~ From Kyoto to Paris ~
A review of South Africa's climate change response with particular emphasis on the Clean Development Mechanism and envisaged transition to the Sustainable Development Mechanism

by

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Thesis presented in fulfilment of the requirements for the Degree of

DOCTOR OF PHILOSOPHY

in the Department of Public Law

Faculty of Law

UNIVERSITY OF CAPE TOWN

October 2017

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This thesis reflects the law and policy as at 30 September 2017

Declaration

I, Lee-Ann Steenkamp, declare that 'From Kyoto to Paris – A review of South Africa's climate change response with particular emphasis on the Clean Development Mechanism and envisaged transition to the Sustainable Development Mechanism' is my work and that it has not been previously submitted in whole, or in part, for the award of any degree or qualification at any university. All the sources used, referred to or quoted have been duly acknowledged.

Signed by candidate

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Signed ....

Lee-Ann Steenkamp

23 Otober 2017

Acknowledgements

I thank my **Lord Jesus Christ**, for directing my path. For the Lord gives wisdom and from His mouth come knowledge and understanding.

I wish to express my sincere thanks to my supervisor, **Prof Jan Glazewski**, for his skilful guidance with this research project. Not only has Prof Glazewski shared his valuable time, vast interdisciplinary knowledge and world-class research expertise with me, he also reminded me to see the forest for the trees. I am appreciative of his support in helping me transition from a commerce background to venture into the colourful world of climate change law. I have found this journey incredibly enriching.

I gratefully acknowledge the **financial support** received from the following institutions:

- The Sir William Solomon Memorial Scholarship from the University of Cape Town;
- The Early Research Career grant from the University of Stellenbosch;
- The Faculty of Economic and Management Sciences (EMS) Research Committee from the University of Stellenbosch supported my participation at several international conferences to present on-going research; and
- The African Climate & Development Initiative (ACDI) at the University of Cape Town arranged a writing retreat during which I had the invaluable opportunity to exchange ideas with leading climate change researchers.

I thank Ms **Karen Nel** for her excellent editing skills and exquisite attention to detail.

Finally, my heartfelt thanks to my husband and best friend, **André**, who never let go of my hand.

Dedication

To Granny Yve

Thank you for teaching me to read, write, count and play poker.

But above all, thank you for teaching me to be whatever I dream to be.

I miss you every day.

Proverbs 3: 5-6

Abstract

The climate change timeline is at critical juncture as policymakers, academics and other climate-related stakeholders are contemplating the transition from the Kyoto era to the advent of the landmark 2015 Paris Agreement on Climate Change (the Paris Agreement). The study focuses in particular on tracing the development of and learning from past experience with the Clean Development Mechanism (CDM) - one of the flexible mechanisms provided for in the Kyoto Protocol and tailored specifically for reducing emissions in developing countries. This is undertaken with a view to drawing lessons for its apparent successor, the Sustainable Development Mechanism (SDM) provided for in the Paris Agreement. The study is undertaken against the backdrop of the theoretical framework of market-based instruments supplementing the traditional command-and-control approach to reducing carbon emissions, specifically in the area of environmental taxes and carbon offsets. While it is acknowledged that the major difference between the proposed SDM and the existing CDM is that carbon markets will no longer be limited to developed country parties in that developing countries will also be able to participate, many uncertainties remain. Moreover, while it is uncertain at the time of writing (mid-2017) whether the CDM will continue to exist alongside the SDM or will be replaced by it, the study investigates, among other things, questions around if and how the SDM refines and streamlines the CDM. It considers these questions in the context of not only the relevant international instruments, but more specifically against the backdrop of South Africa's climate-related laws and policy frameworks. It is posited that the CDM – and by extension the SDM – will come increasingly under the spotlight in South Africa, as it will serve as a useful mechanism for reducing (or offsetting) the impending carbon tax liability. The thesis finds that many of the principles listed for the SDM mirror those of the CDM. Yet, some sort of transition from Kyoto to Paris will be required to ensure that the SDM will realise its potential to mitigate emissions and support sustainable development.

