THE EFFECTIVENESS OF THE CLEAN DEVELOPMENT MECHANISM AND EMISSIONS TRADING WITHIN THE CLIMATE CHANGE REGIME

by

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Declaration

I bear witness that this research report is my own unaided work. It is submitted for the degree of Master of Arts by coursework and research report in the field of International Relations to the University of the Witwatersrand, Johannesburg. It has not been submitted to any other University or Faculty for any degree or examination.

Auriel Niemack

8 July 2011

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GLOSSARY AND ABBREVIATED TERMS

AAU	Assigned Amount Unit
CCN	Carbon Credit Note
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism
CDM EB	Clean Development Mechanism Executive Board
CER	Certified Emissions Reduction
CH_4	Methane
CMP	Conference Member of Parties
COP	Conference of Parties
CO_2	Carbon Dioxide
DNA	Designated National Authority
DOE	Designated Operational Entity
DoE	Department of Energy
ETS	Emissions Trading Scheme
EU ETS	European Union Emission Trading Scheme
EU	European Union
EUA	European Union Allowances
GHG	Greenhouse gas
GWP	Global Warming Potential
HFC	Hydro Fluorocarbon
IET	International Emissions Trading
IRR	Internal Rate of Return
JI	Joint Implementation
KP	Kyoto Protocol
LDC	Least Developed Country
LTMS	Long-Term Mitigation Scenarios
NBI	National Business Initiative
NEMA	National Environmental Management Act
N_2O	Nitrous Oxide
PDD	Project Design Document
PFC	Per fluorocarbon
PIN	Project Identification Note
SD	Sustainable Development
SF_6	Sulphur hexafluoride
UNFCCC	United Nations Framework Convention on Climate Change

Chapter one

Introduction

1. Statement of the problem

South Africa (SA) has signed and ratified the Kyoto Protocol, and is vocal in its support of the climate change regime. As a non-Annex 1 country[1], SA is not compelled to reduce its GHG emissions to equivalent levels in 1990. Whilst SA is not obliged to reduce its emissions (within the current climate change regime), there is evidence, as a coal-based economy, that there is a significant amount of carbon emissions per capita generated by SA. South Africa's GHG emissions rank among the top 20 in the world and contribute 1.8% to global emissions.[2] The SA government has embarked on various policy exercises that seek to explore feasible ways of reducing SA's emissions levels without jeopardising economic growth. The optimal solution outlined in the Long-Term Mitigation Scenarios (LTMS) — one of the policy exercises instrumental in shaping SA's policy on climate change — argue that SA must achieve a peak, plateau and decline in carbon emissions from 2030–2035, through reduced coal dependence, increased use of renewable energy sources and adoption of clean energy technologies (including nuclear energy and carbon capture and storage).[3] Thus, it is in SA's best interests to implement mitigation strategies before it is compelled to do so as the impact of this global issue will continue and intensify if neglected. To reduce emissions and safeguard economic growth, the United Nations Framework Convention on Climate Change (UNFCCC) has developed three Flexibility Mechanisms: Joint Implementation (JI), the Clean Development Mechanism (CDM) and Emissions Trading Systems (ETS). These are market mechanisms designed to incentivise and increase emissions mitigation.

The CDMs is part of the Kyoto Flexibility Mechanisms, which are market-based solutions designed to incentivise the reduction of GHGs. Through the reduction of emissions it is hoped that the effects of climate change will be mitigated or lessened. The purpose of this research is to provide a balanced understanding of the positive and negative effects of the CDM projects that are operational in SA, as well as the extent to which emissions trading affects these projects and the extent to which it provides an incentive to reduce carbon

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[1] These are countries that are not compelled to reduce their emissions to the 1990 levels. See http://unfccc.int/parties_and_observers/parties/non_annex_i/items/2833.php

[2] United Nations Human Development Report, 2006. *South Africa is ranked as the 12th highest emitter of GHGses in the world. SA emits approximately 450 million tones of CO_2 per year, and this amount equates to one per cent of annual global emissions.*

[3] Hallowes, D., 2008. "A Critical Appraisal of the LTMS". Sustainable Energy and Climate Change Project (SECCP) of Earthlife Africa, Johannesburg.

emissions. With the crash of the EU Emissions Trading Scheme (EUETS) in 2006, and with the increased criticism that CDM projects do not generate real reductions in emissions, it is imperative that the effectiveness of these mechanisms be evaluated. [4] By investigating these effects it is hoped that the findings will be used to promote this market-based solution or to provide recommendations to ensure that these projects deliver real reductions in emissions mitigation. Whether South African policymakers will argue for an increased commitment towards complying with the global climate change regime in the upcoming climate change negotiations, it is critical that an assessment of the current state of compliance to this regime is made. This would ensure that policymakers and climate change negotiators have a firmer grasp of South Africa's successes and shortcomings in this issue.

2. Hypothesis

The hypothesis of this research report is as follows:

> South Africa's compliance with the global climate change regime is determined by domestic factors such as the legal, political and economic structure of South African climate change initiatives. South Africa is not complying because the long term commitments that have been pledged and implemented by the SA government are conditional commitments that depend on the future climate change regime, a significant skills transfer, and funding.

SA's compliance with the global climate change regime is the dependent variable in this report. The independent variable relates to a series of domestic/state level considerations such as the legal, political and economic structure of South African climate change initiatives. Such considerations include the following: the domestic regulatory and institutional framework for CDM implementation, the allocation of resources, human, financial and capacities for CDM implementation, the investment environment of the country, and the roles played by the government, the private sector, civil society, as well as the Designated National Authority (DNA) and the Designated Operational Entities (DOE). In addition there are environmental considerations that influence SA's compliance with the climate change regime. These include: the emissions profile and potential for CDM projects, the contribution towards Sustainable development locally, the unintentional effects of the CDM project implementation; and the quantified amounts of GHG reductions and CERs issued as a result of CDM implementation.

[4] Grubb, 2006

The overall effectiveness of the global climate change regime is determined by the ability of member states to comply with the regime, through a domestic implementation of the flexibility mechanisms. Effectiveness or compliance can also be understood as changing the behaviour of the state actor towards behaviour that helps to solve the problem that led to the formation of the regime. Behavioural change in this context would entail a reduction of GHG emissions, and the adoption and implementation of policies that would provide for alternatives to the behaviour that results in anthropocentric climate change.

This analysis argues that even with the existence and implementation of the flexibility mechanisms that the global climate change regime employs such as the clean development mechanism (CDM) and emissions credit trading systems (ETS), these have largely been ineffective due to domestic structural issues. This in turn impedes the effectiveness of Flexible Mechanisms and the global climate change regime, thus requiring careful consideration for future negotiations.

3. Background to the report

Climate change is a transnational issue as its effects are being experienced worldwide.[5] Despite minor dissidence,[6] the prevailing consensus amongst scientists and policymakers is that high amounts of GHGs (such as carbon dioxide, nitrous oxide and methane) trapped in the Earth's atmosphere have led to an increase in global temperatures. The global increase in temperature has resulted in various consequences such as an increase in sea levels (due to glacial ice shelves melting), an increase in intense weather phenomena such as hurricanes, typhoons and flooding as well as droughts, and also increased levels of methane in the atmosphere (released from melting ice shelves) which exacerbates the problem.[7]

The main cause in the increase of GHG emissions is through industrial activity via the burning of fossil fuels such as coal and petroleum. Whilst it would be parsimonious to simply stop burning these fuels in order to stop causing climate change, fossil fuels are the lifeblood of the global economy, as they are used to power transportation and to generate electricity, without which the globalised world would cease to function, which would wreak havoc. However, the prevailing consensus is that something must be done to adjust to the existing

[5] Stiglitz, 2007: 166.
[6] Stiglitz, 2007: 167.
[7] Stern, 2006: 2.

and future effects of climate change and find solutions that will stabilise or decrease GHG emissions and without crippling the world economy. Succinctly put, adaptation and mitigation strategies must be conceptualised and implemented, and these strategies cannot be unilateral, as it is imperative that there be international cooperation on this issue as its consequences are truly global. The consequences of climate change are not proportionate and they do not respect political (or economic) boundaries. According to the Stern Report, sub-Saharan Africa is expected to be hardest hit by the effects of climate change and yet the African continent has contributed the lowest amount of GHGs to the world's atmosphere.[8] The current (and further) increases in global temperature will exacerbate present developmental problems for many developing countries, the bulk of which are in Africa.[9] What follows is a discussion of the action and steps taken by the international community to find solutions to this issue. In discussing these steps, the evidence provided proves that there is significant international cooperation regarding climate change. However, it is the nature and extent of this cooperation, and of the compliance to these measures, that will be further analysed within the South African context in this report.

Recent scientific consensus confirms a link between the increase in GHGs in the atmosphere and the increase in the climate change phenomenon.[10] With the first phase of the KP in place from 2008-2012, developed or industrialised countries (Annex 1 states) are legally compelled to reduce their GHG emissions levels to the 1990 baseline annual levels. Developing countries (Non-Annex states) are not legally compelled to do this in the first phase of the KP. The Protocol has three market-based Flexible Mechanisms designed to increase international cooperation in mitigating and reducing GHG emissions. They are: Joint Implementation (JI); the CDM; and Emissions Trading. Joint Implementation is reserved projects between Annex 1 and Annex B member states.[11] CDMs, however, are implemented in developing countries, such as SA. They can be implemented by public or private entities from Annex 1 member

[8] Stern, 2006: 56-57, 68, 76, 104-105, 158.
[9] Todaro and Smith, 2006: 73, and Kegley and Witkopf, 2004: 381.
[10] IPCC, 2007: 2-3.
[11] *JI is similar to the Clean Development Mechanism (CDM), however JI addresses emissions trading among Annex I countries, while CDM allows Annex I parties to purchase carbon credits from projects undertaken in non-Annex I countries. The main purpose of the JI is to spur investment from industrialized countries to countries that are characterised as "undergoing the process of transition to market economy", and are identified as Annex B states on the Kyoto Protocol The countries are listed as Annex B states: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia, Slovenia and the Ukraine.* For further reference, see: http://climate.org/climatelab/Joint_Implementation_(JI)#ref_1

states, and they can also be implemented unilaterally by public or private entities from within a developing country. While ETS is not applicable to SA, the carbon credits from CDM projects are sold to overseas firms and governments who use them in their own compliance with the KP targets. As such, the nature and extent of South African involvement in the CDM and ETS as a UN Flexible Mechanism, and in the voluntary market, bears further scrutiny (particularly the ethical element of this issue).

Anthropogenic climate change is caused by GHGs as a result of industrial output, and South Africa has one of the highest global emissions per capita. With the second phase of the KP currently in negotiations, and with the South African government planning on increasing its Clean Development Mechanism and emissions trading profile, it is crucial that we understand the impacts and effects of CDMs and ETS as market-based solutions for reducing GHG emissions in South Africa. The positive and negative effects of these projects must be understood before they are implemented on a large scale in South Africa.

4. Aim of the report

The aim of this report, as stated earlier in this chapter, is to assess the effectiveness of South Africa's compliance with the climate change regime. Thus to assess the effectiveness of SA's compliance, effectiveness must be defined. The report also aims to identify the determinants of regime effectiveness that are applicable to the South African context. The determinants of effectiveness must then be conceptualised and discussed as causal mechanisms which affect or influence the effectiveness in question.

There are two elements in Regime theory and analysis that the reader must keep in mind[12]: regimes are set up at the ***international*** level, between various governments, however, they are implemented at a ***national***, domestic level, within the countries that are members of that regime in question. In assessing regime effectiveness from a ***national*** level of analysis, South Africa's compliance with the global climate change regime will be examined. Key components in complying with the regime include the CDM projects and the Emissions Trading System. As such, this report will examine the nature and extent of South Africa's compliance with each of these UNFCCC Flexibility Mechanisms. In assessing the regime effectiveness, the report will examine, through process tracing, how institutional and

[12] With thanks to Dr Hornsby for this insight.

environmental effectiveness influence South Africa's compliance with the climate change regime.

5. Literature Review

The themes that emerged through the review of existing literature on the Kyoto market mechanisms and climate change are as follows:

- the effectiveness of market-based mechanisms through the international environmental regime;
- CDM projects as a market mechanism in climate change mitigation;
- Emissions trading and CDM projects;
- CDM projects and Sustainable development in South Africa;
- the tangible effects of CDM implementation in South Africa; and
- the financing of CDM projects.

These themes are guided by the research questions and (are applicable to) the overall research problem that this report will investigate.

Within the global climate change regime, market-based approaches, such as emissions-trading have been implemented as alternatives to 'command and control', state-centric legislation.[13] The rationale behind this is that a market-based solution is less restrictive and provides a greater incentive for developed-country governments and firms to reduce their GHG emissions and comply with the global climate change regime. This market-based mechanism would serve to limit the liability associated with a corporate firm or nation's release of carbon into the atmosphere, since it would provide them with an opportunity to mitigate their carbon emissions.[14] Moreover, the market potential of emissions credits and their pricing is determined by market forces, and is affected by the various associated risks. Transaction costs also affect the Internal Rate of Return (IRR) on the investment in a CDM project, and are often quite high owing to the need for multiple approval steps which have been established by the UNFCCC. Should non-compliance (a failure to reduce emissions to predefined levels by 2013) occur, there are enforcement mechanisms that have been designed to deter potential transgressors or 'free-riders', namely carbon taxes. Carbon taxes have been

[13] Sonneborn, 2004, and Stern, 2006.
[14] Sedjo and Marland, 2003.

proposed as alternatives to emissions-trading, but the recommendation is that tax rates are set higher than the emission-reduction credit price.[15]

However, mere participation in these mechanisms should not be interpreted as compliance with or effectiveness of the climate change regime. Oran Young questions the effectiveness of international regimes and identifies causal mechanisms which determine regime effectiveness.[16] He defines regime effectiveness as not only achieving success, but also as being efficient and equitable. Moreover, he goes on to state that effectiveness can also mean implementation and compliance, but that high levels of implementation and compliance do not guarantee that the problems which led to the formation of a specific regime will disappear.[17] Young also contends that focusing on behavioural change as an indicator of regime effectiveness enables one to consider the unintentional side effects of a regime as well as the intended results.[18] According to Zacher, Young asserts that there is 'need for governance in many spheres of international relations and that 'governance systems' are pervasive'.[19]

Furthermore, it is international organisations that perform varied roles in the development of rules and the promotion of compliance with them. Young contends that international regime formation involves multiple actors and is based on a striving for consensus. He also argues that states operate 'behind a veil of uncertainty', due to the fact that regimes often involve multiple, 'linked' issues and many participants and that they last over long periods of time. Another observation made by Young is that states tend to focus on key central issues and tend to overlook minor issues. Young also believes that transnational alliances and issue linkages can affect bargaining outcomes. Other factors cited in affecting bargaining outcomes include prevailing ideas, the level of knowledge regarding the effects of specific measures, internal conflicts within major actors, bargaining skills, and a state's jurisdictional control over resources.

While there are over 136 CDM projects that have been submitted to the DNA by mid-February 2010, there are only 17 approved and registered projects that are currently being

[15] UNEP, 2004.
[16] Young, 1999:21.
[17] Young, 1999:23.
[18] Young, 1999:23.
[19] Zacher, 1995: 308.

implemented in SA.[20] The majority of these projects are fuel-switch projects. The existing body of literature presents a pessimistic outlook regarding the current effects of existing Clean Development Mechanism projects in SA. Erion *et al* describe some of the existing Clean Development Mechanism projects as being financially and ecologically unsustainable, as "low-hanging fruits" (in that there is very little real reduction of GHGs yet a high yield of emissions credits), as having a negative impact on the health of nearby residents, and failing to take the concerns of the local populace into account when implementing the CDM projects.[21]

Baker defines the current Sustainable development as 'maintaining a positive process of social change'.[22] The seminal Brundtland approach to Sustainable development supports this current discourse when it advocates that there should be a positive attitude towards development due its contention that environmental protection and economic development can be mutually compatible goals.[23] Sustainable development is officially deemed a distinguishing feature of CDM projects, and this contributes to the acceptance and success of various projects. Even Stern concurs in his assertion that formally recognising Sustainable development policies in developing countries is desirable, as it 'fits in with a development-centred approach to climate change mitigation'.[24] Whilst Stern is an economist from the developed world, his arguments for the inclusion of CDMs in the mitigation of GHGs is compelling, especially when combined with Sustainable development. Although Sustainable development is a noble concept, its meaning has broadened considerably since its inception, which can be interpreted as a weakness when negotiating for an increase in the prioritisation of Sustainable development in CDM projects. [25] A broader meaning of Sustainable development provides scope for wider interpretation of the term which is a problem, as various countries have conceptualised their own definitions for the term.

Stowell correctly describes the CDM project cycle as complex, as it requires the following: extensive project-design and formulation (through a project design document, a PDD); host country approval (through the DNA, which is the Department of Mineral Affairs and Energy in SA); validation by a certified Operational Entity, and registration with the CDM executive

[20] Department of Minerals and Energy, Internet source: 2010.
[21] Erion et al, 2007: 67-95.
[22] Baker, 2006: 26.
[23] Baker, 2006: 25, and Vig, 2005: 6.
[24] Stern, 2006: 547-549, and Stern, 2006:548.
[25] Bruyninckx, 2005: 270.

board, project financing (through investors); monitoring (through the project participants); verification and certification (by another independent operational entity); and the issuance of certificates from the CDM Executive Board of the UNFCCC. [26&27] Emissions trading depend on the type of CDM verification that the Project received. Projects which achieve Gold Standard verification will have their emissions credits (classified as CERs – Certified Emissions Reductions) traded on the largest compliance market, the European Union Emissions Trading Scheme.[28] However, despite the attractiveness of having a project endorsed by the Gold Standard, it is not mandatory for CDM projects as these projects already undergo stringent monitoring, evaluation and verification by the CDM Executive Board.[29] Voluntary compliance markets are for GHG emission reduction projects that were not subjected to stringent regulations (and thus not part of the CDM regime).[30] While these regulations are crucial to ensure the validity of the project, the processes are lengthy and result in driving up the cost price of the emissions credit. The Chicago Climate Exchange is the largest voluntary compliance market, and it trades RECs (Renewable Energy Certificates) and VERs (Verified Emissions Reductions). The third type, voluntary carbon markets are used for a wider set of applications in comparison to compliance and voluntary compliance markets. Credits traded on this market require no compulsory validation. Whilst their credibility has been questioned, the trade-off is that they are generated faster, which is a lucrative incentive for any investor in CDM projects whose sole objective is a maximisation of monetary profit. Such a trade-off nullifies the ethos of Sustainable development, and yet an increasing majority of CDM projects are following this route.

Recently the World Bank has established itself at the forefront of 'carbon financing' and has embarked upon a 'green' strategy providing funds to Annex 1 governments who invest in CDM projects in developing economies. Upon cursory glance this seems fairly innocuous and perhaps even congruent with Sustainable development, however Wysham and Vig highlight crucial flaws in the carbon financing provided by the World Bank.[31] One of the most significant flaws includes providing funding for CDM projects that are not sustainable and that increase GHG emissions in the long-run.

[26] Stowell, 2005: 180
[27] UNEP, 2004, and Ashdown, 2008.
[28] Ashdown, 2008.
[29] Interview, Harmke Immink, Promethium Carbon, August 2010.
[30] Interview with Andrew Gilder, Imbewu Sustainability, August 2010.
[31] Wysham, 2007: 132-137 and Vig, 2005: 9).

6. Methodology

The scope of the report will be on the national level of analysis within International Relations. While regime analysis usually takes the entire global regime into account, and in past research it has focused on comparing various regimes with each other, this report examines the implementation and compliance of the global climate change regime ***within*** a country. The effects of the domestic implementation of an international regime policy will have a bearing on the future decisions that a country's policymakers and negotiators will make with regards to future commitments to the international regime and with regards to the escalation or de-escalation of the regime policy on the national policy agenda. This report therefore focuses on the effectiveness of two of the KP's Flexibility Mechanisms within the climate change regime at a *domestic*, *national* level of analysis.

As a limitation, the aim of this report is not to conduct a comparative technical analysis of CDM projects, but it will identify the current CDM projects in SA and provide a critical analysis of their strengths and weaknesses. The report will also focus on a qualitative analysis of the effectiveness of the CDM implementation and not a quantitative one, as a quantitative analysis would require the implementation of the regime to be considerably older than what it currently is. Moreover, a quantitative analysis would require a larger sample size to ensure the reliability and validity of the findings, yet there are less than 40 registered and operational projects, and less than a quarter of those projects have received their CER issuances, thus reducing the sample size that would be necessary and sufficient for a statistical analysis. By focusing on a qualitative study, this report will provide an in-depth descriptive analysis of South Africa's compliance with the climate change regime through the Flexible Mechanisms, and evaluate the overall effectiveness according to a synthesised conceptual framework based on the combined work of noted Regime Theory scholars.

It is a central assumption that there are certain factors that influence regime effectiveness. Documenting the domestic implementation process helps to identify and discuss the role of political, economic, legal approaches to effectiveness in influencing regime effectiveness. This report will follow the qualitative approach, using primary and secondary data from a range of sources. To conduct a thorough assessment of the causal mechanisms within this report, the method of process-tracing is employed. The CDM cases provided are descriptive narratives of the processes involved in these projects and thus provide a methodological 'fit' for this specific tool of inquiry. Of the 17 registered and operational projects in South Africa,

only four have received CER issuances from 13 June 2008 until 19 February 2010. Of these, three CDM projects were selected for this report: the Lawley Fuel Switch Project; the Sasol Nitrous Oxide Abatement Project; and the Omnia Fertilizer Limited Nitrous Oxide (N_2O) Reduction Project. A small *n* or small case number sample is the logical choice for this specific report, as South Africa has a relatively small CDM project portfolio in comparison to India, Brazil and China. Furthermore, these projects were selected as they were among the first CDM projects to be registered, implemented and issued with carbon credits which they have begun trading on global emissions markets.

Process-tracing, attempts to trace the links between possible causes and observed outcomes of a case study. The data to be obtained and analysed also fits in with the process-tracing research method, as George and Bennett note:

> ...the researcher examines histories, archival documents, interview transcripts, and other sources to see whether the causal process a theory hypothesizes or implies in a case is in fact evident in the sequence and values of the intervening variables in that case.[32]

This method differs to statistical analysis as it interrogates the sequential processes found in a particular case, instead of focusing on data correlations across cases.[33] Process-tracing is considered by George and Bennett to be a powerful tool for inference, and is used in theory-testing and in theory development.[34] Using process-tracing is advantageous for studying macro- and micro-level phenomena,[35] and it is useful where there is more than one independent variable, which is applicable to this report.

Process tracing is used as a methodological tool of inquiry. This report will attempt to draw causal inference from historical examples, archival material, document based research and interview transcripts in support of the hypotheses. Process tracing also combines historical narratives with analytical causal explanation attempts to test theory.[36] It is also useful in understanding issues in single or multiple cases. Process tracing implies tracing the operation of the causal mechanism(s) at work in a given case report. It is achieved by carefully mapping the process, and then exploring the extent to which it coincides with prior, theoretically derived expectations about the workings of the mechanism. The data for process

[32] George and Bennet, 2005: 6.
[33] George and Bennet, 2005: 13.
[34] George and Bennet, 2005: chap 10.
[35] George and Bennett, 2005: 214.
[36] George and Bennett, 2005: 211.

tracing is overwhelmingly qualitative in nature, and includes historical memoirs, interviews, press accounts and documents.[37]

Process tracing is considered to be useful in testing a theory because it 'generates numerous observations about a case' and 'these observations must be linked in particular ways to constitute an explanation of the case'.[38] Process tracing allows for alternative paths through which the outcome could have occurred to be identified and for the different causal variables to be accounted for across the cases.

> "in short, process tracing is a methodology well suited to testing theories in a world marked by multiple interaction effects, where it is difficult to explain outcomes in terms of two or three independent variables – precisely the world that more and more social scientists believe we confront".[39]

Therefore, we can interpret that process tracing is useful for the 'real world' because it follows and open process and takes many variables into account. This makes it all the more applicable for policymakers.

The principle limitation in process tracing lies in the circumstance/case where more than one causal mechanism is identified. It is difficult with multiple potential causal mechanisms to determine whether any of them have precedence. In this report, it will have to be assessed as to whether the institutional or the environmental approaches to effectiveness have precedence in determining the nature and extent of SA's compliance to the global climate change regime. This limitation can be overcome by identifying all the relevant theoretical variables and hypotheses, comparing various case studies of the same events (the CDM projects) that employ different theoretical perspectives and identifying the scope of conditions for explanation in cases can help clarify.[40] This methodological approach has been conducted in conjunction with case studies and document analysis as a means to test theoretical constructs.

