectors; an advanced "financial, manufacturing, mining and chemical sector"; and "modern transportation and communication infrastructure" (Greene, 2006:18). Further, the Government's core economic policies are geared to achieve at least 6 % growth per annum and at attracting FDI into the country with the objective of greater employment (Greene, 2006).

Research concluded by Point Carbon (2007) on the 2006 CDM market highlighted that private sector investment (58 %) dominated the buy-side of the market and HFC-23 and N<sub>2</sub>O reduction projects (low-hanging fruit) dominated the project types (Point Carbon, 2007). Figure 3.1 outlines a classification of the buyers and project types in 2006.

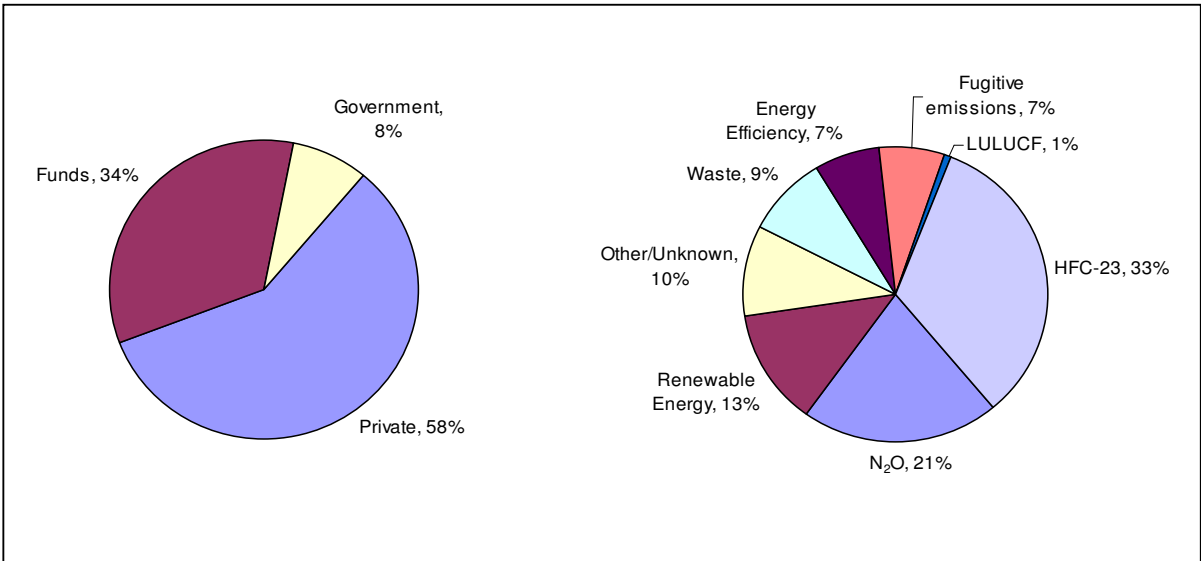


Figure 3.1: The relative share of categories of CDM buyers (left) and the types of CDM projects operating in 2006 (right).  
 (Source: Point Carbon, 2007).

The empirical findings of Point Carbon’s research supports Jung’s assumptions that CDM investment will be concentrated in certain nations, with it being evident that China dominated the CDM supply-side of the market by providing most of the HFC-23 and adipic acid N<sub>2</sub>O reduction projects to the markets (Point Carbon, 2007). Figure 3.2 sets out the current major buying and selling nations, clearly highlighting that South Africa has a relatively insignificant involvement in the CDM initiative by it not receiving specific mention.

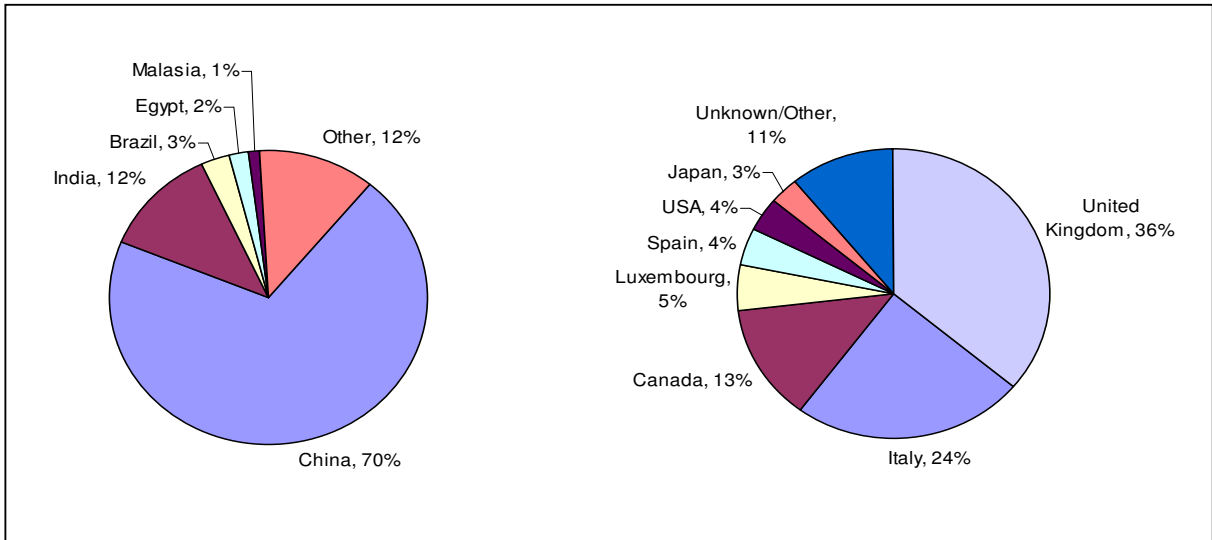


Figure 3.2: The relative share of CDM country sellers (left) and buyers (right) in 2006.  
 (Source: Point Carbon, 2007).

Jung (2006) states that South Africa is one of the nations that is lagging behind relative to its other cluster partners. The question of ‘why this is the case for South Africa?’ needs to be asked. From an industry perspective, Little (2006) identified positive (accelerators) and negative (obstacles) factors that influence the implementation of the CDM by Business South Africa. As at the end of September 2007 there were 781 projects registered under the Kyoto Protocol CDM, of which only 10 (1.3 %) were from South Africa, but there were 43 projects at different stages of development (Financial Mail, 2007a). Of the 781 projects, Brazil and China each had 104 (13.3 %) projects, Mexico had 90 (11.5 %) and India had a staggering 267 (34.2 %) registered projects (Financial Mail, 2007a). Against this backdrop, it is worth surveying, from a public sector perspective, those factors that influence CDM involvement.

### **3.5. Barriers to CDM Involvement: A Public Sector Perspective**

When assessing the barriers to implementing the CDM projects in developing countries, Ellis and Kamel (2007:6) identified that these barriers can occur at different stages of the CDM project-cycle. Consequently, these authors identified four types of barriers and have classified them into the following categories:

- “National-level barriers” not specifically related to CDM projects which includes a country’s policy or legislative framework within which CDM projects need to operate;
- “National-level” barriers related to CDM projects which relates to institutional capacity and awareness;
- “Project-related” barriers such as project finance and project related risk; and
- “International-level barriers” which includes restrictions on project eligibility, framework guidance and protocol decisions.

Set out below are factors which have been identified in the literature which impede CDM development in developing countries.

#### **3.5.1. Application of Sovereign Sustainability Criteria**

Host country governments are allowed the latitude to define their own respective sustainability criteria (Nelson, 2004) and it is required that governments and industry assess projects against this set of criteria. Developing countries essentially become competitors to attract CDM investment in the form of FDI (Kim, 2003) and face the risk of the “race to the bottom” (Muller, 2007). Kim (2003) explains that potential conflict may exist where there is a difference in expectation between the host country and potential investor. Due to competition between developing countries, investors may erroneously believe that a host country’s priority lies in attracting foreign

investment rather than pursuing sustainable development and that they might therefore be willing to compromise social benefits that should accrue (Kim, 2003). Little is known about other nation's sustainability criteria and the level of rigor applied when assessing projects, but it has been purported that a possibility exists that South Africa's CDM process is applied more rigorously than in other countries (Financial Mail, 2007a). Project developers in South Africa need to show that projects are both able to reduce emissions and meet sustainability goals (Financial Mail, 2007a). The DME have documented that a CDM project should not impinge on the environment, economic and social aspects and the project should contribute to at least one of the sustainability development criteria (Greene, 2006).

### **3.5.2. Lack of Funding**

From a national perspective (public and private sector) often economically viable projects that meet the additionality requirement are not implemented due to the lack of funding (Shrestha and Timilsina, 2002; Erion, 2005). Aligned to the "race to the bottom" Nelson (2004) highlights that many African countries are servicing substantial international debt and consequently do not have the funds to invest into projects that solely improve the environment. In the South African Government's 2004 document – a National Climate Change Response Strategy for South Africa (NCCRS) – the South African Government acknowledges that to effectively drive a climate change response programme, public sector funding and financial assistance from external sources is required. Like other African countries, South Africa is experiencing financial constraints in pursuance of implementing national objectives and service delivery (DEAT, 2004). Discussing Carbon Finance, Greene (2005) identifies that the lack of awareness of the available international sources exacerbates the financial constraints. Another important constraint is the difficulty that project developers face in accessing finance from commercial banks (Wohlgemuth and Missfeldt, 2000; Greene, 2005; Del Rio, 2007; Ellis *et al.*, 2007; Pearson, 2007). Banks are reluctant to fund CDM projects where greater reliance is placed on the resultant CERs, as they tend to over state risk (Wohlgemuth and Missfeldt, 2000; Pearson, 2007).

### **3.5.3. Low Political Agenda**

When considering a climate change strategy and particularly a CDM strategy, the government needs to ensure that the strategy is consistent with national priorities. These national priorities include poverty alleviation, access to basic amenities including infrastructural development, job creation, rural development, foreign investment, human resource development and improved health, leading to sustainable economic growth (DEAT, 2004). Using financial assistance as a proxy for level of priority, Lindow (2005) quotes Lindsay Strachan, who is the project manager

for the Department of Cleansing and Solid Waste in the eThekweni Municipality, where he acknowledged that with South Africa struggling to address poverty, aids and faster economic growth - CDM projects are unlikely to receive financial assistance. Similarly, Erion (2005:119) quotes another public sector official – Kevin Nessim: Chief Director for DMEs Energy Planning Unit – where once again it is acknowledged that priority funding is given to “welfare, health care, education, job creation” with CDM type projects relegated to a lower priority.

#### **3.5.4. Insufficient Co-operative Governance**

Due to the South African National Government not providing sufficient guidance on CDM projects, the task of overseeing CDM projects was abdicated to lower levels of government who where either unable or unwilling to accept it (Erion, 2005). In terms of Section 40 and 41 of the South African Constitution, the three spheres of government being National, Provincial and Local Government, are independent but inter-related and are compelled to conduct activities in accordance with Chapter 3 of the Constitution (Constitution, 2004). Amongst other things, this chapter calls for all spheres of government and organs of state *not to assume any power or function except those conferred on them in terms of the Constitution and cooperate with one another in mutual trust and good faith by:*

- *Assisting and supporting one another;*
  - *Informing one another of and consulting one another on, matters of common interest*
- (Constitution, 2004).

This lack of cooperation is evident both between the spheres of government as well as between certain organs of state. The NCCRS (DEAT, 2004:10) acknowledges that officials outside of DEAT and DME, within all spheres of government, often do not perceive climate change as a priority but may even see it as “working against national development priorities”. Erion (2005) argues that the lack of legislation and financial resources in two prominent South African CDM projects (i.e. the eThekweni Municipality and the City Of Cape Town’s Bellville landfill gas projects) underscores the lack of coordination and cooperation between the different spheres of government in South Africa. Worthington (2005) highlights that CDM projects should not conflict with sustainability projects initiated by other government departments. Stiles (2006) argues that project development by businesses in South Africa is hampered due to policy uncertainty and apparent conflicts between strategies implemented between different government departments.

### **3.5.5. Additionality Requirements**

Additionality refers to the phenomenon that only GHG-reduction projects, which would not have been undertaken in the absence of a carbon credit scheme, are eligible to be registered as CERs (Stiles, 2006). If a project would have been implemented as a “business-as-usual” project, or if it is required in terms of a law of a host country, then such projects are disqualified from being registered as CERs due to them not being additional in nature (Greene, 2006). Stiles (2006) suggest that this criterion makes the CDM less attractive to free riders. Additionality is a difficult concept to grasp and often becomes a contentious issue amongst project developers in demonstrating what “business-as-usual” is and what is additional (Greene, 2006; Stiles, 2006). Kamel (2005) stresses that project developers should elaborate fully on the additionality component of the project while Del Rio (2007) offers measures that project developers can adopt to address the practical difficulties in assessing additionality. Nelson (2004) described environmental, financial, investment, technological and institutional additionality, but highlights that environmental additionality may cause investors to bypass the poorest countries who are more likely to pursue development along the most pollution-intensive path. For a project to offer “environmental additionality” it is required that the project reduces GHG levels below a predefined baseline (Nelson, 2004). Greiner and Michaelowa (2003), describe a number of criteria relevant to assessing the investment additionality of a project while Shrestha and Timilsina (2002) address the concept from a pure economic perspective. Greene (2005) calls for a more business-friendly interpretation, while Greene (2006) calls for radical reform of the concept. Operationally, this concept creates a perverse incentive for developing countries not to introduce policies and measures at mitigating climate change (Erion, 2005; Worthington, 2005). The argument being that as mandatory national standards are set and legislated, activities falling within the purview of that legislation essentially become business-as-usual activities and are therefore disqualified from being accorded CDM status. The effect is that the revenue previously derived from the sale of the CERs is lost, so too are the external funding sources available to finance CDM projects.

### **3.5.6. High Transaction Costs**

Transaction costs are relevant because they increase the cost of CDM projects and consequently reduce the profitability (Del Rio, 2007). This author defines transaction costs as including, “search, negotiation, baseline determination, approval, validation, registration, monitoring, verification, certification, enforcement, transfer and registry costs” (Del Rio, 2007:1366). Spalding-Fecher (2002) points out that many of the transaction costs relate to the CDM eligibility

process. Smaller projects often have disproportional transaction costs, due to some of the costs being fixed costs which are independent of the project size (Wohlgemuth and Missfeldt, 2000). Often smaller projects are bundled into larger ones to reduce transaction costs (Spalding-Fecher, 2002). Stiles (2006) estimates that the total transaction costs for a large-scale project can range between R350 000 and R1.5 million, with between R40 000 and R200 000 being paid to the DOE for validation. Comparatively, transaction costs for small-scale projects could range between R185 000 and R325 000, with between R38 000 and R60 000 being paid to the DOE for validation (Stiles, 2006). Chen (2003) relates transaction costs to the price of CERs and its effect on CDM potential. This author concludes that increasing transaction costs will drive price upward and therefore negatively impact on the CDM potential of a developing country. Stern (2006) specifically mentions transaction costs as being a barrier to implementing CDM projects.

### **3.5.7. Lack of Awareness**

The lack of information and knowledge on the CDM is one of the key barriers preventing stakeholders from adopting the CDM (Ellis and Kamel, 2007). These authors have identified three stakeholder groups that need to possess relevant and accurate CDM information. These groups have been categorized as follows:

- Group A: Policymakers;
- Group B: Individuals working in the technical fields and economic activities from which CDM projects can be identified. An example would be individuals working in the field of Energy and Electricity or an academic researching - Renewable Energy alternatives; and
- Group C: Bankers or Financiers.

Both Del Rio (2007) and Ellis *et al.*, (2007) identify a lack of awareness amongst potential financiers on the CDM and its potential benefits. Greene (2005) ascertains that lack of awareness may be in the form of an ignorance of policy, technology, financial and legal aspects that affect the CDM. Further, there may be a lack of awareness by investors of the opportunities, partnerships and existing projects in South Africa (Greene, 2006). In general, there is a lack of public awareness (Refocus, 2005). The South African National Government acknowledges that general awareness on climate change is limited to those departments that are directly involved with that issue (DEAT, 2004).

### **3.5.8. Lack of Capacity and Poor Capacity Building**

Addressing host country attractiveness Jung (2006) identifies the need for the development of institutional capacity through the ratification of the Kyoto Protocol, development of a DNA and a

national strategy response to CDM. Complementing these factors, Ellis and Kamel (2007) identify the need for a CDM specific national framework and for the CDM policy to be coherent with other relevant policies and *vice versa*. Ellis, *et al.* (2007) argues that developing countries that have high absolute emissions and which are likely to receive targets beyond 2012 should build capacity now in preparation for future mitigation requirements. Del Rio (2007) proposes measures to be adopted by a nation to address the aspect of poor institutional capacity which in turn leads to the inability to identify carbon assets and to clearly define sustainable development criteria. Nelson (2004) suggests that poor institutional capacity within African nations has resulted in the lack of an African position and influence on the Kyoto Protocol. Muller (2007) argues that institution building is important in the CDM process but more so as a preliminary measure to facilitate further regulation rather than to supplement it when looking at taxation and FDI issues. Kim (2003) draws attention to the need to provide education and training to the public in general and local communities that will host CDM projects to increase the success rate of CDM implementation. Greene (2005) however, cautions against excessive capacity building in less attractive countries where CDM potential is relatively low and which are less likely to attract carbon finance.

The South African government has acknowledged that it is a late-comer to the CDM initiative and that South Africa together with other African nations have made little progress in furthering CDM projects, with the result being that they lag behind Asia and Latin America (Lindow, 2005; Stiles, 2006). South Africa has the leadership position amongst African nations in terms of institutional capacity with it opening a DNA office in 2004 (Stiles, 2006). However, due to insufficient staffing and relatively late responses, investors are concerned with the slow approval process and the South African Government's perception of the CDM as being a regulatory mechanism rather than an opportunity to attract FDI and clean technology (Stiles, 2006).

While most of the capacity building in Africa is being done by the United Nations, the World Bank and other NGOs, governments need to acknowledge their respective roles. In the NCCRS (DEAT, 2004:30) the South African government has acknowledged that "if National Government has a lack of expertise, there is a much greater problem at Provincial and Local Government levels". To address this shortfall, the South African government has an objective to "improve the level of education, training and awareness regarding climate change in South Africa and capacitate the government and other segments to deal with climate change issues effectively to benefit the country" (DEAT, 2004:30). Greene (2006) highlights that a Memorandum of Understanding between business and South African Government to combat climate change was

signed in October 2005, which will facilitate the gathering of important emission data that can be used in drafting appropriate policy.

### **3.5.9. Uncertainty Regarding Post-2012**

In terms of Article 3 of the Kyoto Protocol the first commitment period will be from 2008 to 2012 (United Nations, 1998). The lack of consensus amongst UNFCCC members on the most appropriate solutions to climate change and global warming post 2012 has negatively impacted the CDM market (Greene, 2005; Stern, 2006; Stiles, 2006; Del Rio, 2007). These authors highlight that there is uncertainty regarding the value and validity of CERs post 2012 as well as whether developing countries will receive targets in the next period. Point Carbon empirically supports this uncertainty where it is identified that only few CDM projects extend beyond the first commitment period (Point Carbon, 2007). Assessing the 2013 – 2017 scenario, Point Carbon (2007:47) is of the opinion that:

- “a new Kyoto-like protocol will be in existence for existing members and a few new ones;
- the US will enact domestic climate policy in parallel with global regime; and
- a US-ETS will link with the EU ETS and spur CER demand”.

Further, this organization argues that the new protocol is likely to be signed in 2010 and will include the aviation and marine transport sectors. The possibility also exists for developing countries with high per capita emissions to be accorded emission caps.

Aligned to the uncertainty, Stern (2006) warns that a lack of long-term goals and a poor domestic policy framework to climate change could hamper carbon finance from facilitating carbon mitigation. This author therefore stresses that the future of the CDM, the eligibility of projects and efficient domestic policies are important elements of international trade for cooperation on climate change issues. Early signs about the acceptability of projects beyond 2012 are therefore essential to continue the momentum of carbon mitigation.

Acknowledging the urgency of addressing climate change and the negative impact of a protracted negotiating process, South Africa will be pushing for a post 2012 agreement to be negotiated before 2009 (Financial Mail, 2007b). Point Carbon (2007) anticipate that progress may be made before 2009 but no productive negotiations will be considered before the new US president takes office in 2009.