Table of Contents

CHAPTER 3 THE HISTORICAL DEVELOPMENT AND WORKINGS OF THE CDM AND SDM

CHAPTER 6 THE STATUS OF THE CDM IN SOUTH AFRICA

CHAPTER 7 BARRIERS PREVENTING THE EXPANSION OF THE CDM - AND SUGGESTIONS TO OVERCOME THEM

CHAPTER 8 CONCLUSION

List of Tables

List of Figures and Boxes

List of Abbreviations, Acronyms and Units

AAU	Assigned Amount Unit
ACDI	African Climate and Development Initiative
ADP	Durban Platform for Enhanced Action
AF	Adaptation Fund
AIJ	Activities Implemented Jointly
AMCEN	African Ministerial Conference on the Environment
AREI	Africa Renewable Energy Initiative
BAU	Business-as-usual
BRICS	Brazil, Russia, India, China, South Africa
CAs	Cooperative Approaches
CAC	Command and Control
CAT	Climate Action Tracker
CCBS	Climate, Community and Biodiversity Standard
CCES	Centre for Climate and Energy Solutions
CCIA	Climate Change Impact Assessment
CCS	Carbon Capture and Storage
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism
CDMF	Clean Development Mechanism Fund
CER	Certified Emission Reductions
CFL	Compact Fluorescent Light
CIEL	Centre for International Environmental Law
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide equivalent
COP	Conference of the Parties
COP/CMA	COP serving as the Meeting of the Parties to the Paris Agreement
COP/MOP	COP serving as the Meeting of the Parties to the Protocol
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CTCN	Climate Technology Centre and Network
CVF	Climate Vulnerable Forum

DAC	Durban Adaptation Charter
DNA	Designated National Authority
DNI	Direct Normal Solar Irradiation
DOE	Designated Operational Entity
DTI	Department of Trade and Industry
EA	Environmental Authorisation
EB	Executive Board
EIA	US Energy Information Administrator
EMCA	Environmental Management Co-operation Agreements
EMM	Emissions Mitigation Mechanism
ERU	Emission Reduction Units
ETS	Emissions Trading System
FDI	Foreign Direct Investment
GCF	Green Climate Fund
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Green Investment Schemes
GS	Gold Standard
GW	GigaWatt
GWC	Growth Without Constraints
$GtCO_2$	Giga ton of Carbon Dioxide
ICCEP	International Conference on Clean Electrical Power
ICLEI	International Council for Local Environmental Initiatives
IE	Independent Entity
IEA	International Energy Agency
IEP	Integrated Energy Plan
IET	International Emissions Trading
IETA	International Emissions Trading Association
IMEL	Institute for Marine and Environmental Law
INDC	Intended Nationally Determined Contribution
INEP	Integrated National Electrification Programme
IPCC	Intergovernmental Panel on Climate Change
IPR	Intellectual Property Right
IRP	Integrated Resources Plan
ITL	International Transaction Log

ITMO	Internationally Transferred Mitigation Outcome
JI	Joint Implementation
JISC	Joint Implementation Supervisory Committee
$KtCO_2$	Kilo Ton of Carbon Dioxide
KZN	KwaZulu-Natal
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
LoA	Letter of Approval
LTMS	Long Term Mitigation Scenarios
LULUCF	Land Use, Land-Use Change and Forestry
MBIs	Market-based Instruments
MDGs	Millennium Development Goals
MRV	Measurement and Evaluation
$MtCO_2$	Million ton of Carbon Dioxide
NAP	National Adaptation Plan
White Paper	National Climate Change Response White Paper
NCCRS	National Climate Change Response Strategy
NDC	Nationally Determined Contribution
NDP	National Development Plan
NEMA	National Environmental Management Act
NEMAQA	National Environmental Management: Air Quality Act
NERSA	National Energy Regulator of South Africa
NGO	Non-governmental Organisation
OECD	Organisation for Economic Cooperation and Development
PCSP	Pilot CO_2 Storage Project
PDD	Project Design Document
PMP	Pilot CO_2 Monitoring Capacity Building Project
PV	Photovoltaic
RBS	Required by Science
REDD+	Reducing Emissions from Deforestation and Forest Degradation
REFIT	Renewable Energy Feed-in Tariff
REFSO	Renewable Energy Finance and Subsidy Office
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RMU	Removal Unit
SACCCS	South African Centre for Carbon Capture and Storage