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[37] Gheciu 2005a, b. Gheciu, Alexandra. 2005a. "Security Institutions as Agents of Socialization? NATO andPost-Cold War Central and Eastern Europe." International Organization 59 (Fall).
[38] Rasmussen, Mikkel Vedby. The Risk Society at War: Terror, Technology and Strategy in the Twenty-First Century. Cambridge, UK: Cambridge University Press, 2006.
[39] Hall, Peter A.. "Aligning Ontology and Methodology in Comparative Politics." Paper presented at the Annual Meeting of the American Political Science Association, Washington D.C., September 2000. Pp. 14-18.
[40] Njolstad, Olav. "Learning from History? Case Studies and the Limits to Theory-Building." In Arms Races: Technological and Political Dynamics, edited by Nils Petter Gleditsch and Olav Njolstad, pp. 240-244. Oslo, Newbury Park: International Peace Research Institute; Sage Publications, 1990.

Other tools of inquiry employed in this report include document analysis and research interviews. Document analysis offers insight into how process and structure influence outcomes. May argues that primary and secondary documents highlight the "political decisions which people make on a daily and longer term basis and may even construct a particular reading of past social or political events". For the purposes of this report, documents that will be used include literature on regime effectiveness, government policy papers, legislation, and presentations from conferences, documents detailing specific Clean Development Mechanism projects from the UNFCCC website, as well as journal articles and books assessing the local experience of Clean Development Mechanism implementation. Empirical data will be collected on CDMs in South Africa and emissions trading resulting from these projects. The types of carbon credits and emissions markets and exchanges will also be identified and differentiated from each other. The life cycle of a CDM project and the options available in trading certified and voluntary emissions credits will also be analysed. Data obtained from research interviews will be used to analyse the nature and extent of emissions trading, and its relevancy to South Africa. The aim is to provide insight into the factors that play a role in the effectiveness of the climate change regime in South Africa.

Interviews were also conducted in order to supplement knowledge gaps that the document analysis could not fill. Cited as one of the most common methods used in qualitative research, it provides an understanding of the current ideas and norms that guide an actor's behaviour. [41] Interviews also provide an opportunity to explore the answers to specific questions that cannot be addressed in quantitative surveys or literature reviews.[42] The interviews conducted for this research report were discussed in the research proposal. Consent was obtained from interviewees to cite their names. During instances where interviewees preferred not to be cited for their statements, they were cited anonymously. A consent form is attached as an annexure to this report.

Added to this, Young's theories, and Cioppa and Bruyninckx's conceptualisation of regime effectiveness, will be used in conceptualising a framework to evaluate the effects of the implementation of these projects in South Africa. Where applicable, structured and unstructured interviews with government officials, CDM experts and notable supporters and

[41] Darlington, Y., and D. Scott. Qualitative Research in Practice: Stories from the Field: Open University Press, 2002. p. 48.
[42] Brenner, M., J. Brown, and D. Canter. "Introduction." In The Research Interview: Uses and Approaches, edited by Brenner, M., J. Brown, and D. Canter. London: Academic Press, 1985. p3.

critics of CDMs and ETS, have been conducted, and will be used to supplement the data used in this report.

7. Chapter outline of the report

This section of this research report has introduced the reader to the research problem and the review of current literature on the issues surrounding the effectiveness of climate change. This report is composed of six chapters. Chapter two focuses on the theoretical overview and the conceptual framework to be employed in this research, namely regime theory and regime effectiveness. It will discuss a literature review of regime theory, regime effectiveness and provide a framework for analysing regime effectiveness of an international environmental agreement within the South African context.

Chapter three then proceeds with an examination of South Africa's compliance with the global climate change regime. Chapter three provides a snapshot or descriptive narrative of South Africa's emissions profile, and actions taken by the government, the private sector and civil society organisation.

The fourth chapter focuses on the policies of the CDM projects in South Africa and provides an overview of the global CDM landscape and SA's position. The chapter then describes the three local CDM projects' processes of implementation, their aims and their effects.

Chapter five examines the extent to which emissions trading has had (if any), an effect on SA. The chapter also discusses an overview of emissions trading within the climate change regime, and the extent of and further prospects for South African involvement in this Flexible Mechanism versus other policy instruments that the South African government have considered implementing in order to reduce domestic carbon emissions.

The final chapter of this report, chapter six, evaluates the current state of CDM implementation in South Africa, then summarises the findings and suggests ways whereby improvements can be made to the climate change regime. The report concludes with suggestions to increase South Africa's international cooperation through steps to improve regime effectiveness.

Chapter Two: Conceptual Framework

1. Introduction

This chapter introduces the reader to the literature on Regime Theory, regime analysis and regime effectiveness. Regime Theory is chosen for this case study because the subject of this thesis examines the climate change regime. Regime effectiveness is appropriately suited as the research paper evaluates the effectiveness of the climate change regime within South Africa. Throughout this section, examples will be provided to substantiate the relevancy and applicability of this theoretical field to this topic. Following this, an overview of the global climate change regime is provided. It then provides an overview of the study of regime effectiveness, and the various approaches to defining and assessing regime effectiveness. It conceptualises environmental regime effectiveness for the climate change regime, integrating the work already done in this field by scholars such as Young, Kütting and Cioppa and Bruyninckx. The two aspects of effectiveness that emerge as being important to this study are institutional effectiveness and environmental effectiveness. Institutional effectiveness is defined as regime compliance amongst the members of that regime, implementation of the regime, the extent to which the regime changes the behaviour of the actors involved, and the monitoring and evaluation and successes and constraints related to the regime. Environmental effectiveness is defined as whether the regime solves the problem that led to its creation in the first place, and the intended and unintended side-effects of the implementation of the regime. It is these two types of effectiveness that will be applied to the rest of this study.

2. Regime Analysis

2.1. Regimes

Regime theory posits that international institutions or regimes affect the behaviour of states or other international actors in areas requiring international cooperation. It explains the mechanisms and procedures by which states seek to regularise behaviour in a specific issue area in international relations. Stephen Krasner's seminal definition of regimes attests to this:

> Regimes are sets of implicit or explicit principles, norms, rules and decision-making procedures around which actors' expectations converge in a given issue area of international relations.[43]

[43] See Krasner, S. D. (ed.) (1983) International Regimes. Ithaca, N.Y.: Cornell University Press, and Krasner, 1982: 186-7

Principles are defined as the beliefs of fact, causation, and rectitude. Norms are the standards of behaviour defined in terms or rights and obligations. The rules of a regime are the specific prescriptions or proscriptions for action. Decision-making procedures are prevailing practices for making and implementing collective actions.

Similarly, Oran Young defines regimes as:

> "[s]ocial institutions that define practices, assign roles and guide the interaction of occupants of such roles within given issue areas".[44]

Likewise Stokke[45] contends that regimes comprise a substantive component of rights and rules and include an operational component that supports the establishment and implementation of such rights and rules. Similarly, Haggard and Simmons also concur:

> "Regimes are multilateral agreements among states which endeavour to regulate national actions in an issue-area, and outline the range of permissible actions of a state by delineating explicit injunctions."[46]

In the climate change regime, such decision-making procedures are the COP, CMP, SBI, SBSTA, the Bureau, the AWG and the CDM EB. The Conference of Parties (COP) is the supreme body of the UNFCCC and serves as the meeting for the parties of the UNFCCC.[47] The Conference of the Parties or CMP serving as the meeting of the Parties to the KP, serves as the meeting for the parties of the KP.[48] The CMP meets annually during the same period as the COP. Parties to the Convention that are not Parties to the Protocol are able to participate in the CMP as observers, but without the right to take decisions (e.g. the USA and China). Both the CMP and the COP have the same functions but they represent different parts of the regime. Examples of the rules would be the KP, the Marrakech Accords, and the CDM Rulebook. Examples of decision-making procedures would be the CDM Executive Board (CDM EB), the CDM Methodology Panel, the Ad-hoc Working Groups (AWG-KP), the Subsidiary Body for Scientific and Technological Advice (SBSTA), and the Subsidiary

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[44] Young, O.R., 1994, pp.3 "International Governance: Protecting the Environment in a Stateless Society". Ithaca: New York. Cornell University Press.
[45] Stokke, O.S., 2001. The Interplay of International Regimes: Putting Effectiveness Theory to Work. The Fridtjof Nansen Institute, FNI Report 14/2001. Accessed online at: http://www.fni.no/doc&pdf/01-14-oss.pdf
[46] Haggard and Simmons pp. 492
[47] UNFCCC, 2010. "Meetings". http://unfccc.int/meetings/items/2654.php
[48] UNFCCC, 2010. "Kyoto Protocol Bodies". http://unfccc.int/kyoto_protocol/kyoto_protocol_bodies/items/2772.php

Body for Implementation (SBI). The SBSTA and the SBI fall under the Convention, whereas the AWG-KP, the CDM EB and Meth Panel fall under the KP.

In his review of regimes as intervening variables, Krasner asserts that his definition concurs with those of his contemporaries. He states that Keohane and Nye define regimes as 'sets of governing arrangements that include networks of rules, norms and procedures that regularise behaviour and control its effects'.[49] Krasner also cites definitions by Haas and Bull as being congruent with his definition of regimes. For Haas, a regime encompasses a 'mutually coherent set of procedures, rules and norms'.[50] Hedley Bull, according to Krasner, refers to the importance of rules and institutions in a society where rules refer to 'general imperative principles which require or authorise prescribed classes of persons or groups to behave in prescribed ways'.[51] For Bull, such institutions help to secure adherence to rules by formulating, communicating, administering, enforcing, interpreting, legitimating and adapting them.

Another point put forth by Krasner is that 'regime-governed behaviour must not be based solely on short-term calculations of interest'.[52] As regimes encompass principles and norms, its utility function must embody a sense of obligation between members. This can be interpreted to mean that when member-states in a regime accept reciprocity, they will sacrifice their short-term interests with the expectation that the other actors will reciprocate in the future, even if other states are under no obligation to do so. Krasner further delineates between principles and norms, and between rules and procedures within the definition of regimes. Principles and norms provide the defining characteristics of the regime. Krasner explains that there may be many rules and decision-making procedures that are congruent with the same principles and norms. He also states that 'changes in rules and decision-making procedures are changes *within* regimes, provided that the principles and norms are unaltered'.[53] Similarly he states that "changes in principles and norms are changes of the regime itself".[54] Thus it is the changes in the principles and norms that equal a change in the regime, and not a change in rules and decision-making procedures. Fundamental political arguments are more concerned with norms and principles than with rules and procedures e.g.

[49] Krasner, 1982, p 186-7.
[50] Ibid.
[51] Ibid.
[52] Ibid.
[53] Ibid.
[54] Ibid.

the 'polluter pays principle' and the 'common but differentiated responsibility' can be seen as potential changes in the climate change regime. Another point stated by Krasner, which applies to the climate change regime, is this:

> "[s]peakers for the Third World...have argued that the norms of the international economic order should be redistribution and equity, not non-discrimination and efficiency."[55]

Krasner explains that the developing world sees the changes in the rules as changes of the regime because they identify these changes with basic changes in principle. Similarly, one could assert that the current tensions in the negotiations within the current climate change regime illustrates this point . This is because the current discord over the future of the climate change regime centres on the principles of "common but differentiated responsibility", as well as issues surrounding redistribution and equity of resources needed to adapt to and mitigate against climate change, as well as issues surrounding the terms and conditions for the second phase of the KP.

There is a fundamental difference between viewing changes in rules as indications of changes in the regime. The difference, Krasner states, depends on assessments of whether the principles and norms have changed as well. Another point stated by Krasner pertains to the distinction between a change in the regime, and the weakening of a regime:

> "If the principles, norms, rules, and decision-making procedures of a regime become less coherent, or if actual practice is increasingly inconsistent with principles, norms, rules, and procedures, then a regime has weakened."[56]

Thus, a change within a regime involves alterations of rules and decision-making procedures, but not of reforms or principles; and the weakening of a regime involves a lack of coherence among the components of the regime or inconsistency between the regime and related behaviour.[57]

3. Criticisms and limitations of Regime Theory and analysis

General criticisms of Regime Theory and analysis are that it is too vague, too value-laden, too static in its analysis and too state-centric in its approach. As a state-centric approach, regime analysis does not always take the role of non-state actors into account. According to

[55] Ibid.
[56] Ibid.
[57] Ibid.

Bulkeley, regime theory has a rigid inside/outside divide between what is seen as 'domestic' politics and 'international politics', which leaves little room for comprehension of the distinctiveness of environmental issues such as climate change:

> The regime approach for, example cannot countenance the fact that the global climate is simultaneously micro and mega in scale and consequently on how actions at local and transnational levels might impinge on inter-state climate co-operation.[58]

Olav Schram Stokke underlines this distinction. He notes that:

> [r]egime analysis tends to study governance through statist lens, focusing on the creation and operation of rules in international affairs...[59]

Granted, it is to be expected that there will be methodological difficulties in using regime theory as a tool of analysis for the climate change regime. However, when analysing a regime (such as the UNFCCC or the KP or the CDM), it is regime theory that IR scholars still turn to, despite the peculiarity of the nature of the specific regime in question.

Another criticism is that regime theory is 'single-issue focused'[60] and as such does not provide for attention to the interconnectedness of the environment. This has been noted by certain scholars as a weakness especially with respect to climate change which has been shown to have linkages with many other issue areas such as agriculture, tourism, housing, health, international trade, migration, forestry etc. Newell underscores this point when he argues that the aim to provide a generic, scientific account of international co-operation and 'generalisable hypothesis that applies across issue areas' renders the regime approach incapable of appreciating the 'particular political dynamics and problem structure' that characterise climate change. [61] As valid as this criticism may be, it widens the scope of analysis considerably, which cannot be done adequate justice to in a research report. There is, however, scope for the study of regime linkages and many scholars have begun studying the linkages between climate change and other issue-areas — however that is not the aim of this particular study.

[58] Bulkeley 2005
[59] Stokke,1997: 28) Op cit. Page 14.
[60] Vogler 2000.
[61] Newell, 2000:27.

Susan Strange also argued that the concept of regimes is 'pernicious' as it obscures the interests and power relationships that are the proximate and not just ultimate cause of behaviour in the international system:

> All those international arrangements, dignified by the label regime are only too easily upset when either the balance of bargaining power or the perception of national interests change among those who negotiate them.[62]

Another, perhaps more pertinent critique relates to using Regime Theory or global governance to analyse environmental degradation. Kütting[63] argues that for Regime Theorists, the focus lies in explaining cooperation between states or other actors competing for power and influence in a situation of anarchy, and that the focus of analysis leans heavily towards the institutions of a regime instead of examining 'environmental concerns vis-à-vis other political or economic concerns in the international or global system'. Kütting's criticism is not a denouncement or repudiation of regime analysis, but rather a call for the environmental degradation (the regime-problem) to obtain a 'wider focus of analysis in order to provide effective solutions for the problems in existence. This is a valid criticism of regime analysis, and in light of the various types of approaches to regime effectiveness identified by Oran Young in recent years, it reinforces the need to examine both the institutional and environmental effectiveness of the regime in question.

3.1. Ideological roots

Regime Theory emerged as a theory for explaining international institutions in the 1980s and had two dominant theories which underpinned it, Neoliberalism and Neorealism. Both theories acknowledge that the state operates in an anarchic society, that regimes are established on the basis of cooperation, and that regimes help to promote order inside the anarchic international system of states. The divergence occurs on more in-depth issues, such as the objectives of a regime for states and the conditions under which a regime tends to fail or succeed.[64]

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[62] Strange, 1982.
[63] Kütting, 2004. "Globalisation and the Environment: Moving beyond Neoliberal Institutionalism". International Journal of Peace Studies, Volume 9(1), Spring/Summer 2004. Pp. 31. http://www.gmu.edu/programs/icar/ijps/vol9_1/Kutting_91IJPS.pdf
[64] Reference the Regime Overview pdf document,

Various schools of thought exist to describe and explain regimes.[65] In their overview of regime theory, Okereke and Bulkeley state that regime theory originally developed in opposition to the realist approaches to the international system and international cooperation, where international politics is viewed as anarchic and cooperation viewed as zero-sum. Regime literature instead places an emphasis on 'the prevalence of inter-state co-operative institutions and the tendencies of states to regulate their practices in a fairly well co-coordinated manner in order to solve collective action problems or simply to maintain order and stability in the international system'.[66] In this way it can be understood that regime analysis owes much of its ideological underpinning to the neoliberal institutionalist theories of International Relations.[67]

Haggard and Simmons present various approaches to understanding the processes through which regimes are formed, the factors that determine their effectiveness and the extent to which they are relevant to the actors involved.[68&69] Realist, power-based theories argue that regimes are created by a *hegemon*, a state that commands considerable economic and military power, in order to further its own interests, or to promote a specific international management or to forestall conflict on a given issue-area.[70] Utility-based approaches emphasise *interest* as the main causal factor in the formation of regimes.[71] Functionalists believe that regimes are created when states realise that their individual short-term actions regarding a specific issue

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[65] Okereke, C. And H. Bulkeley, October 2007. Conceptualizing climate change governance beyond the international regime: a review of four theoretical approaches. Tyndall Centre for Climate Change Research , Working Paper 112. Pp 7.

[66] Keohane 1984; Keohane and Nye 1977; Krasner ed. 1983; Young 1980, 1989; Vogler 2000), in Okereke, C. And H. Bulkeley, October 2007. Conceptualizing climate change governance beyond the international regime: a review of four theoretical approaches. Tyndall Centre for Climate Change Research , p. 5

[67] Kütting , G., 2000, 15 and 17. Environment, Society and International Relations: towards More Effective International Environmental Agreements. London: Routlege.

[68] Haggard, S. and Simmons, B. A. (1987) 'Theories of International Regimes', International Organization, 41 (3): 491-597.

[69] *Although the terminology "regime theory" is widely used in discussions on international co-operation, the term "regime theory" is strictly speaking a misnomer. In real terms, there is nothing like regime theory but rather different 'theories about regimes' (Vogler 2000: 23). The reason as noted is that despite the fact that a consensus definition exists there has always been huge disagreements over: the meaning of the key phrases; the manner in which regimes arise and are sustained; whether regimes matter at all; and even the usefulness of the concept as an analytical tool in the study of world politics (see Keohane and Nye 1977; Young 1982; Krasner ed. 1983; Haggard and Simons 1987; Kratochwil 1989; Keohane 1989; Hasenclever et al. 1997; Vogler 2000). In recognition of the significance of these controversies some scholars now tend to talk, not of regime theory, but of 'a plethora of contending theories to explain regime creation maintenance and transformation' (Haggard and Simons 1987: 429) and of 'various schools of thought within the study of international regimes' (Hasenclever et al., 1996:178).*

[70] (Gilpin 1987; Grieco 1988a; 1988b; 1993; Snidal 1985; Waltz 1979), in Okereke, C. And H. Bulkeley, October 2007. P. 6.

[71] Keohane 1984; and Young 1989; 1994; 1998.

will not support their interests in the long term. Regimes are seen through this approach as the *medium* used by states to reduce vulnerability, opportunism and uncertainty while stabilising the expectations needed to promote collective action.[72] The constructivist approach places an emphasis on *knowledge* as the causal factor in regime formation, meaning that a regime is formed once there is sufficient common knowledge or understanding of the problem and the goals to be achieved to solve the problem.[73] Despite these various approaches to understanding the formation and ideological origin of regimes, it is the effectiveness of regimes that this research focuses on.

3.2. Regime Effectiveness

The increasing trend towards regional and global cooperation and global governance of transnational issues has resulted in over 200 multilateral environmental agreements and an excess of institutional structures to monitor, enforce and strengthen these agreements. Frantzi *et al* argue that academic focus has been on regime formation and strengthening.[74] As a result, regime implementation, they also argue, has been relatively neglected in comparison. This is attributed partly to the early stages of development or implementation of many of the new treaties agreed on in the 1970s and 1980s. Despite the mid-1990s wave of studies examining the implementation of regimes, which has undoubtedly contributed to plugging knowledge gaps in the literature on regime effectiveness,[75] as a sub-field of regime theory, regime effectiveness is a complex, multifaceted concept that cannot be neatly defined. As such, the literature on regime effectiveness has been characterised by a strong methodological debate over the definition and measurement of regime effectiveness.[76]

3.2.1. Conceptualising regime effectiveness

A core problem in defining regime effectiveness is to ask whether *'regimes matter'*. This involves an assessment of the relative improvement in the situation directly resulting from the existence of the regime. To answer this question properly would require knowledge of the counterfactual – namely, "*what would have happened if there had been no regime in existence?"*[77] Young also defines regime effectiveness as not only achieving success, but also

[72] Okereke, C. And H. Bulkeley, 2007,P. 6
[73] Haas E. 1975; Haas 1989; 1992; Kratochwil and Ruggie 1986; Litfin 1994; Onuf 1989
[74] Frantzi et al, 2009, 178.
[75] Kütting, 2000a; Miles et al., 2002; Victor et al., 1998; Young, 1999 inter alia), in Frantzi et al.
[76] Helm and Sprinz, 2000; Hovi et al., 2003; Underdal and Young, 2004; Young, 2001, 2003., in Frantzi et al.
[77] Wettestad, 2006: 301, and Young and Levy, 1999: 18.

as being efficient and equitable.[78] Furthermore, he goes on to state that effectiveness can also be defined through implementation and compliance of the regime, but that high levels of implementation and compliance do not guarantee that the problems which led to the formation of a specific regime will disappear.[79] O'Neill notes two dimensions of regime effectiveness that permeate the literature on regime effectiveness: compliance and problem-solving. Compliance is the extent to which the behaviour of the state conforms to the conditions set out in a treaty.[80] Compliance is akin to the political and legal approaches to effectiveness, discussed later on in this chapter. Problem-solving effectiveness considers whether regime members solved the problem that led to the formation of the regime in the first place.

Determinants of effectiveness

O'Neill[81] identifies three areas or factors critical in determining regime impacts and regime effectiveness:

- How environmental treaties provide incentives that both alter the will and capacity on the part of states to comply with treaty regimes;
- The extent to which regimes incorporate mechanisms for assessment and learning over time (which is important for problem-solving effectiveness);
- Deeper set of impacts: how the process of global environmental governance may actually change the preferences of participating actors.

Incentives, according to O'Neill, alter the will and capacity to comply with a regime, which in turn influences effectiveness.[82] A state's compliance varies over time. If a state perceives its compliance with the terms of a treaty regime as both in its direct interests and within its ability to meet, then compliance is non-problematic. Non-compliance results from the following things, according to:

- a lack of political will or intent to comply;
- a lack of capacity; and
- a lack of the ability to comply.

[78] O'Neill, 2009: 108-109.
[79] Young, 1999:23
[80] O'Neill, 2009: 106.
[81] O'Neill, 2009: 115-132.
[82] O'Neill, 2009: 109.

While states may want to comply with an agreement, they may find themselves unable to, due to a lack of resources or little control over the actors whose behaviour is the ultimate target of the regime. Another reason is that the state may lack the political will to comply, and may have signed the treaty for other reasons, for example to forestall criticism from domestic or international constituencies, or to shape the evolution of a regime. However, both the will and capacity of a state can change — governments can change power, and economic conditions can change. O'Neill states that studies of regime compliance examine how measures can alter a state's will and capacity with treaty obligations over time, and that the following factors influence this: treaty obligations; sanctions; positive incentives; and transparency-enhancing practices.

The second factor identified by O'Neill, which pertains to assessment and learning, is also critical. Regime agency is important for problem-solving effectiveness. The internal politics of international environmental regimes are relatively understudied, especially with regards to improving performance and effectiveness over time. O'Neill cites two dimensions in regime activity, and their implications for the effectiveness of international environmental regimes: 1) regime linkage — systemic effects and effectiveness; and 2) assessment and learning in regimes.