### 3.5.10. Complex CDM Project Cycle

While in theory the CDM offers a win-win outcome for contracting parties, the procedures and modalities required by the process complicates the process (Greene, 2005; Greene, 2006; Stiles, 2006). Stiles (2006:30) argues that due to the complexity and uncertainty of the process, even the most “straight forward projects may flounder along the way” and adds that the requirement of an environmental impact assessment (EIA) further complicates the process. Kim (2003) also identifies that an EIA acts as a barrier but found inconclusive evidence to support the need for a streamlined EIA for CDM projects. Del Rio (2007) identified the delays in approving project methodologies by the Executive Board of the CDM (EB) as a problem but Point Carbon (2007) have ascertained that the EB have hired new staff which should reduce delays in the approval process.

Set out below in Figure 3.3 are the steps in the CDM approval process as well as an indication of the various parties involved in the different phases.

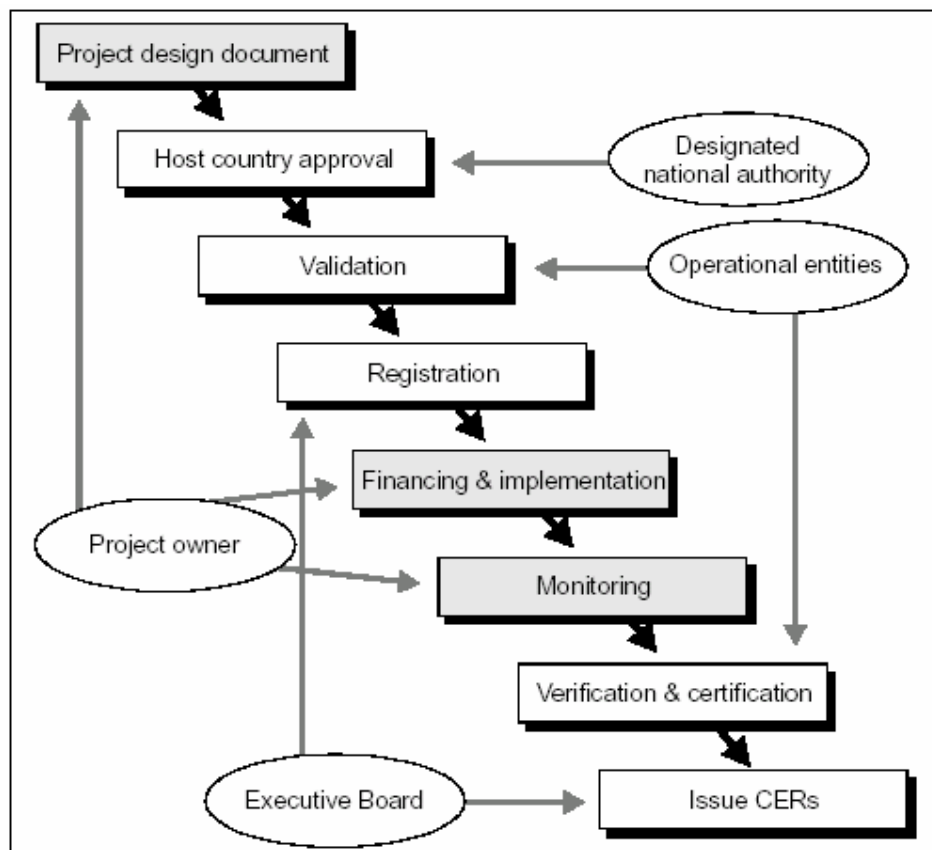


Figure 3.3: A diagrammatic representation of the steps in the CDM project cycle. (Source: Spalding-Fecher, 2002).

While acknowledging that the project cycle could take up to a year and that an EIA could extend that period, the Financial Mail (2007a:16) cites Clarke in an interview who argues against the process being too complex but argues that project developer confidence should be greater due to the fact that the “procedure-based and systematic approach adds process predictability and credibility”.

### **3.5.11. Abundance of Cheap Electricity**

Criticizing a country’s regulatory framework, Ellis and Kamel (2007) state that private-sector independent power producers (IPP), in some countries, are prevented from feeding electricity into the grid. These authors regard this restriction as being a major barrier to CDM development, particularly with regard to renewable energy projects including wind energy or efficient bagasse co-generation projects that IPPs are more likely to initiate.

Platt (2003, in Ellis and Kamel, 2007) revealed that certain municipalities in South Africa owned electricity generating capacity and therefore generate and sold electricity as a source of revenue. Ellis and Kamel (2007) perceive this as a barrier to CDM projects as they contend that a disincentive exists for municipalities to develop energy efficient projects that would reduce the volume of electricity generated and consequently the revenue collected.

South Africa has been rated as the world’s 13<sup>th</sup> biggest emitter of GHGs, as measured by the country’s emissions of CO<sub>2</sub> and related GHGs (Financial Mail, 2007c). This is primarily due to the country using low-grade coal to produce approximately 95 % of its energy needs, as well as coal being used in liquid fuel production (Stiles, 2006). These components account for 45 % of the GHG emissions and therefore necessitates that focus be placed on the generation of electricity from renewable energy sources. Due to the economic importance of South African coal mines and Eskom being heavily dependant on coal-based technology, Kim (2003) argues that coal mines may be threatened by large-scale gas pipe lines or renewable energy projects. Further, this author argues that Eskom may resist the import of renewable-energy technology which might threaten its own technology. In terms of renewable energy resources, government has set a modest target of 10 000 Gwh of energy to be generated from renewable sources by 2013 (Financial Mail, 2007c). This accounts for 5 % of the current electricity generation and could replace two 660 Mw units within Eskom’s infrastructure (Financial Mail, 2007c). However, the complexity of additionality needs to be considered if policy makes a technology a business-as-usual methodology because products that then use that technology will not qualify as CDM projects.

### **3.6. Promoters to CDM Involvement**

Jung (2006) has identified South Africa as a very attractive CDM-host country but research by Point Carbon (2007) has revealed that South Africa is a relatively insignificant player in the CDM market. The preceding section identified potential barriers that might impede an organization from actively pursuing CDM projects, while this section will discuss those factors that may encourage an organization to facilitate the implementation of CDM projects.

#### **3.6.1. Technology Transfer**

As contained in Article 10 of the Kyoto Protocol, one of the objectives of the agreement is the transfer of environmentally sound technologies from developed countries to developing countries (United Nations, 1998). This provision therefore enables a developing country to access more advanced cleaner technology, to which it was previously denied, as it pursues development in a cleaner more sustainable manner. This provision allows developing countries to leap-frog old dirty technologies due to them now having access to advanced technologies, either on a “low-cost or no-cost” basis (Nelson, 2004). This flow of technology between developed and developing countries is perceived as a positive outcome of the CDM (Spalding-Fecher, 2002; Nelson, 2004; Worthington, 2005; Stern, 2006).

From a public sector perspective, it can be argued that technology transfer can be attained from two sources; firstly through the provisions of Article 10 of the Kyoto Protocol and secondly, through collaboration with the private sector within a countries borders. The latter source encourages the development of Public-Private Partnerships (PPP). Gombault, Lee, Reynolds and Toefy (2007) stress that South African municipalities can make a positive impact on the reduction of GHGs, and argue that PPPs offer municipalities the opportunity to access the human capital of private partners. Nelson (2004) argues that technology transfer will help developing countries pursue development by making use of lower cost and more efficient technologies. While the Financial Mail (2007b) highlights that due to patent and intellectual property rights, sustainable technologies, including solar and wind power, have deprived the developing world of their respective benefits the CDM now encourages technology transfer. This article does, however, cynically challenge the caring philosophy of the developed world on the aspect of the transfer of intellectual property. Little (2006) argues that while technology transfer is a driver within industry in developing countries, he is of the opinion that this is not the case in South Africa, due to its relative technologically advanced state amongst developing nations.

Through the CDM-vehicle, technology transfer will allow organizations to access previously restricted environmentally sound technologies. This in turn will allow organizations to improve their respective internal efficiencies and pursue further development in a more sustainable manner.

### **3.6.2. Financial Benefits**

The financial benefits that can be extracted by the public sector from the CDM come from three sources, namely; project funding, revenue from the sale of CERs, and rent extraction from the CERs. Contrary to the debate on the lack of funding, Greene (2006:36) argues that government is willing to support CDM initiatives because it proactively responds to the issue of climate change, it facilitates foreign direct investment and more importantly when external finance is secured, it does not “encroach on hotly contested budgets”. In general, numerous authors acknowledge that financial assistance in the form of FDI encourages CDM initiatives (Shrestha and Timilsina, 2002; Nelson, 2004; Greene, 2005; Ellis *et al.*, 2007).

Due to a CER essentially being a financial instrument and the growing sophistication of the carbon market, the revenue generated by carbon credits act as a lure. The Financial Mail (2007d) highlights that CERs can currently (October 2007) be traded for €16 per CER, which therefore poses a great opportunity for South African companies and municipalities to take advantage of the CDM. The financial viability of CERs is identified as a means of generating additional revenue (Greiner and Michaelowa, 2002; Greene, 2005; Greene, 2006; Jung, 2006) with Worthington (2005) identifying a perverse phenomenon where in many countries the quantity of credits are often regarded as being more important than the quality of the projects. In such cases, the social and environmental components of sustainable development are compromised in lure of financial benefit.

Muller (2007) suggests “rent extraction” by making use of a project tax with “revenue hypothecation” as a policy instrument. The profits generated by the CDM projects are described as economic rents with revenue hypothecation referring to the earmarking of tax revenues for specific purposes (Muller, 2007). This author identifies various forms of rent extraction but more importantly states that due to the lack of true sustainable development by certain CDM projects, the revenue generated can be used to address national strategies including poverty alleviation, technological development and capacity building. The Chinese Government has realized the potential of rent extraction and has imposed a tax of 65 % on CER revenues from HFC 23-

reduction projects (Economist, 2007a). Further, the Chinese government launched a \$2 billion CDM fund in February 2007 to facilitate this initiative in China.

The CDM offers organizations access to international funding as well as a source of revenue. Access to these financial benefits is only through the CDM, thereby promoting the active participation of developing countries. From an economic perspective, by developing countries not extracting the rents from CDM projects, opportunity costs are incurred which impact on all three components of sustainable development.

### **3.6.3. Positive National Response**

Building on host country attractiveness, a country requires certain fundamental aspects to be in place in order for it to be able to facilitate CDM projects. Jung (2006) lists these as:

- The ratification of the Kyoto Protocol;
- Experience in GHG reduction projects;
- Timely establishment of a DNA; and
- A national strategy on climate change and CDM.

Discussing mitigation, Stern (2006) succinctly identifies that while most of the development of new technologies and carbon mitigation will be undertaken by the private sector, it is the public sector's role to provide a stable framework of incentives. Stern (2006) argues that private sector research and development will be encouraged through public research and development and through 'development support' – a market condition which encourages firms to invest in new technologies but relies on competition to stimulate cost reductions.

On the issue of awareness, Stern (2006) identifies that Governments in developing countries have a role to play in increasing general awareness but acknowledges that barriers including illiteracy, inaccessibility and restricted access to electronic media would need to be overcome. Emphasizing the "public good nature of high quality climate information" Stern (2006:495) predicts that "a core responsibility of governments will be to see that it has access to, and disseminates domestically, good information on climate change".

The South African Government has acknowledged that there are benefits in adopting a future strategy that will use clean technology to facilitate development (DEAT, 2004). However, they have also acknowledged that a strategy would need to be established to access investment through the CDM to harness technology transfer and donor funding (DEAT, 2004).

Although the Department of Environmental Affairs and Tourism (DEAT) has been identified as the lead agency driving climate change mitigation, it is recognized that the ramifications of climate change are diverse (DEAT, 2004), which has encouraged the inclusion of business, labour, civil society and other governments in the process. However, in December 2004, legislation was promulgated which nominated the DME as the designated DNA. Gilder (2005, in Green, 2005) argues that the DME was selected because of the expectation that many of the CDM projects would stem from mining and energy generation sectors. Notwithstanding the allocation of responsibility, a steering committee consisting of representatives from ten other government departments was advocated. With no clear legislative framework, climate change responses are patchy, inadequate and inconsistent (Financial Mail, 2007e). Addressing policy formulation, the South African government, is guided by two doctrines namely, the National Constitution and the Kyoto Protocol (Financial Mail, 2007e). In terms of its mandate, the DNA drafted a broad set of sustainable development criteria, which considered the economic, social and environmental impacts of projects. A table of sustainability indicators has been included in Appendix B but these indicators are still to be reviewed and refined (DEAT, 2004). The DNA has adopted the definition for sustainable development as contained in National Environmental Management Act (NEMA) (2004) being “the integration of social, economic and environmental factors into planning, implementation and decision making so as to ensure that development serves present and future generations”. In terms of sustainable development, the DNA will consider whether “on balance” the project supports the country’s sustainable development objectives (DME, 2004).

DEAT drafted the NCCRS in 2004 and aims to publish a policy in 2007/2008 which will assist government decision making on aspects of energy, transport and infrastructure investment (Financial Mail, 2007e). Further, this policy will aim to align national and provincial policies which will infiltrate municipal policies. A summary of the strategic objectives and interventions proposed in the 2004 strategy document (DEAT, 2004) has been included as Appendix C.

Positive steps made toward reducing GHG Levels in South Africa include the:

- Establishment of a DNA;
- Signing of Energy Efficiency Accord;
- Establishment of National Energy Efficiency Authority;
- National treasury’s contemplation of green taxes on polluters;
- Proactive climate change response documents drafted by government departments;
- Appointment of PricewaterhouseCoopers as the DOE; and the
- Identification of South Africa’s top 50 polluters (Financial Mail, 2007e).

#### **3.6.4. Promotion of Renewable Energy Resources**

Within the context of energy generation from coal contributing in excess of 80 % of South Africa's GHGs (Lindow, 2005; Greene, 2006; Stiles, 2006; Financial Mail, 2007e) the South African Government's response has been to encourage the development of renewable energy generation by adopting alternative technologies including biofuels, solar energy, wind energy, fuel switching and hydro energy (Stiles, 2006; Financial Mail, 2007f). Complimenting this strategy is the establishment of an energy efficiency strategy addressing demand-side management (DEAT, 2004). Greene (2006) identifies that the South African Government's support is evident in the establishment of the National Energy Efficiency Strategy, the signing of the Energy Efficiency Accord, the White Paper on energy efficiency and clean energy and the new grant scheme administered by the DME.

Nelson (2004) identifies the need for both renewable energy and energy efficiency measures to propel development of non-Annex I countries along a cleaner development path. Wohlgenuth and Missfeldt (2000) argue that renewable technologies support sustainable development which is aligned to the ideals of the CDM and are therefore likely to feature prominently in CDM projects. Ellis *et al.*, (2007) ascertain that at 24 % of all projects, electricity generation projects – including renewable technology projects – contribute significantly to the pool of CDM projects. These authors argue that this is so due to such projects being the preference of first movers. Point Carbon (2007) revealed that Renewable Energy and Energy Efficiency projects account for 13 % and 7 % respectively of all projects registered in 2006. These authors expect “renewables, energy efficiency, waste (including landfill gas capture) and fugitive emissions (including coal mine methane)” to grow in future years. The Economist (2007b) identifies that many governments have set targets on the proportion of energy that should be derived from renewable sources with subsidies being identified as a means of encouragement.

As a factor that promotes the involvement of organizations in CDM initiatives, the attraction of renewable energy projects include the fact that:

- Renewable energy projects are eligible CDM projects, with agreed modalities issued by the EB to expedite the approval and implementation of such projects;
- South Africa has an abundance of dirty energy production plants;
- The South African Government is proactive in addressing renewable energy;
- Technology transfer is facilitated; and
- Sustainable development is supported.

### **3.7. Future Prospects**

In the preceding two sections, factors were identified that would either impede or promote the participation, by organization, in the CDM initiative. While acknowledging that the constraints would need to be overcome, the next section deals specifically with identifying factors, from a municipality perspective, that could improve greater involvement in the CDM.

#### **3.7.1. Proactive Stance by Public Sector**

While Little (2006) argues that business should take the leadership role in driving the CDM process in South Africa, this study supports a collaborative approach but with public sector taking accountability and leadership. Erion (2005) quotes Strachan (in an interview in 2005) who succinctly argues for public sector leadership as government thinks about the triple bottom line but business generally only thinks about the single bottom line - being profit.

Collaboration is called for as government will need to provide a legislative framework to facilitate a coherent, consistent and appropriate response to climate change and the CDM (Financial Mail, 2007e). Further, technology transfer will need to emanate from the private sector but the majority of the assets that can be used in the CDM process are owned by government (landfill sites and solid waste plants). The Kyoto Protocol clearly places the responsibility on national governments, but the means to achieve national targets will be through business and industry. Complementing the argument for public sector leadership, the Economist (2007b) identifies that currently the main sources of renewable energy is from geothermal and hydroelectric power which limits the scope of private sector involvement due to the aspect of asset ownership.

Muller (2007) proposed rent extraction from CDM projects for the benefit of local governments. Policy makers should carefully consider this issue because while taxes represent an additional source of revenue to government, it may make South Africa less attractive as a host country.

To overcome potential policy or legislative barriers, Ellis and Kamel (2007:18) suggest that host country governments encourage investment through:

- Ensuring that domestic laws are stable and enforceable for the full duration of CDM projects;
- Providing a tax or incentive framework to increase the economic attractiveness of a country for CDM investments;
- Reducing the restrictions on foreigners with regard to project participation and ownership;

- Developing a “clear policy on CDM-relevant issues” including the eligibility of projects and the ownership of resultant CERs.

### **3.7.2. Improve Process Efficiency**

There is a greater body of evidence that argues that the CDM process and its modalities are complex (Greene, 2005; Greene, 2006; Stiles, 2006), thereby limiting the success of South African CDM projects, than what there is arguing for its efficacy (Financial Mail, 2007a). Jung (2006) highlighted that institutional capacity is one of the issues that investors examine before embarking on CDM projects. The Chinese government has been proactive in drafting a plan for the operation of the CDM in China (Refocus, 2005) thereby greatly improving its penetration into the CDM market.

### **3.7.3. Improve Communication and Capacity Building**

Related to communication, Kamel (2005) identifies that insufficient information during the stakeholder consultation process is one of the common pitfalls in the CDM process. Kim (2003) states that there is insufficient communication in the public participation phase.

Acknowledging the low level of skills within government and its fiduciary responsibility as a signatory to the Kyoto Protocol, the South African Government has a strategic objective to “improve the level of education, training and awareness regarding climate change in South Africa and capacitate the government and other sectors to deal with climate change issues efficiently to the benefit of the country” (DEAT, 2004:30). Greene (2006) does, however, caution against the dangers of excessive capacity building in those countries with poor CDM potential.

### **3.7.4. Benefit from Globalization and Strategic International Alliances**

With climate change being a global phenomenon, South Africa has an abundance of a new asset class (carbon assets) that it can export to the developed world as the market for carbon credits converge. Hough and Newland (2007:3) refer to this phenomenon as globalization - being the “shift toward a more integrated and inter-dependent world economy, including the globalization of markets and production”.

Jung (2006) mentions that the general investment climate of a nation contributes to the attractiveness of a host country. Kim (2003) argues that FDI is governed by international investment agreements which have the objectives of liberating foreign investment and to protecting the interests of investors from the actions of host governments. Within the context of

international trade, the South African Government has elevated the importance of biofuel production under its Accelerated and Shared Growth Initiative for South Africa (ASGISA) (Financial Mail, 2007g). These projects have the potential to be registered as CDM projects.

### **3.7.5. Encourage the Formation of Public-Private-Partnerships**

While it has been acknowledged that municipalities in South Africa can make a positive environmental impact through the reduction of GHGs, it is acknowledged that the CDM process is relatively complex, requiring both national and international approval. Gombault *et al.*, (2007:20) advocate the use of PPP's for CDM projects and have identified the benefits to include:

- “Environmental Benefits”;
- A “less onerous compliance process”, referring particularly to supply chain management compliance as contained in the Municipal Finance Management Act;
- A lower financial burden on municipal resources;
- Limited risk exposure; and
- Access to skilled human capital.

Many of the factors mentioned above, will address CDM barriers and foster the implementation of CDM projects. Stern (2006) has recognized that both international and PPP cooperation will be required to expedite the research and development and diffusion of technological innovation.