SADC	Southern African Development Community
SANEDI	South African National Energy Development Institute
SARS	South African Revenue Service
SBC	Sustainable Development Co-benefit
SBSTA	Subsidiary Body for Scientific and Technological Advice
SCCF	Special Climate Change Fund
S-CDM	Sectoral CDM
SDG	Sustainable Development Goal
SDM	Sustainable Development Mechanism
SD Tool	Sustainable Development Tool
SEZ	Special Economic Zone
SIS	Safeguards Information System
SSN	SouthSouthNorth
tCO_2	Ton of Carbon Dioxide
TEC	Technology Executive Committee
TNA	Technology Needs Assessment
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VCLT	Vienna Convention on the Law of Treaties
VCS	Verified Carbon Standard
VCU	Voluntary Carbon Unit
VER+	Voluntary Emission Reduction
WBCSD	World Business Council for Sustainable Development
WEF	World Economic Forum
WIM	Warsaw International Mechanism
WWF	World Wildlife Fund

Chapter 1

INTRODUCTION

1.1 BACKGROUND

This study was carried out during a critical juncture in the climate change timeline, when policymakers, academics and other climate-related stakeholders are contemplating the transition from the Kyoto era to the advent of the landmark Paris Agreement.[1] The study focuses in particular on tracing the development of, and learning from, past experience with the Clean Development Mechanism (CDM) - one of the flexible mechanisms provided for in the Kyoto Protocol and tailored specifically for reducing emissions in developing countries. This is done with a view to drawing lessons for its apparent successor, the Sustainable Development Mechanism (SDM) provided for in the Paris Agreement.[2]

The Paris Agreement entered into force on 4 November 2016, 30 days after the date on which at least 55 parties to the Convention (accounting, in total, for at least an estimated 55 per cent of the total GHG emissions) had deposited their instruments of ratification, acceptance, approval or accession with the UN Depository. As at 30 September 2017, 168 out of 197 Parties had ratified the Paris Agreement.[3] The Paris Agreement is founded on nationally determined contributions (NDCs) by countries themselves, in keeping with their specific situation.

The study is undertaken against the backdrop of the theoretical framework of market-based instruments supplementing the traditional command-and-control (CAC) approach to reducing carbon emissions, specifically in the area of environmental taxes and carbon offsets. As such, this chapter provides an overview of the global response to climate change, followed by a brief account of South Africa's energy context and climate change response strategy.

[1] See United Nations *Paris Agreement* (2015) available at http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf, accessed on 17 March 2016.

[2] Paris Agreement, Art 6(4).

[3] United Nations (UN) *Paris Agreement – Status of Ratification* (2017), available at http://unfccc.int/paris_agreement/items/9444.php, accessed on 20 October 2017.

1.1.1 Climate change: the global response

The challenge of climate change must be seen in the wider context of environmental challenges, as generally exemplified by the Millennium Development Goals (MDGs).[4] The MDGs came to a conclusion in 2015 and were replaced by the UN's *2030 Agenda for Sustainable Development*, comprising 17 Sustainable Development Goals (SDGs).[5] The interrelatedness of climate change and development goals has been recognised by including climate change as an SDG.[6] Moreover, the Intergovernmental Panel on Climate Change (IPCC) warns that the continued emission of greenhouse gases (GHG) 'will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems'.[7] Thus, climate change is no longer solely and environmental problem, but has also become 'an economic, trade and security issue that will increasingly dominate global and national policies as its impacts become more apparent'.[8]