1) Regime linkage

Regime linkage is defined as 'politically significant connections between institutional arrangements.[83] There has been a growing density and maturity of international institutions, and this reflects the realisation that these linkages are being recognised and acted upon in international policy circles. There exists the possibility that exploiting linkages could lead to synergistic gains across regimes, and in others, ignoring potential conflicts could significantly hinder regime operation. O'Neill defines *issue* linkage as a negotiating tactic to co-opt states to states to sign up to one agreement in return for favours granted in another issue area. [84] *Regime* linkage however, focuses on how regimes overlap and interact with each other once the regime has been established. There are many ways that environmental problems can affect each other. Climate change will affect biodiversity, desertification, and how these respective regimes are framed in the future will either generate synergistic or conflictual linkages. O'Neill also surmises that while measures in the climate change regime call for the

[83] O'Neill, 2009: 124.
[84] O'Neill, 2009: 124.

creation of carbon sinks under reforestation activities, the plantations that are acceptable under the KP would damage the ecosystems needed for biodiversity. [85] Political linkage, defined as "the content, design and interest of one regime, or interests and capabilities of regime actors, affect the formation or operation of another", illustrates a growing overlap in how many environmental regimes approach their respective problems. An example cited by O'Neill, states that five international environmental regimes (ozone, climate, biodiversity, forests, and oceans) are linked together through the Global Environment Facility, which in turn is linked to three other agencies: the World Bank, the UNEP, and UNDP. [86] Ignoring potential conflict between regimes can undermine the effectiveness of either of the regimes involved, and could provide opportunities for opponents of these regimes to exploit them. A second implication is that the rising density of international institutions could hinder regime development processes. Raustiala and Victor's assertion that 'extant arrangements in the various elemental regimes will constrain and channel the process of creating new rules' and O'Neill's point that what occurs at the 'joints between regimes' has important implications for the level and type of change that can occur within a regime both emphasise this: to ignore regime linkage or conflict omits an important dimension of global environmental governance that is already being practices and is already a critical factor in improving regime effectiveness.[87]

2) Assessment and learning in international environmental regimes

Most treaty regimes provide mechanisms to assess their progress, incorporate new information, learn from experience, and to adjust policies, practices, and goals accordingly. This is a critical component of a regime if it is to be effective over the long term. Intra and extra-regime learning takes place through a treaty in the following ways: through negotiation processes that take place over many years, and through learning by communities or actors that can lead to the spread of knowledge, ideas, and information within states, and across different constituencies. Many regimes contain active systems for implementation review (SIR), and these operate through formal and informal channels. These SIRs include basic decision-making processes of the regime, the protocols, amendments, the conferences of parties, the rules for submitting reports and conducting on-site inspections, the work of scientific and technical bodies associated with the regime, as well as work carried out by

[85] O'Neill, 2009: 125
[86] O'Neill, 2009: 125
[87] O'Neill, 2009: 125.

NGOs. According to O'Neill,[88] SIRs have greatly enhanced the adaptability and capacity of regimes. At a global level the regular meeting of the CDM Executive Board to update the CDM rulebook can be seen as an example of an SIR.

The third factor looks at how the existence of such regimes as the climate change regime can have deeper impacts on its participants. Although studies on the constructivist notions of effectiveness are still in their infancy,[89] there are important regime effects that can be identified. A first perspective, examines how domestic politics and sub-state actors interact with international regimes. Domestic environmental groups often find themselves empowered by international regimes, and evoke the norms and obligations of the treaty to put pressure on their governments in order to meet obligations. An example of this would be the South African branch of the WWF calling on South Africa to cease construction of the Medupi coal-fired power plant. A second perspective focuses on the changing roles of non-state actors within international environmental treaty regimes. Regarding regime implementation, NGOs have been increasingly incorporated into monitoring compliance and receiving and channelling environmental aid. While this relieves some of the burden that is placed on a state, it also exposes them to more 'third party' monitoring. Another approach cited by O'Neill examines how participation in a regime leads to socialisation of individual states. [90] States and their leaders develop deeper links within international institutions and regimes, by internalising international norms. Studying these constructivist approaches to effectiveness can be complex as it entails identifying the content and origin of international norms, their paths of diffusion through the international system, and their internalisation in national political systems.

3.2.2. Types of approaches to effectiveness

Effectiveness is a matter of the contributions that institutions make to solve the problems that motivate actors to invest the time and energy needed to create them. Young contends that some of the meanings of effectiveness require normative, scientific and historical judgements. Oran Young has described a typology of five approaches to understanding effectiveness as follows:

[88] 2009: 127
[89] O'Neill, 2009: 130
[90] 2009: 131

A problem solving approach

This is defined as the degree to which a regime eliminates or alleviates the problem that led to its creation.[91] But this meaning fails in practicality as the observed changes within a regime that it oversees are not observed properly. Furthermore the problems that lead to the regime being formed can instead motivate actors to pursue solutions through a range of initiatives which can include those which do not involve the regime directly. As such, what is perceived to be an effective regime, measured according to this meaning, can actually be what Young describes as 'an irrelevant sideshow'. Examples of this can be 'low-hanging fruits' within CDM implementation, as there have been noted examples of CDM projects and CER issuances becoming a financial incentive to generate GHGs that are lucrative to reduce via this Flexible Mechanism. This results not in an incentive to reduce emissions, but in 'gaming the system' - a perverse incentive to continue generating the emissions that are financially 'viable' through the regime.

The legal approach

The degree to which contractual obligations are met, how rules are complied with, policies changed, and programmes initiated.[92] The legal approach provides for a straightforward measurement because effectiveness is defined in terms of obligations written into treaty language, in the Kyoto Protocol, the Marrakech Accords and the CDM Rulebook. However, a regime can be effective in the legal sense without actually contributing to resolving the problem that led to its creation. In other words, the problem-solving and legal approaches to effectiveness are mutually exclusive. Young states that while in some cases regimes generate positive effects beyond the contractual terms (unintended positive side-effects) in other cases they can generate perverse substantive outcomes.[93]

The economic approach

Economic effectiveness would incorporate the legal approach and also add an efficiency criterion to it. An effective regime would create the right outcome but would also do so at the 'least cost'.[94] However, this approach has limitations as measuring economic efficiency requires all things to be equal, and in the real world, empirical observations show that

[91] Young and Levy, 1999: 4.
[92] Young and Levy, 1999: 4.
[93] Young and Levy, 1999: 4.
[94] Young and Levy, 1999: 4-5.

calculations based on theoretical models cannot explain determinants of efficiency that are essential in reality.

The normative approach

Normative effectiveness is equated with terms such as fairness, justice, stewardship, and participation. Equating effectiveness with the achievement of these values presents measurement problems, as these terms are subjective, have various definitions and are not easily standardised. Young advises that it is more appropriate to treat the normative approach to effectiveness as a matter of general evaluation rather than part of an effort to achieve a causal understanding of effectiveness.[95]

The political approach

Politically effective regimes cause changes in the behaviour of actors, in the interests of actors, or in the policies and performance of institutions in ways that contribute to positive management of the targeted problem.[96] This approach looks at how behavioural changes are responsible for the improved environment. Young states that such a definition brings to mind '*broad'* problem-oriented goals rather than *specific* action-oriented goals. The objectives of such goals are 'unambiguous': the objective of the 1992 UNFCCC and the 1997 KP is to stabilise GHGs at a level that will 'prevent dangerous anthropogenic interference with the climate system'. Effectiveness in a political sense, according to Young, means 'spurring action toward achieving these objectives'. Specific regulatory rules, protocols, and operational targets are means to these ends (and not just the ends in themselves). An outcome of this definition is that compliance is not granted a privileged conceptual position. Activities that move the system in the right direction, even if they fall short of full compliance, are signs of effectiveness. In this light, the regular schedule and attendance of COP and CMP meetings indicate political effectiveness, despite the (hitherto) failure to conclusively draft the terms for the second phase of the KP. Similarly, institutions that goad members to undertake measures that go beyond what is required for compliance are considered more effective than those that only elicit the minimum behavioural change required.

[95] Young and Levy, 1999: 5.
[96] Young and Levy, 1999: 6.

As international regimes are political institutions, Young regards some variant of the political definition as a necessary component in studying institutional effectiveness.[97] Regimes that are effective in the political sense will also be effective in the problem-solving sense, because they drive the behavioural-change necessary to solve the regime-problem. Young also contends that political effectiveness has no connection to either the legal or economic sense of effectiveness.[98] This argument holds true as there are examples of countries (namely the USA and China) that are not party to the KP and yet have begun domestic/regional implementation of initiatives to reduce their emissions levels — this shows that political effectiveness is independent of legal and economic effectiveness. Moreover, a politically effective regime could also be highly economically inefficient or produce low levels of legal compliance.

4. Review of literature on Regime Effectiveness

4.1. Approaches to evaluating Regime Effectiveness

The causal relationship between a regime and environmental performance is extended, complex and ultimately, highly uncertain as there almost always intervening variables which must be controlled in the analysis.[99] According to Young, the empirical difficulties of causally connecting regime performance to environmental improvement have led to an emphasis on such variables as '*goal attainment, implementation and compliance, behavioural change, social learning, and the initiation of social practices.*[100]' Young argues that although it makes sense to classify an international regime as effective when it solves or alleviates the problem that motivated its creation, it is extremely difficult to empirically/quantitatively demonstrate such effectiveness.[101] This is especially true of the climate change regime, because the first commitment period of the KP only ends in 2012, and a quantitative measurement of a reduction (or increase) in emissions levels can only be conducted then. A better way to state this is to explain that it is nearly impossible to assess the problem solving effectiveness of the regime, as the regime is fairly young and still in operation.

Taking the complexity of establishing a causal chain into consideration, the majority of case studies have analysed regime effectiveness in terms of institutional performance, rather than

[97] Young and Levy, 1999: 6.
[98] Young and Levy, 1999: 6.
[99] Young, 1999
[100] Young, 1997:13
[101] Young, 1997:13; Young and Osherenko, 1993: 243

environmental improvement.[102] On the other hand, Haas *et al*focus on the political effects/impacts of environmental institutions rather than on their environmental impact. [103] Young has in recent years placed a greater emphasis on the behavioural dimension of regime effectiveness, identifying six causal mechanisms by which regimes can influence actors and contexts.[104] Notwithstanding the approaches that recognise environmental improvement as the ultimate aim of an environmental regime, institutional performance is still highly regarded as the most viable indicator of regime effectiveness.[105]

Assessing regime effectiveness is a complex process. In their study of regime effectiveness, Cioppa and Bruyninckx note that the majority of authors who have written extensively on regime effectiveness have emphasised the need to examine the processes and procedures by which regime mechanisms lead to behavioural changes among the actors. [106] Young contends that focusing on '**behaviour'** as an indicator of regime effectiveness enables one to consider the unintentional consequences or side effects of a regime as well as the intended consequences or results.[107] In assessing the consequences of regimes, both the links between the rules and decision-making procedures of regimes as well as the behaviour of the parties subject to the regimes' arrangements should be evaluated. Young offers six 'variables of effectiveness' for consideration: problem-solving (whether the regime solves the problem that motivated its formation); goal attainment (does the regime attain its targets/goals); behavioural (do the actors alter their behaviour as a direct consequence of the regime); process (the degree to which the provisions of an institution are implemented at the domestic level of by member-states); constitutive (the expenditure of time, energy and resources on the part of the member-states); and evaluative (does the regime produce results that are efficient, equitable, sustainable, or robust). [108] However, his treatment of effectiveness as problem solving is somewhat vague, as it is completely dependent on how the actors involved choose to frame the problem that is to be solved. Consequently, 'judgments regarding the effectiveness of a regime may vary depending upon the way in which those making such judgments choose to frame the problem'.[109] Such a statement is disconcerting, however,

[102] Cioppa and Bruyninckx, 2000
[103] Young, 2009: 131
[104] Young, 1999, 2001, and 2003
[105] Underdal, 1992; Wettestad and Andresen, 1991
[106] Cioppa and Bruyninckx, 2000, Internet source
[107] Young, 1999:23
[108] Young, 1996
[109] Young 1996:9

because it offers the temptation to claim that a regime has succeeded or failed based on little more than a subjective interpretation of what problem the regime was supposed to address.

In their study of regime effectiveness, Cioppa and Bruyninckx explain that attention is focused on either the variables which affect the internal operation of the regime (endogenous variables), or the external influences that affect the operation of the regime (exogenous variables), or a combination of the two. Kütting diverges from using institutional performance as an approach to measuring regime effectiveness, by trying to measure the environmental impact of the regime more directly, albeit through qualitative analysis. [110] Kütting and Cioppa and Bruyninckx all regard the distinction between institutional and environmental effectiveness as necessary, with Kütting emphasising that a competent definition incorporates both these dimensions, as they are 'two sides of the same coin'.[111] It is critical that either types or dimensions of effectiveness are treated as distinct from each other, as they are two sides of the same issue.

4.2. Techniques

Many studies on regime effectiveness have used a qualitative approach, ranging from normative, predictive, explanatory and descriptive methods.[112] Equally there have been several attempts to develop a rigorous quantitative method of measuring effectiveness.[113] For example, Helm and Sprinz use game theory to establish empirical parameters of regime performance, and then they relate the actual performance to those parameters to produce a coefficient between 0 and 1. [114] Mitchell applies regression analysis to yearly country level performance. [115 & 116] The objective in quantitative analysis of regime effectiveness is to develop a more systematic and stronger analysis of patterns across cases. However in circumstances where necessary and sufficient quantitative/statistical data is lacking, in situations where the implementation of the regime in question is relatively 'young' and where there may be a 'time lag' between implementation and results achieved, and in an analysis of the domestic-level implementation of the climate change regime, a quantitative, statistical, time-series analysis of the regime effectiveness is not feasible or even possible. More

[110] Kütting , 2000a, b
[111] Kütting , 2000a: 33
[112] Mitchell and Bernauer, 2002
[113] Helm and Sprinz, 2000; Miles et al., 2002; Mitchell, 2004
[114] (2000)
[115] (2004)
[116] See Wettestad, 2006: 307

explicitly there is insufficient data relevant to South Africa's compliance with the climate change regime to warrant a quantitative analysis of regime effectiveness. However, there is sufficient data to merit a qualitative analysis, as South Africa has moved towards adopting a number of policies aimed at mitigating climate change.

Much of Young's work has provided a number of indicators to measure and assess the effectiveness of a regime. However Cioppa and Bruyninckx argue that it focuses more on institutional performance rather than environmental impact.[117] In their adaptation of Young's work, they have derived the following broad categories of prerequisites for regime effectiveness: *policy implementation; compliance; monitoring;* and *verification*. These categories are not unique in any sense, but they are relatively parsimonious and they serve to simplify regime analysis. It can be construed that while there are differing interpretations of regime effectiveness (as Cioppa and Bruyninckx highlight the distinction between institutional and environmental effectiveness), it is imperative that the climate change regime's ability to deliver environmental protection is what must be examined.[118] Similarly one can concur with Kütting's argument that institutional and environmental effectiveness are 'two sides of the same coin'. As such, this study intends to investigate and evaluate the environmental effectiveness of the climate change regime through the compliance mechanisms that it has in place, and also the institutional effectiveness of the implementation of the climate change regime within South Africa. For this study a qualitative assessment based on a small number of relevant cases is applicable.

4.3. An Outline For Evaluating The Nature And Extent Of Climate Change Regime Effectiveness For South Africa

A suitable outline or framework would assess the overall case-study, based on a set of questions derived from the chosen elements or indicators. These indicators of effectiveness would be based on work by Oran Young, as well as by Kütting, Cioppa and Bruyninckx. While this research will only focus on the South African context, the questions that are asked can be applied to other Non-Annex 1 or developing country case studies.

4.3.1. Indicators of Institutional Effectiveness

[117] Cioppa and Bruyninckx 2000, Internet source
[118] Cioppa and Bruyninckx, 2000, Internet source

Oran Young's legal, economic and political approaches to effectiveness (as discussed earlier in this chapter) fall under the umbrella of institutional effectiveness. Institutional effectiveness of a regime pertains to regime compliance amongst the members of that regime. Key elements of institutional effectiveness would focus on the implementation, the extent to which the regime changes the behaviour of the actors involved, and the monitoring and evaluation and successes and constraints related to the regime. Governmental concern, political and administrative capacity, and the contractual environment of the member country are all aspects which influence the compliance to the regime. Specific/explicit elements include the following: the CDM registration process; constraints and successes surrounding the CDM projects; technology transfer; the roles of the stakeholders involved; cost-effectiveness; CER issuances and trading. The successes and constraints experienced in the implementation of CDM projects in South Africa are also institutional indicators. The CDM project life cycle and the roles played by the DNA and the DOE, as well as the extent of the cost effectiveness also fall under institutional effectiveness.

4.3.2. Indicators of Environmental Effectiveness

Young's definitions of the problem-solving and normative approaches to effectiveness (discussed earlier in this chapter), fall within the scope of environmental effectiveness. Problem-solving effectiveness asks whether the regime solves the problem that led to its creation in the first place, and environmental effectiveness can be summarised as this: does the regime solve the problem that it was created to solve? Specific/explicit elements include the following: the current profile of the CDM projects in South Africa's CDM portfolio, the concept of Sustainable development as defined by the South African DNA and how it is incorporated into the CDM project criteria; the concept of additionality as defined by the UNFCCC and how it is complied with locally; the unintentional effects of the CDM project implementation; the amount of GHG reductions and CERs issued, etc. Unintended side effects related to the environment and the health of local communities in the vicinity of CDM projects are also environmental indicators.

5. Conclusion

The aim of this chapter provided the reader with a comprehensive understanding of regime analysis and regime effectiveness. While this chapter has described and explained regime effectiveness within the context of environmental regimes, it can be noted that institutional effectiveness is more highly regarded and more approachable in analysis than environmental

effectiveness. Nevertheless, both dimensions of effectiveness are critical and one dimension should not be preferred at the expense of another. Although sustainability and additionality are listed as key elements under environmental effectiveness, it must be noted by the reader that these concepts are also normative.

Chapter Three: South Africa's Compliance with the Global Climate Change Regime

1. Introduction

This chapter will examine South Africa's institutional compliance with the climate change regime. The SA government has embarked on various policies, ranging from engaging as an active player in the climate change negotiations to encouraging the private sector to comply with policies that are currently being implemented. Compliance has also occurred through the National Business Initiative (NBI), the Carbon Disclosure Project (CDP), and notable examples of investments in the CDM projects. Whilst the first two are examples of issue-awareness, the third (the CDM) is an example of an attempt to solve the problem that led to the formation of the regime. As such it is investigated and analysed in the following chapter.

The outline of this chapter is as follows: a snapshot of the global climate change regime, the UNFCCC, the KP, followed by a description of the Flexible Mechanisms and the evolution of the CDM into the policy instrument that it is today. The chapter then provides an overview of South Africa's emissions profile, then a discussion of South Africa's participation in the climate change regime, detailing actions taken by the government, the private sector and civil society.

2. The Climate Change Regime

The KP, the United Nations Framework Convention on Climate Change (UNFCCC), the World Bank (WB), the European Union, and the Kyoto Flexible Mechanisms (CDM projects and Emissions Trading) are key components of the current climate change regime. Cooperation is paramount when resolving or negotiating aspects of a regime, especially regarding the second phase of the KP, which experts hope will be ratified by December 2011 and implemented by early 2012 - 2016. In his assessment of international regimes, Zacher[119] suggests that 'global governance has lost out to the increasing influence of market forces in certain issue areas'. He also mentions the growing trend of an increase in the involvement of non-state actors in regime formation and negotiations. If this is proved true regarding the international climate change regime, then it increases the importance of understanding all the effects of relying on a market mechanism to solve a global 'tragedy of the commons'.

2.1. The Kyoto Protocol

[119] Zacher, 1998:12

The KP was adopted at the third session of the COP3 to the UNFCCC held in Kyoto, Japan, in December 1997. It defines quantified GHG emissions reduction targets for Annex I Parties. GHGs are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), Hydro fluorocarbons (HFCs), Per fluorocarbons (PFCs), and sulphur hexafluoride (SF_6). Annex 1 Parties are the countries listed in Annex I of the UNFCCC. They are developed countries as well as economies in transition, namely Russia and Eastern European countries. Annex I Parties have individual GHG emission caps or ceilings for the five year period of 2008-2012. This five year period is also known as the first commitment period of the KP.[120]

The Protocol introduces three market mechanisms, known as the Kyoto Flexible Mechanisms. Annex I Parties are theoretically able to achieve their emission reduction targets cost-effectively, by using these mechanisms: the Joint Implementation (Article 6 of the KP); the Clean Development Mechanism (Article 12 of the KP); and International Emissions Trading (Article 17 of the KP). According to a decision taken by the CMP in 2005, private companies are also entitled to use the Kyoto Flexible Mechanisms, provided the Parties meet eligibility requirements for using them.[121] The Protocol entered into force on 16 February 2005. As of the 16 October 2008, 182 countries and one regional economic integration organisation (the EEC) have deposited instruments of ratifications, accessions, approvals or acceptances.

As the current international climate change regime, the KP will remain in force until 2012. The second phase of the protocol is being negotiated, with talks on a post-Kyoto regime for 2012–2016 having begun in Bali in December 2007, and continued throughout COP talks in Bangkok, Bonn, Accra and Poznan in 2008, Copenhagen in 2009, and Cancun in 2010. This will be followed by the COP negotiations in Durban. Either at COP 18 or COP 19, the terms of the second phase of the Kyoto Protocol are expected to be finalised. The next phase of the treaty, which will last from 2013-2016, is expected to entail penalties for non-compliant states.

2.2. The Kyoto Flexible Mechanisms

2.2.1. The Clean Development Mechanism

[120] UNFCCC, November 2009.
[121] See the following decisions: CMP/2005/8/Ad2, p7 para29, CMP/2005/8/Ad1, p13 para33, and CMP/2005/8/Ad2, p19 para5.

The CDM is a mechanism whereby Annex I Parties assist non-Annex I Parties to implement project activities to reduce GHG emissions. Carbon credits are issued based on emission reductions achieved by the project activities. A Party or country where a CDM project is implemented is the Host Party. The credit from the CDM is called a certified emission reduction (CER).[122] Additionality is a critical component of CDM activity. Additionality means that the reductions in emissions shall be 'additional to any that would occur in the absence of the certified project activity'.[123] Annex I Parties can use CERs to contribute to compliance of their quantified GHG emissions reduction targets of the KP. This must be supplementary to their domestic mitigation policies.[124]

2.2.2. International Emissions Trading (IET)

International Emissions Trading entails trading KP units including part of assigned amounts, CERs, ERUs etc between Annex I Parties. Annex I Parties can trade the following types of KP units:

- Assigned amount unit (AAU).
- Total amount of AAUs of an Annex I Party is calculated from its base year emissions and emission reduction target.[125]
- Removal unit (RMU).[126]
- Total amount of RMU of an Annex I Party is calculated from the net removal of GHGs by afforestation and reforestation (A/R) activities[127] and additional activities related to GHG removals by sinks.[128]
- Emission reduction unit (ERU) from JI.
- Certified emission reductions (CER) from the CDM.
- Temporary CER (tCER)and long-term CER (lCER).
- tCER and lCER are issued from afforestation and reforestation (A/R) CDM project activities.[129]

By the end of the first commitment period (December 2012), all Annex 1 states are expected to have complied fully with the terms and conditions of the KP. Theoretically, if an Annex I

[122] See CMP/2005/8/Ad1, p7 para1(b). UNFCCC, November 2009, *op. cit.*
[123] See KP Art.12 para5(c).
[124] See KP Art.12 para3(b).
[125] See CMP/2005/8/Ad1, p7 para1(c).
[126] See CMP/2005/8/Ad1, p7 para1(d).
[127] See CMP/2005/8/Ad3, p5 para1(a)-(d).
[128] See CMP/2005/8/Ad3, p5 para1(e)-(h).
[129] See CMP/2005/8/Ad1, p62 para1(g)-(h).

country has complied, their total emissions cap level should equal the sum of their AAUs, RMUs, acquired credits from JI and CDM (a total of ERUs, CERs, tCERs, and ICERs), and the KP units acquired and transferred by IET. If an emission cap of an Annex I Party is more than its GHG emissions during the 1st commitment period, the surplus can be carried over to the subsequent commitment period.[130] The end of additional period is the 100th day after the date set by the COP/MOP.[131]

Conversely, if the GHG emissions during the 1st commitment period of an Annex I Party are more than its emission cap, the Annex I Party will be deemed to be in non-compliance to the KP. Any Party who is in non-compliance shall be applied the following consequences:[132]

- Deduction from the Party's assigned amount for the 2nd commitment period of a number of tonnes equal to 1,3 times the amount in tonnes of excess emissions;
- Development of a compliance action plan; and
- Suspension of the eligibility to make transfers under Article 17 of the Protocol until the Party is reinstated.

As a non-Annex 1 Party, South Africa is exempt from these conditions, and can comply with the institutional conditions of the KP through the conditions set out for non-Annex 1 states. In terms of institutional compliance, South Africa produced an initial GHG Inventory (base year 1990) in 2004, and has now updated this and is completing its second GHG Inventory (base year 2000). It has produced a first National Communication that was submitted to the UNFCCC in 2004, and has now submitted a second National Communication report. It is an active (albeit not prominent) participant in the CDM (through the DNA) and has a portfolio of projects at various stages in the CDM pipeline. SA is also a prominent voice in global negotiations within the regime. However, in terms of the environmental conditions for compliance with the KP, it can be argued that South Africa's compliance is lacking. Although SA is not legally bound to the same terms that the Annex 1 countries are, SA has made pledges towards reducing its domestic emissions levels. South Africa's domestic emissions profile and energy mix contradicts the international policies, norms and conditions that the SA government claims to comply with. The rest of the chapter considers SA's role in the international arena, examines the domestic emissions profile and discusses the state of play between the SA government, private sector, and civil society organisations (CSOs) in an

[130] See CMP/2005/8/Ad2, p27 para15 and CMP/2005/8/Ad2, p30 para36.
[131] See CMP/2005/8/Ad3, p101 XIII.
[132] See CMP/2005/8/Ad3, p102 para5.

attempt to assess the extent of institutional and environmental compliance to the international climate change regime.