### **3.8. Conclusion**

Aligned to the principle of Common but Differentiated Responsibility, the CDM is a scheme which encourages developing countries to become involved in climate change mitigation and to pursue sustainable development domestically. Certain cautions to the CDM were discussed in this chapter with a major concern being the “race to the bottom” where developing countries lower their respective environmental regulatory standards in pursuit of attracting FDI. The phenomenon where countries host projects that employ technologies that may compromise sustainability, was described as the pollution effect .

The current expectation is that there will be a proliferation of “brownfields” projects as investors seek to invest in countries and projects that will yield a high quantity of carbon credits at the lowest cost. Governments will be faced with the dilemma of enforcing national sustainability goals, of making trade-offs between the different components, and of ensuring sustainable development when accepting or rejecting projects.

Research by Jung (2006) was contextualized in this chapter by highlighting that the findings of this research categorized South Africa as a very attractive CDM-host country. Amongst other things, the abundance of a country's dirty industries increases its relative attractiveness. However, the main factors that determine host country attractiveness for both non-sink CDM and JI projects were cited as:

- the scope for cheap carbon credits;
- the institutional capacity within host countries to process CDM deals; and
- the country's general investment climate.

Notwithstanding South Africa's classification, research by Point Carbon (2007) highlighted South Africa's relatively insignificant involvement in the CDM when compared to its peers in the very attractive category.

Ellis and Kamel (2007:6) identified that barriers that impeded CDM involvement could occur at different stages of the CDM project cycle and consequently classified four types of barriers. These categories were cited as being national level barriers not related to CDM projects; national barriers associated with CDM projects; project related barriers; and international barriers. A number of factors were identified, from the literature, which could impede the active involvement of South African public sector organizations, in the implementation of CDM projects. These included:

- Application of sovereign sustainability criteria;
- Lack of funding;
- Low political agenda;
- Insufficient co-operative governance;
- Additionality requirement;
- High transaction costs;
- Lack of awareness;
- Lack of capacity and capacity building;
- Uncertainty regarding post-2012;
- Complex CDM project cycle; and
- Abundance of cheap electricity.

Following on from the barriers, this present literature study revealed that there were certain factors that promoted the involvement of public sector organizations in the CDM initiative. These factors were identified as being:

- Technology transfer;
- Financial benefits;
- Positive national response; and
- The promotion of renewable energy projects.

Bearing the constraints in mind, the literature was then assessed to identify factors that could improve the greater involvement by municipalities in future CDM projects. These factors were identified as being the need for:

- The assumption of a proactive stance by public sector (National Government);
- Improved process efficiency;
- Improved communication;
- The realization of benefits from globalization and strategic international alliances; and
- The encouragement of the formation of Public-Private-Partnerships.

The factors identified in the literature formed the theoretical context of this present study, upon which propositions were built. These propositions sought to explore those factors that either impede or promote CDM involvement, or that require change to encourage greater CDM involvement within the NMBM. The intention was to test the findings of the research, conducted within the NMBM, against the formulated propositions. The stated outcome was to either accept or reject the factors as being relevant to the NMBM's involvement.

Chapter 4 describes the propositions to be tested and elaborates on the methodology applied in the research.

## **CHAPTER FOUR RESEARCH METHODOLOGY**

*Not everything that can be counted counts, and not everything that counts can be counted.  
Albert Einstein*

### **4.1. Introduction**

With the phenomenon of climate change currently being an important global issue and with South Africa being a developing country which has ratified the KP, the question, “Why is South Africa not a prominent player in the CDM market?” needs to be asked. Curiosity around this aspect was heightened by Jung’s (2006) findings which classified South Africa as a “very attractive” country for CDM investment but yet findings by Point Carbon (2007) suggest that South Africa is a relatively insignificant player relative to most of its peers in Jung’s “very attractive” category.

A literature review revealed that capacity building research was available which addressed the broader issues of climate change, carbon finance and to a limited extent the CDM for South Africa (Spalding-Fecher, 2002; Greene, 2005; Greene, 2006; Stiles, 2006). However, Little (2006) recently conducted research into the aspects that support and restrict South African industry from implementing non-sink CDM projects. This purposeful exclusion of the Public Sector exposed a gap in the current literature and offered an opportunity to investigate the reasons for the poor involvement of the public sector at the Municipal (micro) level by conducting an exploratory case study in the NMBM.

### **4.2. Purpose of Research**

The purpose of this research dissertation was to explore why South African Municipalities, in general and the NMBM in particular, are not proactively pursuing the implementation of CDM projects? Set out below are the objectives and theoretical propositions formulated for the study.

#### **4.2.1. Research Objectives**

The goal of the research was to develop an understanding of the factors that would either constrain or promote the active involvement of the NMBM in the implementing of CDM projects. Further, this research sought to explore what needed to change, within the municipal context, to encourage the NMBM to proactively pursue CDM investment. The researcher’s intention was to make the findings available to the NMBM to encourage greater thought and debate on how the Municipality could proactively become involved in or positively influence CDM projects.

In order to explore the topic, the following research objectives were defined:

- Understand the level of awareness of and perception towards the CDM initiatives amongst selected municipal officials within the NMBM.
- Ascertain the current Institutional Capacity with regards to CDM;
- Determine the current obstacles prevalent in the Municipality preventing it from proactively pursuing CDM initiatives;
- Determine the enablers required to facilitate CDM project initiation; and
- Ascertain Future Prospects and Developments required within the NMBM to promote greater involvement in CDM initiatives.

#### **4.2.2. Propositions**

Based on the literature review and deductive nature of the study, factors were identified that could either impede or promote CDM involvement by Municipalities. Further, factors were also identified which would improve future Municipality involvement. To explore these aspects, the following three theoretical propositions were formulated:

##### **Proposition 1 - The following factors impede the proactive participation of the NMBM in the implementation of CDM initiatives:**

- Application of sovereign sustainability criteria
- Lack of funding
- Low political agenda of CDM
- Insufficient co-operative governance
- Additionality requirements
- High transaction costs
- Lack of awareness
- Lack of capacity and poor capacity building
- Uncertainty regarding post-2012
- Complex CDM project cycle
- Abundance of cheap electricity

##### **Proposition 2 - The following factors promote the involvement of the NMBM in the implementation of CDM initiatives:**

- Technology transfer
- Financial benefits
- Positive national response
- Promotion of renewable energy

**Proposition 3 - The following factors are required to improve greater future involvement by the NMBM in the CDM:**

- Proactive stance by public sector
- Improve process efficiency
- Improve communication and capacity building
- Benefit from globalization and strategic international alliances
- Encourage Public-Private-Partnerships

These theoretical propositions were then compared against the empirical findings to ascertain whether the propositions could be supported or rejected (Gray, 2004).

**4.3. The Research Paradigm**

Due to the nature of the knowledge being investigated residing internally within the respective units of research, a constructivist paradigm with a relativist ontological view of reality was adopted to offer an emic perspective to the study. The relativist view acknowledged the existence of multiple realities which were “experientially based” and dependant on the specific unit’s construction (Guba and Lincoln, 1994:110). Consequently, the epistemology was that of a subjectivist approach due to the researcher and unit of investigation being “interactively” linked, with the findings being created as the study proceeded (Guba and Lincoln, 1994:111). While it is acknowledged that the researcher’s subjective engagement with the subject is one of the strengths of qualitative research, Kvale (1994, in van der Mescht, 2002) argue that this approach places strong demands on interviewer competence.

**4.4. The Case Study Approach**

As a research method, a case study method is appropriate when “How” or “Why” questions are being asked about a contemporary sequence of events, over which the researcher has no direct control (Gray, 2004). Babbie and Mouton (2001) identify that a case study design is appropriate when the researcher is interested in understanding a clearly delineated entity. The logic of a case study is therefore analytic rather than enumerative induction (Neuman, 2003). With case study research, the researcher explores many features in a few cases but in depth, resulting in data that is “detailed, varied and extensive” (Neuman, 2003). Gray (2004) clarifies that case studies may be used to explore subjects where relationships may be ambiguous or uncertain but also attempt to attribute causal relationships and not just describe a situation. Riege (2003) explains that the primary objective of case study research is to develop and construct a theory by following a semi-structured process which requires a relatively high level of prior theory preparation. This author

believes that the strength of a case study can be attributed to its replication. Gray (2004) believes that a case study is particularly valuable when a researcher is attempting to understand the relationship between a phenomenon and the context in which it occurred. According to Vaughan (1992, in Neuman, 2003:33) a case study assists a researcher to connect “micro level” to the “macro level”, where the former refers to the individual unit and the latter to the “social structure and process”.

Four types of case study designs are possible, being:

- Single case, holistic;
- Single case, embedded;
- Multiple case, holistic; and
- Multiple case, embedded (Gray, 2004).

The main difference between the holistic and embedded approach is that the holistic approach examines one particular phenomenon while an embedded approach examines the different perspectives of multiple units regarding the particular phenomenon (Gray, 2004).

For the current study, a holistic single case study approach was adopted which is suited to investigating a “unique or revelatory” case (Gray, 2004:132), such being the case of the adoption of CDM projects by the NMBM. Further, the case study sought to develop “rich and thick descriptions” of the phenomenon being investigated (Remenyi, 1996). A deductive approach was followed which seeks to confirm or reject theoretical propositions (Gray, 2004).

To enhance the quality of the case study method, Riege (2003) acknowledges Guba and Lincoln’s research which suggests that design tests for credibility, transferability, dependability and confirmability be incorporated. Yin (1994:90-98) suggests three principles of data collection for case studies, namely; “use multiple sources of evidence, create a case study database and maintain a chain of evidence”. Through the multiple sources of data, triangulation of evidence is possible which increases data reliability and validity (Tellis, 1997). On the issue of triangulation, van der Mescht (2002) argues that within the interpretive paradigm, the use of multiple sources of information is possible but the purpose should be to gain a fuller more complete picture rather than to confirm findings. This author maintains that combining methods from different perspectives produces results that are “more complete not more valid” (van der Mescht, 2002:48). The researcher subscribes to this logic and therefore aimed to improve the dependability of the study by creating a fuller picture of the aspect rather than to search for “one true social reality”

(Arksey and Knight, 1999 in van der Mescht, 2002:48). Stake (2005) argues that the purpose of a case study is to represent the case, not the world. In the current study, credibility was enhanced by allowing the respondents the opportunity to validate and confirm the data contained within the interview transcripts. Further, to allow for external confirmability, the raw data will be made available for audit purposes but anonymity will be maintained.

Babbie and Mouton (2001) highlight that transferability rests with those who wish to apply the knowledge gained from one context to another receiving context. To facilitate this, non-probability sampling was adopted and thick descriptions of the phenomena were formulated.

Not seeking to generalize, the researcher was only interested in “why” the NMBM was not proactively pursuing CDM investments and what improvements are required to entice greater involvement with CDM projects. It therefore follows that in order to fully appreciate the CDM-issue within the NMBM context, the researcher needed to obtain an in-depth understanding of the factors that either constrained or promoted involvement, as well as factors that were considered necessary to improve so as to encourage the future involvement of the Municipality in such projects. Based on this, the single-holistic case study approach offered an ideal approach to explore the issue.

#### **4.5. Data Collection**

To develop an understanding of the case study being explored, the researcher made use of a semi-structured questionnaires and a formal interview process. Set out below is a description of the data collection methods employed during the study.

##### **4.5.1. The Interview Technique**

In the qualitative paradigm, Babbie and Mouton (2001:273) argue that the “researcher is the most important instrument in the research process” due to the central role that the researcher needs to play as well as the unbiased interpretation and description of results. Neuman (2003:292) describe the interview as a “social relationship” which is bounded by the “roles, norms and expectations”. Fontana and Frey (2005:695) highlights the subjectivity of interviewing and acknowledged that the process is “historically, politically and contextually bound”. Nevertheless, an interview is a social interaction between two parties with the explicit purpose of the one party extracting information from the other party, with the interviewer directing the general direction of the conversation (Babbie and Mouton, 2001; Neuman, 2003; Fontana and Frey, 2005). The technique of interviewing is becoming more popular and is being used by both qualitative and

quantitative researchers for the purpose of data gathering, with the assumption that the results are a true reflection and accurate picture of the respondent's perspective (Fontana and Frey, 2005). The most popular form of interviewing is a face-to-face interaction with an individual but interviewing may be conducted with groups, or via telephone or electronic surveys (Babbie and Mouton, 2001; Neuman, 2003; Fontana and Frey, 2005).

Due to the complexity and relatively new field of research, all the interviews conducted within the NMBM were performed face-to-face. Telephone and electronic interviews were avoided as the researcher believed that the authentic and in-depth aspects of the study would be compromised and the researcher would not have full control of the interview process.

Congruent with the epistemology of inter-subjectivity, the researcher made use of semi-structured questionnaires to guide the interviews with relevant-purposefully selected interviewees. Fontana and Frey (2005) mention that an interview may be structured, semi-structured or unstructured. These authors describe a structured interview as consisting of a technique where a pre-established set of questions are asked to all the respondents with little room for variation. Conversely, an unstructured interview seeks to explore general topics with little use of close-ended questions. Malinowski (1989 in Fontana and Frey, 2005) explain that a structured interview aims to capture precise codable data to explain behaviour in pre-established categories while the unstructured interview seeks to understand behaviour without limiting the field of inquiry by applying priori categorization. The semi-structured interview draws from both approaches to understand behaviour.

#### **4.5.2. Questionnaire Development**

The questionnaire was designed using the findings of two prior studies. Firstly, the parameters described by Jung (2006), which contributed to host country attractiveness, being the mitigation potential, institutional capacity and investment climate were used to analyze the micro-level – the Municipality. The second component of the questionnaire, built on the work of Little (2006:120) who constructed a matrix consisting of “obstacles, brakes, enablers and accelerators”. The two former mentioned terms, obstacles and brakes, refer to constraints while the latter two, enablers and accelerators, refer to those factors that would promote CDM involvement.

The intention of the questionnaire was to guide the interview process and so, was developed in such a manner that it be completed in the presence of the researcher. To ensure that the questions were relevant and understandable, the researcher consulted a former senior municipal official,

from the Environmental Science Directorate, to validate the questionnaire. Following this meeting, the questionnaire was amended, where necessary, to improve the validity. A copy of the questionnaire has been included as Appendix D.

Essentially the Questionnaire consisted of two Sections (Sections A and B). Section A was aimed at eliciting the biographical details of the interviewees, while Section B was divided into a number of categories (Subsection B.1 to B.10), which each addressed a theme relating to the implementation of the CDM within the NMBM. Subsection B.1 of the questionnaire sought to examine the interviewees' awareness on relevant climate change and CDM concepts. Following these questions, where it was interpreted that the respondent required additional clarity on the concepts, the interview was punctuated and the concepts explained to assist interviewees in answering the remaining questions in Section B (Subsections B.2 to B.9). These Subsections sought to explore the current involvement as well as the factors that influenced the NMBM in its involvement with the CDM.

Leading on from the sequence of questions in Subsections B.2 to B.9, phrases to gauge reaction, as described by Fontana and Frey (2005), were posed to interviewees (Subsection B.10), with the intention of obtaining the respondents' opinion on the phrase and to stimulate a response. Due to the research being conducted within the public sector (municipality), the researcher selected the reactionary phrases from the South African National Government's 2004 NCCRS document (DEAT, 2004) rather than from the broader body of literature. The reason for this was to obtain additional insights on issues particular to the public sector. The analysis of the responses obtained is described below.

#### **4.5.3. Sample Selection**

A non-probability, purposive or judgmental sampling technique (Babbie and Mouton, 2001) was adopted where the researcher selected respondents from Directorates within the Municipality which were most likely to have been involved or familiar with CDM initiatives. Set out in Appendix E is an organogram of the NMBM which indicates that the NMBM has nine Directorates with 38 Sub-Directorates falling under the Office of the Municipal Manager (IDP, 2007). In terms of governance, the Executive Mayor, Deputy Executive Mayor and a committee of nine Portfolio Chairpersons govern the Municipality (IDP, 2007). Set out below is an outline of the Committee:

- *Budget and Treasury*
- *Economic Development, Tourism and Agriculture*

- *Health and Environment*
- *Housing and Land*
- *Human Resource and Corporate Administration*
- *Infrastructure, Engineering, Electricity and Energy*
- *Recreation and Culture*
- *Safety and Security*
- *Constituency Services (IDP, 2007).*

The sample was therefore purposively selected from Directorates which the researcher classified as being “operational” in nature and those that offered “strategic support”. Those Directorates or Sub-Directorates that were considered operational included, Environmental Management, Waste Disposal Waste Management and Electricity and Energy while those Directorates that were considered essential to the provision of strategic support to potential CDM projects included, IDP and Strategic Planning, Treasury and the Office of the Municipal Manager.

#### **4.5.4. Research Process**

Due to the perception of an interview being intrusive and potentially exposing confidential information, the researcher first gained permission from the Municipal Manager to conduct the research within the NMBM. Also, the objectives and research instrument were shared with the Municipal Manager in order to be transparent on the type of information that interviewees would be sharing. Once permission had been obtained, a representative from the Environmental Science Directorate was assigned to assist the researcher in identifying suitable and appropriate interviewees. Six interviewees were identified with three coming from the operational directorate and three from the strategic support directorates. The researcher contacted each prospective interviewee telephonically to set up a one-hour interview. Although requested, the researcher did not share the questionnaire with the interviewee prior to the formal interview as the researcher believed that it would compromise the outcome of the interview by allowing the interviewee the opportunity to artificially gain insights into the subject. The researcher allowed the interviewees to elaborate when answering but where elaborations became irrelevant, the researcher needed to tactfully guide the conversation back to the topic. The purpose of this was both to keep responses relevant and to ensure that the allotted time was not exceeded.

Five of the six interviews were conducted over a two-month period (September 07 – October 07), with all but one of the interviews keeping to the allotted time. The sixth interview was cancelled due to the interviewee being called away to an international assignment. Copious notes were

taken during the interview and, in addition, all interviews were digitally recorded and transcriptions were made. These transcriptions were given to the interviewees for verification after which the data was coded and analyzed as outlined below.

#### **4.6. Data Analysis**

To analyze the interview data, use was made of “explanation building” to reveal the underlying cause of the problem and to generate insights about the case study (Babbie and Mouton, 2001; Gray, 2005). To facilitate the analysis, two general methods, scoring and coding, were used to organize and analyze the recorded interview data, and were applied to the Sections of the Questionnaire (Appendix D) as follows:

##### *Section A*

Biographical data was merely collected to provide background information on the interviewees, and it was not presented or analyzed in order to ensure the anonymity of the respondents.

##### *Section B*

When analyzing the respondents’ awareness (Subsection B.1), seven concepts were explored. The question that sought to explore the respondents’ understanding of the risk that global warming posed to South Africa (Question 2, Subsection B.1), was examined by using a close-ended yes / no question. The results from this question were scored on a 2-point scale, with “yes” being given a score of 1 and “no” a score of 0. The remaining six questions were examined by using open-ended questions. The responses from these questions (Questions 1 and 3 to 7 in Subsection B.1) were compared against theoretical definitions of the concepts and, scored on a 5-point scale, where:

- 1 = No Awareness;
- 2 = Superficial Awareness;
- 3 = General Awareness;
- 4 = Advanced Awareness; and
- 5 = Expert Awareness.

To assist with the understanding and interpretation of the data collected from the open-ended questions (Subsections B.2 to B.9) and reactionary phrases (Subsection B.10), use was made of data coding. The coding of data from a qualitative research paradigm, as in the case of the present study, entailed organizing the raw data into conceptual categories and creating themes or concepts to assist in the analysis of the data (Neuman, 2003). Miles and Huberman (1994, in Neuman,

2003:441) described codes as being “tags or labels for assigning units of meaning to the descriptive or inferential information compiled during the study”, with codes being assigned to “chunks” of data. Further, the process of coding entailed two simultaneous activities being the “mechanical data reduction and categorization of data into themes” (Neuman, 2003:442). Strauss (1987, in Neuman 2003) proposed that a three phased approach be followed when coding which includes open coding, axial coding and selective coding. In the process of open coding, themes were identified in the data and initial codes assigned to the data to condense the data into categories (Neuman, 2003). The second review of the data (axial coding) then focused on the actual data where codes are assigned to the themes and lastly, selective coding entailed scanning the data and previous codes which enables the researcher to compare and contrast the results across cases (Neuman, 2003). Applying this method to the NMBM case study, the categories in the questionnaire fulfilled the requirement of open coding, with general themes being assigned to the different components of the questionnaire. The data was then assessed to ascertain the main themes (axial coding) in the data which was followed by a finer or more descriptive coding of the data (selective coding) to allow for an analysis of the results between respondents.