The United Nations Framework Convention on Climate Change (UNFCCC)[9] took effect in 1994 and attempts to embrace the interests and needs of all countries. The Kyoto Protocol elaborates on the UNFCCC by placing more specific obligations on developed countries and Countries with

[4] UN *The Millennium Development Goals Report* (2015) at 3. In 2000, world leaders entered into a landmark commitment in collaboration with the UN, which thereafter became the 'most successful anti-poverty movement in history' – this was known as the MDGs.

[5] UN *Sustainable Development Goals* available at http://www.un.org/sustainabledevelopment/sustainable-development-goals/, accessed 15 July 2016.

[6] Climate change is addressed by 'SDG No. 13: Take urgent action to combat climate change'.

[7] Intergovernmental Panel on Climate Change (IPCC) *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, RK Pachauri & LA Meyer (eds)] (2014) at 8, available at http://epic.awi.de/37530/1/IPCC_AR5_SYR_Final.pdf, accessed on 19 December 2016. Recently, the IPCC has decided the strategy and timeline for its next series of reports, the Sixth Assessment Report (AR6), and the special reports that will be prepared in the next few years. The special reports will be on the impacts of global warming of 1.5 ºC above pre-industrial levels and related global GHG emission pathways. Preparations are underway for the main AR6 report, which is expected to be released in three working group contributions in 2020/2021 and a Synthesis Report in 2022. See in this regard Intergovernmental Panel on Climate Change (IPCC) 'IPCC agrees special reports, AR6 workplan' (2016), available at https://www.ipcc.ch/news_and_events/pdf/press/160414_pr_p43.pdf, accessed on 15 July 2016.

[8] Foreword to the UN Climate Change Secretariat *Uniting on climate: a guide to the Climate Change Convention and the Kyoto Protocol* in United Nations Framework Convention on Climate Change (UNFCCC) (2002).

[9] The UNFCCC is an international environmental treaty that was produced at the UN Conference on Environment and Development (informally known as the Earth Summit) in Rio de Janeiro in 1992.

Economies in Transition.[10] Essentially, the Kyoto Protocol translated the UNFCCC into a specific action plan. Annex I countries were obliged to reduce their overall emissions of six GHGs by at least five per cent below 1990 levels between 2008 and 2012 (the first commitment period).[11] Non-Annex I countries were not required to make any comparable cuts unless they chose to do so.[12]

In order for the Annex I countries to accomplish their pledge, the parties have to rely primarily on domestic action.[13] However, in acknowledgement of the importance of institutional flexibility and private sector involvement, the Kyoto Protocol introduced three flexible mechanisms that may be used to supplement domestic action[14], viz. the International Emissions Trading, Joint Implementation (JI) and the CDM. The focus of this thesis is on the latter, namely the CDM, and its apparent successor, the SDM.[15]

The underlying concern of the UNFCCC is that the earth's climate system is threatened by a rise in atmospheric GHG concentrations resulting from increased anthropogenic GHG emissions,[16] as reflected in its ultimate objective to 'achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic [originating in human activity] interference with the climate system'.[17] This objective is qualified in that food production should not be threatened and that economic development should be able to proceed in a sustainable manner.

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[10] J Glazewski & L du Toit 'Chapter 3: International climate change law' in J Glazewski & L du Toit (eds) *Environmental Law in South Africa* (2016) at para 3.2.2.1.

[11] Ibid.

[12] Ibid. Although South Africa is a non-Annex I country in the Kyoto Protocol, it is a signatory. It has ratified the Kyoto Protocol on 31 July 2002, but as a developing country, does not have targets under the protocol.

[13] In the preamble to the Marrakech Accords, the parties to the UNFCCC confirmed that

> 'the use of the [flexible] mechanism shall be supplemental to domestic action and that domestic action shall thus constitute a significant element in the effort made by each Party included in Annex I to meet its quantified emission limitation and reduction commitments included under Article 3, paragraph 1'.