3. South Africa's compliance in the global climate regime

International regimes have been defined as 'the set of rules, norms and decision-making procedures that co-ordinate state behaviour within a given issue area',[133] and also as '… principles, norms, rules, and decision-making procedures around which actor expectations converge in a given issue area'.[134] The KP, the UNFCCC, the Intergovernmental Panel on Climate Change (IPCC) and the Flexibility Mechanisms are key components of the current climate change regime. Other important elements are the Protocol's member states and non-governmental organisations such as the Prototype Carbon Fund (PCF), the GEF, and the Climate Action Network (CAN). Co-operation between state and non-state actors is of paramount importance in resolving or negotiating aspects of a regime, especially Kyoto's second phase. South Africa's participation and compliance in the current regime will be examined across the government, private sector and civil society.

South Africa has played an increasingly important role as a mediator in the ongoing climate change negotiations:

> The country has played a midwifery role in bridging the divide between the countries of the North and South. This has been an element enhanced by its involvement in the climate space with the G5, G8, G77, G77+China and Africa Group as well as the nature of its economy and political landscape that fits well with both the developed North and the developing South. [135]

Nhamo states that the SA's position as a leader in climate change negotiations is premised on the notion that 'developing economies must not be forced GHG emission reduction targets post-Copenhagen'.[136] SA has been a supporter of the principle of 'common but differentiated responsibility' within the negotiations. This concept takes into consideration historical GHG emissions, advocates that countries share responsibility proportionally, and it supports the emerging economies' argument against placing a 'cap' on their respective domestic emissions levels.

[133] Kegley & Wittkopf, 2004: 253.
[134] Krasner, 1982: 185–205.
[135] Nhamo, 2009: 473-4.
[136] Nhamo, 2009: 473

3.1. Climate change negotiations

South Africa puts itself in the Africa Group and with the G77+China. There is according to Nhamo, increasing pressure to have SA participate in the climate space with the G5, G8, G13 and the G20. As of 2009 South Africa's commitments towards the new climate change treaty were articulated by President Zuma as such:

> The global agreement should be guided by a shared vision. It should be inclusive, fair and effective. It must recognise that solving the climate problem cannot be separated from the struggle to eradicate poverty…On mitigation, the agreement must contain ambitious, quantified, and legally binding emission reduction commitments by developed countries. It must set the framework for mitigation actions by developing countries that are supported and enabled by finance and technology…Our goal should be to significantly reduce emissions across the globe without constraining development in the countries of the South.[137]

SA has pledged a commitment towards reducing domestic emissions by 34% over the next 20 years. However this commitment is also dependent on technology transfer and international finance for adaptation and mitigation. SA will also host the COP17 negotiations in December 2011. In addition to this, SA will play an important role in other global climate debates: President Jacob Zuma will co-chair the UN Sustainable development commission, Trevor Manuel has an important role within the UN Advisory Group on Climate Finance (which is seeking US$100 billion a year in North-South flows), as well as the G8-G20 meetings in France.[138] It is imperative that policymakers ensure that any future commitments made by the SA government can be delivered on by the country.

3.2. South Africa's emissions profile

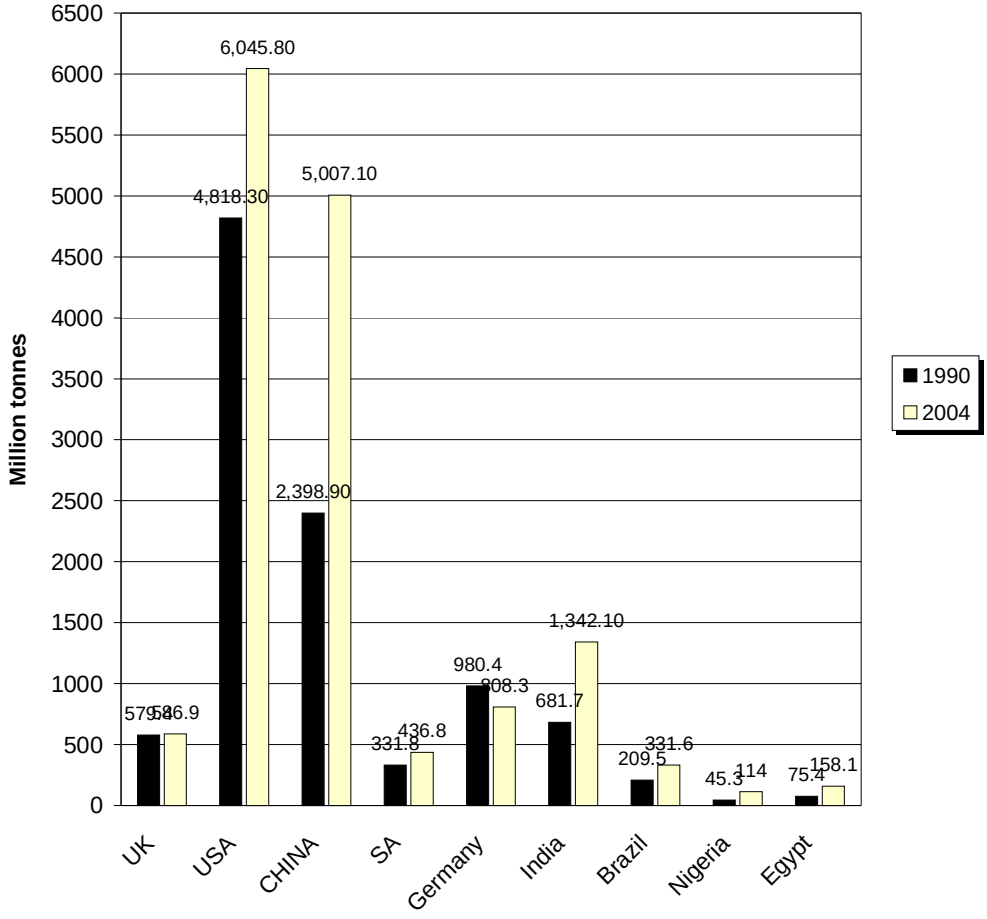
South Africa is an emerging power internationally and an anchor state in the southern African region. It is among the top 10 African states in terms of economic growth and has a well-developed infrastructure compared with many neighbouring countries, while its financial system is considered one of the best in the world. With strong agricultural, mining, industrial and service sectors, it accounts for roughly 75% of the gross domestic product (GDP) of the Southern African Customs Union.[139] But SA's economic and infrastructural strength comes at a price: it is underpinned by a dependency on coal as its primary energy source. When it is burnt, coal emits carbon dioxide ($CO_{2,}$), methane (CH_4) and sulphur oxide (SO_2).

[137] Zuma, 2009, p. 1, in Nhamo, 2009. Nhamo, 2009.
[138] Bond, P., 2/20/2011. South Africa: The ANC government's 'talk left, walk right' climate policy. Accessed at: http://links.org.au/node/2137
[139] Chevallier R, 2008, Internet source.

Compared to the developed economies classified under Annex 1 of the KP, SA does not have high CO_2 emissions (see Figure 1). One per cent of global emissions were generated by SA in 2004. According to the *UN Human Development Report 2007/2008* (Figure 2), these totalled about 436 million tonnes in 2004, while the United States and China emitted 6 045 million tonnes and 5 007 million tonnes respectively. But SA's per capita emissions were higher than China's — 9.8 million tonnes of CO_2 compared to 3.8 million. Its per capita emissions are also higher than those of the US and of other emerging economies and exceed the global average. In addition, its carbon output has increased significantly in the past 15 years (see Figure 3); with CO_2 emissions rising 2.3% between 1990 and 2004. (See Figure 2). South Africa's GHG emissions rank within the top 20 in the world and contribute 1.8 % to global emissions.[140]

[140] United Nations Human Development Report, South Africa is ranked as the 12th highest emitter of GHGses in the world. SA emits approximately 450 million tones of CO_2 per year, and this amount equates to one per cent of annual global emissions.

Figure 1: Total CO_2 emissions per country[141]



[141] UNDP, 2008a, Internet source. Unfortunately there are no 2009/10 updates available for these statistics, as the UNHDR is a thematic report and the 2008 edition dealt with climate change.

Figure 2: CO_2 emissions per capita[142]

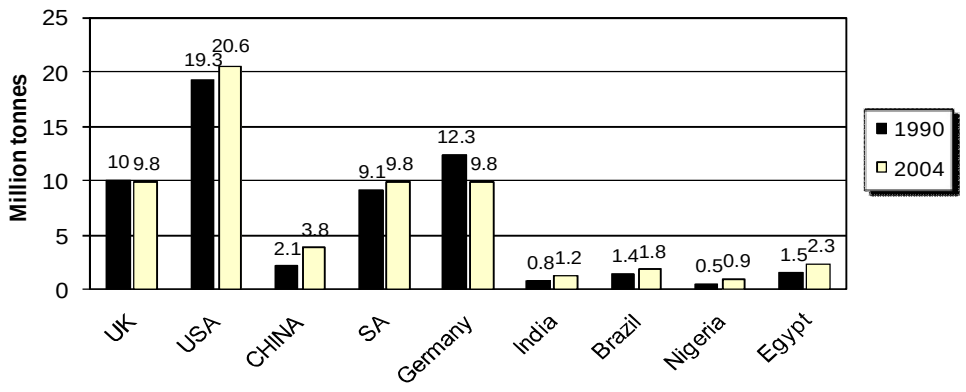
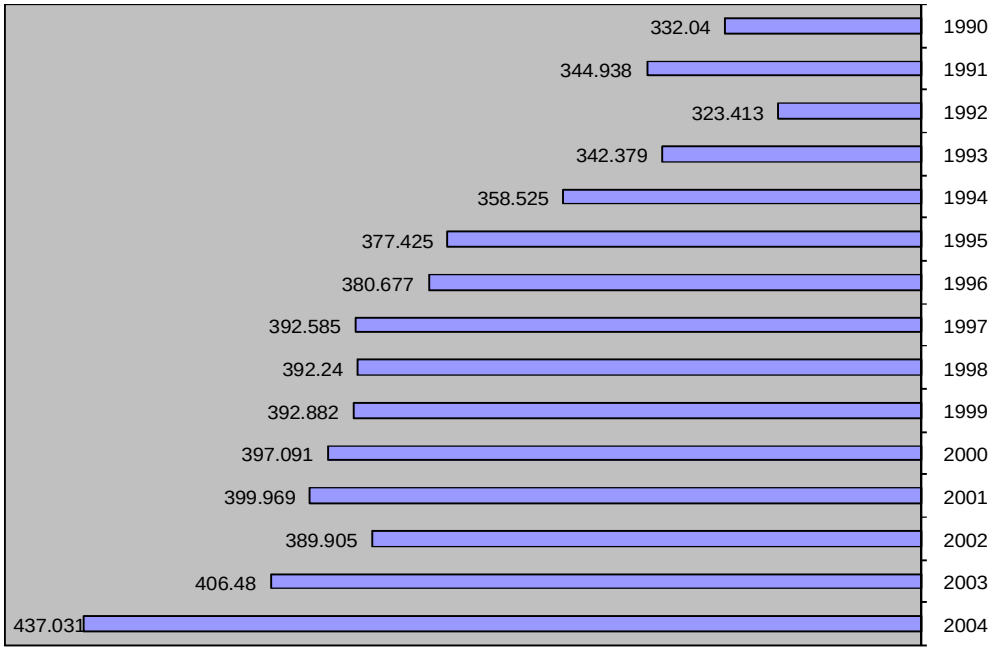


Figure 3: Carbon emissions in South Africa, 1990–2004, in million tonnes of CO_2[143]



Industry output and mass electrification are key factors in contributing to the growth in emissions, as the country's mining and manufacturing sectors are energy-intensive and energy is sourced from coal. South Africa's highest emissions occur in public electricity and

[142] UNDP, 2008b, Internet source.
[143] Source: Adapted from the Millennium Development Goals Indicators, 2008.

heat production, manufacturing and construction, and internal transportation.[144] Its carbon dioxide intensity is particularly high — 0.87 metric tons per thousand $ 1995.[145] As a non-Annex 1 country SA is not legally compelled to reduce emissions during the 2008–2012 phase of the KP. But as one of the foremost proponents of the climate change regime, it should lead by example. However, this has proved to be difficult to achieve given the government's ambitious socio-economic agenda.

As part of its post-apartheid development path, the government embarked on a policy of providing electricity to all citizens; by 2004 77% of urban households were electrified.[146] While successful at household level, this policy did not include increasing the capacity of the national electricity grid or diversifying the energy mix to increase the use of renewable energy.[147] Coal now accounts for 93% of the country's electricity output, despite being an inefficient and carbon-intensive energy source. For every kilowatt–hour of electricity produced, 0.5kg of coal is burnt and 1.29 litres of water consumed, while the by-products are 142g of waste ash and 0.9kg of carbon.[148] If SA is to become an effective and compliant member in a future legally constrained regime, then it is imperative that the country's emissions profile be mitigated or diversified.

3.3. The South African government

Since acceding to the UNFCC in 1997, the SA government has been involved in climate change negotiations. Two key policies that focus explicitly on climate change are the National Climate Change Strategy (NCCS) (2004), and the more recent Long Term Mitigation Scenario (2007). The NCCS was designed to address priority issues in terms of climate change in South Africa. This document has helped place South Africa in a strong position in international climate change negotiations. In a move to reduce the impact of climate change, the *Long-Term Mitigation Scenarios* (LTMS) document was published. It examines the potential for carbon mitigation in South Africa and presented four strategic options. In July 2008 the former Minister of Environmental Affairs and Tourism, Marthinus

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[144] International Energy Agency (IEA), 2005.
[145] Carbon intensity is measured by CO_2 emissions per unit of GDP. The Organisation for Economic Co-operation and Development estimated that in 2001, coal accounted for 75% of South African energy consumption. See the *World Energy Use and Carbon Dioxide Emissions, 1980–2001*. Energy Information Administration, April 2004, <http://tonto.eia.doe.gov/ftproot/environment/energycarbon2004.pdf>.
[146] DEAT, State of the Environment, Energy, 2008.
[147] *The Engineer Online*, 18 September 2008.
<http://www.theengineer.co.uk/Articles/307986/Power+to+the+people.htm>.
[148] DEAT, *op. cit*.

van Schalkwyk, unveiled the *Vision, Strategic Direction and Framework for Climate Policy*, which outlined a number of broad policy themes. These were carbon emission reductions; limits to the strengthening of energy efficiency policy; preparing for vulnerability and adaptation to climate change; and ensuring that government and other stakeholders co-operate and are aligned with policies responding to climate change.

The LTMS is considered a first in many respects for an emerging economy. It recognises a scenario whereby South Africa's GHG emission will peak (continue to increase) in the next two decades, plateau around 2030 to 2035 and start to decline thereafter. This scenario is recognised as the one most sustainable in terms of projected growth and major source of energy (coal-fired electricity) powering the growth.

A joint Oxfam and Earthlife Africa report on South Africa's climate change and development problems highlights the relevant policies and legislation dealing with climate change as follows.[149]

- White Paper on Energy Policy (1998).
- The National Waste Management Strategy (1999). Department of Environmental Affairs and Tourism.
- South Africa First Country Studies (2000) including the Synthesis Report for the Vulnerability and Adaptation Assessment. This report includes a range of reports on vulnerable sectors (health, malaria, agriculture, water, biodiversity and forestry).
- Johannesburg Plan of Implementation 2002. The NEMA Air Quality Act (2004). Department of Environmental Affairs and Tourism.
- South African National Climate Change Strategy 2004. Department of Environmental Affairs and Tourism.
- Renewable Energy Policy of South Africa White Paper 2004. Dept of Minerals and Energy.
- Electricity Regulation Act (2006).
- Disaster Management Act and the National Disaster Management Framework.
- The Bio-fuels Industry Strategy. Dept of Minerals and Energy, 2008.
- Long Term Mitigation Scenario Planning study (2008) and associated technical reports. Department of Environmental Affairs and Tourism.

[149] Oxfam, 2009.

South Africa faces a significant challenge in efforts to decrease its national GHG emission levels. As a country dependent on coal for energy, and with carbon-intensive mining and industrial sectors (detailed in the emissions profile), it has one of the highest per capita carbon emissions in the world.

In order to deal with these mitigation challenges, South Africa underwent the *Long-Term Mitigation Scenario's* exercise (2006) to complement its national policy document *Vision, Strategic Direction and Framework for Climate Policy*. The main objective of this research is to explore feasible ways of reducing South Africa's emissions levels without jeopardising its economic growth. The government's *Vision, Strategic Direction and Framework for Climate Policy* comprises six policy pillars which will guide South Africa's climate strategy. They are:

- GHG emission reductions and limits;
- building on, strengthening and/or scaling up current initiatives;
- implementing the 'business unusual' call for action;
- preparing for the future;
- identifying vulnerability and adaptation to climate change; and
- ensuring the alignment, co-ordination and co-operation of all actors.

The first pillar entails the 'peak, plateau and decline' emissions trajectory, in terms of which carbon emissions will stop growing by 2020–2025, stabilise at a plateau from 2030–2035 and fall in 2050–2060. Pillar two involves scaling up existing demand-side initiatives and interventions through regulatory instruments and mechanisms, including a proposed carbon tax. The aim of pillar three is to ensure that the renewable energy and transport sectors meet national targets for energy and emissions reduction respectively. Pillar four includes providing support for carbon-friendly technologies, especially in the energy and transport sectors, so that they meet research and development targets. Pillar five entails identifying South Africa's vulnerabilities to climate change and ensuring that adaptation interventions are undertaken. Under pillar six the roles and responsibilities of stakeholders will be clearly defined to ensure that all spheres of government are aligned and co-ordinated and work together.

According to Tyler[150], the major building blocks of SA's policy direction include: the establishment of a National Committee on Climate Change in 1994 to advise the relevant minister on climate change-related issues, the 2005 South African Country Study on Climate Change, the 1994 and 2000 national GHG inventories, the First and Second National Communications to the UNFCCC in 2000 and 2009, the 2004 Climate Change Response Strategy, the 2005 Technology Needs Assessment which resulted in a Cabinet-endorsed prioritised list of environmentally sound technologies, the 2005 Climate Change Conference, the African National Congress (ANC)'s 2007 Polokwane resolution on climate change, the Long Term Mitigation Scenarios (LTMS) process and the 2008 Cabinet Response, the March 2009 Climate Policy Summit Discussion Document and international commitments made at the 2009 Copenhagen COP to the KP. Another important building block that forms part of SA's policy direction includes the Integrated Resource Plan (IRP2), which is comprised of renewable energy policies.

South Africa made further pledges in the Copenhagen Accord, to take nationally appropriate mitigation actions to enable a 34% deviation below its 'business as usual' emissions growth trajectory by 2020, and a 42% deviation by 2025. According to the pledge however, South Africa's actions are dependent on the provision of financial resources, the transfer of technology, and capacity-building support by developed countries.

Despite the caveat mentioned within the commitment pledge, these are ambitious targets for any developing country, and more so for South Africa given the complexities of its mineral-energy complex. In South Africa, a shift away from coal dependence and dedicated resources to climate mitigation is often perceived as a trade-off with economic growth. And given South Africa's macro- and micro-economic policies, economic growth is critical to development. However, there are opportunities for simultaneously addressing emissions reductions while ensuring sustainable development, economic growth and investment — through the Flexible Mechanisms[151] of the KP. These incentive schemes exist for developing countries to generate carbon credits that can be traded in the market for emission allowances.[152]

[150] Tyler, E., 2009: 2.
[151] Mentioned earlier in this chapter, and discussed in the following two chapters.
[152] The emissions reductions realised via the various mechanisms illustrated above have different names (AAUs, CERs, ERUs) but each unit corresponds to one tonne of CO2.

Between February 2009 and 2012 the government had planned a process[153] which will (hopefully) lead to climate change legislation. The schedule is as follows:

- February 2009: summit on policy development in response to national climate change;
- February–June 2009: sectoral policy development work;
- Now until July 2009: post–2012 positions;
- December 2009: conclusion of the UNFCCC post–2012 negotiations;
- March 2010: updating of national policy to meet international commitments;
- April 2010: publication of the Green Paper for public comment;
- End of 2010: publication of the final national climate change response policy (subsequently delayed until 2011); and
- until 2012: translation of policy into a legislative, regulatory and fiscal package.

The schedule has fallen behind in the past two years, but the government has finally caught up during early 2011. While the government has shown it has the political will to comply with the international climate change regime by outlining various policies and frameworks, parastatal entities such as Eskom and heavy carbon emitters within the private sector are under increasing pressure to co-ordinate and align their policies so that the government's objectives are met. Whether the private sector and parastatals are receiving the necessary support to achieve these objectives remains to be seen.

3.4. The South African private sector

For any climate change commitment to be operationalised and delivered on, it is necessary that the private sector is included in consultations and in decision-making within South Africa's climate change negotiations. The private sector in South Africa has faced considerable pressure regarding its carbon footprint, but it has collectively supported the government's measures and policies. Moreover, the private sector has participated in initiatives designed to increase awareness regarding its current and future role in complying with the climate change regime. The Carbon Disclosure Project (CDP) Report is an initiative that encourages firms to assess and disclose their carbon footprint, as part of their corporate social responsibility. This is facilitated by the National Business Initiative (NBI), an organisation that acts as a liaison between the private sector and government, and which has been proactive in facilitating carbon mitigation activities within the private sector.

[153] Department of Environmental Affairs and Tourism, 2009. National Climate Change Response Strategy. P. 4.

According to interviewees the NBI had had a unit or project on the CDMs, but this had been discontinued. The NBI, however, does have a climate and energy unit which responsible for the Energy Efficiency Accord, a voluntary initiative for companies that focus on strategic energy consumption. An interviewee stated that companies had saved approximately 24, 000 GW per hour through this initiative, and have been able to claim from their demand side management from Eskom.[154] Initially the Accord was due to run for five years, but it is currently under review.

The climate change part of the unit focuses mainly on the CDP reporting. According to Mr. Kgope, the NBI assists firms via GHG accounting, the identification of risks and opportunities and government issues. The NBI also looks at making climate change part of a business's core strategy. A forthcoming project that the NBI has also begun is the CDP and Water initiative, which follows the same principles as the CDP. A lesson that the NBI has learnt throughout all of this is that data deficiency weakens the ability of businesses to comment on policy issues. There are issues surrounding the verification of data as well. The NBI is also trying to start an adaptation programme, and is partnering with the Department of Science and Technology and the Climate Change Risk Atlas. The purpose of this is to help firms further assess their risks, opportunities and available resources against the current and anticipated impacts of climate change.

One of the NBI's concerns is the need for even greater communication between government and the private sector regarding climate change commitments. Mr. Kgope cited the unveiling of the LTMS as an example:

> What is important to note is that with the LTMS, the very first draft, there was consultation with CEOs at a dinner event. The presentation focused on the Business Unusual strategy; however it did provide an understanding of the operationalisation of the LTMS...

Despite this early hiccup, some businesses have changed their behaviour in terms of their carbon emissions and energy consumption through various strategies already mentioned. There has been an increase in private sector participation in the CDP according to the NBI. However, Mr. Kgope explained that there still hadn't been a proper consultation between government and the private sector in terms of unpacking the LTMS. Now, the approach by

[154] Interview, Mr. Barney Kgope, August 2010.

the NBI and the private sector is to obtain the necessary and relevant data so that they can challenge and interrogate these policies for themselves.

3.5. South African civil society

In contrast to the private sector, the civil society organisations (CSOs) resemble a disparate motley assortment of pragmatists and ideologues. Activists within South African civil society are not all unified in their positions regarding South Africa's compliance with the climate change regime. While some CSOs support the policies being implemented by the South African government and the private sector, there are CSOs who have expressed criticism of these policies. Nevertheless, all CSOs across this spectrum are unified in their criticism of the SA government, especially with regards to the coal-fired power stations being built at Medupi and Kusile.[155]

Some CSOs act as CDM-watchdogs, such SouthSouthNorth Project. Other prominent civil society activists, such as Patrick Bond, are vociferous in their contempt for this market mechanism, and not without due cause.[156] However, it is simplistic to paint all CDM projects with the same brush; they are developed, implemented and monitored by various people. Moreover, they undergo high standards, as will be demonstrated in the following chapter.