The reactionary phrases (Subsection B.10) were firstly analyzed by ascertaining whether the respondents either agreed or disagreed with the statements (“yes” or “no” answers only). Secondly, the data was coded according to the same method applied in the coding of Subsections B.2 to B.9 to complement the findings of those sections.

Complementing the qualitative research approach, an Illustrative Method, as described by Neuman (2003:451), was applied to the analysis and interpretation of the data. According to this method, “preexisting theory provides the empty boxes” requiring the researcher to gather data to fill the boxes. The extent of the evidence in these boxes, allows the researcher to confirm or reject theory. Further, in the analysis, consideration was given to “negative evidence” because the nonexistence of an issue can provide additional insights (Neuman, 2003:457).

#### **4.7. Ethical considerations**

Remenyi (1998) identified certain ethical considerations that need to be borne in mind when conducting research and specifically highlights that case study research may reveal; “unlawful or illegal conduct, unsatisfactory practices which endanger staff or embarrassing revelations”. This did not occur but the researcher was cautious when interpreting the negative information so as not to compromise respondents. An assurance was given to the respondents that the findings of the research were for research purposes only and that anonymity would be maintained. It was also

explained that the final research document would be made available to the respondents and that a copy would also be placed in the Rhodes University library.

#### **4.8. Research Limitations**

At the macro level, the research is contextually bound to South Africa and at the micro level, it is bound to the NMBM. Therefore, any inferences made in the findings can not be used as generalizations for other countries or municipalities but can be used as empirical insights into the problem against which further studies can be compared and contrasted.

In order to obtain a fuller picture of the research topic, the scope of the population can be increased to include National, Provincial and other Local Government institutions. Further, to gain a richer understanding of the scenario prevalent within municipalities, the sample size can be increased to at least 30 respondents and the scope increased to include politicians, consisting of Councilors and the Mayor. The Councilors are essentially the decision makers who can play a significant role in pursuing CDM initiatives.

Due to the extensive literature review conducted before the fieldwork, the researcher gained theoretical insights into the topic which had the potential of creating a researcher bias in the form of preconceived ideas about interviewee responses. To reduce this bias, the questionnaire sought to probe respondents' knowledge by making use of non-leading questions.

Lastly, with the researcher not being a municipal employee, the researcher did not have a deep understanding of the organizational climate and culture of the Municipality when interpreting results. The researcher did, however, explore these issues as well as the decision making process within municipalities so as not to misrepresent the organization.

#### **4.9. Conclusion**

The purpose of this study was to explore why the NMBM was not proactively pursuing the implementation of the CDM and so the researcher sought to develop an understanding of the factors that either constrained or promoted CDM Involvement. The research was conducted from a constructivist paradigm with a relativist view of reality and use was made of a holistic single case study approach to explore this reality. Further, a questionnaire was used to gather information which was completed through semi-structured interviews with selected Municipal Officers.

The following chapter (Chapter 5) gives an account of the research results, thereby providing insights into the awareness and perceptions of the selected sample. Further, the results discuss the current reality within the NMBM, in terms of institutional capacity, and also identify certain factors which either constrain or promote CDM involvement. Lastly, the future prospects and reactionary phrases are elaborated on. A discussion of the results is given in Chapter 6.

## CHAPTER FIVE RESULTS

*Clearly, the starting point for a future climate regime must be equity. Any deal on the fair use of the ecological space will have to be balanced by a deal on giving all countries a fair chance in the development space.*  
*President Thabo Mbeki, South Africa.*

(Financial Mail, 2007b:12)

### 5.1. Introduction

Set out below is an analysis of the interview notes taken during semi-structured interviews held with five NMBM municipal officers. The objectives of the data analysis were firstly to gain an understanding of the general awareness of the respondents with regards to global warming and the CDM, secondly, to investigate what factors influenced the NMBM with regards the implementation of CDM projects and then lastly, to ascertain why the Municipality was not proactively pursuing CDM initiatives. The overall aim was to understand and explain the current reality, within the NMBM, with regard to the implementation of the CDM.

### 5.2. Interview Data Collected by Means of a Semi-structured Questionnaire

A copy of the questionnaire used in the interview process is given as Appendix D. Section A of the Questionnaire related to the biographical details of the respondents and this data is not reported in order to ensure anonymity of the respondents. The remainder of the Questionnaire (Sections B1 to B10) was divided into categories, which each addressed a theme relating to the implementation of the CDM within the NMBM.

#### 5.2.1. Awareness with Regard to Global Warming and CDM Concepts

As a point of departure, it was necessary to explore the respondents' understanding and respective levels of awareness of global warming and various CDM specific concepts. The analysis and interpretation of those results are presented below.

The mean of the respondents' scores obtained for each question were ranked from highest to lowest (Table 5.1), in order to give an indication of the level of awareness with regards the concepts being investigated. It was revealed that overall the respondents understood the concept of Global Warming best (Mean score = 3.2) (Table 5.1). While one respondent exhibited an "Expert Awareness" of the concept, three respondents had a "General Awareness" and one respondent a "Superficial Awareness". The concept of Sustainable Development (Mean score = 2.8) was understood to a lesser extent, with one respondent exhibiting an "Advanced Awareness", two respondents having a "General Awareness" and two respondents as "Superficial Awareness" of the concept. However, in general, the mean scores revealed that the respondents had, on

average, a superficial understanding of four of the key concepts of climate change, specifically the SA Carbon Market (Mean score = 1), Additionality (Mean score = 1.6), CDM (Mean score = 2) and Kyoto Protocol (Mean score = 2.4) (Table 5.1). When considering the overall awareness of the group, a mean score of 2.1 was calculated (Table 5.1), which may be interpreted as the group having a “General Awareness” of the concepts. Setout in Table 5.1 are the mean scores obtained for questions 1 and 3 to 7 of Subsection B.1. However, due to the results from question 2 being analyzed by making use of a two-point scale rather than a five-point scale, those results are shown separately in Table 5.2.

Table 5.1: Concept Awareness of respondents (n=5) with regard to global warming and the Clean Development Mechanism.

Question No	Rank	Concept	Mean Score	High Score	Low Score	Std Deviation
1	1	Global Warming	3.2	5	2	1.1
7	2	Sustainable Development	2.8	4	2	0.8
3	3	Kyoto Protocol	2.4	5	1	1.5
4	4	CDM	2.0	3	1	1.0
5	5	Additionality	1.6	4	1	1.3
6	6	SA Carbon Market	1.0	1	1	-
<b>Overall Score</b>			<b>2.1</b>	<b>3.5</b>	<b>1.3</b>	<b>0.8</b>

Notwithstanding this relatively low level of awareness, most of the respondents (four of the five) acknowledged that global warming is a risk to South Africa (Table 5.2.). Without a suitable benchmark, it was neither possible to compare the results to that of other municipalities nor to comment on the relative significance of the results achieved in the NMBM. However, from a theoretical perspective, the level of awareness regarding global warming and the CDM were considered as being “general” at best.

Table 5.2: Concept Awareness of respondents (n=5) with regards the risk that global warming poses to South Africa.

Question No	Concept	Mean Score		
		Operational Group (n=3)	Strategic Support Group (n=2)	Total Group (n=5)
2	Risk to SA	1.00	0.50	0.80

When comparing the different functional units within the municipality, the results (Table 5.3), indicate that those employed in the “operational” directorates had a better understanding of the concepts than their colleagues in the ‘strategic support’ directorates. This is indicated by the overall mean scores obtained of 2.6 and 1.6 respectively for these functional units (Table 5.3). Particular to this study, the results revealed that there is a substantial difference in the

understanding of the CDM between the “operational” and “strategic support” directorates as indicated by their mean scores obtained of 2.7 and 1.0 respectively (Table 5.3).

Table 5.3: Comparison of Concept Awareness between the different functional units within the Nelson Mandela Bay Municipality.

Question No	Concept	Mean Score		
		Operational Group (n=3)	Strategic Support Group (n=2)	Total Group (n=5)
1	Global Warming	3.7	2.5	3.2
3	Kyoto Protocol	3.0	1.5	2.4
4	<b>CDM</b>	<b>2.7</b>	<b>1.0</b>	<b>2.0</b>
5	Additionality	2.0	1.0	1.6
6	SA Carbon Market	1.0	1.0	1.0
7	Sustainable Development	3.0	2.5	2.8
<b>Overall Mean Score</b>		<b>2.6</b>	<b>1.6</b>	<b>2.1</b>

The results revealed that the respondents from the operational group had a better overall understanding of the concepts explored, than did the respondents from the strategic support group. From the combined scores obtained for the sample (n=5), the overall level of awareness, on the concepts explored, was interpreted as being “general”.

### 5.2.2. Perceptions with regard to the role of CDM initiatives within the NMBM

*Should the Municipality be actively involved in CDM initiatives?*

The majority of the respondents (four of the five) believed that municipalities should be involved with the CDM because the South African Constitution states that everyone has a right to an environment that is not harmful to their health or wellbeing. Further, NEMA called for organizations to operate in a sustainable manner. An interesting and practical response to this question from one of the respondents was that “the majority of the assets that allow for CDM projects are owned by the Government”.

*As a Government body, do you believe that the Municipality should take a lead role in encouraging CDM initiatives?*

Unlike in Little (2006) where it is stated that business should take the leading role, a unanimous outcome of the case study was for Government to take the leading role. This builds on the fact that Government owns most of the assets conducive to CDM projects. Also, municipalities are “major players” and should be regarded as “central partners in this process”. One respondent did indicate that politicians [Councilors] were “difficult to influence” and could act as a “stumbling block” in the proactive role of government.

*What benefits would you expect from a CDM?*

Perceptions about the benefits of the CDM were grounded in the principles of sustainability, with “social upliftment” being widely (n=5) acknowledged by four of the five respondents. The idea of cross-subsidization was suggested as a potential benefit where “the funds generated from CDM projects can be used to subsidize other [non-CDM] projects”. One respondent referred to the “feel-good-factor” as a benefit that a CDM could offer a Municipality – giving the Municipality a project to “showcase” in order to attract industry and development. Tourism, jobs and poverty alleviation were other benefits identified as well as the sharing of “best practices” between the private sector and government.

*What adverse effects would you expect from a CDM project?*

While one respondent (n=5) did not perceive there to be any negative effects from CDM projects, one respondent identified social, two respondents identified financial and one respondent identified developmental constraints as being possible adverse effects. The respondent who expected development to be impaired believed that CDM projects would bring additional costs and funds could be channeled away from developmental service delivery projects. Another respondent highlighted the financial constraints faced by municipalities and stressed that, “if it is going to cost us a lot of money, it is going to have to go on a priority list and at the moment, I don’t think it would be at the top of that list – we have so many other pressing needs”.

While the CDM encourages technology transfer, a concern was raised that “South Africa could become a dumping ground for failed technology because developed countries may export technologies to South Africa that have not been tested and proved to work in South Africa”. Both Nelson (2004) and Stiles (2006) stated that CDM projects often involved experimental or pilot technologies which increased the project risk.

*What factors do you believe are the most attractive to implementing CDM initiatives?*

“The potential of making money” was regarded as an attraction of the CDM by one respondent (n=5), while job creation was considered important by one respondent, poverty alleviation by three of the respondents and sustainability by one respondent were regarded as additional benefits. Intergenerational equity was quoted as being a noble attraction of the CDM by one respondent, as it shifted society’s attention to focus on long-term goals.

*Does the Municipality have a responsibility to the people of the City to curb the emission of greenhouse gases – both within the Municipality and Industry?*

On this issue all the respondents acknowledged this as Local Government's responsibility. While acknowledging this responsibility, a national initiative was proposed for a standard response, thereby not affecting the competitive nature of a city's "laws and regulations". This can be aligned to the concept of the "Race to the Bottom" as described by Muller (2007).

*What are the greatest incentives / drivers for Municipalities to initiate CDM projects?*

The greatest CDM-drivers were cited as being financial gain and social responsibility. Environmental issues were identified as being non-core to a Municipality – this sentiment being captured in the statement that "it is very difficult for the Municipality to drive an environmental agenda particularly when it is required to provide basic services – like sanitation, houses and water".

Intuitively, it was noticed that the respondents' respective perceptions were positively associated with their respective level of awareness. In other words, the greater the respondent's awareness of the concepts, the more relevant and meaningful the responses were when assessed against the theoretical background of the topic.

The general interpretation derived from this section was that the Municipality should be involved in CDM initiatives and that the Municipality should take the leading role in encouraging CDM involvement within the City. While the involvement in CDM projects was suggested as not being a core function of the Municipality, in general, the benefits of social upliftment and financial gain were acknowledged as potential benefits.

### **5.2.3. Institutional Capacity**

*Does the Municipality have a Climate Change Policy / Strategy?*

The results of the interviews confirmed that the Municipality neither had a Climate Change Policy nor a CDM Policy. An explanation for the absence of these policies was that these issues were "non-core" to a Municipality but the importance of these issues was acknowledged. Indications were that consideration was to be given to climate change and CDM in the revised Environmental Policy which was scheduled for 2008.

*Does the Municipality have a specialized unit to facilitate and promote CDM Issues?*

It was revealed that the Municipality did not have a specific unit focusing on CDM initiatives but that individuals within the Electricity and Energy Sub-Directorate had identified the need to focus on renewable energy projects as outlined in the Governmental White Paper on Renewable Energy (2003). While supported by the Municipal Manager and Council, these projects did not originate from “Municipal strategic initiatives” but rather from individuals within the operational areas. Three of the five respondents (n=5) believed that the responsibility fell within the purview of the Environmental Science Directorate.

*Which Department is currently responsible for identifying CDM projects within the NMBM?*

Aligned to the previous question, three respondents believed that by association, CDM project identification should form part of the Environmental Science Directorate. Further, one respondent believed that the Energy and Electricity and Waste Management directorates should be responsible while another believed that outside parties should identify opportunities within the municipality. Coincidentally, it was revealed that most climate change mitigation projects that the municipality was involved in (see section 5.2.4 below) were indeed identified by outside parties and not by the Municipality itself.

*What priority or level of importance does the Municipality ascribe to CDM initiatives as a political agenda item?*

From a political agenda perspective, CDM initiatives had a low level of priority, although renewable energy projects were regarded as being of a higher priority. The reasons for this higher priority is expand on in Section 5.2.4 of this chapter. Financial constraints were cited as one of the reasons for this low priority *vis a vis* other core municipal deliverables. Notwithstanding this stance, it was stated that Council and Municipal Management supported renewable energy projects.

*What aspects are considered when assessing CDM project viability?*

When assessing CDM project viability, social upliftment through jobs, skills and technology transfer were mentioned but more significance was placed on the financial perspective by four of the five respondents. Focus was not on the revenue generating potential of the transaction but on the cost dimension. Alluding to an investment culture, a respondent emphasized that “Council does not have the appetite for risk so projects need to be done at no-cost to Council”. This, once again, brought financial constraint to the fore. The Municipal Finance Management Act, 2003 (MFMA) was recognized as a “stumbling block” with the respondent saying that “this financial

management system makes it difficult to contractually structure CDM projects because of certain legal requirements”.

One respondent raised the issue of insufficient capacity within the Municipality to sufficiently assess the viability of projects. It was therefore expected that in future, reliance would need to be placed on external consultants to fulfill that function.

*What process does a prospective CDM project currently need to follow within the Municipality to bring it to fruition?*

Reviewing the steps required to bring a prospective CDM project to fruition, a lengthy, generic, bureaucratic process was described, with no specific enablers being made available to facilitate or expedite the implementation of CDM projects. Two respondents specifically mentioned that external consultants would be required to “add the required competency” necessary when designing and assessing CDM projects. A striking reality and potential stumbling block that was shared, was the fact that “the ultimate decision making rests with Council”.

*How many people are involved with facilitating and promoting CDM initiatives within the Municipality?*

While not a core function, respondents reported that there were between 6 and 30 employees within the NMBM that were involved with the implementation of CDM initiatives. There was however great uncertainty on this issue amongst respondents.

*What budget has been allocated towards facilitating and promoting CDM initiatives?*

With the allocation of budget being a constraint, it was revealed that a R1 million allocation was made to the Electricity and Energy Sub-Directorate for capacity building and project initiation in the field of renewable energy. Most respondents believed that a strong probability existed for CDM projects to be awarded budget in the future. However, the rider being that due to financial constraints, CDM projects would need to be assessed relative to other projects.

*What is the probability of budget being allocated in the future?*

Two respondents did expect future budget allocations for CDM initiatives to be ring-fenced within the Environmental Science Directorate as a coordinated and structured approach rather than in its current “blinkered way”. This was qualified by the respondent calling for an assessment of the Nelson Mandela Bay’s assets with the view of increasing the scope of potential CDM projects.

A powerful comment made by a respondent on the allocation of budget was, “Once the Municipality understands the implications of CDM, obviously there will be a political commitment to dedicate a budget to implement CDM projects”. Besides alluding to financial constraints and political will, the statement also raised the issue of awareness and supported the earlier findings which showed that generally awareness of CDM issues within the strategic support functions of the municipality was superficial.

*What capacity building initiatives with regard to CDM initiatives are prevalent within the municipality?*

On the prevalence of capacity building all respondents were aware of workshops that were being conducted. An interesting revelation was that all workshops were “self-driven initiatives which were hosted by DME, DEAT, National Treasury and other external consultants” but not all relevant municipal officers attended. While Councilors were invited, the level of commitment and attendance was uncertain. Surprisingly, none of the respondents from the “strategic support” functional units, that were interviewed, attended the workshops. It became apparent during the analysis that while capacity building happened within the “operational” functional units there appeared to be less commitment within the “strategic support” and executive functional units where decision making was vested. None of the literature reviewed mentioned or elaborated on this shortcoming.

*How and what information on CDM initiatives are disseminated through the municipality?*

From the responses obtained, it could be inferred that there is very little information on the CDM being disseminated through the Municipality. Reports, in the form of hardcopies, were however made available to the Councilors and the Mayoral Committee on current GHG reduction projects and the current status of those projects.

*How does the Municipality support CDM initiatives from the Private Sector?*

There also appeared to be little support and collaboration between the Municipality and the private sector with regards to CDM projects. One respondent’s brutal but honest response was that there were no private sector initiatives in place because, “the Municipality would not approach a private enterprise and suggest a CDM project. Firstly, because of the tender process that is required by the MFMA; secondly because Council wants projects to be at zero cost to the Municipality; and thirdly because there are greater social delivery projects”. An important initiative which the Municipality did support was the Port Elizabeth Regional Chamber of

Commerce and Industry's Green Charter – chiefly because of the leverage potential that aligning to that organization offered the Municipality.

The overall perception gained from the responses to the questions posed in this subsection, was that the Institutional Capacity of the NMBM was relatively low. It was ascertained that the Municipality neither had a Climate Change Policy nor a CDM Policy to guide its involvement. Further, no specific business unit was tasked to facilitate CDM involvement but that the Energy and Electricity Sub-Directorate had taken the initiative to become involved in renewable energy projects which addressed GHG reduction. Politically, CDM projects were not perceived as being priority issues and the Councilors were perceived as being potential stumbling blocks. A relatively small budget of R1 million had been allocated to CDM projects but respondents believed that the probability of additional future budget allocations was high, provided Councilors were made aware of the CDM initiative. Lastly, the Municipality did not support private sector involvement with regard to CDM projects but respondents identified that the potential existed for greater cooperation between the Municipality and the private sector to promote CDM involvement.

#### **5.2.4. Involvement in the CDM**

*What CDM projects have been attempted or investigated by the Municipality?*

The respondents from the “operational” functional units were aware of the GHG reduction projects that were either being investigated or implemented within the Municipality. These were listed as being projects in:

- Solar Water Heating
- Methane Capture in Landfill Sites
- Methane Capture in Sewerage / Water Reclamation Plants
- Wind Power
- Demand Side Management.

*Why were these projects accepted or rejected?*

A respondent mentioned that these projects were selected because the Municipality had the assets (infrastructure) and these projects could be managed in South Africa. An insightful answer described the project selection as being in terms of the Municipality's “renewable energy obligation”. Owing to the Municipality being an electricity distributor it is “obliged to investigate alternative energy” or risk losing its electricity distribution permit. Consequently, the Electricity

and Energy as well as the Waste Management Sub-Directorates were instrumental in administering these projects.