[14] C Streck 'New partnerships in global environmental policy: The Clean Development Mechanism' (2004) 13(3) *The Journal of Environment & Development* 295-322 at 296.

[15] The SDM, as proposed in Art 6(4) of the Paris Agreement, will be introduced in paragraph 1.1.5 below and elaborated on in subsequent chapters.

[16] D Blodel, N Meyer-Ohlendorf, C Schlosser-Allera & P Steel *United Nations Framework Convention on Climate Change: Handbook* (2006) at 21.

[17] UNFCCC, Art 2.

The UNFCCC acknowledges that, on a per person basis, developing countries contribute 'only a small portion' of GHG emissions.[18] Furthermore, it is recognised that the particular needs of developing countries in adapting to climate change is of critical importance, as the problem of climate change is interlinked with development, ie economic growth is essential for developing countries to improve the health, economic livelihood and quality of life of their citizens.[19] The challenge, therefore, is to sever the link between economic development and GHG emissions.

Comprising mainly developing countries, Africa is one of the continents most vulnerable to climate change, a situation exacerbated by multiple stresses and low adaptive capacity.[20] Agricultural production and food security are likely to be severely compromised; warming could extend the range of mosquitoes with a resultant rise in malaria, among other things; changes in the variety of ecosystems could negatively impact on fisheries, tourism and safety at coastal levels; and climate change could aggravate pressures on water availability and accessibility.[21] Yet, Africa's role in the Paris Agreement negotiations should not be underestimated. For example, the African Union has coordinated African support for the Paris Agreement, thereby unifying the continent's response to climate change.[22] Another example is the African Ministerial Conference on the Environment (AMCEN), which has also contributed to strengthening Africa’s participation and active involvement both in global negotiations and in international agreements on the environment.[23]

Following years of protracted negotiations, the rapid entry into force of the Paris Agreement set 'new records for the speed of international diplomacy'.[24] The Paris Agreement marks the end of the strict differentiation between developed and developing countries. Instead, a common framework is used that commits all countries to put forward their best efforts and to improve on these in years to come. Broadly, the Paris Agreement reflects a hybrid approach, blending bottom-up flexibility (to

[18] UNFCCC Guide (n8) at 3.

[19] Ibid.

[20] M Boko, I Niang, A Nyong, C Vogel, A Githeko, M Medany, B Osman-Elasha, R Tabo & P Yanda 'Chapter 9. Africa' in ML Parry, OF Canziani, JP Palutikof, PJ Van der Linden & CE Hanson (eds) *Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (2007) at 435.

[21] Ibid.

[22] C Golubski 'Even before the U.S. left the Paris Agreement, Africa stepped up to the plate on climate change' (2017), available at https://www.brookings.edu/blog/africa-in-focus/2017/06/02/even-before-the-u-s-left-the-paris-agreement-africa-stepped-up-to-the-plate-on-climate-change/, accessed on 15 October 2017.

[23] United Nations (UN) 'AMCEN' (2017), available at http://www.unep.org/africa/amcen, accessed on 15 October 2017.

[24] D Hone 'Five steps for the Paris Agreement' (2016), available at https://blogs.shell.com/2016/11/11/five-steps-for-the-paris-agreement/, accessed on 1 August 2017.

achieve broad participation) with top-down rules (to promote accountability and ambition).[25] This hybrid model recognises that climate change is a global challenge, but it requires political will to address it, which primarily occurs within the domestic realm.[26]

The main achievement of the Paris Agreement is that consensus was reached to confine global greenhouse gas (GHG) emissions to a limit that will ensure that the planet's global temperature will not increase by more than 2 ̊ Celsius above pre-industrial levels,[27] although many argue that a 2°C target is inadequate.[28] To meet the latter criticism, a more aspirational 1.5°C target has been built into the COP21 agreement which sets in motion a ratcheting mechanism that combines transparency and regular disclosure. As a primary step towards meeting this target the Paris Agreement obliges parties to prepare, communicate, and maintain successive Intended Nationally Determined Contributions (INDCs) with the aim of achieving the objectives of the UNFCCC.[29] Each INDC represents a nation's voluntary commitment to pursue actions, policies and regulations deemed necessary to achieve a self-determined goal to mitigate GHG emissions and adapt to a changing climate.[30] Once ratified, the INDC is converted into the NDC.