4. Conclusion

Taking the aforementioned mitigation strategies into account, one can contend that there is evidence of strong transnational institutions and cooperation in South Africa. However this cooperation could be improved upon. Andonova defines such transnational institutions as 'being established privately by non-state actors with transnational ties or agenda, and publicly by units of national governments or inter-governmental organisations'.[157] Moreover there is evidence that international cooperation on this issue epitomises the neo-liberal perspective, in that the gains to be had ensure a win-win outcome for all actors involved in cooperation. This is because the state's need to reduce emissions (and simultaneously ensure continuous economic development) is met through CDMs and emissions trading, and the private sector's

[155] Business Day, 02/02/2011. Co-generation could delay need for Kusile, says WWF. Accessed at http://www.businessday.co.za/articles/Content.aspx?id=93099
[156] Bond, P., 02/08/2011. The ANC government's 'talk left, walk right' climate policy. Accessed at http://links.org.au/node/2137
[157] Andonova, 2005: 5.

'need' for profit and (to an extent) corporate social responsibility is met through investing in such projects.

However, more needs to be done in terms of communication between the private sector and government. South Africa has signed and ratified the KP, and is an active member who adheres to the climate change regime. As a non-Annex 1 country, South Africa is not compelled to reduce its carbon/GHG emissions to the 1990 levels. As mentioned earlier in this report, such GHGs include carbon dioxide, methane, nitrous oxide, sulphur hexafluoride and perfluoromethane. Whilst South Africa is not obliged to reduce its emissions (yet), there is evidence that as a coal-based economy, there is a significant amount of carbon emissions per capita generated by South Africa. Thus it is in South Africa's best interests to implement mitigation strategies regarding climate change, as the impacts of this global issue will continue and increase if neglected. [158] Despite pledging a 34% reduction over 20 years at the COP17 summit in Copenhagen, SA has made these pledges conditional. The failure by South Africa to pledge non-conditional GHG emission reduction targets post-Kyoto can be viewed by some as weak political leadership in the climate space. This is mainly due to the fact that SA has a very high carbon footprint, with the private sector (and parastatals such as Eskom) emitting GHGs that surpass other countries with quotas specified under the current KP regime. It is important that government communicate more with the private sector on operationalising SA's commitments to ensure a genuine reduction of GHGs. A failure to do so could be construed as a failure in leadership, and if left unchecked, a failure in regime effectiveness.[159]

[158] PACE, 2008.
[159] Nhamo, 2009: 474.

Chapter Four: CDM Effectiveness

1. Introduction

The number of projects is limited to three CDM projects, as these are amongst the first registered, operational projects to receive substantial CER-issuances within South Africa. The rationale for their selection is discussed in the Introduction Chapter to this research report. This chapter will provide a descriptive analysis of these projects and discuss their effectiveness according to guidelines synthesised in the previous chapter. Firstly the evolution of the CDM into the regime that it is today is discussed. This is followed by a discussion of the scope and depth of CDM projects within South Africa, and a description of the CDM project cycle.

The aim of this chapter is to discuss case studies of three CDM projects. This entails an overview of the types of projects, the stakeholders involved in a project, a description of the implementation processes of these projects, and an evaluation of the extent to which each project meets the criteria for institutional and environmental effectiveness. Information for each of the CDM projects discussed in this chapter is sourced from the respective Project Design Documents and Validation Reports of the CDM projects, and supplemented by interview findings from various stakeholders, participants and government officials. These case studies are extensive, but in describing their processes, key institutional and environmental indicators (derived from the conceptual framework in Chapter Two) are applied to the case studies. The findings are then discussed at the end of this chapter.

2. The evolution of the CDM

Of the three Flexible Mechanisms, the CDM is the only one that is open to developing-country participation. Established under Article 12 of the KP and adopted by the Third Conference of the Parties (COP 3) in December 1997, it has two objectives: to assist developing countries in achieving Sustainable development and to help industrialised countries to cost-effectively reach their respective emission reduction commitments under the KP during the first period (2008–12). Despite being defined in 1997, Figueres highlights the original, earlier evolution and development of this policy, and states that the concept is older than UNFCCC.[160] According to Figueres, it was Norway who introduced the concept of 'joint implementation' (JI) as a broader version of emissions trading during the negotiations that

[160] Figueres, C, 2006: 2.

resulted in the UNFCCC. The concept originated from the recognition that the costs of GHG abatement activities vary significantly among countries, and global costs can be reduced if countries formed partnerships in their GHG reduction efforts. This led to the inclusion of JI in the Climate Convention:

> … [P]arties may implement such policies and measures jointly with other Parties and may assist other Parties in contributing to the achievement of the objective of the Convention […][161]

While Article 4 does not explicitly state which countries are being referred to as 'Parties', Figueres argues that the marked difference in abatement costs between industrialized and developing countries led to the reasoning that cost-effectiveness would best be served by implementing projects in developing countries or economies in transition. However, during the negotiations leading up to the COP 1 of the UNFCCC in 1995, many developing countries questioned the value of JI, and perceived it as an attempt by developed or industrialised countries to buy their way out of reduction commitments, particularly if credits for JI projects were to be available before binding targets for domestic emission reductions were in place for the industrialized countries (a step that was not taken until the KP was adopted in 1997).[162] A compromise between the G-77 and the Annex I countries restructured JI and established the 'Activities Implemented Jointly' (AIJ) pilot phase. To respond to developing countries' concerns, a key criterion was imposed on AIJ:

> 'activities implemented jointly should be compatible with, and supportive of, national environmental and development priorities and strategies of the host country.'

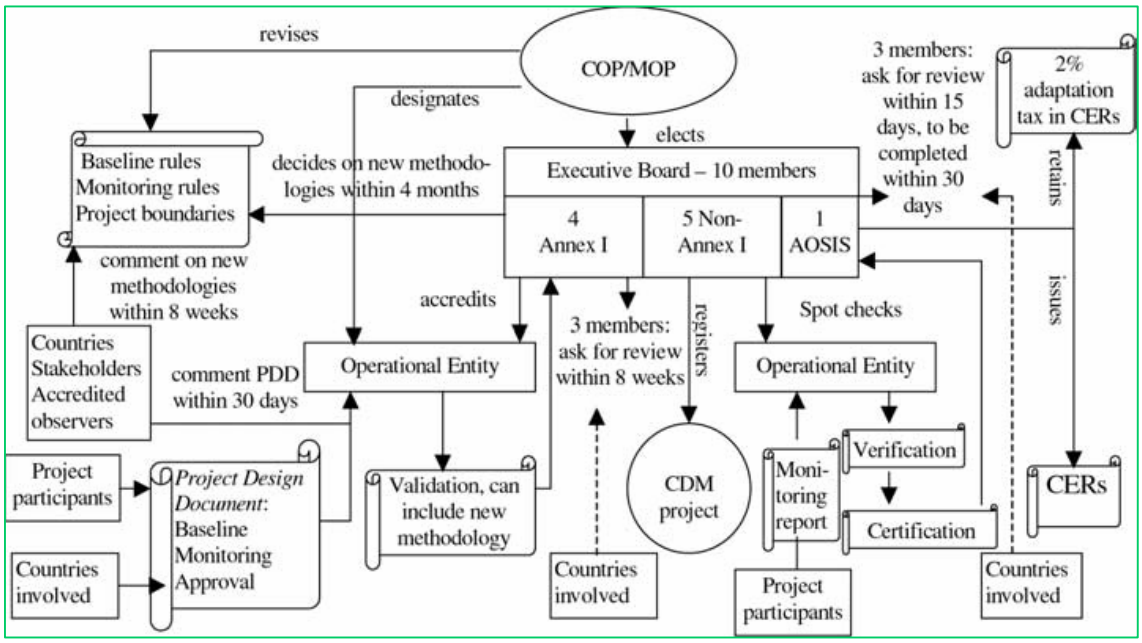
This, contends Figueres, was the first time that an international emissions reduction mechanism incorporated the interests of developing countries, albeit in a secondary manner. The mechanism's primary purpose was to *implement activities*, namely low cost mitigation projects for the benefit of industrialised countries.[163] It was Brazil who suggested the introduction of a penalty system that would subject industrialised countries to a fine if they failed to reach the targets, and these fines would be channelled into a 'Clean Development Fund' to support GHG emissions mitigation projects and particularly adaptation measures in countries most adversely affected by climate change.[164] This measure, despite early controversy, was successful and adapted and integrated into the concept that was behind the

[161] UNFCCC 1992, Article 4.2(a).
[162] Figueres and Ivanova.
[163] Figueres, 2006: 2-3.
[164] Nhamo, 2009: 464.

previous AIJ. The result was the new CDM , which would allocate a 2% levy on all its projects towards an adaptation fund. This would also function as a 'market-based measure to meet emissions reduction commitments'.[165]

This mechanism then became a critical part of industrialised countries' acceptance of reduction targets, and developing countries agreed to this on the condition that Sustainable development became a primary goal of the mechanism. With the adoption of the CDM in Article 12 of the KP, this became the first time that text which defined an international market mechanism granted equal importance to GHG mitigation and development concerns by placing them both as primary objectives of the instrument.[166] Subsequently, the proposal was backed by the G-77 and China, and was then approved by the Conference of the Parties under Article 12 of the Protocol. From 1997 to 2000, various stakeholders around the world developed proposals for the guidelines and modalities of the CDM. Agreement on the basic rules and regulations of the CDM was reached at the UNFCCC COP 7 in November 2001, commonly referred to as the Marrakesh Accords. It was also at this COP that the first members of the CDM Executive Board were elected and the Board was tasked with writing the detailed rulebook for the CDM.[167]

3. The CDM Regime



[165] Figueres, 2006: 2-3.
[166] Figueres and Ivanova
[167] Figueres and Ivanova.

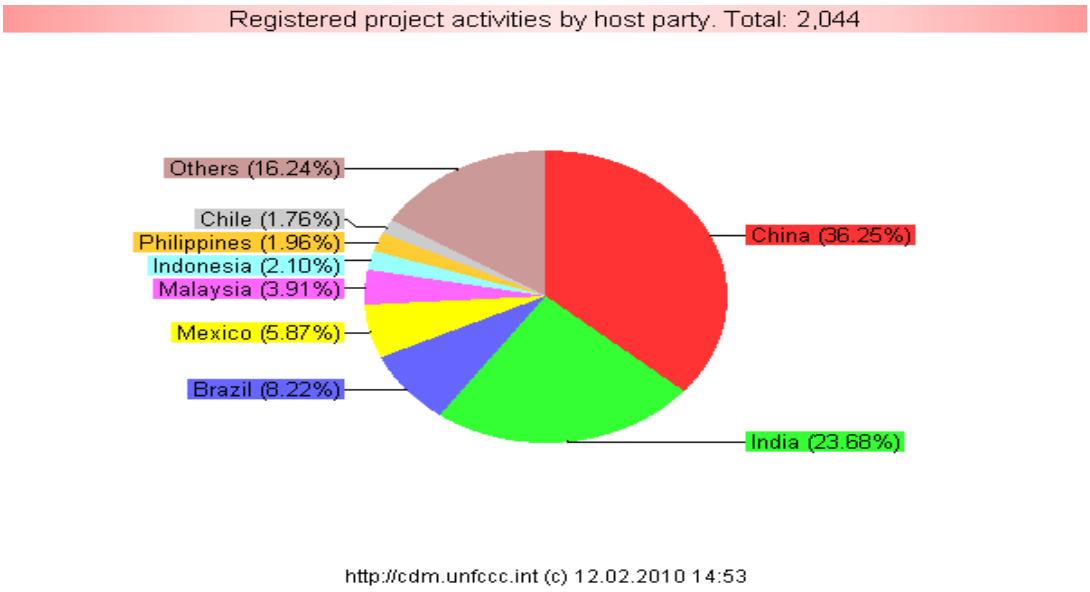
The CDM Processes, Decisionmakers, and Stakeholders. Adapted from Michaelowa, 2002.[168]

As depicted above, the CDM regime, which is part of the overall global climate change regime, involves multiple processes, various decisionmakers and stakeholders at different stages of a project's development. The CDM regime is complex, but if one follows the CDM project cycle criteria, it is easy to grasp. Key decision-makers are the COP/MOP, the Executive Board, and the CDM Methodology panel. Key actors are the Operational Entities the project participants, and the countries involved. The entire process of the CDM project life cycle is akin to the norms and procedures that Krasner discusses in his definition of regimes.[169]

3.1. The CDM and South Africa

By February 2010, according to the UNFCCC, there were approximately 2 044 CDM projects globally that had been approved by the CDM Executive Board, and 6,101,959 CERS or carbon credits that had been requested for issuance. This number does not reflect the amount of projects in the pipeline that are currently being validated and registered. On average, CDM projects have reduced more than 300 million tonnes of GHG per year.[170] Globally, 60% of the CDM projects focus on renewable energy technologies in the energy sector: hydropower, biomass and wind energy. Only 17% are for waste handling and 5% for agriculture. Of the 2044 registered CDM projects worldwide, China accounts for 36.25%, India 23.68%, Brazil 8.22% and Mexico 5.87%. Despite the emissions reduction potential in Africa, the continent performs poorly, with only 36 registered projects in eight countries.[171] The figure below illustrates this.

[168] Michaelowa, 2002: 202.
[169] *See Chapter Two for a more contextualised explanation.*
[170] Ecosystemmarketplace.com, 2010, Internet source.
[171] Niemack and Chevallier, 2010:9



Registered CDM projects by host countries.

As of the beginning of 2010, South Africa is the only African country among the top 20 CDM host countries. It has a less risky investment environment, and a more sophisticated industrial and financial infrastructure. South Africa's emissions per capita and carbon intensity also make it a sought-after candidate for CDM initiatives. Despite this, by February 2010 there were only 17 projects operational in South Africa, of which 4 have been issued CERs. Proposals for more than 100 additional initiatives have been submitted to the Department of Energy, South Africa's Designated National Entity (DNA).[172] The majority of South African CDM projects cover bio-fuels, energy efficiency, waste management, cogeneration, fuel switching, and hydro-power, and occur in the manufacturing, mining, agriculture, energy, and housing sectors. Successful projects include the Omnia Fertiliser Nitrous Oxide Reduction Project, and the Lawley Fuel Switch Project. CERS issued from the two projects are 321 234 and 17 032 respectively.[173]

The main aim of such projects is to reduce emissions by using clean technologies. They also contribute to technology transfer and sustainable development — the 2% levy on the emissions credits is allocated to the UN Adaptation Fund, used to help developing countries

[172] The CDM project developer submits the project plans to the Designated National Authority (DNA), who gives final approval after they have assessed the Sustainable development criteria of the project.
[173] See the UNFCCC site for regular updates of CER issuances. This data accessed at http://cdm.unfccc.int/Projects/DB/DNV-CUK1162558371.82/iProcess/SGS-UKL1236681217.02/view and http://cdm.unfccc.int/Projects/DB/DNV-CUK1135341553.72/iProcess/SGS-UKL1189699960.07/view on 16 February 2010.

adapt to the current and future effects of climate change. However, Erion *et al* assert that some CDM projects are financially and ecologically unsustainable, describing them as 'low-hanging fruits' which have little effect in reducing GHGs while receiving a high yield of emissions credits as having a negative impact on the health of nearby residents, and failing to take the concerns of the local populace into account when implementing the projects.[174] Stowell[175] correctly describes the CDM project cycle as complex, as it requires the following: extensive project design and formulation (through a project design document, a PDD); host country approval (through the Designated National Authority, which is the Department of Energy in South Africa); validation (by a certified Operational Entity), and registration with the CDM executive board, project financing (through investors); monitoring (through the project participants); verification and certification (by another independent operational entity); and certificate issuance from the CDM Executive Board of the UNFCCC.[176]

3.2. The CDM Project Cycle

There are many versions and interpretations of the CDM project cycle, but this overview is distilled from the documents on the UNFCCC website, and supplemented with findings from interviews with local CDM project developers, UN Methodology Panel staff, and stakeholders.

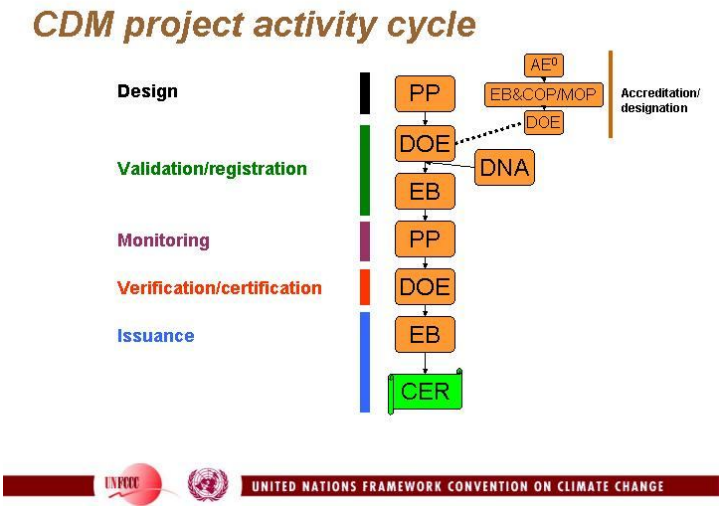


Figure 3.1. The CDM Project activity cycle.[177]

[174] Erion G, Lohmann 2007.
[175] Stowell D, *Climate* 2005, p. 180.
[176] UNEP, 2004; and Ashdown R, 2008.
[177] Adapted from http://cdm.unfccc.int/CommonImages/ProjectCycleSlide.jpg

The UNFCCC identifies the following phases as being part of the CDM project activity cycle: design; validation; registration; monitoring; verification; certification; and issuance. In the project design phase, project participants submit their project information using a Project Design Document. The first step is entirely optional whereby a project developer can submit a Project Identification Note (PIN) to the country's Designated National Authority (DNA.) The PIN tells the verifier what the project plans to do and usually has less detail than a formal Project Design Document (PDD.) The purpose of this stage is to allow a project developer to get a sense of how they will be viewed by the DNA and should this be positive they can ask for a letter of no objection. Whether or not a PIN is submitted, everyone must submit a PDD to the Designated Operational Entity (DOE).[178] Until the end of 2008, South Africa's DOE was the auditing firm Pricewaterhouse Coopers. At the time of writing this, there is still no local DOE in South Africa. The common reason provided by many interview respondents is that the South African market was too small to justify a local DOE presence. However it is not mandatory for a DOE to have a local office in-country, and many CDM project developers have resorted to using overseas-based DOEs.[179]

The purpose of the DOE is to ensure the validity of the project's methodology, that the claimed emissions reductions and baseline scenarios are accurate, and that the project meets the criteria for additionality. All of this information must be laid out in the PDD. This is also the first time the public may comment on the project. Following the approval of the DOE, the PDD then goes back to the DNA, who must sign off on everything, but most importantly whether the project meets the national sustainable development criteria. Sustainable development is critical to the credibility of the CDM regime. Under the 2001 Marrakesh Accords, it is the responsibility of the respective host country to determine whether a given proposed CDM project will assist it in meeting its sustainable development objectives. Each project submitted to the CDM Executive Board must first have obtained the approval of the respective host country's CDM DNA.[180] The South African DNA defines sustainable development according to the National Environmental Management Act (NEMA) 108 of 1998 as:

> "integration of social, economic and environmental factors into planning, implementation and decision -making so as to ensure that development serves present and future generation."

[178] Although Pricewaterhouse Coopers has withdrawn as a local DOE within South Africa, CDM project developers are not restricted to local DOEs and may make use of overseas DOEs.
[179] Interview with Harmke Immink, August 2010.
[180] World Bank, May 2010. p. 82.

In accordance with NEMA definition of sustainable development, three core criteria are used to assess the contribution of the proposed project to sustainable development in South Africa: environmental, social, and economic impacts. These are supported by additional indicators to allow the DNA to effectively regulate clean development mechanism projects activity in South Africa.[181] Following the submission of the PDD to the DNA, there is another opportunity for public comment, and unlike the DOE, the decisions of the DNA can be appealed to the relevant minister.

The CDM EB has provided the official guidelines for completing a PDD, and developed this in line with Appendix B of the CDM modalities and procedures. Information regarding the baseline methodology, a description of the project and identification of the project participants is included in the PDD that is submitted by the DOE to the CDM EB. The approved methodology is a methodology that was previously approved by the CDM EB and made publicly available along with relevant guidance. Where approved methodologies are being used, the DOE may proceed with the validation of the CDM project activity and submits the PDD for registration.

The validation phase entails independent evaluation of a project activity by the DOE. The purpose of a validation is to have an independent third party assess the project design, baselines and monitoring plan. The project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).[182]

The evaluation criteria are the requirements of the CDM as set out in Decision 17/CP.7, and in the present annex and relevant decisions of the COP/MOP, on the basis of the project design document, as outlined in Appendix B. Upon successful validation, the registration occurs. The registration of a CDM project is defined by the UNFCCC as:

[181] DME, year unknown. DNA: Designated National Authority, Guideline for Applicants of Clean Development Mechanism in South Africa. p 10-11.
[182] Det Norsk Veritas, 2005. Validation Report, Lawley Fuel Switch Project. Report No. 2005-1178, Revision no. 02, p. 1.

> formal acceptance by the Executive Board of a validated project as a CDM project activity. Registration is the prerequisite for the verification, certification and issuance of CERs related to that project activity.[183]

Verification and certification follows the registration of the project, and precedes the issuances of credits. Verification entails a periodic independent review and determination by the DOE of the monitored reductions of GHGs that have occurred as a result of a registered CDM project activity during a specific verification period. Certification entails a written assurance by the DOE that during the specific verification period, the CDM project achieved the reductions in emissions as verified.[184] Verification is critical to the integrity of the CDM projects, and it occurs implicitly at various phases in the CDM project life cycle.

The final step for a project is the CDM Executive Board whereby they review the findings of the DOE and DNA and make a final decision whether to grant certified emissions reductions credits (CERs). There is also a 30 day public comment period while the project is being validated.[185]

4. CDM Project Case Studies

Background to the case studies

The aim of the case studies is to provide a description of the processes involved in implementing the earliest and to date, most successful CDM projects, and to assess their environmental and institutional effectiveness. Tools of analysis are derived from the conceptual framework discussed in the second chapter of this report. By using the framework questions and indicators, the following sections will chart the processes followed by the CDM projects. The intention is to assess their environmental and institutional effectiveness, and in doing so, assess the nature and extent to which South Africa has complied with the aims and goals of the climate change regime.

4.1. The Lawley Fuel Switch Project

Description

[183] UNFCCC
[184] UNFCCC
[185] Erion, G., 2005. Low-hanging fruits always rot first"

Initiated by Corobrik (Pty) Ltd and Statkraft, (a Scandinavian renewable energy company),[186] the project entails the conversion from coal to natural gas of the thermal fuel used in clay brick baking kilns at Lawley brick factory, an existing brick factory wholly owned by Corobrik (Pty) Ltd, South Africa.[187] According to the UNFCCC, the project is classified under the CDM Sectoral Scope 4: Manufacturing Industries. The applicable baseline methodology used in this project is AM0008, which is "Industrial fuel switching from coal and petroleum fuels to natural gas without extension of capacity and lifetime of the facility".[188]

The project began in 2004 and was registered in 2005. The actual fuel switch process was completed in February 2009. The start-up was a two to three month period; the technological implementation was smooth and the technology transfer was all in-house. A US firm, Swindell-Dressler, performed the technical implementation. Sasol extended their gas pipeline by approximately 4km to the factory.

Delays however, were encountered during the design of the CDM project.

> The verification process is slow and labourious due to time taken to communicate with the DOE. The process was extremely bureaucratic.[189]

Complexities and constraints experienced in this project were centred on the planning phase, and the calculation of the baseline emissions for the project. According to both the project developer and the staff interviewed at Lawley, establishing the baseline for the CDM project was a lengthy and complex process.[190] Calculations not only factored in the actual emissions from coal combustion, but also included the following: body coal; natural gas combustion, project leakage (which factored in emissions from the transport of coal, mining the coal, and from fugitive natural gas emissions). Leakage in the pipeline (the Sasol gas pipeline from Mozambique, which was extended to the factory) was also factored in. Where it was impossible to obtain exact data, international estimates were factored in.[191]

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186 http://www.statkraft.com/presscentre/press-releases/2005/statkraft-signs-cdm-deal-in-south-africa.aspx
187 http://public.ises.org/PREA/3_Papers/8__EmissionTrading_Mueller_Annex.pdf page 2.
188 UNFCCC, Lawley PDD, 2005, p9.
189 Interview with Mr. John Anthony.
190 Interviews with Mr John Anthony, and Ms Harmke Immink.
191 Interview with Mr. John Anthony.

The fuel switching from coal to natural gas, was developed, financed and implemented by Corobrik. The retrofit conversion of the plant took place in December 2004, prior to the registration of the PDD.[192] It involved replacing the coal stoker pots with gas burners installed at each firing port. As a result of the fuel switch the emission of 19, 159 tonnes CO_2/annum are reduced. The plant has the capacity to reduce 191 590 tons CO_2/annum equivalent over a 10 year time frame. The gas firing technology used at Lawley has been used by Corobrik at some of its other plants which were located close to the gas pipeline network and did not face the barrier of pipeline extension in order to connect to the gas network. The technology transfer was therefore internal within South Africa and from one Corobrik plant to another. The project underwent two versions of the PDD before being accepted by the UNFCCC EB. According to interview respondents, the project developer, Promethium Carbon, was cited as providing invaluable assistance to Corobrik in moving the process forward.[193] Project costs, although high, did not exceed initial projections. No objections were cited during the public commentary stage.