*What aspects of Sustainable Development did these projects address?*

Respondents generally agreed that these projects addressed the social, environmental and financial aspects of sustainable development but emphasis was placed on the financial aspect but more from a cost perspective. On this point, it was acknowledged that Carbon Credits possessed the potential for the Municipality to derive substantial income but Council held the notion of projects needing to be done at “no-cost to Council”.

*How and where is the CDM policy linked to the Integrated Development Plan (IDP)?*

On a strategic front, while there were environmental projects listed in the IDP, there were no CDM projects listed. A plausible defense offered was that due to the CDM being a new field, the Municipality did not have CDM projects *per se*. Addressing the strategic nature of the IDP relative to CDM initiatives, a respondent agreed that “there is currently no implementing legislation in place to complement the development of CDM projects”.

This subsection highlighted that the Municipality’s involvement in the CDM had been restricted to GHG reduction projects aligned to it’s obligation to initiate renewable energy projects. Further, it was indicated that these projects supported the social, environmental and financial perspectives of sustainable development, and the general funding constraints of the Municipality were also emphasized. Respondents confirmed that the IDP did not contain CDM projects and acknowledged that as a shortcoming. The following subsection aimed to determine whether the NMBM offered opportunities for CDM projects by exploring the aspect of mitigation potential.

#### **5.2.5. Mitigation Potential**

In the context of CDM projects, mitigation potential refers to the potential that a project has to alleviate or eliminate GHG production. This aspect has been identified as one of the qualities that makes a geographic area attractive for CDM investment (Jung, 2006).

*Which areas of the Municipality do you believe are most suited to a CDM project?*

Looking at the City’s mitigation potential, the respondents from the “operational” functional units clearly identified that the infrastructure that the Municipality held in the Electricity and Waste Sub-Directorates could be used in CDM projects. Demand side management was offered as another initiative to curb GHG emissions.

*Has the Municipality proactively assessed how CDM projects can be implemented within its current infrastructure (eg. Energy & Waste Management Systems)?*

There was some disagreement between the respondents on the proactive approach applied by the Municipality with regard to it identifying CDM projects within its current infrastructure. One respondent argued that the Municipality had proactively sought to identify GHG reduction initiatives, although not necessarily CDM initiatives. A second respondent argued that the Municipality, through its individual departments had merely “taken stock of the Municipality’s assets that will provide CDM opportunities”.

*Does the Municipality proactively seek out CDM projects?*

All the respondents (n=5) agreed that the Municipality did not proactively seek out CDM projects. One respondent described the Municipality’s response as reactive, in response to “legislation that promotes sector involvement [in renewable energy projects]”. A second respondent offered a practical reason for a lack of a proactive approach where it was, once again, stressed that the “hindering requirements of the MFMA” forced the Municipality to look to external consultants for project initiation.

*Are projects that are presented to Council assessed for potential CDM involvement?*

With Council being the decision making forum, it was sought to establish if this forum assessed projects for CDM potential. The majority of the respondents (four of the five) agreed that this was not happening, with insufficient skill, capacity and political will being cited as plausible reasons.

In summary, respondents identified that the infrastructure in the Energy and Electricity and the Waste Management Sub-Directorates, within the NMBM, did possess mitigation potential. However, the NMBM was not proactively promoting CDM development and Council was not sufficiently skilled to assess projects for CDM potential.

#### **5.2.6. Economic Attractiveness of Region**

*What is the competitive advantage that the NMBM has with regard to attracting foreign and domestic investment?*

Responses to this question were diverse, ranging from the City being referred to as the “five-biome City”, the city’s strategic location, to the greater NMBM zone offering an industrial advantage due to the proximity to the Coega Industrial Development Zone (IDZ). However, with respect to CDM potential, a respondent mentioned that NMBM was attractive because it was

small and possessed suitable infrastructure in landfill sites and an extensive coastline for wind power. The latter insight was confirmed by a second respondent who humorously stated, “The one thing we’ve got in abundance is wind”!

### **5.2.7. Enablers and Accelerators to CDM Involvement**

*What support exists for Municipalities to promote CDM initiatives?*

In the current municipal structure, four of the respondents agreed (n=5) that there was “no-support to limited- national-support” for CDM projects. Furthermore, development of CDM projects would have to be driven by individuals within the Municipality who possessed limited knowledge of CDM and who had other core responsibilities. As one respondent put it, “there is no enabling legislation”.

*What is required for Municipalities to promote CDM initiatives?*

Moving onto what municipalities require to promote CDM investment; respondents identified awareness, funding, legislation and a National Government response. Rather than employing additional people, a respondent contended that awareness amongst municipal officers and Councilors was essential. The official therefore proposed that education and training be implemented in the Municipality to address this gap. Greater Government and business interaction as well as intra-governmental interaction were called for to improve awareness of the CDM status of the region. On the issue of funding, project “bankability” was considered important by one respondent, referring more to the financial viability of a project than to the transferability of CERs across commitment periods. In terms of co-operative governance, a respondent felt that National Government must issue a mandate to municipalities in the form of enabling legislation and foster greater communication of the CDM in general. Critical of the MFMA, one respondent purported that the MFMA should be amended so as to be aligned with the intention and duration of CDM projects. Identified as a major stumbling block, this respondent stated that Section 33 of the Act is still feared by banks and financial institutions when it comes to funding projects “and will be the downfall of these [CDM] projects”. Subsequent to the interview, it was ascertained that this section placed limitations on a Municipality entering into contracts which had budgetary requirements beyond a financial year (MFMA, 2003).

*What is required for SA Municipalities to develop a distinct competence in the implementation of CDM projects?*

“A massive increase in capacity – skills and people”, a national policy and financial assistance were given as requirements for municipalities to develop a competence. Two respondents

specifically referred to the CDM as a “new field” and advocated that consultants from the private sector be deployed within the Municipality to facilitate skills transfer and to provide the required competence to the Municipality on CDM projects. In order to ensure commitment and focus within the municipal context it was suggested that the CDM projects be made a “Municipal Manager deliverable” and be allocated to a senior official who has the necessary authority to command other municipal officers’ time and resources. This person would need to be relatively senior and able to influence Councilors and draw support from within the Municipality.

*What internal efficiency or competence is required for the NMBM to develop a competitive advantage in the implementation of CDM projects within South Africa?*

For the initiation of CDM projects to be successful within NMBM, respondents acknowledged the dire need for awareness and capacity building. Once again, the issue of CDM projects not being core-business to a Municipality was raised and supported the argument for specialist CDM skills to be acquired from outside the organization. While this was proposed as a solution, the respondents contended that a Municipality would not employ a person solely to attend to CDM projects but offered a solution where municipalities could group together and have one CDM Consultant or Municipal Official attending to the needs of multiple smaller municipalities.

This subsection explored the presence of factors that enabled or accelerated CDM involvement but the lack of such factors also came to the fore. It was suggested that CDM projects be given a high level of priority in the Municipality by placing the accountability with the Municipal Manager, and it was revealed that limited support existed for the NMBM to drive CDM projects; that capacity, skills and funding were problems. These could all be regarded as obstacles/brakes to CDM involvement. While enablers were present, the methodology employed did not uncover the relevant enablers but identified obstacles that could be overcome which would then offer the Municipality an opportunity to accelerate involvement. Additional obstacles/brakes are highlighted in the following subsection.

#### **5.2.8. Obstacles and Brakes to CDM Involvement**

*What legislation is currently in place that inhibits the implementation of CDM projects?*

By exploring possible legislative stumbling blocks, an understanding of “what” prevents the Municipality from being proactive with respect to the initiation of CDM projects was sought. On the legislative aspect, certain respondents criticized both the existence and absence of current legislation as being obstacles. The NEMA was regarded as being progressive environmental legislation but increased the time factor and transaction costs of CDM projects as a result of the

need for Environmental Impact Assessments (EIAs). The MFMA was described by one respondent as a “CDM inhibitor” and this was confirmed by another who stated that it had “a negative impact”.

*What do you believe are the barriers to implementing CDM initiatives for a Municipality?*

Relating to Electricity and Energy, Eskom, being the only authorized energy generator, was considered as a stumbling block to municipalities because it limited the scope of projects and investment opportunities to municipalities as Independent Power Producers. Moreover, this regulation offered Eskom the perverse opportunity to continue with “dirty technology” – being the generation of electricity from coal. Looking at the antonym, it was contended that with there being no clear legislative path for CDM projects, different pieces of legislation need to be considered in developing and structuring CDM projects which made the process cumbersome and projects vulnerable to rejection on legal technicalities. The restrictions posed by the MFMA, as identified by the respondents, will be elaborated on in Chapter 6.

Other relevant barriers that were cited by respondents included:

- **Councilors:** one respondent boldly identified “politicians” [Councilors] as stumbling blocks due to the erratic stance that Councilors have on policy acceptance and subsequent rejection – explaining that decisions that are taken at one Council session may be reversed in subsequent sessions which created great uncertainty and frustration in the Municipality.
- **Finance:** both from a funding and revenue perspective. On the funding arm of the transaction, CDM projects were required to compete for scarce financial resources and to prove their financial viability, while on the revenue arm, the uncertainty on the value of the CERs generated created further uncertainty on the future income streams of CDM projects.

*What factors prevent the NMBM from developing a competence in the implementation of CDM initiatives both in the Municipality and through PPPs.*

Internally, the bureaucratic structure and clumsy workings of the MFMA were stated as being factors that prevented the Municipality from taking a proactive stance. A surprising remark by a respondent was that while the organization lacked capacity, it did have the funding.

While the use of PPPs was encouraged, it was emphasized that the establishment of PPPs were governed by S120 of the MFMA – creating a further hindrance. The MFMA was once again cited as an inhibitor because of the stringent conditions that govern the formation and control of PPPs.

In summary, the main theme identified in this subsection was the legislative stumbling block that inhibited CDM development. The MFMA was cited as being a major obstacle to CDM initiatives, but it was also suggested that the lack of enabling legislation impeded involvement. Once again the issues of the lack of funding and Councilors' lack of awareness and poor political will were cited. The next subsection aimed to ascertain what the NMBM required for greater involvement in CDM projects.

### **5.2.9. Future Prospects**

*What additional support is required from national Government, SALGA or Industry to facilitate the proactive participation of Municipalities in the CDM initiative?*

The development of a national policy framework by National Government was considered a fundamental aspect required to further the interests of CDM projects within municipalities. It was proposed that the policy or regulation be “added to NEMA”. It was also proposed that National Government provide “grant funding”, to municipalities, specifically earmarked for CDM project development. To share successes and methodologies, it was suggested that municipalities submit CDM specific data and the performance of the projects to a central body which would then rate and publish the success stories. The objective of this would be to foster a coordinated effort, industry participation and collaboration to facilitate the transfer of technology and skills.

*Do you believe that the DME is the appropriate Designated Authority?*

The majority of the respondents (three of the five) agreed with the current status of the DME being the DNA but it was suggested by one respondent that it could form part of the responsibilities of the National Energy Regulator. This respondent believed that the Energy and Electricity sector possessed substantial potential to reduce GHG emissions and therefore perceived the National Energy Regulator as a suitable organization to fulfill the responsibilities of a DNA. However, one respondent argued that due to the CDM extending to broader environmental issues and not just renewable energy projects that the DNA should reside within DEAT.

*What factors need to change to make the NMBM proactive in CDM development?*

Alluding to the bureaucratic structure, one respondent called for a change in the level of thinking from Councilors. It was that respondent's opinion that Councilors do not fully acknowledge the severity of climate change and need to concern themselves with such issues and "not just service delivery". These Councilors would then be responsible for "driving the message to their constituents" to increase awareness amongst the public. It became acutely obvious that public bodies require policy with respondents calling for a "national directive" or a "legal framework" on CDM projects.

Building on political will and a legislative framework, another respondent requested additional capacity and finance and explained that "the Municipality is not going to do anything unless it has to, or wants to" and therefore may not have the political will to prioritize funding to the project. The respondent contended that, "if there is legislation, then they would have to afford it". Addressing the internal efficiencies, a respondent offered a potential solution to the lack of commitment within municipalities and proposed that "a political mandate be passed onto the Municipal Manager". The respondent believed that such a step would give "CDM projects the required level of authority and make it priority within the Municipality".

*How can the IDP be refined to include CDM project development?*

On this strategic aspect, all respondents acknowledged that CDM projects should be included in the IDP. The document was described as the "municipalities living strategy plan" and built on the proposals submitted from other municipal directorates or any other interested stakeholder. By including CDM projects into a plan, it would be easier for funding to be allocated and would also influence the way that Council perceived environmental issues.

While the document was reviewed annually some respondents maintained that the document was not dynamic enough. Further, where CDM projects were excluded it was not necessarily an indication that they should be ignored. A respondent firmly believed that the IDP needed to oversee CDM initiatives and that the IDP needed to coordinate projects between departments.

*What sustainability issues should be addressed by CDM initiatives?*

In terms of sustainable development criteria, the South African DNA has indicated that when assessing project sustainability, it would consider whether the project would "on balance" support the country's sustainable development objectives (DME, 2004). Within this context, an attempt was made to ascertain which of the sustainable development criteria was considered most

important. It was confirmed that while consideration should be given to the social, financial and environmental dimensions, it was social issues that were most important. Responses included “social upliftment, poverty alleviation, jobs and housing”.

*What factors do you believe make the NMBM an attractive or unattractive vehicle for promoting and facilitating CDM initiatives relative to other Municipalities?*

Looking internally within the Municipality, two respondents highlighted that financially the Municipality was performing well and enjoyed a favourable credit rating. Three of the respondents (n=5) acknowledged that the Municipality had the necessary “assets” to foster CDM projects. On a wider scope, it was acknowledged that the greater Port Elizabeth area had nature and eco-tourism as an asset and revenue source respectively. The respondents intimated that the Municipality should therefore “take the lead” and be proactive in environmental policy development by including climate change related issues.

The unattractive aspects of the Municipality included: lack of internal capacity, poor communication of CDM projects, and the perceptions of “high unemployment, and high crime rate”. It was suggested that people perceive Port Elizabeth to have a small-town mentality and therefore favoured larger cities including Johannesburg, Cape Town and Durban. Perhaps tacitly supporting this notion, a respondent identified that the Municipality could have been more proactive in the past but now needs to correct the misconception of Port Elizabeth being perceived as the “ghost on the coast”.

*What is the Municipality’s perspective on PPPs as a means to implementing CDM initiatives?*

The use of PPP’s was agreed as being an effective way to further the initiation and implementation of CDM initiatives within the City. Greater project success was anticipated as an outcome because of there being “public sector buy-in from the start”. One respondent cynically replied that “for municipalities, PPP are always attractive but there are legislative stumbling blocks [MFMA] which hampers the implementation of PPPs”. The concern raised was that the use of PPPs should not be at the expense of jobs!

*What does the NMBM need to do to make it attractive for PPP investment and participation?*

For the NMBM to be regarded as an attractive PPP vehicle, it was suggested that the Municipality “needs to make a public stance”. It was proposed that a progressive step would be for the Municipality to “advertise for proposals” similar to what was done for the renewable energy project (see section 1.3 in Chapter 1). Greater collaboration between the Municipality and the

private sector was recommended because it was acknowledged that while the public sector had the assets, the private sector had the expertise.

*Which international cities does Port Elizabeth have strategic alliances with?*

Within a global context, it was reassuring to establish that the city did have such relationships.

The following cities were top-of-mind:

- Gothenburg (Sweden)
- Jacksonville (USA)
- Ningbo (China).

Due to the relationships currently being vague, respondents did not see any immediate opportunities, in terms of CDM project development, flowing from the relationships but acknowledged that potential did exist with those cities where their respective countries had ratified the Kyoto Protocol. It was recognized that skills and technology transfer was possible, although currently benefits were limited to general municipal administration issues.

*Additional Comments*

When invited to offer concluding comments on the CDM, two respondents raised the concern of the Kyoto Protocol only being applicable until 2012 and the risks that South Africa faced if the successor to the Kyoto Protocol placed emission targets on South Africa. The urgency of a national response was reiterated, to deal with the global phenomena of Global Warming, Climate Change and the CDM.

In summary, this subsection highlighted the need for National Government to develop a framework to enable Municipalities to drive CDM projects. Within the NMBM, it was identified that the Municipality had appropriate assets but that the level of awareness, insufficient capacity and political will needed attention to create an environment conducive to promoting CDM initiatives. Lastly the use of PPPs and strategic alliances with international cities were identified as prospects for greater future involvement by the NMBM.

#### **5.2.10. Phrases to gauge Reactions**

Phrases extracted from the South African Government's 2004 NCCRS document (DEAT, 2004) were posed to respondents, to gain further insights into the topic and to validate certain of the responses obtained from the open-ended questions. On the statements posed (Table 5.4), respondents from the "operational" group were 90 % in agreement with the phrases while those in

the “strategic support” group were 85 % in agreement. Clearly, as the sample size is increased, the results will be more realistic but in general, they indicate a positive alignment to National Government’s stance on the topic.

When responding to Phrase 4 (Table 5.4), one respondent mentioned that “Government does have sufficient capacity and sufficient resources but the problem is that Government has not yet made the strategic choice whether they should roll-out climate change challenges to other spheres of government”. While this point of view argued against the consensus of the group, it inferred a potential stumbling block, being the lack of co-operative governance.

On the strategic perspective of the IDP citing CDM projects (Phrase 7), a respondent mentioned that by including the CDM projects, the Municipality will be sending a clear message to the international community. With the IDP being a publicly available document which is posted on the Municipalities internet site, international investors reading the IDP may be attracted to sponsoring projects in the Nelson Mandela Bay if they are able to identify that the NMBM is “really proactive as a Municipality”.

Table 5.4: Consensus between respondent groups on reactionary phrases extracted from the South African Government’s 2004 NCCRS document (DEAT, 2004).

No	Abridged Phrase	Consensus	
		Operational Group (n=3)	Strategic Support Group (n=2)
1	Climate change could undermine poverty alleviation - Negatively impact on SA	100%	50%
2	Limited Government awareness on climate change thus requiring capacity building	100%	100%
3	Climate Change not priority but perceived as working against national SD goals	67%	50%
<b>4</b>	<b>Poor public awareness -limited Government capacity - require PPP</b>	<b>67%</b>	<b>50%</b>
5	Require focus on projects aimed at mitigation & adaptation	100%	100%
6	All spheres of Government need to give greater priority to CDM projects	100%	100%
7	CDM initiatives to be included in IDP	100%	100%
<b>Group Mean value</b>		<b>90%</b>	<b>85%</b>

In brief, the respondents generally agreed with the statements that were posed to them. However, the respondents from the operational group had a marginally higher consensus than did the group from the strategic support functional units.

### **5.2.11. Summary**

The results presented in Section 5.2 were derived from an analysis of the transcriptions of the interviews conducted. The results revealed that the respondents had a “general” awareness of the concepts explored (Table 5.1) but held positive perceptions about the CDM and the Municipality’s involvement with the initiative.

Challenges regarding institutional capacity were discussed, so too was the Municipality’s involvement with the CDM and its mitigation potential. The economic attractiveness of the region was also briefly explored. One of the themes that emerged when exploring the enablers to CDM projects within the Municipality was the need for National Government to empower Municipalities through the promulgation of enabling legislation. Other relevant themes included the need for improved awareness and greater capacity building. When assessing the obstacles to implementing CDM projects, legislation, awareness, insufficient capacity, lack of funding and poor political will came to the fore.

Regarding future prospects, it was identified that potential existed for the NMBM to promote CDM involvement through; engaging business, the establishment of PPPs and drawing on the benefits of the strategic alliances that the City of Port Elizabeth has with other international cities in developed countries. Lastly, the reactionary phrases confirmed that the respondents supported the extracted themes contained within the NCCRS (DEAT, 2004).

### **5.3. Review of Relevant NMBM Internal Documents**

The latest publicly available Environmental Policy (July 2004) and IDP (IDP, 2007) were examined to create a context for the analysis and validation of the findings. Further, the analysis aimed to ascertain the presence of a formal policy or policy statement on global warming, climate change and the CDM.

#### *Environmental Policy*

The Environmental Policy is a document that gives direction to the Environmental Management System and that makes statements regarding specific environmental issues (Environmental Policy, 2004). The Municipality’s environmental policy statement acknowledges the Municipality’s Constitutional obligation to “facilitate and enhance environmentally sustainable development” (Environmental Policy, 2004). This declaration requires the Municipality to conduct its activities in a sustainable an environmentally friendly manner and to strive to correct impacts on the environment that are a result of previous activities (Environmental Policy, 2004).