Bodansky et al remark that the causes and effects of climate change are global and require 'complex collective action'.[31] The conundrum lies in getting countries to operate not only in their own best interest, but also for the good of all.[32] Thus, the problem of climate change can only be dealt with if all states – or at least the major GHG emitting countries – overhaul their energy production and

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[25] Centre for Climate and Energy Solutions (CCES) 'Outcomes of the UN Climate Change Conference in Paris' (2015) at 2, available at http://www.c2es.org/international/negotiations/cop21-paris/summary, accessed on 15 November 2016.

[26] D Bodansky & E Diringer *Building flexibility and ambition into a 2015 Climate Agreement* (2014), available at https://www.c2es.org/docUploads/int-flexibility-06-14.pdf, accessed on 19 July 2017.

[27] United Nations Framework Convention on Climate Change *Adoption of the Paris Agreement* (Draft decision -/CP.21, FCCC/CP/2015/L.9/Rev1) at Preamble, available at http://unfccc.int/2860.php, accessed on 30 June 2017.

[28] See for example J Cassidy 'A skeptical note on the Paris climate deal' (2015), available at http://www.newyorker.com/news/john-cassidy/skeptical-note-paris-climate-deal, accessed on 1 August 2017; K Levin & T Fransen 'Insider: Why are INDC studies reaching different temperature estimates?' (2015), available at http://www.wri.org/blog/2015/11/insider-why-are-indc-studies-reaching-different-temperature-estimates, accessed on 1 August 2017.

[29] Paris Agreement, Art 4(2).

[30] Crowell Moring *The Paris Agreement on climate change: a practical guide* (2015), available at https://www.crowell.com/NewsEvents/AlertsNewsletters/all/The-Paris-Agreement-on-Climate-Change-A-Practical-Guide, accessed on 2 June 2016.

[31] D Bodansky, J Brunnée & L Rajamani *International Climate Change Law* (2017) at 2.

[32] Id at 3. The authors explain that significant investments to reduce GHG emissions will only be in a country's individual self-interest if they are reciprocated by other states.

consumption.[33] The next paragraph explores how South Africa – as the leading emitter on the African continent – has attempted to address climate change.

1.1.2 Climate Change: the South African response

South Africa is among the top 25 GHG emitting countries globally.[34] This is hardly surprising, given that South Africa's energy and electricity supplies are made up of nearly 70 per cent from coal.[35] This has resulted in South Africa contributing more than one-third of the total energy-related carbon dioxide (CO_2) emissions on the African continent.[36] Figure 1.1 below illustrates the relative contribution of the top 20 fossil fuel emitters (including South Africa), expressed in $MtCO_2$.[37]