Stakeholders

As the project entailed conversion from one fuel source to another *within* an industrial facility, the stakeholders with an interest in the project were mainly the staff and employees at the Lawley plant.[194] The plant is located on agricultural land with no adjacent settlements from where possible stakeholders could emerge. According to the PDD document, project stakeholders as well as interested and affected parties were invited to comment on the Environmental Impact Assessment (EIA) done on the project.[195] This consultation was done in accordance with domestic EIA legislation. Stakeholder comments were invited in writing and at stakeholder workshops. The comments received on the EIA were incorporated into the final EIA report that was submitted to the Provincial Environmental Authorities, and was used by the authorities to give the record of decision.

Corobrik also conducted extensive consultation with the staff and employees at the Lawley plant to inform them of the pending conversion from coal to gas and to ensure the buy-in from its labour force for the project. The consultation process with the employees at the Lawley plant centred on the employment positions which were made redundant due to the

[192] UNFCCC, Lawley PDD, 2005, p2.
[193] Interview with Mr. John Anthony.
[194] UNFCCC, Lawley PDD, 2005, p 39.
[195] UNFCCC, Lawley PDD, 2005, p 39.

fuel switch. This consultation process was started in May 2005 (seven months before the actual fuel switch) and was conducted between Corobrik' s Director Industrial Relations and the Brick and General Workers Union as represented by their Head Office Organisation Secretary. The Union also held meetings with staff at the Lawley plant to give feedback on discussions with Corobrik management and to get inputs from its members.[196] Further opportunity to comment was given when the draft PDD was posted on the South African DNA web site.

The main comments received from stakeholders were from the Brick and General Workers Union, regarding the positions which were made redundant as a result of the fuel switch. The Brick and General Workers Union made the following comments:

- Corobrik should indicate what alternative employment positions could be created at the plant for employees who are to be affected by the retrenchment
- There are more than 20 employees who intend to volunteer for retrenchment, i.e. employees who are near retirement age and those who do not find themselves fit anymore to carry out their daily tasks, and others
- Corobrik should indicate each employee's retrenchment package.

In response to the retrenchment of staff at the Lawley Plant, Corobrik, in consultation with the union, agreed to the following steps:

- A list of 24 volunteers for retrenchment was agreed upon. Those who submitted their names, but who wish to withdraw their offer of voluntary retrenchment would be allowed to do so.
- Information on severance packages was drawn up and was made available at the office of the Wage Clerk.
- The opportunity was created for those taking voluntary retrenchment to engage in other forms of business with Corobrik. Corobrik undertook to consult with its materials management Department to establish if there are any business ventures which could be conducted on a micro basis
- Corobrik offered training courses (bricklaying etc) for those taking voluntary retrenchment at its Midrand Brick School.

[196] Interview with Mr. John Anthony, and UNFCCC, Lawley PDD, 2005, p 40.

The relevance of the discussion of the stakeholders who are affected by the implementation of the CDM project is to demonstrate whether the company implementing the project did indeed conduct a consultative process and ensure that there was no negative impact on stakeholders (as a consequence of project implementation). The above discussion indicates that Corobrik complied with this aspect of project implementation.

Sustainable development Criteria

One of the arguments for this project was that it would improve the general working and environmental health conditions at the plant. The improvements are attributed to the reduction in the airborne particulate levels at the plant resulting from the combustion of coal. Such benefits, together with the GHG emission reductions and economic benefits of the project meet the sustainable development objectives of the SA Government as required for host country approval by the South African Designated National Authority. Despite the initial loss of jobs as a result of the fuel switch, provisions were made by the firm to provide alternative training for the workers who would be affected by the CDM project, thus complying with South Africa's SD criteria.

Validation

Project validation was undertaken by the DOE, which was Det Norske Veritas Certification Ltd (DNV). According to the *request for validation* document (obtained on the UNFCCC website) this project underwent successful validation and its PDD was reviewed against criteria in Article 12 of the KP, the CDM modalities and procedures as agreed in the Marrakesh Accords, as well as the approved consolidated baseline and monitoring methodology AM0008[197] and the relevant decisions by the CDM EB.[198]

The validation of the project consisted of the following three phases: a desk review of the project design document; follow-up interviews with project stakeholders; and the resolution of outstanding issues and the issuance of the final validation report and opinion. The Lawley validation report findings comprised an extensive checklist of institutional and environmental criteria that the PDD was evaluated against. In areas where the PDD fell short, 'corrective action requests' were sent to the firm, and revisions of the PDD were undertaken. The findings of the validation report were positive.

[197] DNV, 2005: 1, 6
[198] DNV, 2005: 6.

Monitoring and Evaluation

According to the PDD, before the start of the crediting period of the project activity, the following procedures were developed and implemented:

- Establish and maintain data measurement, collection and record keeping systems for landfill gas collection and Sustainable development indicators;
- Quality assurance procedures for internal and external data acquisition;
- Develop and establish management and operations system;
- Procedures for storing and maintain records (paper trail);
- Training procedures to enable operational staff to meet the needs of this MP;
- Procedures for calibration of monitoring equipment;
- Procedures for maintenance of monitoring equipment;
- Procedures for project performance review before submitted for verification;
- Procedure for corrective actions to improve future monitoring and reporting;
- Emergency Preparedness Procedures.

The Monitoring and Verification Plan describes the procedures for data collection, and auditing required for the project, in order to determine and verify emissions reductions achieved by the project.[199] According to the project developers, this project requires a straightforward collection of data, most of which is already collected routinely by the staff of Corobrik's Lawley Plant, where the CDM project is. In addition, the company maintains its existing internal programs related to social and environmental quality, which also serve as indicators of the company's commitment to social and environmental quality.

Additionality

According to the PDD, the proposed CDM project will reduce the emission of CO_2 by replacing coal with natural gas as thermal fuel in the brick baking kilns at the Lawley plant. Reduced coal consumption at the plant further reduces the fugitive methane emissions associated with coal mining and post mining activities. In addition, transport related emissions are also reduced since the need to transport coal is vastly reduced. The Lawley plant will still use a small amount of coal which is added to the brick body (mixed with the clay prior to baking) for quality and aesthetic purposes. In the project case, the amount of

[199] DNV, 2005: 7-8.

body coal used is 4% by weight, which more than in the baseline case when only 3.5% body coal is added to the clay.[200]

However, the use of natural gas at the site would increase methane emissions in the natural gas pipeline supplying the site and from gas leaks at the project site. These fugitive CH4 emissions were included in the project emissions calculations. Thus, the project encompasses the reduction of both CO2 and CH4 emissions. The combustion of fossil fuels also produces some NO_x emissions but in both the project and baseline cases these emissions are very low.[201]

The CO2 emissions reduction thus results from:

- natural gas combustion replacing of coal combustion in the kilns;
- Reduced use of diesel powered road transport due to reduced coal consumption.

The CH4 emission reduction thus results from:

- reduced coal consumption at Lawley;
- Natural gas combustion replacing of coal combustion in the kilns.

In South Africa coal is a much cheaper energy source than natural gas, and is also far more accessible. In addition, the conversion from coal to gas required significant investment in new capital equipment. The additional investments and the higher cost of natural gas per unit of energy implies that the project will not be cost effective on its own, in the absence of the income from the sale of GHG emission reductions. The baseline for the project is founded on the assumption that in the absence of carbon finance Corobrik would continue to operate the plant with coal, as is the case in the sector as a whole. Thus, the proposed project activity is not the project baseline and the calculated GHG emission reductions would not occur in the absence of it.

Environmental Impacts

No significant negative environmental impact is expected from project activities as was found by the environmental impact assessment on the gas pipeline extension and conversion of the factory from coal to gas. Due to the increased efficiency of the baking process using natural

[200] UNFCCC, PDD, 2005
[201] Interview with Mr. John Anthony.

gas the 'yield' of the plant also increased by some 10%. Yield refers to the number of 'first class' bricks produced. When using coal a portion of the bricks were damaged and could not be sold at the same price as first class bricks. This increase in yield is and concomitant increase in profit has been taken into account it the NPV[202] calculations for the project.

The fuel switch has positive environmental impact. Reduced coal consumption in turn reduces negative environmental impact at the mining site. Moreover, the environmental impact of coal transport (by diesel trucks) from mines to the project site is eliminated. Finally, coal burning produces a number of gaseous and particulate emissions which are local air pollutants. The particulate emissions are almost completely eliminated by switching to natural gas thus vastly improving local environmental health and working conditions at the factory.

According to interview respondents, the CDM project has increased the environmental sustainability of the firm. Better air quality and better health of the workers was cited as positive side effects of implementing the project. As a result of the fuel switch there was no excess ash residue on the bricks, which in turn was cited by a respondent as having a positive effect on the export of bricks overseas.

From a technical perspective, the fuel switch technology was easy to work with once it was implemented and fine-tuned. There was also a better colouring and enhanced yield of the bricks. Corobrik was using an old gas burner which was difficult to maintain in terms of parts and skills/knowledge. Also, it was becoming more difficult to source the right type of coal locally.

> "The new gas burner is easy to maintain in terms of skills and parts. This saves in time and resources, as there is no need for manual adjustments with the new technology."[203]

According to the production manager, Mr Lucas Masolo, the new technology was cleaner:

> With the old way, coal was burned and converted to a producer gas to fire on the kilns. This method was messy – in addition to dirty gas being used, a lot of maintenance was required on the burners. With the new clean gas being used, no maintenance or cleaning is required, which saves Corobrik time and resources.[204]

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[202] UNFCCC, Lawley PDD, 2005
[203] Interview with Mr. Lucas Masolo, Production Manager, Lawley Factory.
[204] Interview with Mr. Lucas Masolo, Production Manager, Lawley Factory.

According to Mr Masolo, the new switch is safer as well. In case of fire, there are many fail-safes to cut off the gas supply. With the old coal-fired gas producer, he explained that it would have been difficult to cease combustion in case of an emergency.[205]

According to South African regulations, an Environmental Impact Assessment (EIA) was done for the following activities:

- The construction, commissioning and operation of an extended gas pipeline for the transportation of the natural gas,
- The gas pipeline for the transportation of natural gas would be extended by about 4.5km from a tie in point in an existing Sasol supply network
- The EIA found that the project area was not environmentally sensitive and that no significant impact on fauna and flora are expected. Based on the EIA the project was approved (Reference Number GAUT 002/04-05/253). The relevant Authority (Gauteng province Department of Agriculture, Conservation and Environment) has provided a formal notice that the project complies with all EIA requirements.

CERs

Years	Annual estimation of emission reductions in tonnes of CO_2 eq
2005	19 159
2006	19 159
2007	19 159
2008	19 159
2009	19 159
2010	19 159
2011	19 159
2012	19 159
2013	19 159
2014	19 159
Total estimated reductions (tonnes of CO_2 e)	191 590
Total number of crediting years	**10**
Annual average over the crediting period of estimated reductions (tonnes of CO_2 e)	**19 159/annum**

Taken from the PDD, Lawley Fuel Switch Project[206]

The Corobrik Lawley CDM project received 35 130 CERs for their 2005-2006 reporting period.

> The funds received [from the CERs] go back to Lawley to offset the costs of financing the project.[207]

[205] Interview with Mr. Lucas Masolo, Production Manager, Lawley Factory.
[206] UNFCCC, Lawley PDD, 2005: 8.
[207] Interview with Mr John Anthony.

The CERs from this project were sold to Statkraft, a German-based electricity producer. This purchase agreement is a long term deal for the duration of the life of the Lawley CDM projects. As a CDM project, verification is undertaken by DOEs, project developers and the UNFCCC's CDM EB. The applicable baseline methodology in this project is the AMC 008. In addition to a reduction of GHGs, the project has other benefits, cited as improved environment and better working conditions for employees (health and safety).

According to Mr Anthony, the methodology had undergone a technical change after the project was registered with the CDM EB. Whilst the change in methodology did not affect the CER issuance and verification for the 2005-2006 reporting period, it has affected the 2007-2008 reporting period. The result of the methodology change has been that the Lawley project may apply for more CERs. This change in methodology was instituted by the CDM EB as part of its regular technical reviews.

The CERs are traded on the EU ETS. Regarding the voluntary market, Corobrik stated during the interview that it has no intention to pursue this as an alternative to the CDM projects:

> We're aware of it, but we are not pursuing it.[208]

Analysis

Overall, the Lawley Fuel Switch Project meets with the institutional effectiveness criteria as identified earlier in this research report. The project developers were as thorough as possible in compiling the necessary data for baseline calculations, the report submissions to the UNFCCC's CDM Executive Board complied with all the necessary regulations and all deadlines were met. In terms of environmental effectiveness, the project meets the acceptable criteria for sustainable development. This has been corroborated by independent verifiers (Det Norsk Veritas), and the reports have undergone rigorous assessment by the CDM Executive Board. What would be of interest, for a possible future study, would be to assess the effects five to ten years after implementation. For instance, what happened to the workers who had chosen to undergone training, and those who had opted for retrenchment instead? Granted, the firm ensured that there was very little negative impact by offering alternatives in this regard, but the long term effect of this consequence would be worth assessing at a later stage in the overall regime effectiveness. The overall cost of the project was high, and if there

[208] Interview with Mr. John Anthony.

had been less bureaucratic hurdles, then it is likely that the project would have been implemented faster, and at a lower cost. It must be noted, however, that a recommendation for less bureaucratic hurdles does not equate to a recommendation for less monitoring, evaluation, or even less stringent standards. Rather, it has been observed from the research interviews conducted that the entire process could have been more expedient if there had been a local Designated Operational Entity within the country. However the counterargument to this is that there are insufficient CDM projects within South Africa to merit a local DOE presence. Yet, if there was a local DOE, projects would be processed more expediently, at a lower institutional cost. This in turn could serve as an incentive for other firms within South Africa to consider implementing CDM projects (if the institutional and transactional costs were lower).

4.2. The Sasol Nitrous Oxide Abatement Project

Description

Nitrous Oxide (N_2O) is an undesired by-product gas from the manufacture of nitric acid. Nitrous oxide is formed during the catalytic oxidation of Ammonia. Over a suitable catalyst, a maximum 98% (typically 92-96%) of the fed Ammonia is converted to Nitric Oxide (NO). The remainder participates in undesirable side reactions that lead to the production of Nitrous Oxide, among other compounds. Waste N2O from nitric acid production is typically released into the atmosphere, as it does not have any economic value or toxicity at typical emission levels. N_2O is an important GHG which has a high Global Warming Potential (GWP) of 310. The project activity involves the installation of a secondary catalyst to abate N_2O inside the reactor once it is formed.[209]

The project activity falls within the CDM *Sectoral scope*: '(5) Chemical industries'. The project activity is located at two nitric acid plants owned by Sasol. The smaller unit (557 tonnes per day) is located in Sasolburg and the other nitric acid plant (860 tonne per day) in Secunda. The selected methodology is the version 2 of AM0034 'Catalytic reduction of N2O inside the ammonia burner of nitric acid plants'.[210]

[209] UNFCCC, SASOL PDD, year: pg nr.
[210] Ibid.

The project activity involves the installation of a new (not previously installed) catalyst below the oxidation gauzes (a 'secondary catalyst') whose sole purpose is the decomposition of N2O; the secondary approach has the following advantages:

- The catalyst does not consume electricity, steam, fuels or reducing agents (all sources of leakage) to eliminate N2O emissions; thus, operating costs are negligible and the overall energy balance of the plant is not affected.
- Installation is relatively simple and does not require any new process unit or re-design of existing ones (reactor basket needs some modifications to accommodate the new catalyst).
- Installation can be done simultaneously with a primary gauze changeover; thus, the loss in production due to incremental down time will be limited.
- Considerably lower capital cost when compared to other approaches.

The selected technology has been developed by W.C. Heraeus GmbH[211] (Hanau, Germany; hereafter called "Heraeus"). Heraeus has developed a "secondary" catalyst that decomposes N_2O without affecting Nitric Acid production. The PDD underwent five revisions before being successfully approved and registered by the CDM EB on the 31 January 2007.[212]

Stakeholders

The Republic of South Africa is the Host Party. The private entity is Sasol Nitro, which is a division of Sasol Chemical Industries Limited. In this project, the South African government is not considered to be a project participant.

Stakeholders in proximity to the project were invited to participate in the stakeholder consultation process. Several documents were delivered to each of them (by fax or e-mail):

- A letter inviting them to participate,
- An executive summary of the proposed project; and
- A survey document for completion by the stakeholder.

Stakeholders were to submit their commentary within seven days. After this period, stakeholders who didn't respond were contacted again and requested several times for comment with an additional 14 day response period allowed. In addition to contacting

[211] Ibid.
[212] Ibid.

specific stakeholders, an article of the proposed project was placed in two local publications, one in Secunda and the other in Sasolburg. The article described the project and invited any person to submit comment. It also invited the public to attend a public presentation of the project which was conducted at Sasol Nitro's offices in Secunda and Sasolburg respectively. The specific stakeholders were also contacted individually with an invitation to attend the public presentation.[213]

Additionality

The additionality of the project activity was demonstrated and assessed using the "Tool for demonstration and assessment of additionality".[214] Steps used to demonstrate additionality include: Investment Analysis, Common Practise Analysis, and the Impact of CDM Registration analysis. In the investment analysis, as catalytic N2O destruction facilities generates no financial or economical benefits other than CDM related income, a simple cost analysis was applied. According to the project scenario no income from any kind of potential product or by-product **except CERs** are able to pay back investment costs as well as running costs for the installation of the secondary catalyst as no marketable product or by-product exists.

In the common practice analysis, Sasol argued that the proposed project activity was not common practice since no similar project at nitric acid plants was identified in South Africa (at the time of registering this PDD).[215] The nitric acid industry typically releases into the atmosphere the N_2O generated as a by-product, as it does not have any economic value or toxicity at typical emission levels. N_2O emissions in the stack gas can be considered the business-as-usual activity and it is spread all over the country. Moreover no nitric acid plant in South Africa has a secondary catalyst (or any other type of N_2O abatement technology) currently installed (at the time of registering the PDD).

The Impact of CDM Registration analysis entailed a consideration of the baseline scenario, which is:

[213] ibid
[214] ibid
[215] Interview with Mr. Herman van der Walt, Sasol.

'The continuation of the current situation' will neither require any additional investments costs nor any additional running costs[216].

Therefore, the proposed CDM project activity is, without the revenues from the sale of certified emission reductions, obviously less economically and financially attractive than the baseline scenario. Without the sale of the CER's generated by the project the NPV and IRR of the project is negative, no revenue would be generated and the technology would not be installed. The secondary catalyst technology when installed will reduce the Nitrous Oxide emissions by up to 90% below what they would otherwise be without the catalyst technology installed.[217]

The proposed CDM project activity is undoubtedly additional, since it passes all the steps of the 'Tool for demonstration and assessment of additionality', approved by the CDM EB. No income from any kind of potential product or by-product except CERs are able to pay back investment costs as well as running costs for the installation of the proposed project activity as no marketable product or by-product exists. The registration of the project activity as a CDM project and corresponding CER revenues are the single source of project revenues. CDM registration is therefore the decisive factor for the realization of the proposed project activity. According to an interviewee, proving the additionality with N_2O in this project was 'easy' when compared to another CDM project that Sasol is involved in.[218]

Sustainable development criteria

According to the PDD, the project contributes to the Sustainable development in SA through industrial technology transfer (the catalyst technology from a developed country being adopted in South Africa).[219] The project also reduces N_2O emissions and does not increase nor decrease direct emissions of other air pollutants. The project does not impact on the local communities or access of services in the area. More importantly the project does not cause job losses at Sasol's plants. In a detailed assessment of the sustainable development criteria in the PDD, this CDM project meets sustainable development criteria on all eight criteria and 26 indicators.[220]

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216 Interview with Mr. Herman van der Walt, Sasol.
217 Sasol, Project Design Document
218 Interview with Mr. Herman van der Walt, Sasol.
219 ibid
220 As per the Department of Energy's definition, see Annex 6 of the Sasol PDD, pages 73-76.

Validation

On the 13 and 14 December 2006, Det Norske Veritas[221] performed interviews with project stakeholders to confirm selected information in the PDD and to resolve issues identified in the document review. Representatives of SASOL Nitro were also interviewed.[222] Based on the recommendations in the Validation and Verification Manual[223], the validation team applied a risk-based approach to this CDM project, focusing on the identification of significant risks for project implementation and the generation of CERs.[224]

Monitoring and evaluation

The monitoring plan took into account baseline emissions and project emissions, considering the quality control and quality assurance for data monitoring. Both the nitric acid plants have installed continuous gas analysers and flow meters in the stack. According to the PDD, the European norm EN14181:2004, which is referred to in the approved methodology AM0034, was used and all three levels of quality assurance are clearly described in the PDD as comprising the following:

- QAL 1: Suitability of the AMS for the specific measuring task;
- QAL 2: Validation of AMS following installation;
- QAL 3: Ongoing quality assurance during operation.[225]

The QAL 2 tests, including measurements with a standard reference method, are performed by a laboratory which has an accredited quality assurance system according to EN ISO/IEC 17025. The QAL 2 tests will be performed prior to finalisation of the baseline campaign.

Details of the data to be collected, the frequency of data recording, its certainty, and format are described in the PDD and verified in the validation report. The authority and responsibility for registration, monitoring, measurement and reporting are also clearly described. According to the validation report, both Sasolburg and Secunda plants are ISO

[221] Det Norske Veritas, 2007. Validation Report: "Sasol Nitrous Oxide Abatement Project" in South Africa. Report No. 2007-0195, Revision No. 01., p. 5.
[222] Det Norske Veritas, 2007. Validation Report: "Sasol Nitrous Oxide Abatement Project" in South Africa. Report No. 2007-0195, Revision No. 01., p. 5.
[223] Ibid.
[224] Det Norske Veritas, 2007. Validation Report: "Sasol Nitrous Oxide Abatement Project" in South Africa. Report No. 2007-0195, Revision No. 01., p. 5.
[225] Det Norske Veritas, 2007. Validation Report: "Sasol Nitrous Oxide Abatement Project" in South Africa. Report No. 2007-0195, Revision No. 01., p. 6

9001:2000 and ISO 14001:1996 certified.[226] All necessary procedures related to the monitoring of the project were also fully integrated into Sasol's quality and environmental management system.

Environmental Impacts

According to the PDD for this project, no significant negative environmental impacts are expected from the implementation of the project activity. An environmental impact study is not required by South African authorities.[227]

After project implementation, waste N_2O is converted into N_2 and O_2 avoiding the high global warming effects of the GHG. The installation of secondary catalysts has a positive environmental impact because it reduces N_2O emissions to the atmosphere and thereby results in cleaner overall air quality. The project activity involves the installation of a secondary catalyst system inside the reactor immediately underneath the primary gauze system. The exhausted catalyst will be removed and replaced by the technology provider, who has developed the selected technology. No waste liquids, solids or gases are generated by using this technology. No further environmental impacts are expected. Then, an Environmental Impact Assessment (EIA) is not necessary for this activity as it is stated in the national regulation. Sasolburg and Secunda nitric acid plants are in compliance with the Atmospheric Pollution Prevention Act of the Republic of South Africa, which covers NOX regulations, as indicated in Air permits 238-1 and A1308/1 (for Sasolburg and Secunda, respectively).[228]

CERs

Total emissions reductions are estimated to be 960,322 tonnes CO_2e/year for the first seven-year crediting period.

[226] Det Norske Veritas, 2007. Validation Report: "Sasol Nitrous Oxide Abatement Project" in South Africa. Report No. 2007-0195, Revision No. 01., p.7-8.
[227] Sasol, Project Design Document
[228] Ibid.

Year	Annual estimation of emission reduction in tonnes of CO_2e		
	Sasolburg	Secunda	Total
Year 1	515,837	444,485	960,322
Year 2	515,837	444,485	960,322
Year 3	515,837	444,485	960,322
Year 4	515,837	444,485	960,322
Year 5	515,837	444,485	960,322
Year 6	515,837	444,485	960,322
Year 7	515,837	444,485	960,322
Total estimated reductions (tonnes of CO_2e)	**3,610,859**	**3,111,395**	6,722,254
Total number of crediting years		7	
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	515,837	444,485	960,322

Adapted from PDD, Sasol Nitrous Oxide Abatement Project.[229]

The expected operational lifetime of this project is 25 years. The first crediting period began on the 1 May, 2007, and will last seven years.