According to the Environmental Policy (2004), the principles that need to be applied by the Municipality, amongst others, included:

- Intergenerational Equity;
- Polluter Pays and Cradle to Grave Principles, where the costs of the products or services should reflect the environmental costs;
- Local impacts need to be assessed in the context of regional, national and international environments;
- Improve environmental awareness amongst employees, stakeholders and the public;
- Manage environmental resources and impacts to promote social, economic and environmental justice.

Although this document does not specifically address the issues of climate change and the CDM, these principles support the aims of the CDM, being GHG abatement and the facilitation of sustainable development.

The greater part of the document is committed to creating a context for an Environmental Management System for the Municipality. This raises the question of whether the Environmental Policy is the correct instrument to address CDM projects. Recommendations on this issue are made in Chapter 7.

#### *Integrated Development Plan*

The IDP (2007:8) document is described as a “*single inclusive and strategic plan that:*

- a) links, integrates and co-ordinates a Municipality’s sector specific plans;*
- b) aligns the resources and capacity of the Municipality to the overall development objectives of the Municipality;*
- c) forms the policy framework on which annual budgets rest; and*
- d) informing and aligning to similar development plans at national and provincial spheres.”*

By its own admission, the IDP is the principle strategic planning instrument which informs “all other key institutional policy documents, implementation plans and planning processes” (IDP, 2007:9). It is further stated that the aim of the IDP is to ensure “horizontal and vertical coordination and integration across the three spheres of government” (IDP, 2007:9).

Further scrutiny of the IDP (2007) revealed that, amongst other things, the Municipality had a favourable credit rating of zaA Long-term and zaA1 Short-term issued by CA Ratings. These

ratings indicate the Municipality's strong capacity to repay its long-term liabilities and a very strong capacity to service its short-term liabilities. This would give an investor comfort when assessing risk.

Although the IDP does not specifically address the issues of climate change and the CDM, it does acknowledge climate change as a risk when referring to the Disaster Management Plan.

In summary, the review of selected internal documentation revealed that the Municipality acknowledged its obligation to foster development in a sustainable manner. Further, the Municipality did have a formal IDP to guide strategy but this document did not specifically address CDM project involvement. The documents reviewed, revealed that the Municipality did not have a formal Climate Change or CDM Policy.

#### **5.4. Conclusion**

Drawing from the analysis of the interview data, it can be concluded that:

- The respondents had a "general" level of awareness of the concepts explored (Table 5.1), however, certain individuals did show an above average understanding of certain concepts;
- The respondents, in general, had a positive perception of the CDM and the Municipality's involvement with the initiative;
- The NMBM did exhibit awareness and capacity problems distinctive to CDM involvement;
- The majority of the GHG reduction projects that the NMBM was currently involved in were driven on an informal-basis by the Energy and Electricity and Waste Management Sub-Directorates – focusing on renewable energy;
- The NMBM has the potential for GHG mitigation and that the jurisdiction controlled by the NMBM may be regarded as being attractive for FDI and CDM investment;
- National Government needed to provide greater support to the NMBM through the promulgation of enabling legislation and external funding;
- The MFMA, lack of Funding and poor political will on the part of Councilors, were major inhibitors to the implementation of CDM projects;

- Prospects existed for the NMBM to promote CDM involvement in the future through the NMBM formalizing a policy; specifically including CDM projects in the IDP; allocating budget; and using strategic international alliances;

From the review of the relevant internal NMBM documents, it can be concluded that:

- The NMBM has an Environmental Policy albeit more for the development of an Environmental Management System than for the CDM;
- The IDP document was current but did not specifically address the CDM initiative;
- The NMBM does not have a Climate Change or CDM Policy.

These findings form the basis of the discussion which is presented in Chapter 6, and which then subsequently leads to the recommendations made to the NMBM in Chapter 7.

## CHAPTER SIX DISCUSSION OF FINDINGS

*The simple truth is that climate change is everyone's problem and that over the next fifty years it may well define the worst social, economic and environmental challenges ever faced. This is why our government has made dealing with climate change a national priority.*

*The Honourable Martinus van Schalkwyk, Minister of Environmental Affairs & Tourism, May 5, 2005*

(Stiles, 2006:3)

### 6.1. Introduction

The findings of this study presented in the previous chapter described the current reality within the NMBM on the Municipality's stance towards the CDM initiative, as experienced by the respondents. Through a deductive process, these findings were mapped against the propositions and factors identified in Chapter 4, to ascertain whether the findings supported the theoretical propositions in this particular case study.

#### 6.1.1. Proposition 1

This proposition states that the following factors *impede* the proactive participation of the NMBM in the implementation of CDM initiatives:

- **Application of Sovereign Sustainability Criteria.** Within the context of the three tiers of government, at the municipal level this factor was not raised as a concern. Results revealed that municipalities would look to National Government for a guiding policy. Further, of the three principles of sustainability (Social, environmental and social), the NMBM was concerned mostly about the social dimension. It can be inferred that this is the case due to a municipality's mandate to essentially be responsible for service delivery. This factor is a National Government concern which would ultimately be enacted by municipalities. It therefore does not appear to have a direct impact on the Municipality's proactive stance towards CDM and so this factor was rejected.
- **Lack of Funding.** This factor was raised in various guises. As expected, the Municipality operated under acute financial constraints, with CDM projects given no preferential treatment but needing to pass the normal capex requirements before a project was accepted. This line of reasoning ignores the concept of financial additionality (Nelson, 2004) which strengthens a projects' chance of being accepted by the EB as being a valid project. Also, the environmental benefit, as calculated by applying environmental economic tools, is not considered, which could support the requirement that a project also offers environmental additionality (Nelson, 2004).

Exacerbating the funding problem is Council's notion that CDM projects should be at no cost to Council. This logic will prevent PPP's from being established as no rational investor would be willing to assume full risk for a project and only receive partial financial benefit.

A Municipality by nature is concerned with service delivery, poverty alleviation and social upliftment (Erion, 2005; Lindow, 2005) which hampers the political will of a Municipality to engage in CDM projects and consequently allocate funds to such projects. With Councilors being the decision-makers and having substantial influence over budget allocation, it can be inferred that where Councilors do not perceive environmental issues as priority or where policy makers lack awareness of the CDM (Ellis and Kamel, 2007) it is unlikely that budget will be allocated to CDM projects. In the NMBM case study, by virtue of the CDM not being discussed in the IDP, the likelihood of budget allocation and political priority is unlikely. Aligned to poor awareness, Greene (2005) stated that a lack of funding may be due to project developers not knowing about the availability of international funds or how to access these funds.

Nelson (2004) raised the issue of developing countries not being able to invest in environmental projects because of a real financial shortage. However, in the case study, when responding to Phrase 4 (Table 5.4) a respondent stated that the National Government had the funds to assist Municipalities with CDM projects but that it had not rolled out its climate change strategy yet. It may be interpreted that prospects exist for external funding to be made available to Municipalities, including the NMBM, in the future.

The IDP (2007) revealed that the NMBM had a favourable credit rating which would assist the Municipality in raising funds with commercial banks. The ability to raise external funding for CDM projects was identified as a problem by numerous authors (Wohlgemuth and Missfeldt, 2000; Greene, 2005; Del Rio, 2007; Ellis *et al.*, 2007; Pearson, 2007). Even though the NMBM has a favourable credit rating, it may still face resistance from commercial banks when seeking to raise funds for CDM projects. Ellis and Kamel (2007) ascribed this reluctance as being a result of a lack of awareness on the financier's part.

Evidence of a marginal budget of R1 million reinforced the financial constraint hypothesis. To place the budget in context, Stiles (2006) identified that just the transaction costs for large-scale CDM projects could range between R350 000 and R1.5million. This factor supported the proposition and it was therefore retained.

- **Low Political Agenda of CDM.** Respondents generally agreed that CDM initiatives had a low level of priority, although renewable energy projects, which could be related to CDM, were given a higher priority. It later emerged that a plausible reason for this was due to the Municipality's obligation as an electricity distributor rather than through political will. Supporting this argument, Greene (2006) identified that the South African Government did support renewable energy and had imposed obligations on IPPs as well as on Eskom regarding renewable energy targets.

Further, the decision-makers in the Municipality are the Councilors who were identified as being stumbling blocks in the process because of their erratic response to policy, Council's low level of awareness and their lack of urgency on CDM issues. As political figures, Councilors may be weary to commit to projects that could jeopardize their employment or to projects where benefits would only be realized in the long-term. It may therefore be argued that Councilors would support short-term low-risk projects that are core to the responsibility of a Municipality. As a result of the CDM project cycle, it could take a long time before a project is registered and an even longer period before it begins generating revenue or yielding environmental benefits. The Financial Mail (2007a) states that it may take up to a year before a project is registered but a more realistic figure is approximately four years, being the actual time that the eThekweni Municipality Methane recovery and Energy Generation Project (2002 -2006) took to reach its operational stage (Strachan, Wright, Broomfield, Couth and Pass, 2007). Throughout this period, the project will be attracting costs with no corresponding benefit and could be perceived as inefficiency by the public. Moreover, there is uncertainty about the successor to the Kyoto Protocol at the end of the first commitment period (2012) (Greene, 2005; Stern, 2006; Stiles, 2006; Del Rio, 2007) so it is unlikely that a Councilor will commit funds to projects that will only yield benefits after 2012. Similarly with technology transfer, while the technology flow between a developed and developing country is perceived as a benefit of the CDM (Spalding-Fecher, 2002; Nelson, 2004; Worthington, 2005; Stern, 2006), technology transfer is not immediate.

From a legal perspective, by the National Government not formally publishing a policy or issuing a mandate, there is no obligation on municipalities to consider CDM projects. This statement is supported by the research of Erion (2005) where this author states that due to insufficient support by National Government on CDM projects, the lower levels of government are either unable or unwilling to support the CDM. This factor was thus retained.

- **Insufficient Co-operative Governance.** While the management of environmental issues was listed as a local government competence (Constitution, 2004), there is no enabling or implementing legislation from National Government to support the local structure when it comes to climate change and CDM issues. This lack of guidance and urgency has created an impression of complacency on the issue of global warming as can be inferred from on respondent’s statement that “we [the Municipality] don’t take those things seriously” when discussing global warming and the CDM. Further, from the reactionary phrases (Table 5.4), all respondents agreed that not all government departments or spheres of government perceived climate change issues as being a priority (DEAT, 2004).

Notwithstanding it being a National Government competency to define a country’s sustainability criteria (Nelson, 2004), local governments would be required to follow the stated criteria. The South African Government has drafted a broad set of criteria but these are still to be reviewed and refined (DEAT, 2004). It follows that where National Government is slow to confirm and enforce sustainable development at lower levels of Government, the risk exists that local governments will be drawn in to the “race to the bottom” (Muller, 2007) and compromise their respective regulatory standards. This factor was retained.

- **Additionality Requirements.** This factor was not raised as a concern by any of the respondents. However when exploring the respondents respective levels of awareness of the concepts – additionality was generally poorly understood (Table 5.1). This low level of concern for additionality may therefore be ascribed to the low level of awareness that exists on the CDM projects within the NMBM. Once a technology or methodology is written into policy and becomes a business-as-usual issue, it no longer fulfills the additionality requirement (Greene, 2006). The interpretation of additionality is confusing for project developers (Greene, 2006) and where additionality can not be proved, the project will be disqualified from receiving CERs. This is an important aspect that policy makers will need to fully understand before committing the country to a business-as-usual technology or methodology. Notwithstanding the lack of a clear response from the case study, this factor was retained. The motivation for this was the belief that due to the repeated concern about financial aspects (viability, risk etc) of projects, it was unlikely that municipalities would proactively pursue CDM projects that did not qualify for CERs.

- **High Transaction Costs.** This factor, *per se*, was not mentioned by any of the respondents but a respondent did mention that CDM projects would be considered provided it was done on a “no cost to Council” basis. Due to the NMBM not having significant experience with

CDM projects and fully understanding the CDM and related concepts (Table 5.1), it would have been unreasonable for this factor to have been raised as a concern. However, understanding the financial constraints of a municipality, the low political agenda of CDM initiatives and the conservative approach to CDM capex decisions, this factor was retained but included with the factor “Lack of Funding”.

- **Lack of Awareness.** This factor was raised many times by all respondents. Findings revealed that there was a general sentiment of a lack of awareness both amongst Municipal employees and Councilors. The lack of awareness is arguably the greatest barrier to implementing the CDM within the NMBM as it affects:
  - Capacity building in terms of education and training (Kim,2003);
  - Capacity building in terms of institution building (Muller, 2007) for the crafting of an appropriate internal supporting structure;
  - Sources and availability of international funding (Greene, 2005);
  - Policy making (Ellis and Kamel, 2007);
  - Loss of technology transfer in terms of accessing advanced technologies on a “low-cost or no-cost” basis (Nelson, 2004);
  - Loss of revenue in terms of CER revenue foregone by the NMBM not pursuing the additional revenue that a CDM project would yield (Shrestha and Timilsina, 2002; Nelson, 2004; Greene, 2005; Ellis *et al.*, 2007);
  - Potential loss of sustainable development as a host country by not exploiting the potential benefits of the CDM (Jung, 2006).

When addressing the question of identifying “what” the Municipality required to promote CDM initiatives, a respondent succinctly answered “Awareness”. This was explained as a major concern and stumbling block. Other respondents intimated that Councilors were not aware of the severity of global warming and the CDM as a means of mitigation. As previously indicated, Councilors fulfill a strategic and influential role within the NMBM and if these Councilors lack awareness on the CDM, the likelihood of the NMBM supporting CDM projects is reduced.

When interpreting the answers given by the respondents, the concept of negative evidence was used as a test of the respondents’ respective levels of awareness as confirmation of the findings from the first part of the questionnaire (see Section 5.2.1 in Chapter 5). This factor was retained.

**Lack of Capacity and Poor Capacity Building.** Most of the respondents (three of the five) acknowledged this factor as impeding a proactive approach to CDM projects but this needed to be interpreted within the context that facilitation of CDM projects was not considered as being part of the Municipality's core-business. Findings revealed that there was no specific unit attending to CDM projects; that there were insufficient people involved with such projects and the "CDM-drive" was being managed on an uncoordinated-basis by individual Directorates. The level of skills and expertise within the Municipality with respect to CDM was also acknowledged as lacking. While capacity building in the form of workshops and lectures were conducted, the level of commitment from the Municipal employees and Council was questioned by some respondents. Of the respondents interviewed, those from the Strategic Support group had not attended the workshops notwithstanding the crucial role that they would fulfill in the NMBM's involvement in the CDM. The South African Government has acknowledged the relatively poor level of understanding on Climate Change issues by National, Provincial and Local Government and consequently has a strategic objective to improve education, training and awareness within these structures (DEAT, 2004). This factor was retained.

- **Uncertainty Regarding Post-2012.** Two respondents did raise a concern about the risk of the Kyoto Protocol's successor and the subsequent impact that it may have on South Africa and the future of CDM projects. Due to CDM projects requiring the NMBM to adopt a long-term view of the investment, this uncertainty about the future policy impacted negatively on perceptions of the CDM Market (Greene, 2005; Stern, 2006; Stiles, 2006; Del Rio, 2007). The first round of negotiations to map out a successor for the Kyoto Protocol has been scheduled to take place in Bali in December 2007. The uncertainty created by this factor is expected to negatively influence decision makers and particularly the financial decisions required by CDM projects until a formal successor is agreed. This factor was retained.

- **Complex CDM Project Cycle.** This factor was not raised by any of the respondents other than certain respondents contending that the EIA process required by a CDM project added costs and delays projects. Stiles (2006) stated that an EIA further complicates the process and an article carried in the Financial Mail (2007a) acknowledged that an EIA would negatively influence CDM project time lines. It could, however, once again be argued that due to the NMBM not being significantly involved in the CDM – the respondents would not fully appreciate the required process. However, the respondents did acknowledge the effect of an EIA on the process and for that reason, this factor was retained.

- **Abundance of Cheap Electricity.** Although South Africa is the world's 13<sup>th</sup> largest emitter of GHGs, as measured by the country's emissions of CO<sub>2</sub> and related GHGs (Financial Mail, 2007c), primarily due to its reliance on low-grade coal to generate cheap electricity, this factor was not mentioned as an inhibitor. On the contrary, the South African Government's White Paper on Renewable Energy (2003) has promoted the development of renewable energy technology.

One respondent did state that a significant stumbling block, to CDM project development, was imposed by legislating that Eskom be the only authorized energy generator. Ellis and Kamel (2007) criticized a country's regulatory framework that prevents IPPs from feeding electricity into a grid and argue that this is a barrier to CDM development. These authors also perceived the Municipality's ability to generate electricity and derive revenue from the sale of that electricity as a disincentive for municipalities to pursue renewable energy technology and therefore as an additional barrier to CDM projects. It was, however, revealed in this present study that this is not the case in South Africa. Instead it appeared that if a Municipality had a permit to generate electricity and did not investigate alternative energy sources, it would lose its permit to generate electricity and consequently the income stream that flowed from the sale of that electricity. This factor was rejected.

From this case study, it was identified that capacity building addressing CDM did happen within the "operational" directorates, but only to a limited extent within the "strategic support" directorates and even less so at the executive level where decision making is vested. This creates a misalignment in project evaluation due to the asymmetrical level of awareness between the parties, with those from the operational directorates being more informed than the decision makers. Furthermore, the analysis and evaluation of CDM projects needed to be assessed from a different paradigm than from that used to assess conventional projects. For CDM projects, all three aspects of sustainability (social, environmental and financial) needed to be considered in the greater scheme of the CDM initiative or Carbon Market where funds generated could be applied to other municipal projects. A pure financial capex approach may rule out many viable CDM projects if decision makers were unaware of how the CDM could be used to fulfill internal objectives and offer financial incentives to local communities.

The above issues did not appear to cover all factors that purported to impede the proactive adoption of CDM projects within NMBM. Based on the above, it was proposed that the following factors be included as part of Proposition 1:

- **Non-Core Business Function.** The identification, implementation and management of CDM initiatives are not regarded as core functions of the NMBM Municipality.
- **Absence of Strategic Focus.** With CDM projects not being included in the IDP, no strategic focus is attached to the importance of CDM projects.
- **Compliance with MFMA Requirements.** The results revealed that the MFMA complicated and impeded the CDM development process because it:
  - Inhibited the negotiation of external funding from commercial Banks (Section 33);
  - Placed an onerous time frame of three years on project funding;
  - Called for an elaborate tender process;
  - Inhibited the formation of PPP through the stringent conditions on the formation and control of PPPs (Section 120).
- **Inappropriate Capex Process Applied.** Assessing CDM project viability by applying a pure capital budgeting approach is inappropriate as only the financial component of the project is assessed. Consideration needs to be given to the social and environmental costs and benefits to fully appreciate the worth of the CDM project.
- **Poor Collaboration.** There is a poor collaboration between Local Government and local business on CDM opportunities and project specific information.
- **Inappropriate Decision Making Structure.** CDM projects are subject to a bureaucratic decision making process rather than an efficient flat-structured approval committee approach.

Set out in Section 6.1.1. was a discussion on the factors which appeared to *impede* the involvement of the NMBM in the proactive involvement of the CDM. The findings were used to validate the theoretical propositions and additional factors that appeared to *impede* CDM involvement in the NMBM were added. Of the factors identified, lack of awareness, poor political will and lack of funding appeared to be the main inhibitors for the NMBM.

### 6.1.2. Proposition 2

This proposition states that the following factors *promote* the involvement of the NMBM in the implementation of CDM initiatives:

- **Technology Transfer.** This factor was cited by all the respondents (n=5), identifying that CDM projects created the potential for transfer of skills and technology transfer from both international investors and the South African private sector to the Municipality. Nelson (2004) identified that the attraction of the CDM, with regard to technology transfer, was the ability of a developing country to access more advanced technologies on a no-cost or low-cost basis. This would therefore allow the developing country the opportunity to leap-frog dirty technology and pursue development along a sustainable path. With regard to skills transfer, Gombault, *et al.*, (2007) identify that through the establishment of PPPs, the Municipality would have access to the human capital of private partners. The ensuing skills transfer will facilitate improving the awareness and capacity within the NMBM.