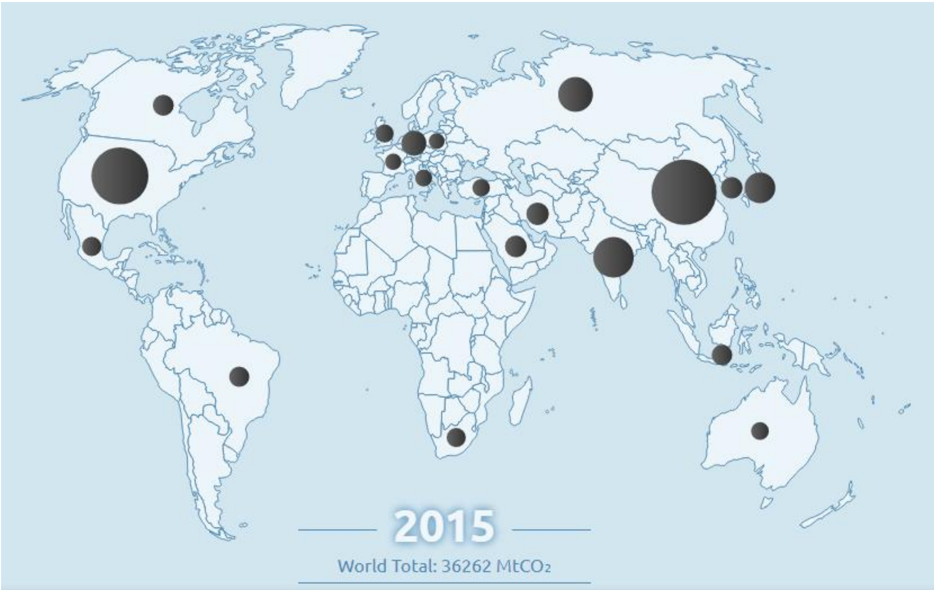

Figure 1.1 Top 20 territories for fossil fuel emissions

[33] Id at 2.

[34] International Energy Agency (IEA) *Energy Climate and Change: World Energy Outlook* (2015) at 64, available at https://www.iea.org/Textbase/npsum/WEO2015SUM.pdf, accessed on 14 April 2016.

[35] International Energy Agency (IEA) *Share of total primary energy supply in 2014 – South Africa* (2014), available at https://www.iea.org/stats/WebGraphs/SOUTHAFRIC4.pdf, accessed on 17 March 2017.

[36] IEA *World Energy Outlook 2015* (n36) at 65. The same report states that emissions in South Africa are projected to follow a 'peak, plateau and decline' trajectory, largely due to improved energy efficiency and a turn towards renewables and nuclear energy.

[37] Source: Global Carbon Atlas, available at http://www.globalcarbonatlas.org/en/CO2-emissions, accessed on 7 August 2017.

Chapter 5 will provide more detail concerning South Africa's energy profile, comparing it with the other BRICS (Brazil, Russia, India, China and South Africa) countries.[38] It will be seen that, despite having a much smaller population and economy compared to the other BRICS countries, South Africa is by far the largest CO_2 emitter on a per capita basis (coming in at 8.10 tCO_2 per person), followed by China (6.66), Brazil (2.31) and India (1.56).[39]

South Africa has adopted both the UNFCCC Kyoto Protocol and Paris Agreement in response to climate change. As part of its commitments under these agreements, the South African government through its lead agent for South Africa's climate change response - the Department of Environmental Affairs - has recognised its responsibility to curb GHG emissions and has accordingly put a number of policy and legal measures in place,[40] as elaborated on in Chapter 4 of the thesis. These include the *National Climate Change Response Strategy for South Africa to Address Climate Change* (NCCRS),[41] the *National Climate Change Response White Paper* (the 'White Paper')[42] and the relevant chapter of the National Development Plan (NDP).

The NCCRS outlines the steps that should be taken by government and other role players at a national level to respond to climate change. A number of principles and factors guided the

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[38] Per B O'Boyle 'Explainer: what are the BRICS?' (2014), available at http://www.as-coa.org/articles/explainer-what-are-brics?gclid=CjwKEAjwgPe4BRCB66GG8PO69QkSJAC4EhHhx7KLgq7CvBvEDb3vNAVFR5FKXGzOuDUUo7m2DgwQCRoCOWnw_wcB, accessed on 25 April 2016, the BRICS countries are characterised by rapidly growing economies and increasing international influence. O'Boyle also states that with over 40 per cent of the world's population, the BRICS countries contribute more than 20 per cent of global GDP, with some economists predicting that Brazil, China, India and Russia will join the US as the five largest economies in the world by 2050.