According to an interview respondent, the CERs belong to the specific business unit (that implemented the project) within Sasol Limited. In earlier years, the business unit would sell its CERs to Sasol Limited. This has changed, and now CO_2 credit management committee consolidates all the CERs. This committee then either sells the CERs to other Sasol business units/subsidiaries that are based in Annex 1 countries (so that they may comply with their country's own KP commitments) or the committee sells the CERs and invests the proceeds in research and development of new energy alternatives.[230]

Analysis

The implementation of the Sasol CDM project is far more technical and complex than the Lawley project. Both are fuel switch projects, but the Sasol one has a longer operational lifetime. By virtue of being awarded carbon credits, the project proves that it complies with criteria laid out by the UNFCCC, thus in a nutshell; it meets with institutional effectiveness criteria. Regarding environmental effectiveness, the project documents state that there are no negative impacts on the environment, and this is corroborated by the validation report. As a fuel switch project, the switch is to a considerably cleaner gas, thus less harmful on the environment. It must be noted, that this Sasol project *does* meet the criteria for additionality

[229] Ibid.
[230] Interview with Mr. Herman van der Walt, Sasol.

according to the CDM Executive Board.[231] However, the project documents state what the project does not do, and has not stated what the project would do. In other words, the text in the PDD submitted to the CDM Executive Board stated that the project "does not" have a negative impact on the environment. The project design document did not discuss what the impact on the labour force or the surrounding communities would be. Moreover the project design document did not discuss what positive initiatives it had set up, or what the positive effects of the project would be (in addition to cleaner energy and carbon credits earned). Although on paper, institutionally, it is effective, it is the opinion of this writer that the long term environmental effectiveness of the Sasol CDM project should be called into question. It is insufficient for a CDM project to state that it does not have a "negative effect" – for a CDM project to truly meet with sustainable development criteria, a positive contribution to the community it finds itself in, should be made. If Sasol have simply neglected to include any information regarding positive contributions that this project made in terms of sustainable development, then it should be supplied by the firm. However, in interviews, and in analysis of the primary documents, no mention of such was made to the writer.

4.3. The Omnia Fertilizer Limited Nitrous Oxide (N2O) Reduction Project

Description

The project site is located in the industrial town of Sasolburg in Free State Province. The project falls under the CDM Sectoral Scope Category 5: Chemical Industries listed in the Sectoral Scopes for accreditation of the operational entities. The project activity uses approved baseline methodology AM0028/Version 01, which has been approved and made publicly available by the CDM Executive Board during its 23rd meeting (Feb. 22 – 24, 2006).[232]

Omnia Group, in business since 1953 and listed in the Chemicals, Oils and Plastics sector of the Johannesburg Stock Exchange is the project operator. The project technology was provided by UHDE GmbH (hereinafter called UHDE), a 100% subsidiary of ThyssenKrupp Technologies AG. UHDE developed a tertiary catalyst based process for removing up to 98% of the N2O from a nitric acid plant's tail gas stream.[233]

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[231] There is another Sasol CDM project in the pipeline that has attracted negative publicity, due to allegations that the additionality criteria were applied retroactively to the project in order to obtain carbon credits.
[232] UNFCCC, Omnia PDD, 2004: 5-7.
[233] UNFCCC, Omnia PDD, 2004: 2.

The PDD underwent two versions before successful registration. The construction phase of the project activity started immediately after the submission of the PDD for validation. The starting date of the project activity was December 2006.[234]

Stakeholders

The process followed to collect stakeholder comments for Omnia's Nitric Acid Plant N2O reduction project was through a survey developed by Omnia in conjunction with its consultant. Stakeholders selected for consultation by Omnia included representatives from local NGOs and representatives from the following government agencies:

- Free State Dept. of Tourism, Environment and Economic Affairs;
- South Africa Dept. of Minerals and Energy (DME);
- SALGA – South Africa Local Government Association;
- SANGOCO – South African NGO Coalition.

Moreover, to ensure that other interested parties were also invited, Omnia published advertisements in both English and Afrikaans in the local *Vaal Ster* newspaper from 22-26 August 2005. The following set of questions was given to stakeholders present at the public information forum:

> 1. In relation with the information that you have and your knowledge about environmental issues, climate change, KP, Clean Development Mechanism, and Global Carbon Market; please express your opinion on the Omnia N2O Reduction Project.
> 2. Would you recommend to other private companies, to develop this kind of project under the Clean Development Mechanism?
> 3. Do you consider that Omnia's N2O Reduction project will contribute to Sustainable development of the region and South Africa?
> 4. Any additional comment that you want to express.[235]

According to the PDD, five questionnaires were completed and submitted at the public forum, and the project was well received and the comments were favourable towards the project.[236] The only issue raised was the question related to the disposal of the spent iron zeolite catalyst and the effect of the project on ground or water quality. Stakeholders were

[234] UNFCCC, Omnia PDD, 2004: 2.
[235] UNFCCC, Omnia PDD, 2004: 54-55.
[236] UNFCCC, Omnia PDD, 2004: 58.

informed that, based on information received from the catalyst supplier, the material was not hazardous and could be safely disposed at the local landfill. Alternately, the local catalyst supplier has agreed to take the catalyst back and dispose of it.[237]

Additionality

Omnia proved successfully to the CDM EB that it meets the additionality criteria by arguing that under the 'business as usual' conditions, the project activity would not be implemented because:

- There are no national or provincial regulations or other legal obligations in South Africa currently in place regarding N_2O emissions. In effect the most current Air Quality Bill, issued in 2005 did not mention N_2O whatsoever. It is highly unlikely that any such limits on N2O emissions would be imposed in the near future.
- The installation of a tertiary N_2O destruction facility required a significant capital investment plus an on-going operating cost for the reducing agent and the periodic replacement of the catalyst. The project activity would not be commercially viable without the revenue from the sale of the CERs.[238]

Omnia's case for additionality is that the CDM project activity will not result in any revenue to the firm other than the income from the sale of CERs. It is expected to reduce up to 98% of the N_2O emissions that would normally be emitted without the project activity. Calculations ex ante emissions reduction, based on the monitoring data over a full crediting period (as calculated in the PDD) indicate that the project activity has the capacity to reduce GHG emissions by 3,948,410 tCO_2e over the first seven year crediting period.[239]

In addition, the project's argument for it meeting additionality criteria includes the following:

- its the first nitric acid plant in South Africa to be registered, with the potential to act as the catalyst to encourage other South African nitric acid producers to implement N_2O reduction measures;

[237] Det Norske Veritas, 2006. Validation Report: Omnia Fertilizer Limited Nitrous Oxide (N2O) Reduction Project in South Africa. Report No. 2006-1196, Revision No. 1, p. 8.
[238] Det Norske Veritas, 2006. Validation Report: Omnia Fertilizer Limited Nitrous Oxide (N2O) Reduction Project in South Africa. Report No. 2006-1196, Revision No. 1, p. 10-11.
[239] Det Norske Veritas, 2006. Validation Report: Omnia Fertilizer Limited Nitrous Oxide (N2O) Reduction Project in South Africa. Report No. 2006-1196, Revision No. 1, p. 13.

- it would create construction jobs for the initial erection of the N_2O reduction facility as well as sustainable employment in maintaining the reduction facility as well as monitoring its performance; and
- it would use a portion of the revenue from the sale of CERs to help alleviate employment and poverty in the municipality where the nitric acid plant is located.[240]

In effect, the project not only fulfils institutional effectiveness criteria but also contributes towards environmental effectiveness through substantially reduced N_2O and NO_x emissions, but social and economic benefits, therefore contributing to the South African government's Sustainable development objectives. By conducting its own analysis of its additionality according to UN guidelines, the project demonstrates its compliance with the institutional criteria. The additionality criteria, which are linked to environmental effects of a project, also ensure that a project contributes to environmental sustainability in its host country.

Sustainable development criteria

The project meets the SA government's sustainable development criteria as set out by the DNA. As such, the project received a Letter of Approval from the Department of Energy which was submitted to the CDM EB as part of the CDM registration process.[241]

Validation

DNV performed the validation, as it had with the other two projects discussed. The validation scope is defined as an independent and objective review of the PDD. The PDD is reviewed against the criteria stated in Article 12 of the KP, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM EB, including the approved baseline and monitoring methodology AM0028.[242] The validation team, based on the recommendations in the Validation and Verification Manual, employed a risk-based approach, which focused on the identification of significant risks for project implementation and the generation of CERs.

Monitoring and evaluation

[240] Det Norske Veritas, 2006. Validation Report: Omnia Fertilizer Limited Nitrous Oxide (N2O) Reduction Project in South Africa. Report No. 2006-1196, Revision No. 1, p. 23-25.
[241] Det Norske Veritas, 2006. Validation Report: Omnia Fertilizer Limited Nitrous Oxide (N2O) Reduction Project in South Africa. Report No. 2006-1196, Revision No. 1, p. 37.
[242] Det Norske Veritas, 2006. Validation Report: Omnia Fertilizer Limited Nitrous Oxide (N2O) Reduction Project in South Africa. Report No. 2006-1196, Revision No. 1, p.

Prior to its CDM registration the Omnia project had already been using existing monitoring methodology. This methodology was approved and made publicly available by the CDM Executive Board at CDM EB 23 on the 22-24 February 2006. The monitoring methodology is designated as AM0028/Version 01 and entitled: *Monitoring Methodology for catalytic N2O destruction in the tail gas of Nitric Acid Plant*.[243]

The technical process for the monitoring is as follows:

- Emissions are monitored by a single component multichannel infrared analyser, a venture to measure tail gas flow and other instrumentation to monitor temperature and pressure.
- Data acquisition and storage is performed by the DCS which also controls the operation of its reactor. Data is stored at one minute intervals.
- Data storage is redundant. On a weekly basis, the data stored will be transferred to Omnia's secure storage facility in Johannesburg. Electronic data will be maintained for a period of 2 years beyond the life of the project activity.
- In addition, a shift process leader also takes separate readings of the N_2O data electronically on the computer's hard drive and the back-up system.
- Monitoring equipment is maintained by Omnia's instrumentation technician. The accuracy of the N_2O emissions monitoring results is ensured by installing, operating and maintaining a monitoring system that has been certified to meet or exceed the best industry practices.[244]

Environmental Impacts

The project implementation involved installing a catalytic N_2O DF in the tail gas of the nitric acid plant plus piping to supply ammonia and natural gas. The natural gas is required as a reducing agent for NO_x removal, as the DF works best at low NO_x levels, and the ammonia is required as a reactant with the catalyst to destroy the N_2O. Additionally, the installation will also include all of the flow, temperature and pressure monitoring equipment as required to accurately calculate the baseline and project GHG emissions. This work is readily done off line and connected to the main tail gas pipe during a minor plant shutdown for replacement of

[243] Det Norske Veritas, 2006. Validation Report: Omnia Fertilizer Limited Nitrous Oxide (N2O) Reduction Project in South Africa. Report No. 2006-1196, Revision No. 1, p.
[244] Det Norske Veritas, 2006. Validation Report: Omnia Fertilizer Limited Nitrous Oxide (N2O) Reduction Project in South Africa. Report No. 2006-1196, Revision No. 1, p.

the precious metal gauzes. According to the PDD, the environmental impact of these activities was expected to be insignificant.[245]

According to project validation, the installation of a catalytic N_2O destruction facility in the tail gas has a positive environmental impact because it reduces N_2O emissions to the atmosphere as well as NO_x up to 98%. This results in cleaner overall air quality in the Sasolburg area. According to the PDD, no significant negative environmental impact is expected from the project activities and an environmental impact assessment (EIA) is not required by the provincial South African authorities.[246]

CERs

The project activity has the capacity to reduce GHG emissions by 3,313,368 tCO_2e over the first 7-year crediting period as shown in table 3 of the original Project Design Document, shown below:

Table 3: Emission Reduction During the First 7-year Crediting Period	
Year (1)	**Annual Estimation of Emissions Reduction (tCO_2e)**
2008	479,391
2009	488,455
2010	458,904
2011 (2)	451,191
2012	488,455
2013	479,391
2014	467,580
Total Estimated Reductions	**3,313,368**
Total number of crediting years	**7**
Annual Average of estimated reductions over the crediting period	**473,338**
Notes: (1) Year is defined as the time period between April 1 and March 31 of subsequent year (2) Reduced production for this year is due to the 21 day major plant shutdown that occurs every 5 years vs the normal 7 day/yr minor shut down.	

Adapted from PDD, Omnia[247]

As there is no leakage to be considered, the project activity emissions are 292,391 tCO_2e over the seven year crediting period, as per table 7 of the original PDD, shown below:

[245] UNFCCC, Omnia PDD, 2004: 53-54.
[246] Det Norske Veritas, 2006. Validation Report: Omnia Fertilizer Limited Nitrous Oxide (N2O) Reduction Project in South Africa. Report No. 2006-1196, Revision No. 1, p.
[247] UNFCCC, Omnia PDD, 2004:

Table 7: Ex-ante Project Emissions				
Year [1]	Emissions from N_2O not destroyed (tCO_2e)	Emissions from natural gas used (tCO_2e)	Emissions from NH_3 used (tCO_2e)	Total Project Emissions (tCO_2e)
2008	30,731	1,276	789	32,797
2009	31,312	1,300	804	33,417
2010	51,219	1,276	789	53,284
2011	50,358	1,255	776	52,389
2012	31,312	1,300	804	33,417
2013	30,731	1,276	789	32,797
2014	52,187	1,300	804	54,292
Total	**277,851**	**8,983**	**5,556**	**292,391**

Notes:
(1) Year is defined as the time period between April 1 and March 31 of subsequent year

Adapted from PDD, Omnia[248]

The IFC, a member of the World Bank Group, has committed to purchase a minimum 50% of all Omnia's CERs for five years and will guarantee the delivery of the credits to potential buyers.

Omnia Fertilizer, through its Sasolburg plant, will generate approximately 420 000 CERs per annum. The carbon credits are expected to add R60million to the Group's revenue annually.[249]

Analysis

Although the Omnia project has comparatively similar levels of technical complexity to the Sasol project, this project provides a more detailed, explicit discussion of its environmental impact within the affected area. Despite this discussion, the project design document lacked a sufficient discussion of its contributions to sustainable development. The South African government had stated that it did not require an environmental impact assessment, according to its criteria for sustainable development. In addition, there was no need for a long term monitoring and evaluation assessment of the environmental impact of the project, according to the South African DNA. By all indication, this would imply that the project received favourable recommendations from all stakeholders involved, and, based a review of the PDD, and the independent verification thereof, the project is credible and has earned its registration (and subsequent CERs). However, the long-term impacts of the project should be considered. If environmental effectiveness is to be truly assessed, then the project's monitoring and

[248] UNFCCC, Omnia PDD, 2004:
[249] Omnia Press Release, 2006. Omnia and IFC announce landmark Carbon Trading transaction. Accessed at http://www.omnia.co.za/pebble.asp?relid=1187#

evaluation should consider environmental impacts of the medium to long term effects of the projects.

5. Key Findings

The findings of these case studies corroborate the findings of many other studies regarding CDM projects worldwide. The trend in South Africa is towards fuel switch projects are easier to implement and whose carbon emission reductions are easier to achieve. This, in itself, is not bad, as it is still evidence of attempts to mitigate carbon emissions on a domestic level, thus increasing international cooperation, and providing the South African negotiators more bargaining power at international for a. more bargaining power ensures that the next international climate change agreement is one that will include South Africa's national interests. However, the SA government needs to "come to the party" (to use a pejorative term). It is one thing for the government to pledge a commitment, but it is important that whatever pledge is made, should be a feasible pledge that can be operationalised and implemented within the provided timeframe. Given South Africa's energy challenges, lag in CDM implementation, and lag in diversifying the energy mix, it is doubtful that the country will uphold its pledge made to the Copenhagen Accord. However, this is where the CDM projects present an opportunity in both diversifying the energy mix and also in reducing domestic emissions levels, while also providing a financial incentive that can offset the costs of CDM implementation (in addition to making a legitimate profit). The projects discussed in this chapter have undergone stringent verification and validation, and illustrate the aforementioned opportunities.

There are barriers to the expedient implementation of CDM projects. Such barriers include institutional constraints, (such as a lack of necessary data, a lack of skilled personnel involved in the project life-cycle), and DOE approval (which can be lengthy). There are also high standards to these projects which add to their credibility and environmental effectiveness. Moreover, the SA government's criteria for sustainable development, and the adherence of local CDM projects to these criteria, ensure that genuine reductions take place through CDM implementation in SA, and that employment and public health of communities affected by these projects are safeguarded.

However, barriers remain, and must be resolved. Transactional costs are a critical barrier, as firms have found that delays in the implementation of CDM projects have cost them more

money. The bureaucracy of the CDM EB (especially in reviewing the methodology) is another barrier. Whereas the reviewing of methodology adds to the overall credibility of the CDM, implementing the methodology changes on operational CDM projects can either reduce or increase the amount of CERs to be issued, which can influence the CER revenue of a project, and add to the risk profile of a project.

According to an interviewee, it was explained that many executive boards of firms are still highly sceptical of the CDM process and transactional costs involved. As long as the CDM EB feeds this uncertainty by not increasing communication regarding changes in project methodology, then the perceived risk will remain high, and the uptake of CDM projects in SA will continue to lag behind other emerging powers. As stated by the interviewee:

> When CERs end up being less due to a change in methodology, the revenue stream can decrease, and this can put people out of business.[250]

The lack of capacity is another factor that hinders expedient processing of projects along the CDM pipeline. There is no local DOE, and overseas-based DOEs do not place a high priority on processing South African CDM projects.[251] This is turn increases the time lag of a project which increases the financial risks associated with implementing such projects.

Communication between the DOE and the firm was not always as clear as it should have been, and was seen as a constraint in implementing the project. An interview respondent (who wished to remain anonymous on this comment) made the following recommendation: formalise the communication process, whereby the project developer can give clarity to a reviewer on the CDM EB or on the CDM Methodology Panel.[252]

The previous carbon market bubble of 2006-7 is also a factor in the perceived risk surrounding CDM projects.[253] Firms are wary of committing huge amounts of money into a project whose value could diminish due to market volatility. Granted, the CDM has encountered a number of challenges and weaknesses, and has been criticised on its unequal regional distribution of projects, lack of concern about environmental integrity and actual technology transfer, complex governance procedures, and questions about the CDM's

[250] Interview with Mr. Herman van der Walt, Sasol.
[251] Interview with Ms Harmke Immink, Promethium Carbon, August 2010.
[252] Anonymous, 2011. Interview,
[253] Niemack and Chevallier, 2010: 7

contribution to Sustainable development. CDM project cycles are also complex and require extensive specialist knowledge. To ensure that the CDM accomplishes the important goals it is intended to fulfil, numerous safeguards and checks have been included in the rules of its implementation.[254] However, the stringent regulatory framework and lengthy time period for verifying methodology and validating CER issuances have been perceived as barriers to CDM market entry (particularly for Africa) as these factors influence the price of CERs, which are explored in the following chapter.

[254] The CDM: A User's Guide. Chapter 2: Going Through the CDM Process. Page 20.

Chapter Five: Emissions Trading

1. Introduction

The rationale for including emissions trading (despite scant implementation of it within South Africa), in this report is due to the following: emissions trading is the "end destination" for the carbon credits which are generated through emissions reductions in CDM projects; carbon markets are a platform for such credits, and the establishment of one can generate additional revenue for stock exchanges; and thirdly, the establishment of a local carbon trading can act as an incentive for increasing the implementation of CDM projects. These reasons, although overlapping, also explain the link between CDMs and emissions trading.

This chapter focuses on the nature and extent of South Africa's participation and compliance with the climate change regime through emissions trading, commonly referred to as carbon trading. It begins with an overview of existing global practices within carbon trading. This is followed by an examination of South Africa's position as a non-Annex country under the KP and the implications thereof. This entails a description of the existing domestic legislation and policies within the public and private sector that pertain to carbon trading. As it is logically impossible to assess whether carbon trading has been effective in terms of the climate change regime, owing to the relatively short time-span in which it has been operational and owing to the uncertain future of emissions trading post-2012, this chapter will instead review the initial goals of emissions trading as a part of the climate change regime, and discuss its current effects. This chapter will provide a critical review of emissions trading, from a global and local perspective, before concluding with a cursory assessment of the prospects for increased carbon trading within South Africa.

2. Overview of existing global practices within carbon/emissions trading

2.1. Carbon trading

Carbon trading was formalised by the KP during 1997. It places a cap on the carbon emissions of developed countries (Annex 1 countries) according to 1990 annual levels, with the goal of reducing emissions from developed countries. Emissions can be reduced by the implementation of environmentally friendly technology in factories. In circumstances where this is cost prohibitive, carbon offsets are used. This occurs through the purchasing of carbon credits from other companies who reduce carbon emissions through the use of alternative technology, in order to offset (reduce) one's own emissions levels.

Carbon trading works through the purchase or sale of emission permits that have been distributed by a regulatory body or generated by a carbon emissions reduction project. GHG emissions reductions are traded in carbon credits, which represent the reduction of GHGs equal to one metric tonne of CO_2 (tCO_2e). Each gas is rated according to its *global warming potential* (GWP).[255] By assigning a GWP value it also enables policy makers to compare the impacts of emissions and reductions of different gases. For instance, methane (CH_4) is a significant contributor to the greenhouse effect and has a GWP of 21. This means methane is approximately 21 times more heat-absorptive than carbon dioxide per unit of weight. N_2O has a GWP of 310. Thus every tonne of N_2O that is reduced through a CDM project is equal to 310 credits (the type of credits depending on the type of emissions standards used by the specific project).

2.2. Carbon markets

Carbon markets and exchanges deal with carbon and/or emission credits that are verified and generated through the CDM. CDMs are projects, funded by foreign governments or MNCs, whose objective is to reduce carbon emissions and generate carbon credits. Such projects use clean technologies to capture or convert GHGs. The amount of carbon that is captured or converted is measured (using various techniques). A certified emissions reduction (CER) is generated for each ton of carbon that is stored or reduced/saved. These credits are then traded on various carbon markets and exchanges around the world.

2.3. Carbon trading and carbon markets

Carbon trading involves the selling and purchasing of emissions credits generated by a carbon reduction project and distributed through a market or exchange. These trading initiatives are intended to increase the participation of the private and public sector in investments that enhance the mitigation of GHGs. A carbon credit, or CER is generated for each ton of carbon that is captured or prevented.[256] CERs are interchangeable with several other kinds of carbon credit, although the extent of this varies depending on who is buying and what other types of credits are being exchanged. For example, in the EU, credits are created by companies that have managed to bring their emissions below a certain level, based

[255] *The GWP of a GHG is its effect on climate change relative to a similar amount of CO_2. It is divided into a three-part "time horizon" of 200, 100 and 500 years. As a base unit CO_2 has a value of 1.0 across each time horizon, which allows the six GHGs regulated under the Kyoto Protocol to be converted into common CO_2 equivalents.*

[256] One CER represents the reduction of GHG equal to one metric tonne of CO_2 ($t\ CO_2e$)

on EU 'allowances' (EUAs) granted by their governments. The EU allows companies that have exceeded their EUA to make up the shortfall by either purchasing EUAs from other companies with a surplus, or by buying carbon credits such as CERs. However, many EU national governments have imposed limits on the substitutability of CERs for EUAs, at 25% of the total requirement.[257]

Carbon markets are divided into the following categories depending on the types of standards and methodology used in their verification:[258]

- **Compliance markets**

  This is for those who trade their allowances or buy CERs to meet their legal or KP treaty requirements. These markets adhere to stringent regulatory and verification methods and standards, such as the Gold Standard, and projects that undergo this type of verification take longer to generate carbon credits. These credits are traded on the European Union Emissions Trading Scheme (EU ETS).

  The reduction will be achieved partly within the EU emissions trading scheme, and partly by steps taken in other sectors.

- **Voluntary compliance markets**

  These do not follow the above mentioned regulatory framework and credits accumulate quicker. Credits are traded on the Chicago Climate Exchange (CCX). A company sets its own baseline and emission reduction target (its own allocation plan and target date). The use of viable Renewable Energy Certificates (RECs) or Verified Emission Reductions (VERs) can be used to meet these reduction goals.

- **Voluntary carbon markets**

  These apply to companies, individuals, and other entities not subject to mandatory limits, yet wish to offset their emissions by buying CERs. They are used for various applications, such as for those who wish to 'neutralise' or offset their carbon footprints. There is no emissions allocation, but a carbon footprint is used to set the baseline from which emission reduction

[257] Carbonfinanceafrica.org, Carbon Finance in South Africa. Accessed at: http://www.carbonfinanceafrica.org.za/default.asp?pageid=2218
[258] Niemack, AR, and R Chevallier, 2010: 4-5.

targets are set. This type of market is a 'buyer-beware' market as credits undergo less rigorous verification methods and standards.