While technology transfer was perceived as a promoting factor and positive outcome of the CDM (Spalding-Fecher, 2002; Nelson, 2004; Worthington, 2005; Stern, 2006), one respondent did caution against adopting untested pilot technologies, where South Africa could become the “dumping ground for failed technology”. Two separate issues are raised by this respondent, the first being the application of technologies that have failed elsewhere in the world and are being tested in South Africa; and the second issue being the application of technologies that have been successful in other parts of the world but have not been tested under South African conditions. These are two very different challenges and would need to be approached with caution by the South African host-city. Due to CDM projects often making use of pilot technologies or applying technology in a host country for the first time, the performance risk of projects are usually higher (Stiles, 2006). Care therefore needs to be taken that appropriate technologies are introduced that fit within the South African context. This factor was retained.

- **Financial Benefits.** As part of the triple bottom line of sustainable development, all respondents (n=5) raised this factor as a CDM-promoter. However, the financial constraint related to funding the project was perceived as a significant stumbling block, preventing the Municipality from initiating projects and thereby creating an additional source of revenue. The benefits of using the income generated by CDM projects to cross-subsidize other community or sustainability projects were only recognized by two respondents (n=5). Muller (2007) suggested that revenues generated by CDM projects that lack true sustainability be applied to other national strategies that address sustainability. None of the respondents identified the potential tax revenue (Muller, 2007) that a CDM project could generate for the National Government which could be used to create a fund for further CDM financing. Furthermore, only one respondent identified the potential for raising external funding from international donor sources which supported Greene’s

(2005) observation of the lack of awareness of the availability of international funding. This factor was retained.

- **Positive National Response.** This factor was referred to by the respondents but tended to focus on the lack of a positive national response. Interpreting the information by applying the technique of negative evidence, it was ascertained that the absence of a clear communicated positive response by the National Government has prevented or not encouraged the Municipality to proactively pursue CDM initiatives. It was anticipated that the South African National Government would be publishing a policy on climate change in 2007/2008 which would aim to align national and provincial policies (Financial Mail, 2007e) and subsequently infiltrate municipal policies.

None of the respondents identified the existence of the DNA or the appointment of a DOE as a positive factor in South Africa's favour even though such institutions are essential to facilitate CDM involvement (Jung, 2006; Financial Mail, 2007e). When reviewing institutional capacity within the NMBM it became evident that the Municipality did not have a corresponding structure to deal with CDM projects. Further, it became clear that a policy was important to an organ of state, so with an official positive statement by the South African National Government, it is anticipated that the lower levels of Government would react positively. This factor was retained.

**Promotion of Renewable Energy.** This factor was cited by all respondents (n=5) either directly when referring to legislation, or indirectly when discussing current involvement in projects. Further, by derivative, this factor is supported as the Electricity and Energy Sub-Directorate was the only section in the Municipality to be awarded a budget to pursue GHG reduction (potentially CDM) projects. The literature suggested that the abundance of cheap electricity would impede CDM development (Ellis and Kamel, 2007) but the White Paper on Renewable Energy (2003) has been proactive in focusing the energy sector on GHG reduction. Nelson (2004) identified that through appropriate technology transfer, developing countries would be able to generate more electricity with the same amount of natural resources.

With respect to demand side management, the Energy Efficiency Accord was signed which aimed to reduce energy consumption to that of the consumption levels of the year 2000 (Financial Mail, 2007e), thereby providing additional support to the energy sector's initiatives to reduce GHG emissions. This factor was retained.

Again, it would appear that the above factors did not encompass all positive promoters identified during the interviews with NMBM officials. It was suggested that the four factors identified in the literature be retained and that the following factors be added:

- **Ownership of Infrastructure.** To a large degree, the existing ownership of the appropriate infrastructure (assets) that are conducive to the implementation of CDM projects reside with the public sector. Relevant assets include landfill sites and sewerage / water reclamation works which allow for municipalities to take the lead role in identifying and implementing CDM projects.
- **Common but Differentiated Responsibility.** A positive and formal collaboration between the NMBM and the relevant business chamber is required, in which they both acknowledge a common but differentiated responsibility and together charter a coordinated path. The results revealed that the NMBM did support the PE Regional Chamber of Commerce and Industry's Green Charter but greater use of the collaboration needed to be explored.
- **Public-Private-Partnerships.** Gombault, *et al.*, (2007) identified that through the establishment of PPPs, the Municipality will have access to skilled human capital, limited risk exposure, lower financial burden and less onerous compliance conditions. For the NMBM these features of a PPP would address certain of the inhibitors identified within the NMBM. It therefore follows that the use of PPPs would be an effective mechanism for identifying and implementing prospective projects.

In Section 6.1.2., the factors that would promote CDM involvement within the NMBM were discussed. The theoretical factors identified in the literature review were complemented by those factors that emerged from the interviews. For the NMBM the greatest promoters appeared to be the financial benefits that would accrue to the NMBM, the ownership of infrastructure and the opportunity of a synergistic technology transfer in the use of the assets to implement CDM projects. The following section addressed those factors that were required to change in order to encourage greater involvement from the NMBM.

### **6.1.3. Proposition 3**

This proposition states that the following factors are required to *improve* Municipality involvement in CDM initiatives:

- **Proactive Stance by Public Sector.** This factor was raised by all respondents (n=5), either by them calling for National Government to publish a formal policy and / or enabling legislation; or through respondents acknowledging that the public sector needed to take the leadership role in the facilitation of CDM projects. Stern (2006) identified that while most of the development of new technologies and carbon mitigation will be undertaken by the private sector, it is the government's role to provide a stable framework of incentives. However, not only should incentives be considered but so too should taxes as it represents an additional source of revenue to government (Muller, 2007). Two respondents suggested that the National Government should create a fund or allocate budget to municipalities, specifically aimed at investigating and implementing CDM projects. Muller (2007) proposed the practice of revenue hypothecation i.e. the earmarking of tax revenues for specific purposes to support sustainable development initiatives. The formal policy that would be published by the South African National Government would be perceived as a proactive and responsible declaration by the Government.

On the issue of the public sector taking the leadership role Erion (2005) quoted Strachan (in an interview in 2005), who argued that the Government should take the leadership role because the Government considered the triple bottom line and not only the single bottom line (profit) like most businesses. The factor described as the Ownership of Infrastructure (Assets) was identified as one of the main promoters within the NMBM which suggested that the NMBM would need to proactively apply those assets in CDM projects. An article in *The Economist* (2007b) complemented the argument for public sector leadership where it was highlighted that the majority of the renewable energy projects would need to be conducted using state-owned assets, thereby limiting private sector leadership. This factor was retained.

- **Improve Process Efficiency.** While not raised as a concern by many respondents, two respondents (n=5) emphasized the inefficiency of and delays experienced in the EIA process. Due to CDM projects being “global products” (Hough and Newland, 2007:3), South African processes needed to be competitive relative to other non-Annex I country processes. The antonym to this factor, being that process inefficiency will discourage proactive CDM involvement, was plausible.

Two processes need to be considered. Firstly, the internal process where Councilors will be required to make a decision, and secondly the formal CDM project cycle. In the present study, one respondent raised concern about the efficiency of the Councilors to make decisions on CDM related issues as well as on the permanency of the decisions taken by the Councilors. Local

authorities are notorious for not making decisions within a reasonable period of time even where the risk is relatively low. A more efficient decision making structure for CDM projects should therefore be designed. On the second aspect, Jewaskiewitz (2007) reported that for the eThekweni project, the formal contract to begin implementation was awarded 12 months after the tender submission date due to the protracted public participation process, required by the EIA. This factor was retained.

- **Improve Communication and Capacity Building.** Stern (2006:495) has predicted that “a core responsibility of government will be to see that it has access to, and disseminates domestically, good information on climate change”. The aspect of communication about the CDM in general and CDM projects in particular was not referred to directly by any of the respondents. However, when examining the manner and extent to which CDM information was disseminated throughout the Municipality, it became evident that little or no information was widely shared. Communication tended to be status reports to Council on renewable energy projects currently being implemented (see Section 5.2.4. for a list of the GHG reduction projects that the NMBM was currently involved with).

A lack of communication was previously identified as a stumbling block for the adoption of CDM projects within the NMBM. Thus improving the communication could assist by clearly stating the common but differentiated responsibility that the various Directorates and stakeholders had with regards CDM project development. This improved communication would need to be between:

- The Municipality and National or Provincial Government;
- The Directorates within the Municipality;
- The Municipality and the formal business chambers that the NMBM aligned with; and
- The Municipality and the general public in the Nelson Mandela Bay (Port Elizabeth, Uitenhage and Despatch).

The additional benefits that improved communication and capacity building would bring include:

- An improved awareness on global warming, climate change and the CDM amongst stakeholders, employees and Councilors;
- The improvement of the political will of the Councilors to promote CDM initiatives;
- The allocation of budget to CDM projects;
- The creation of a formal structure within the NMBM to promote CDM and GHG reduction projects;

- A streamlined decision making process to expedite the approval of CDM projects;
- A vertically aligned strategy with National and Provincial Government; and
- A horizontally aligned strategy, via collaboration, with the local business chambers that the NMBM would be aligned with.

This factor was retained.

- **Benefit from Globalization and Strategic International Alliances.** The CDM is a global response mechanism to a global phenomenon. As a developing country, South Africa competes with other developing countries for a share of the CDM market. It is therefore important that South Africa and the cities in South Africa consider their respective competitive advantages. Respondents indicated that the Municipality had strategic alliances with international cities but contended that, currently, the “relationship agreements were too vague” but acknowledged the potential of technology and skills transfer. A synergistic relationship was possible where CERs could be sold through strategic alliances to assist that country meet its emission targets. The city of Gothenburg in Sweden would offer the most potential for CDM development because Sweden is cited as being an Annex I country while the other partner cities, Ningbo (China) and Jacksonville (USA), do not qualify to implement CDM projects with South Africa. In the case of Ningbo, China is also classified as a developing country and may therefore not implement a CDM project with another developing country while in the Jacksonville case, the USA has not acceded to the Kyoto Protocol and consequently is excluded from its mechanisms.

- **Encourage Public-Private-Partnerships.** The efficiency and attractiveness of PPPs were widely acknowledged, with most respondents regarding PPPs as an enabler to CDM involvement. Notwithstanding the respondents being positive about PPPs, the “stumbling block” imposed by the MFMA impeded the formation of PPPs. This factor was retained.

It is therefore concluded that the five abovementioned theoretical factors be retained and proposed that the following improvement factors be added in the case of NMBM:

- **Public Sector Leadership.** National Government should assume the leadership role in the facilitation of CDM projects by creating an enabling and attractive framework for both investors and municipalities. Such a framework would need to consider taxation on carbon credits and incentives for FDI.

- **Enabling Legislation.** Specific enabling legislation would need to be drafted for the facilitation of CDM projects in South Africa. This legislation would need to be aligned to NEMA and regarded as the supreme piece of legislation when implementing CDM projects.
- **Financial Grants.** The National Treasury should create a fund, earmarked specifically for CDM project development, to which municipalities and other organizations would be able to apply.
- **Strategic Status.** CDM projects should specifically be included in a municipality’s IDP document and acknowledged as being of strategic importance.
- **Municipal Manager Deliverable.** CDM projects should be administered through the Municipal Manager’s Office, by either making use of external consultants or sufficiently competent employees.

In Section 6.1.3., those factors that the NMBM considered necessary to change in order to improve the Municipality’s involvement with the CDM initiative were explored. The most positive change would come from a proactive stance by National Government; the use of PPPs to facilitate CDM projects; and improved communication and capacity building where the Municipality would be able to benefit from the synergies of a coordinated approach within the Municipality as well as with the business community in which it operated.

## 6.2. Conclusions

The discussions in this chapter sought to map the findings of Chapter 5 against the propositions and factors identified in Chapter 4 by making use of a deductive approach. Based on the findings, the factors were either accepted or rejected and additional factors were proposed for each of the three main propositions.

It was concluded that the factors listed in Table 6.1 were relevant to the NMBM and did influence the Municipality’s involvement with the CDM. Further, while avoiding any generalizations, it is proposed that the factors set out in Table 6.1 should be explored by other municipalities, to understand:

- “Why” a particular municipality is not proactively pursuing CDM initiatives?
- “What” prevents CDM involvement?
- “What” is required to improve involvement?

Table 6.1: An abridged version of the revised list of factors that influenced the NMBM in the implementation of CDM projects.

<b>Number</b>	<b>Factors</b>
<b>Proposition 1: Factors that impede proactive participation of the NMBM</b>	
1	Lack of Funding
2	Low Political Agenda of CDM
3	Insufficient Co-operative Governance
4	Additionality Requirement
5	Lack of Awareness
6	Lack of Capacity and Poor Capacity Building
7	Uncertainty Regarding Post-2012
8	Complex CDM Project Cycle
9	Non-Core Business Function
10	Absence of Strategic Focus
11	Compliance with MFMA Requirements
12	Inappropriate Capex Process Applied
13	Poor Collaboration
14	Inappropriate Decision Making process.
<b>Proposition 2: Factors that promote the involvement of the NMBM</b>	
1	Technology Transfer
2	Financial Benefits
3	Positive National Response
4	Promotion of Renewable Energy
5	Ownership of Infrastructure
6	Common but Differentiated Responsibility
7	PPPs as Enablers
<b>Proposition 3: Factors that are required to change in order to improve CDM involvement of the NMBM</b>	
1	Proactive Stance by Public Sector
2	Improve Process Efficiency
3	Improve Communication and Capacity Building
4	Benefits from Globalization and Strategic Alliances
5	Encourage Public-Private-Partnerships
6	Public Sector Leadership
7	Enabling Legislation
8	Financial Grants
9	Strategic Status
10	Municipal Manager Deliverable

Taking the results and discussion chapters into consideration, the next chapter (Chapter 7) makes recommendations to the NMBM to encourage their greater involvement in CDM initiatives.

## **CHAPTER SEVEN**

### **CONCLUSION AND RECOMMENDATIONS**

*Our Challenge is to find ways of achieving our growth and development objectives  
without compromising the environment.*

*The Honourable Martinus van Schalkwyk, Minister of Environmental Affairs & Tourism*

(Financial Mail, 2007c:4)

#### **7.1. Introduction**

This concluding chapter presents a summary of the case study which is then followed by recommendations to the NMBM for consideration. The chapter continues with recommendations for future research on related aspects of the topic and the lastly, presents some concluding thoughts on the study.

#### **7.2. Summary of the NMBM Case Study**

The NMBM is the only metropolitan Municipality in the Eastern Cape and includes Port Elizabeth, Uitenhage, Despatch, Seaview and Blue Horizon Bay. The Municipality consists of nine Directorates and 38 Sub-Directorates falling under the control of the Office of the Municipal Manager. This study sought to investigate why the NMBM was not proactively pursuing CDM projects like the eThekweni and Ekurhuleni Municipalities (Greene, 2006). The goal of the research was therefore to develop an understanding of the factors that would either constrain or promote the active involvement of the NMBM with regards to implementing CDM projects. Further, the study aimed to explore what needs to change within a municipal context to encourage the NMBM to proactively pursue CDM investments.

The case study sought to validate the propositions and factors that were identified in Chapter 4 as well as to rely on the findings to deduce additional factors. Chapter 5 described the findings of the interviews conducted with the respondents, where the interview transcriptions served as the primary documents. By applying the deductive approach, Chapter 6 provided a thorough discussion of the findings relative to the propositions and factors identified. This discussion resulted in some of the factors initially identified in the literature being rejected, other factors being accepted and where new factors emerged from the study, they were added to the initial list of factors that influenced CDM involvement.

After analyzing the data, it was possible to construct a list of 14 factors that constrained the NMBM from implementing CDM projects; a list of seven factors that promoted CDM involvement; and a list of 10 factors that were required to change in the NMBM scenario for it to become more involved in the CDM initiative. The study essentially validated all but two of the

factors, originally identified from the literature, as being relevant to the NMBM. The factors described as the ‘Application of Sovereign Sustainability Criteria’ and “Abundance of Cheap Electricity” were rejected. The first factor was rejected because it emerged as being a National Government concern which would ultimately be enacted by municipalities while, with regard to the second factor, the evidence collected tended to suggest that the South African Electricity and Energy sector has promoted rather than constrained CDM involvement. It was therefore concluded that the factors listed in Table 6.1 (see Chapter 6) did influence the NMBM’s involvement with the CDM.

While some of the factors that emerged required National Government intervention, many of the factors fell within the Municipality’s circle of influence and were factors upon which the Municipality could act immediately.

### **7.3. Recommendations to the NMBM**

While it became abundantly clear that CDM projects are not regarded as core-deliverables to the NMBM, the threat of global warming is too severe to be ignored by any contemporary organization – business or other. Skeptics may argue that until China is assigned emission reduction targets and the USA either accedes to the Kyoto Protocol or implements a comparable initiative, the NMBM’s efforts to stem climate change, would be in vain. To contest this logic, the Precautionary Principle encourages society to take precaution in the case of uncertainty rather than to ignore the warning indicators and thereby intensify the threat. Councilors would however appreciate the direct short-term financial benefits and indirect social and environmental benefits that a CDM project could offer the Municipality and its electorate.

It also became clear that the existence of a policy drives behaviour in the NMBM so, in the absence of a policy, the probability of CDM projects being pursued actively was limited. Moreover, the study established that the general level of awareness on the CDM and global warming, within the municipality, was relatively low and that no formal structure existed on a permanent basis to coordinate and drive CDM initiatives within the NMBM. While the study did not specifically set out to ascertain the level of awareness amongst the Councilors on the CDM, it was indirectly discovered that there was generally a lack of awareness amongst Councilors. This observations still however needs to be confirmed empirically. The relevance of this short coming was that the Councilors were the decision makers within the NMBM and where the level of understanding was superficial, the probability of active involvement in CDM projects would be significantly reduced.

Like any strategy, if not supported and advocated by the top leadership, it would not be implemented successfully. Further, without an appropriate organizational structure, the successful implementation of a strategy was greatly reduced.

The scope of this research was limited to the local government level and more specifically the NMBM. However during the study it emerged that certain developments and actions were required by National Government to facilitate the involvement of municipalities and included the:

- promotion of public sector leadership;
- provision of a formal policy on CDM;
- creation of greater awareness of the CDM between governmental departments as well as between levels of government;
- drafting of enabling legislation;
- provision of financial assistance; and
- provision of a stable framework of incentives and taxes.

Assuming the changes at National Government level are enacted, there are however certain changes or actions that can be initiated by the NMBM (local government level) in order to facilitate development of CDM projects. These include:

- As a point of departure, the NMBM should take a **proactive stance** on the issues of Global Warming, Climate Change and the CDM, by including these issues in a newly drafted **Sustainable Development Policy** for the NMBM. The current Environmental Policy contained within the NMBM focused on the parameters of an Environmental Management System and only addressed one perspective of the triple bottom line - being the environment. The results revealed that the environment did not carry a high priority in the NMBM relative to service delivery, and therefore a different policy would be required to elevate the environment's relative status. It followed that in order to do justice to the CDM in a host country, the three components of sustainable development being the social, environmental and economic perspectives would need to receive consideration, and furthermore the interrelationships between these components would need to be understood. A Sustainable Development Policy would offer the NMBM a perfect platform to acknowledge the threat and risks that global warming and climate change posed to the planet. Further, this Policy could be used to identify the opportunities that the development of CDM projects offered the Municipality in terms of sustainability.

- Leading from the Policy Statement, a **formal strategy** should be drafted to drive a coherent and consolidated approach to the Municipality's involvement with CDM projects. The formal strategy should address the following issues:
  - **Awareness:** Before the severity of global warming and the opportunities presented through the CDM can be appreciated, the awareness of these issues needs to be created. Awareness should be created throughout the organization but particularly amongst the "decision makers". The awareness and capacity building that would stem from the Sustainable Development Policy should rather focus on training programmes, for employees and Councilors, on the broader issues of Sustainable Development rather than on the narrower issues of pure environmental education or the CDM in isolation.
  - **Capacity Building:** Besides the drafting of a coherent policy, appropriate skills would need to be acquired from the private sector to assist with strategy implementation and control. Further, additional staff would need to be employed or redeployed who have CDM projects as a core deliverable rather than just as another task that does not form part of the municipal official's job description. The training and development of these staff members on the CDM should be fast-tracked. Further, it would be inappropriate to offer the same CDM-awareness training to all employees and stakeholders due to the different roles that they assumed in the organization. Programmes that address general awareness, project identification, CDM process requirements, CDM decision making and Carbon Trading should be identified and consultants contracted to offer the appropriate training to the appropriate employees and Councilors.
  - **Identification of potential Carbon Assets:** The Municipality should take stock of its assets that have the potential of generating Carbon Assets. Furthermore, opportunities stemming from demand side management practices should be explored.
  - **Budgeting:** After identifying the potential Carbon Asset, budget should be set aside for the CDM initiative. At this point, consideration should be given to external funding from donor sources or from the private sector through the establishment of PPPs. By improving the Councilors' awareness on climate change, sustainable development and the CDM, the benefits of the CDM would become more apparent and this should increase the propensity of Councilors to approve budget for such projects.

- **Capex Decisions:** Rather than applying conventional capital budgeting techniques to assess project viability, a paradigm shift is required, where it is proposed that the techniques derived from Environmental Economics be included so as to assess the welfare effect of the project on society and the environment. The financial instrument derived from CDM projects would be in the form of a tradable asset (CER) which could be realized in an open market and the revenue used to fund other developmental projects.
  
- **Involvement with local Business and Industry:** It is proposed that the Municipality make use of established business forums and Chambers of Commerce within the Nelson Mandela Bay area to stimulate the debate on the impacts of climate change and to drive the CDM initiative. Further, business and industry should be drawn into mitigation efforts that are possible within the Nelson Mandela Bay, by the Municipality calling for tenders to implement CDM projects within the Nelson Mandela Bay and to establish PPP's as an enabling vehicle.
  
- **Action required from National Government:** In terms of co-operative governance, the Municipality should, through the South African Local Government Association, lobby National Government to: issue a formal National Policy on Climate Change and the CDM; provide a synergistic framework (for the investor and the host organization) where consideration is given to taxes and incentives; and to promulgate enabling legislation. Further, the NMBM should advise the National Government of current legislation that inhibits the implementation of CDM projects due to the operational difficulties that it creates. While it is acknowledged that capital is a scarce resource, climate change will have severe repercussions. To assist municipalities, the NMBM should lobby National Government to create a fund for CDM projects or allocate funds to the Provinces for CDM initiatives.

A positive national response through an enabling framework would encourage both the public and private sector to actively pursue CDM initiatives. Further, by the National Government providing clarity on domestic sustainable development goals; issuing a national CDM-policy; streamlining the CDM process and proactively engaging Corporate-South Africa, greater involvement could be expected.

- **Pursue international opportunities:** The NMBM should engage with its network of international cities, that it has Strategic Alliances with, to ascertain the prospects of implementing CDM projects with those cities.
- Following the development of strategy, an appropriate **structure** would be required to implement that strategy. It is proposed that the responsibility, of implementing the Sustainable Development strategy, should be placed under the Office of the Municipal Manager so that sufficient authority is attached to drive its implementation.
- Due to the **strategic nature** of the IDP, CDM Projects or a commitment to CDM projects should specifically be included in this document.

While recommendations were made based on the findings of the case study, the NMBM would be well guided if it considered all the factors cited in Table 6.1 (see Chapter 6). Those factors listed under Proposition 1 should be circumvented, those listed under Proposition 2 should be emphasized and those listed under Proposition 3 should be instigated or facilitated.

#### **7.4. Further Research Recommendations**

The focus of this study was to understand the current reality with regard to the implementation of CDM projects in the NMBM. Being a single holistic case study, the researcher could not make generalizations that would be applicable to the South African Local Government sphere of governance. It was however permissible to make recommendations that pertained specifically to the NMBM. Further, this study did not ascertain how the eThekweni, Ekurhuleni or City of Cape Town Municipalities implemented their respective CDM projects. It is recommended that future research should be conducted in the following areas:

- The Awareness and Perceptions of the Executive Structure (Mayor and Councilors), within the NMBM, towards global warming and the CDM, should be ascertained to provide a more complete picture of the current reality within the NMBM;
- To allow for generalizations to be considered, the study presented in this thesis should be replicated in at least 30 municipalities of different size and geographic locations;
- Case Studies on the implementation of CDM projects in the eThekweni, Ekurhuleni and City of Cape Town Municipalities should be conducted, firstly to test for the relevance of

the factors identified in this study, secondly to ascertain how the constraining factors were circumvented and thirdly, to identify which of the factors acted as promoters.

- Ascertain how the corresponding level of public sector government in India, China and Brazil are involved in the implementation of CDM projects – with the aim of identifying the factors that either constrain or promote CDM involvement.

### **7.5. Post Script**

From the outset of the study, it was the intention to give something back to the City of Port Elizabeth. While the findings of this thesis will be made available to the NMBM for consideration, it was the NMBM that was the greater of the givers. This Municipality gave the researcher the opportunity to gain an insight into its involvement with the CDM and to make a contribution to the emerging body of knowledge on this subject. It is hoped that this study will stimulate debate and act as a catalyst for change within the NMBM in pursuit of the researcher's vision for the City (see Section 1.4 in Chapter 1). Further, within the greater context of sustainable development, the researcher trusts that this study will prompt the NMBM to acknowledge its "Common but Differentiated Responsibility" to the global phenomena of global warming and climate change.

*The significant problems that we face cannot be solved using the same level of thinking we were at when we created them.  
Albert Einstein*

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## APPENDIX A

### Emission Reduction Targets as cited in the Kyoto Protocol (United Nations, 1998).

Party	Quantified emission limitation or reduction commitment (percentage of base year or period)
Australia	108
Austria	92
Belgium	92
Bulgaria*	92
Canada	94
Croatia*	95
Czech Republic*	92
Denmark	92
Estonia*	92
European Community	92
Finland	92
France	92
Germany	92
Greece	92
Hungary*	94
Iceland	110
Ireland	92
Italy	92
Japan	94
Latvia*	92
Liechtenstein	92
Lithuania*	92
Luxembourg	92
Monaco	92
Netherlands	92
New Zealand	100
Norway	101
Poland*	94
Portugal	92
Romania*	92
Russian Federation*	100
Slovakia*	92
Slovenia*	92
Spain	92
Sweden	92
Switzerland	92
Ukraine*	100
United Kingdom of Great Britain and Northern Ireland	92
United States of America	93

\* Countries that are undergoing the process of transition to a market economy.

## APPENDIX B

### Sustainable Development indicators in support of the CDM project approval criteria (DME, 2004).

	Criteria	Indicator
Environmental	Impact on local environmental quality	<ul style="list-style-type: none"> <li>• Impact of the project on air quality</li> <li>• Impact of the project on water pollution</li> <li>• Impact of the project on the generation or disposal of solid waste</li> <li>• Any other positive or negative environmental impacts of the project (such as impacts on noise, safety, visual impacts, or traffic)</li> </ul>
	Change in usage of natural resources	<ul style="list-style-type: none"> <li>• Impact of the project on community access to natural resources</li> <li>• Impact of the project on the sustainability of use of water, minerals or other non renewable natural resources</li> <li>• Impact of the project on the efficiency of resource utilisation</li> </ul>
	Impacts on biodiversity and ecosystems	<ul style="list-style-type: none"> <li>• Changes in local or regional biodiversity arising from the project</li> </ul>
Economic	Economic impacts	<ul style="list-style-type: none"> <li>• Impact of the project on foreign exchange requirements</li> <li>• Impact of the project on existing economic activity in the area</li> <li>• Impact of the project on the cost of energy</li> <li>• Impact of the project on foreign direct investment</li> </ul>
	Appropriate technology transfer	<ul style="list-style-type: none"> <li>• Positive or negative implications for the transfer of technology to South Africa arising from the project'</li> <li>• Impacts of the project on local skills development</li> <li>• Demonstration and replication potential of the project</li> </ul>
Social	Alignment with national provincial and local development priorities	<ul style="list-style-type: none"> <li>• How the project is aligned with provincial and national government objectives</li> <li>• How the project is aligned with local developmental objectives</li> <li>• Impact of the project on the provision of, or access to, basic services to the area</li> <li>• Impact of the project on the relocation of communities if applicable</li> <li>• Contribution of the project to any specific sectoral objectives (for example, renewable energy targets)</li> </ul>
	Social equity and poverty alleviation	<ul style="list-style-type: none"> <li>• Impact of the project on employment levels? (specify the number of jobs created/lost; the duration of time employed, distribution of employment opportunities, types of employment, categories of employment changes in terms of skill levels and gender and racial equity)</li> <li>• Impact of the project on community social structures</li> <li>• Impact of the project on social heritage</li> <li>• Impact of the project on the provision of social amenities to the community in which the project is situated</li> <li>• Contribution of the project to the development of previously underdeveloped areas or specially designated development nodes</li> </ul>
General	General project acceptability	<ul style="list-style-type: none"> <li>• Are the distribution of project benefits reasonable and fair?</li> </ul>

## APPENDIX C

### The strategic objectives and interventions proposed in the National Climate Change Response Strategy for South Africa (DEAT, 2004).

No	Objectives	Interventions
1	Create a synergy between national government objectives, sustainable development and climate change.	Ensure that the relevant national government directorates and sub-directorates have the capacity to carry out their assigned functions regarding climate change response, including the CDM.  Establish procedures for CDM projects
2	To enable the relevant national government departments to address climate change issues in South Africa.	Ensure that the relevant national government directorates and sub-directorates have the capacity to carry out their assigned functions regarding climate change response, including the CDM.
3	Offset South Africa's vulnerability to climate change.	Extension of health protection and health promotion measures.  Water resource management and contingency planning.  Adaptation of rangeland practices.  Adaptation in agriculture.  Changes in forestry practices.  Protecting plant biodiversity.  Protection of animal biodiversity.  Protecting marine biodiversity.  Formulate actions that will offset the economic vulnerability of South Africa to climate change response measures.
4	Create a national greenhouse gas mitigation plan that furthers the process of sustainable development in South Africa in the light of CDM, technology transfer, donor funding and capacity building opportunities.	The efforts of all stakeholders will be harnessed to achieve the objectives of the Government's White Paper on Renewable Energy (2003) and the Energy Efficiency Strategy, promoting a sustainable development path through co-ordinated government policy.  Initiating the Government's joint implementation strategy for the control of exhaust emissions from road-going vehicles.  Implement a transport sector mitigation programme through the National Department of Transport, in conjunction with the Government's energy efficiency strategy (2003) and the joint implementation strategy for the control of exhaust emissions from road-going vehicles.  Develop and implement an appropriate coal-mining sector mitigation programme through the Department of Minerals and Energy and the mining industry.  Implement sustainable industrial development through co-ordinated policies, strategies and incentives through the Department of Trade and Industry and the various industry sectors.  Reduce greenhouse gas emissions in the agricultural sector through the National Department of Agriculture.  Facilitate the establishment and extension of forest schemes through the Department of Water Affairs and Forestry and the forestry industry.  Optimise waste management practices to minimise the emissions of greenhouse gases and develop a government position, through all relevant departments and all spheres of government and industry, to implement a waste sector mitigation programme.
5	Optimise South Africa's potential to benefit from climate change mitigation by suitable international response and positioning.	Maintain an appropriate attendance at UNFCCC and related meetings.
6	To ensure that government departments in all spheres work together on a co-operative basis in dealing with climate change.	Use the Government Committee for Climate Change to consolidate the government position.
7	Ensure that South African environmental law provides for climate change issues.	Use the ongoing law reform process to ensure that climate change issues are provided for in South African legislation.
8	Improve the level of education, training and awareness regarding climate change in South Africa and capacitate the government and other sectors to deal with climate change issues effectively to the benefit of the country.	Accelerate the process of relevant education, training, awareness and capacity building in South Africa to speed up the implementation of climate change response.
9	Ensure that there is an effective and integrated programme of climate change research, development and demonstration in South Africa.	Set up a database of climate change related research, development and demonstration projects and integrate the research, development and demonstration programme for South and Southern Africa.
10	Identify and put in place an information handling system that incorporates greenhouse gas data.	Introduce greenhouse gas emissions into air quality legislation and put in place a national information handling system that incorporates greenhouse gas data alongside air pollution data.
11	Ensure that South Africa gets the best possible access to available climate change funding.	Ensure that an investment friendly climate is developed and maintained to attract development country partners to invest in climate change related projects in South Africa. Co-ordination of Climate Change donor funds that are procured for South Africa. Involve the public sector and financing institutions linked to government, such as the Industrial Development Corporation and the Development Bank of South Africa.

## **APPENDIX D**

### **Questionnaire used in semi-structured interviews held with selected officers from the Nelson Mandela Bay Municipality.**



As an MBA student, it is required that a dissertation be submitted in partial fulfillment of the qualification.

The purpose of the research dissertation is to provide the researcher with an insight of the level of awareness of and perception towards the Clean Development Mechanism (CDM) initiatives amongst selected municipal officials within the Nelson Mandela Bay Municipality (NMBM). Further objectives include establishing the current Institutional Capacity; assessing current and historic involvement with CDM initiatives; determining Mitigation Potential within the NMBM; assessing the Investment Potential of the NMB zone; ascertaining the current Obstacles prevalent in the Municipality preventing it from proactively pursuing CDM initiatives; ascertaining the Enablers required to facilitate CDM project initiation; and assessing Future Prospects and Developments required to position the NMBM as a competent partner in public-private partnerships in the implementation of future projects. Your cooperation with regard to the completion of this questionnaire will be appreciated.

**ALL INFORMATION WILL BE TREATED CONFIDENTIALLY.**

## **Section A**

### **A. Biographical details of the respondent**

1. Name of Respondent
2. Position in the organization
3. Number of years experience in current capacity
4. Total number of years of business experience
5. Academic and/or professional qualification

## **Section B**

### **B.1. CDM Conceptual Awareness**

1. What do you understand about the concept of Global Warming?
2. Do you believe that Global Warming is a serious issue facing South Africa?
3. What do you understand of the Kyoto Protocol?
4. What do you understand of the Clean Development Mechanism?
5. What do you understand of the concept of Additionality?
6. What is your understanding of the Carbon Market in South Africa?
7. How would you define Sustainable Development?

**(Brief on Concepts before continuing Questionnaire)**

### **B.2. Perception**

1. Should the Municipality be actively involved in CDM initiatives?  
-If so why / why not?
2. As a Government body, do you believe that the Municipality should take a lead role in encouraging CDM initiatives? – Elaborate
3. What benefits would you expect from a CDM?
4. What adverse effects would you expect from a CDM?
5. What factors do you believe are the most attractive to implementing CDM initiatives?
6. In your opinion, does the Municipality have a responsibility to the people of the City to curb the emission of greenhouse gases – both within the Municipality and Industry?
7. What are the greatest incentives / drivers for Municipalities to initiate CDM projects?

### **B.3. Institutional Capacity**

1. Does the Municipality have a Climate Change Policy / Strategy?
  - If so, please elaborate on the policy
  - If not, why not?
2. Does the Municipality have a CDM Policy / Strategy?
  - If so, please elaborate on the policy.
  - If not, why not?
3. Does the Municipality have a specialized unit to facilitate and promote CDM issues?
  - If so, please elaborate on the policy.
  - If not, why not?
4. Which Department is currently responsible for identifying CDM projects within the NMBM?
5. What priority or level of importance does the Municipality ascribe to CDM initiatives as a political agenda item?
6. What aspects are considered when assessing CDM project viability?
7. To assess the system employed, what process (steps) does a prospective CDM project currently need to follow within the Municipality to bring it to fruition?
8. How many people are involved with facilitating and promoting CDM initiatives within the organization?
9. What budget has been allocated towards facilitating and promoting CDM initiatives?
10. How does this budget differ from that which was allocated to this initiative over the past two financial years?
11. What is the probability of budget being allocated in the future?
12. What capacity building initiatives with regard to CDM initiatives are prevalent within the municipality?
13. How and what information on CDM initiatives are disseminated through the organization?
14. How does the Municipality support CDM initiatives from the Private Sector – i.e. what role does the Municipality play in facilitating CDM initiatives within the private sector in the Municipal zone (NMB)?

### **B.4. Activity in / Involvement with CDM Initiatives**

1. What CDM projects have been attempted or investigated by this organization?
2. Why were these projects accepted or rejected?
  - Please elaborate.
3. How and through which departments were these projects assessed and administered?

4. What aspects of Sustainable Development did these projects address?
5. What projects, if any, are currently being considered?
6. How and where is the CDM policy linked to the Integrated Development Plan (IDP)?

#### **B.5. Mitigation Potential**

1. Which areas of the Municipality do you believe are most suited to a CDM project?  
-Please elaborate
2. Has the Municipality pro-actively assessed how CDM projects can be implemented within its current infrastructure (Energy & Waste Management Systems)?
3. Does the Municipality proactively seek-out CDM Projects?
4. Are project that are presented to council, assessed for potential CDM involvement?

#### **B.6 Economic Attractiveness of Region**

1. What is the competitive advantage that the NMBM has with regard to attracting Foreign and domestic investment?
2. What major Foreign Direct Investments were made within the NMB over the lasts year?  
– Please list a few.
3. What was the level of Foreign Direct Investment within NMB over the last three years?
4. As a zone, do you believe that the NMB is an Investment alternative to facilitate CDM projects? Why?

#### **B.7 Enablers and Accelerators**

1. What support exists for Municipalities to promote CDM Initiatives?
2. What is required to promote CDM Investment (Uni-lateral and Foreign) within Municipalities?
  - a) What factors do you believe will promote the implementation of CDM Initiatives within South African Municipalities?
  - b) What factors do you believe will positively influence the implementation of CDM projects within Municipalities?
3. What is required for SA Municipalities to develop a distinct competence in the implementation of CDM projects?
4. What internal efficiency / competence is required for the NMBM to develop a competitive advantage in the implementation of CDM projects within South Africa?

## **B.8 Obstacles and Brakes**

1. What legislation is currently in place that inhibits the implementation of CDM projects?
2. What do you believe are the barriers to implementing CDM initiatives for a Municipality – i.e. what factors do you believe inhibits Municipalities from being pro-active in implementing / initiating CDM projects?
3. Internally, what factors prevents the NMBM from developing a competence in the implementation of CDM initiatives both in the Municipality and through PPP's

## **B.9 Future Prospects & Developments**

1. What additional support is required from National Government, SALGA or Industry to facilitate the proactive participation of Municipalities in the CDM initiative?
2. Do you believe that the DME is the appropriate Designated Authority?
3. What factors need to change to make Municipalities / NMBM pro-active in CDM development?
  - Elimination of Obstacles & Brakes
  - Additional Enables & Accelerators
4. How can the IDP be refined to include CDM project development?
5. What Sustainability Issues should be addressed by CDM Initiatives?
6. What factors do you believe make the NMBM an **attractive** vehicle for promoting and facilitating CDM initiatives relative to other Municipalities?
7. What factors do you believe makes the NMBM an **unattractive** vehicle for promoting and facilitating CDM initiatives relative to other Municipalities?
8. What is the Municipality's perspective on public-private partnerships as a means to implement CDM initiatives?
  - a) Is it a consideration?
  - b) What are the benefits & disadvantages?
  - c) How would PPP's be established?
9. What does the NMBM need to do to make it attractive for PPP investment and participation?
10. Which Cities (both 1st & 3rd World) does Port Elizabeth have strategic alliances with?
11. How can the NMB zone leverage off those alliances to facilitate the implementation of CDM projects and benefit from the resultant investments?
12. What opportunities exist with these cities and how can they be exploited?
13. Any additional comments that you would like to make?

### **B.10 Phrases to gauge Reactions**

1. Global Climate change is a threat to sustainable development in developing countries and could undermine the global poverty alleviation efforts and negatively impact South Africa?
2. General awareness within all spheres government on the likely impacts of climate change is limited to those departments directly involved with the issues therefore requiring significant capacity building.
3. Climate change is not seen as a priority within all departments and all spheres of governments, with climate change some times being perceived as working against national development priorities.
4. In South Africa, Education, training and public awareness of the impacts of climate change lags behind the required standard and Government has insufficient capacity to address this aspect effectively thereby requiring active PPP involvement.
5. In South Africa, attention now needs to be focused on projects that will assist with mitigation of and adaptation to climate change to address specific areas of vulnerability.
6. All spheres of Government need to give the implementation of CDM projects greater priority.
7. Municipalities should specifically include CDM initiatives in their respective IDPs.

**THANK YOU FOR YOUR COOPERATION**

## APPENDIX E

### Organogram of the Administrative Structure of the Nelson Mandela Bay Municipality (IDP, 2007).