Table 1 below depicts the overall volumes and values from the trade in carbon markets. The overall carbon market grew from US$ 63 billion in 2007 to US$ 126 billion in 2008. Approximately US$ 92 billion of the 2008 value is from trading in emissions allowances, primary CERs and derivatives on the EU ETS. The second largest portion was the secondary CDM market for secondary CERs, valued at over US$ 26 billion. What is clear is that there is a demand for more credits from CDM projects – but as stated in the World Bank's *State and Trends of the Carbon Market 2009*, this demand can only be realised if these projects can 'obtain necessary financing and emerge from their regulatory process more quickly'.[259]

Table 1: Carbon markets at a glance, Volumes and Values from 2007-2008

	2007		2008	
	Volume ($MtCO_2e$)	**Value (Million $)**	**Volume ($MtCO_2e$)**	**Value (Million $)**
Project-based transactions				
Primary CDM	552	7433	389	6519
Joint Implementation	41	499	20	294
Voluntary market	43	263	54	397
Sub-total	**636**	**8195**	**463**	**7210**
Secondary CDM				
Sub total	**240**	**5451**	**1072**	**26277**
Allowances markets				
EU ETS	2 060	49 065	3 093	91 910
New South Wales	25	224	31	183
Chicago Climate Exchange	23	72	69	309
RGGI	Na	Na	65	246

[259] The State and Trends of the Carbon Market 2009, the World Bank, p. 3. Accessed 9 February 2010, online at: http://wbcarbonfinance.org/docs/State_Trends_of_the_Carbon_Market_2009-FINAL_26_May09.pdf.

AAUs	Na	Na	18	211
Sub-total	**2108**	**49361**	**3276**	**92859**
Total	**2984**	**63007**	**4811**	**126345**

Source*: The State and Trends of the Carbon Market 2009, The World Bank.*[260]

The realisation of plans to develop a global carbon emissions market depend on the outcome of a legally binding resolution to limit emissions. At present the largest carbon market is the EU ETS, but other markets, such as the CCX and the Western Climate Initiative, also exist. In the event that the South African government embarks on a policy to establish a local carbon market, it is important to consider what type of market it would be. A domestic market cannot be established until South Africa faces a mandatory cap on its emissions levels during the second phase of the KP; and until there is a substantial increase in locally generated carbon credits through the CDM. Currently the South African government has instead embarked on a carbon tax policy, which is discussed in this chapter.

3. South Africa's position as a Non-Annex 1 country

3.1. Background

It has been argued by various researchers that for the climate change regime to be effective, it must include a carbon trading market for all countries, both developed and developing. South Africa, as a non-Annex 1 country, is not legally compelled under the KP (currently) to establish a cap-and-trade programme, or to reduce its emissions levels to specified baseline levels. However, with the conclusion of the UNFCCC COP15 talks in Copenhagen during 2009, the South African government did announce its commitment to reduce its emissions to 34% over the next 20 years.[261]

Despite the current ambiguity regarding the future of the global climate change regime, it is certain that emission targets agreed to under the existing KP will lapse in 2012 and that a future regime will include more stringent commitments and timeframes for developing and

[260] The State and Trends of the Carbon Market 2009, the World Bank, p.1. Accessed 9 February 2010, online at: http://wbcarbonfinance.org/docs/State__Trends_of_the_Carbon_Market_2009-FINAL_26_May09.pdf

[261] Engineering News, 22/02/2010. 'More countries pledge to cut emissions under Copenhagen Accord' http://www.engineeringnews.co.za/article/more-countries-pledge-to-cut-emissions-under-copenhagen-accord-2010-02-22

developed countries. While there is also some uncertainty about the nature and scope of trade in carbon credits (and particularly the future of the CDM), there is a general consensus that carbon markets will exist beyond 2012 and that these are important mechanisms for the involvement of developing countries in the voluntary market.

Against this background, South Africa introduced an ambitious strategic framework for reducing its domestic carbon emissions, which includes a framework to improve the uptake of renewable energy projects domestically. As discussed in Chapter Two, the LTMS, various national policy documents, and international pledges made at climate change summits all discuss an eventual reduction in GHG emissions for SA. This would result in environmental compliance and effectiveness within the global climate change regime for SA. However these actions are dependent on reducing coal dependence and on increasing the use of renewable energy, all of which must be achieved without jeopardising economic growth and employment.

These are ambitious targets for any developing country, and more so for South Africa given the complexities of its mineral-energy complex. Unfortunately in South Africa, a shift away from coal dependence and dedicated resources to climate mitigation is often perceived as a trade-off with economic growth, as SA's energy mix is not yet diversified enough. However, there are opportunities for simultaneously addressing emissions reductions while ensuring sustainable economic growth and investment – namely through the flexible mechanisms of the KP. These incentive schemes exist for developing countries to generate carbon credits that can be traded in the market for emission allowances.[262] As discussed in Chapter Four, the CDM projects, despite their bureaucratic/institutional flaws, provide an opportunity for the use of cleaner energy and for the continued implementation of Sustainable development for SA. Economic growth and sustainable employment fall within the DNA's definition of Sustainable development, thus increasing the credibility of the CDM in SA – and also supporting the argument for the CDM. But the CDM is a market mechanism, and as such is accompanied by the trading of the financial products that it generates, namely, carbon credits.

The only carbon trading that has occurred in South Africa has been through the carbon credit note (CCN), released by Sterling Waterford Holdings in 2005 and in 2008. It is the world's

[262] The emissions reductions realised via the various mechanisms illustrated above have different names (AAUs, CERs, ERUs) but each unit corresponds to one tonne of CO2.

first carbon credit derivative and investment product to be listed on an exchange. The CCN is a pre-paid forward contract, which places an obligation on the issuer to deliver either a carbon credit or the cash equivalent on the delivery date. Carbon credits are the underlying security of the CCN and credits are obtained by contracting with various countries through intermediaries. CCN investors do not participate directly in CDM projects. It allows South Africans to invest in the overseas carbon market and benefit from the hedge fund characteristics of this instrument without affecting their offshore allowances. To date there have been CER issuances from CDM projects in South Africa, but this number is low compared to the global amount. As of January 2010, South Africa's CER issuances were 1 138 467, out of a global total of 375 064 035.[263]

3.2. Existing legislation

Legislation published in December 2004 in South Africa, in terms of the National Environmental Management Act, give effect to the KP. A Designated National Authority (DNA) was established, under the Department of Energy, to consider and approve applications for CDM projects. The DNA's letter of approval contains authorisation for a project proponent to sell the title and rights to CERs generated by the CDM project. Through the CDM, developed nations with emission targets may invest in GHG reduction projects in developing nations. Financiers of CDM projects can acquire CERs, which can then be sold to signatory/Annex 1 countries with emission targets that they have to achieve. CERs are also tradable in the EU ETS.[264]

Due to the absence of targets and timetables for CERs, the South Africa government has no emission caps. It also does not presently have a formal emission trading market and no "cap and trade" market therefore exists. The Johannesburg Stock Exchange, however, announced in October 2007 that it is investigating commencing such trade. At the time of writing this however, there had still been no establishment of a carbon trading platform.[265]

Subsequently CER's have an uncertain legal status in South Africa, due to the lack of a formal emission trading market. According to legal opinion, CERs are not a secure financial

[263] UNFCCC, 2010. CERS issued by host party. Accessed at http://cdm.int/Statistics/Issuance/CERsIssuedByHostPartyPieChart.html
[264] http://www.bowman.co.za/LawArticles/Law-Article~id~2132417307.asp
The future of carbon trading in South Africa by Claire Tucker & Sandra Gore. Tuesday, July 08, 2008
[265] Interview, Shameela Ebrahim, JSE, August 2010.

instrument within SA, as they do not represent cash or an equity instrument; nor provide a contractual right to exchange or receive anything.[266]

Despite this challenge, two amendments to tax legislation were signed into law on 30 September 2009. These amendments are the *Exemption for Certified Emissions Reductions*, and the *Special Allowance for Energy Efficiency Savings*. The first amendment, for CERs, is critical as it acts as a form of tax relief to "overcome the market failure associated with environmental protection".[267]

3.3. Current private sector practices

Apart from the arbitrary purchase of overseas credits, some SA firms such as Sasol, who have a global presence, purchase carbon credits for their subsidiary firms who are based in Annex I countries, so as to meet the KP commitments in those countries. South Africa's Johannesburg Stock Exchange (JSE) has a limited involvement with carbon trading, through the sale of Carbon Credit Notes (CCN).

4. Review of the role of emissions trading as part of the climate change regime

A potential pitfall to investing in CDMs and carbon credits is the lengthy time period used for verifying methodology and validating CER issuances. The lengthy regulatory framework is perceived as a key barrier to CDM market entry as it influences the cost and overall price of the carbon credits. However this can be resolved by increasing the number of Operational Entities locally – and with a local carbon market, it would also become more financially viable to increase the number of operational entities operating within South Africa (which, in turn, enables a more expedient registration process for local CDM projects).

Another constraint is the uncertain status of CDM projects and emissions in the second phase of the KP. The emission targets agreed to under the KP will lapse in 2012 and uncertainty about the trade in carbon credits will exist until the agreement is extended, as expected, hopefully with broader participation and higher reduction targets. Whilst the general consensus is that there will still be a carbon market at least until 2020, many firms worldwide

[266] Tucker, C, and S. Gore, 2008. The Future of Carbon Trading in South Africa. http://www.legal500.com/c/south-africa/developments/5310

[267] For further information please see the following website: http://www.sustainabilitysa.org/CarbonTrading/FriendliertaxtreatmentonCarbonCredits.aspx and http://www.pmg.org.za/files/docs/090901explanatorytaxlaws.pdf

have been hesitant to invest beyond 2012. Thus it is critical that a decision on the future of CDM and carbon trading is made sooner rather than later, so that firms can plan ahead. Policymakers must be cognizant of the fact despite government uttering the political rhetoric on climate change commitments, it is up to the private sector to operationalised these commitments and implement carbon mitigation – therefore it is important that governments find ways to enable and assist the private sector in reducing their emissions, should government be serious about institutional and environmental compliance with the Kyoto Protocol and UNFCCC.

Another potential pitfall in carbon trading is the "additionality" dilemma. For a CDM project to be classified as additional it must be proved that it is a project that would not have occurred without an incentive (such as carbon credits).[268] However it is disputed by certain environmental NGOs that many projects which do not meet "additionality" criteria have been classified as such and have received credits that effectively allow companies to maintain their domestic emissions without bringing about any new, additional carbon reductions in the project's host country.[269] Various environmental social justice activists have also criticised carbon trading as a means of ensuring that the objectives of the KP are met without a genuine reduction in emissions or a real transfer of technology. To some extent this is a valid claim, as there have been accounts of some CDM Host Parties engaging in a "gaming" of the CDM regime.[270] It is important to note that the stringent verification processes that each CDM project undergoes is crucial to ensure that such criticisms are invalidated. Regarding the criticism that the trade in carbon credits is seen by some sceptics as a way for the more developed northern economies to outsource their environmental responsibility to the developing southern economies, such a criticism ignores the benefits of technology transfer and foreign direct investment. While there is no explicit technology transfer mandate

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[268] According to Article 12.5 of the Kyoto Protocol activities must generate emission reductions ***additional*** to any that would have occurred in the absence of the project activity.

[269] http://www.climatechangecorp.com/content.asp?ContentID=4781

[270] *China has been criticised for the mass implementation of HFC CDM-mitigation projects. Due to the GWP of HFCs, they are highly lucrative and are considered "low-hanging fruits" – in other words, easy projects. However, an unintended consequence was the increase in the manufacturing of goods that emitted HFCs as a by-product, so as to continue implementing CDM projects that reduced this GHG. The result was a vicious cycle for the environment, and very little genuine reduction of the GHG, despite the legality of the process. This is an instance where institutional effectiveness trumped environmental effectiveness, and is a valid argument against CDMs and carbon trading. During January 2011, the EUETS announced that it would no longer be trading in these credits, in an effort to regulate the carbon market and encourage the environmental effectiveness of this Flexibility Mechanism.*

regarding CDM projects and carbon trading, such transfers do occur through the development of clean technologies needed for various CDM projects.[271]

5. Alternative policy instruments to carbon trading

Carbon taxation has been touted as a viable alternative to a cap and trade policy, and it has already been adopted by the SA government. According to one interview respondent, a tax policy is easier to implement, the price outcome does have a definite rate and be easily managed, and if modelled correctly, the penalty can act as a deterrent in order to drive the correct behavioural change towards a positive environmental outcome. However critics assert that it does not change the behaviour of GHG emitters/polluters, but rather passes the cost of polluting onto the consumer.[272]

6. Conclusion

South Africa has begun to increase its share of CDM projects and has embarked on a strategy to ensure that its domestic emissions are reduced. For a local carbon market or carbon exchange to be established it is crucial (and logical) that more carbon credits are produced through CDM projects. In the immediate short-term the establishment of a local carbon market is not viable, as the uptake or implementation of CDM projects has lagged in comparison to other emerging powers. However it is possible for local investors to purchase carbon credits through financial derivatives such as the Sterling-Waterford carbon credit note, and also through the Central Energy fund (CEF). Despite criticisms that it is exploitative, carbon trading presents an opportunity amidst the challenge that many countries face in reducing their domestic carbon emissions. It is a financial incentive designed to increase the proliferation of CDM projects, which have the aim of increasing Sustainable development and reducing GHG emissions.

If CDM projects are to increase, it would be advisable for the SA government to consider a local carbon market – irrespective of whether or not SA becomes legally compelled to reduce it emissions (in the second phase of the KP, should this occur). An opportunity to trade such credits adds to the overall financial attractiveness of the CDM and can reduce the financial risk that many local firms in the private sector are wary of. South African policy makers need

[271] Brewer, Thomas, (2008). Climate Change Technology Transfer: a new paradigm and policy agenda. Climate Policy, 8 (2008), pp. 516-526.
[272] Interview, Shameela Ebrahim, JSE, August 2010.

to remain engaged in the debate as to what form a future carbon market will take. For carbon trading to remain credible and for CDM projects to provide genuine emissions reductions (as well as technology transfer), stringent verification and validation procedures must be adhered to. Moreover, the private sector, in particular, plays an important role in the investment in carbon projects. To ensure the success of carbon trading, it is critical that all stakeholders are consulted in the policy process and that the government provides the necessary regulatory and institutional framework to support their inclusion.

The aim of this chapter is not to provide an assessment of past effectiveness of carbon trading in south Africa, but to illustrate the link between carbon trading and the CDM, and to present the argument for the introduction of a local carbon market, with a view to possible or eventual mandatory caps on South Africa's domestic emissions levels. South Africa is a lead negotiating country within the international climate change for a, and establishing this mechanism domestically will add weight to the overall credibility of the country's pledges and commitments. This in turn will provide additional bargaining power for the country during the negotiation of the terms and conditions of a future climate change agreement. Even if such a cap were not to occur within the next two to twenty years, a local carbon market will provide the incentive to implement more CDM projects, which in turn will ensure more emissions reductions, which is the aim of the global climate change regime.

Chapter Six:

1. Conclusion

The aim of this research report was to assess the effectiveness of the CDM and Emissions Trading within South Africa, as part of SA's integration into the global climate change regime. Regime Theory was chosen as the overarching theoretical framework for this study and Regime Effectiveness (as a sub-field within Regime Theory) was used as a tool of analysis. In reviewing the literature on environmental regime effectiveness, indicators for institutional and environmental effectiveness were selected, and these were used in analysing the CDM case studies presented in this report.

The third chapter of this research report described the South African context. The South African government has emerged as a key negotiator in the international climate change regime. However, this is in stark contrast to SA's GHG emissions profile and energy mix, which illustrates SA's heavy carbon intensity. In the run-up to the UNFCCC's Conference of the Parties (COP17) to be held in November/December 2011 in Durban, South Africa, the SA government's departments of Energy as well as International Relations and Cooperation should not only emphasise the mitigation policies and initiatives that SA has begun implementing, but also find a way to resolve the future of a second phase for the KP. As an emerging economy with an abundance of coal, economic growth and energy security are central to SA's development path; however Sustainable development is essential if SA is to reduce its own carbon footprint, thus complying with the objectives laid out in the Kyoto Protocol within the international climate change regime.

Challenges in implementing the CDM in South Africa include the limited scope of existing projects, the complexities of the CDM project cycle, the rigorous regulatory framework and the financing of such projects. CDM projects are environmentally effective, this is demonstrated in the sustainable development criteria that each project must fulfil to receive approval from the DNA — however, there are an insufficient number of them within SA to be relied on as the sole instrument in mitigating climate change. Another possible problem in the long-term is the country-specific definition of sustainable development. Whereas South Africa has lengthy criteria, and includes employment as part of it, India has a relatively lax definition for sustainable development. India also has a higher amount of CDM projects in its country portfolio, as the barriers are easier to overcome. Noting this distinction does not imply a recomment for a relaxed definition of sustainable development for South Africa –

rather, a recommendation that the international community take note of the SA definition, and consider a global definition, which would level the global playing field for the implementation of the CDM projects.

This research report has shown that institutionally, the CDM may be considered a paradox in its effectiveness. Reasons include that while their project life-cycle is stringent and a successfully registered project in and of itself demonstrates environmental and institutional compliance, the bureaucratic delays, lack of capacity and reviewing of methodology all serve to undermine the overall effectiveness of the CDM. The findings in the case studies presented in Chapter Four reflect this. What is required is a local DOE presence in SA, so that CDM projects can be expedited timeously in order to minimise the financial risk associated with these projects, and cut through bureaucratic hurdles. A local DOE would simply be a South African branch of an overseas one, so that there would be a dedicated presence to South African CDM project implementation. Such a branch could be located in any one of the country's major cities, but a location within the Gauteng province is practical, as the province is the economic hub. An advantageous spin-off of a local DOE presence would be dedicated presence not only for South Africa projects, for projects within SADC countries, and throughout the continent. Certainly, a local DOE would be beneficial, with little if any disadvantages. The only foreseeable disadvantage would be the initial cost of establishing a local presence, and the bureaucratic red tape involved in doing so. However, this could be overcome through lobbying the government to woo potential DOEs and in pressuring the necessary government departments to fast-track the registration process through all the necessary and legal procedures involved. However, the stringent standards for CDM projects should remain, so that a genuine reduction of GHG emissions is achieved. Without such a reduction, the CDM regime does not solve the problem that it was created to solve[273], and would become a mechanism purely for monetary gain.

Regarding Emissions Trading, Chapter Five illustrates the scant, if any, tangible emissions trading within SA. At the time of conceptualising this report, the South African government had been considering both options. However, in the past year the SA government has demonstrated a preference for the alternative, carbon taxation. However, this research recommends a hybrid combination of both instruments that would actually enhance SA's

[273] Oran Young's key criteria for regime effectiveness, as discussed in Chapter Two: *does the regime solve the problem that it was created to solve*?

compliance to the KP. Taxation is intended to bring about a change in behaviour, and to result in compliance, however the South African model for carbon taxation is punitive and actually passes on the cost to the general South African taxpayer, instead of specific polluters. Moreover, there is contention regarding the extent to which the revenue from carbon taxation will be ring-fenced to be spent on environmental projects. A local carbon market, on the other hand, has the financial incentive to increase the implementation of CDM projects, thus increasing local implementation of international measures to change polluter behaviour (thus implementing international cooperation within the regime, solvingthe problem that created the regime in the first place). What is needed are incentives to change behaviour, and not more punitive measures (which could be passed onto the consumer through a price influx instead of changing the pollutants' behaviour).

Although they should not be considered a panacea or cure-all for mitigating climate change, the CDM and Emissions Trading are important instruments within mitigation. They have been subject to manipulation by some actors, but as long as the project cycle remains stringent, their overall validity is ensured. Emissions mitigation measures must be underpinned by Sustainable development and should also result in cleaner production methods. Mitigation demands a long-term shift from coal dependency to a diverse energy mix. But it should be coupled with increased energy efficiency and investment in renewable energy. There is no simple way to ensure energy security while reducing GHG emissions. Renewable sources of energy, although clean, have not yet emerged on a large scale in South Africa. However, given the ambitious targets set in the country's climate change policy, it is crucial that many firms implement clean energy in their operations and that the government introduce further legislation to promote renewable energy production. The government should be commended for appreciating the intricacies of carbon mitigation. But policy planning must be followed by substantial implementation if South Africa is to deliver on its own targets.

If SA is keen on leading the continent, and the world, towards a favourable outcome at the Durban COP17 negotiations, and if policymakers are sincere in their statements regarding plans to reduce GHG emissions, then more must be done in the short term to facilitate this. The Kyoto Flexible Mechanisms, despite perceived and real flaws, offer opportunities for international cooperation and cooperation across the public, private and civil society divide in order to reduce GHG emissions and combat the effects of climate change, while continuing to

build a strong sustainable economy. Moreover these projects offer the opportunity to solve the regime problem, which should be the focus of all the negotiators for COP17 and COP18.

International negotiation requires a give and take, if SA is to continue as a voice for the G20 and as a member of the BRICS, then it be perceived to be making sacrifices or trade-offs in the pursuit of emissions reductions, so as to pressure other countries into doing the same (in other words, to lead by example). However, this trade-off needn't place the country at a disadvantage. Conventional thought among emerging power states is that a cut in carbon emissions meant a cut in energy production, which would lead to a cut in economic activity, as the energy mix is heavily sourced from fossil fuels. Diversifying the energy mix and implementing measures to offset domestic emissions is a solution to this, and should be considered by such pundits as an incentive to make the perceived trade-off (e.g. using less coal and oil, and using more renewable energy). CDM projects provide this incentive. Their processes may be stringent and rigorous, but this ensures their credibility. The projects discussed in this research report attest to the effectiveness of these projects and their ability to contribute towards solving the problem that led to the establishment of the climate change regime. Despite institutional hindrances (which are country-specific and which can be overcome), the CDM projects solve the environmental effectiveness of the climate change regime. Moreover implementing these projects will enable the SA government to comply with any future demands that might be made on the country at future negotiations. As mentioned in this report, compliance is equated with effectiveness; therefore greater compliance will result in greater effectiveness, both institutionally, and environmentally.

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Dear Respondent,

In summary, this study aims to evaluate the effectiveness of the CDM project implementation in South Africa, as part of an overall assessment of the effectiveness of the climate change regime. This CDM project has been identified as one of the few in South Africa that meet the following criteria:

- Registered with the CDM Executive Board
- Operational
- Have received CER issuances

The aim of this questionnaire is twofold: to supplement knowledge already obtained from online and literature sources; and to gain more insight into the design, implementation and factors behind the success of this CDM project.

All responses will be treated with sensitivity. Should you wish for information that is shared, to be kept in confidence, then the information supplied by you will be used confidentially. However, if you would prefer to be accredited in this study, responses will be integrated and cited under your name.

Should you wish to rather schedule a face to face or telephonic interview, please contact me on the details provided below. In addition, if you require more information on my study and a complete research project proposal, please feel free to contact me.

Thank you for your participation in this; your inputs will be of great value to this study.

Kind Regards,

Auriel Niemack
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Tel: (011) 915 5469
Cell: +27 (0)72 298 7762
auriel.niemack@gmail.com

Please provide a brief background of your area of expertise and practice below and complete sections that are relevant to your experience in CDM project.

Name and surname:

Title:

Designation:

Area of expertise:

Organisation (optional):

Experience in CDM projects:

Confidentiality (please tick one of the options):

I exercise my right to confidentiality. My responses will be cited anonymously in the study

I would like to be accredited and for my responses to be cited under my name in the study

Instructions:

Kindly complete the sections that are relevant to your area of expertise.

Project design

Where did you encounter delays and misunderstandings during the design of the CDM project?

_____

_____

_____

_____

Did your project costs exceed initial projections? If so, please elaborate.

_____

_____

_____

_____

Were there any objections during the 30 day public commentary stage?

Yes

No

If yes, how were the objections addressed and resolved?

_____

_____

_____

_____

Was the PIN and PDD accepted upon the first submission to the CDM Executive Board?

Yes

No

If not, what was done to resolve this?

_____

_____

_____

_____

Skills/Technology transfer

Was there a tangible transfer of technology and/or skills to the host country/ local community in any form? Please provide examples.

_____

_____

_____

_____

External funding

Who were the project's additional/external funders?

_____

_____

_____

_____

CER issuances

Who receives the CERs? How are they allocated?

_____

_____

_____

_____

Who purchased the CERs from these partners?

_____

_____

_____

_____

What standard of verification was used in your project?

_____

_____

_____

_____

Sustainability

The acceptance of the project by the DNA implies that the project met with the sustainability criteria. However, could you personally elaborate on the factors that you believe enable your project to contribute towards sustainable development?

_____

_____

_____

_____

Additionality

As with sustainability, the acceptance of your project by the CDM Executive Board implies that additionality was indeed proved. How has your specific CDM project met with the additionality criteria set out by the CDM Executive Board?

_____

_____

_____

_____

Do you have any further recommendations or comments with regards to CDM projects? Please provide your insights below.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Thank you for your participation.