GL Ribeiro & T Dwyer *Social, Political and Cultural Challenges of the BRICS* (2015) at 168 remark that the BRICS members are all developing or newly industrialised countries, but they are distinguished by their large, fast-growing economies and significant influence on regional and global affairs. Moreover, all five countries are G-20 members.

[39] The data and calculations for these revealing statistics are contained in Tables 5.1 and 5.2 of this thesis.

[40] Glazewski & Du Toit (n10) at para 3.4.2 outline the various sub-directorates concerned with managing and co-ordinating South Africa's climate change response. One such institution, the National Climate Change Committee (NCCC), was established to advise the Minister of the Department of Environmental Affairs, including regarding the design of a climate change policy. The NCCC is a multi-stakeholder platform aligning government, business and industry, academia, non-governmental organisations (NGOs) and organised labour.

[41] Department of Environmental Affairs (2004) *National Climate Change Response Strategy (NCCRS)*, available at https://unfccc.int/files/meetings/seminar/application/pdf/sem_sup3_south_africa.pdf, accessed on 23 January 2017.

[42] The White Paper was approved by Cabinet in October 2011, GG 34695 (19 October 2011). The White Paper is available at https://www.environment.gov.za/sites/default/files/legislations/national_climatechange_response_whitepaper.pdf, accessed on 29 January 2017.

formulation of the NCCRS, including poverty alleviation, access to basic amenities, as well as infrastructure development, job creation, rural development, foreign investment, human resource development and improved health.[43] These ambitious principles aim to result in sustainable economic growth.[44] South Africa's responsibilities, as contained in the NCCRS, include the establishment of a national inventory of GHGs, the Long Term Mitigation Scenario (LTMS) and the Technology Needs Assessment (TNA) Report.

The LTMS study[45] was commissioned in order to inform the country's long-term climate policy as well as contributing to South Africa's negotiating position in terms of the UNFCCC.[46] The LTMS was the first interpretation of international climate mitigation policy in a domestic developing country context. Chapter 4 elaborates on the mitigation scenarios that the LTMS undertook to build.

The TNA report[47] is used by developed country parties as a means to cooperate with developing countries in order to meet their obligations in terms of technology transfer with respect to climate change. Importantly in this context the South African TNA report emphasises that 'South Africa could harness financial benefits through global funding mechanisms, including the Clean Development Mechanism'.[48] In other words, developed country parties can use the TNA report to identify the specific needs where investment in South Africa will be most beneficial, and use the CDM as a means to achieve this.[49]

The NCCRS was followed seven years later by the White Paper, in anticipation of South Africa hosting COP17 in Durban. The White Paper builds on the NCCRS report by conveying the South African government's vision for an effective climate change response via two overarching objectives, namely to effectively manage climate change impacts and to stabilise GHG concentrations. Although the White Paper indicates South Africa's commitment to making a fair

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[43] Id at vi.

[44] Ibid.

[45] The LTMS Research Project took place in South Africa between 2005 and 2008. The detailed technical report comprising the Long Term Mitigation Scenarios is available at http://dspace.africaportal.org/jspui/bitstream/123456789/33713/1/07-Winkler-LTMS-Technical%20Report.pdf?1, accessed on 15 February 2017.

[46] Glazewski Glazewski & Du Toit (n10) at para 3.4.3.3.

[47] Department of Science and Technology *South Africa's Climate Change Technology Needs Assessment Synthesis Report* (2007), available at http://www.gov.za/sites/www.gov.za/files/DST_SA-climate-change-technology-needs-assessment_25102007_0.pdf, accessed on 24 January 2017.

[48] Id at 6.

[49] Per DF Humphris *South Africa's law and policy framework for the regulation of the Clean Development Mechanism* (unpublished LLM dissertation, North-West University, 2011) at 33.

contribution to the global effort in reducing GHG emissions, it does so against the 'overriding national priorities' of, amongst others, sustainable development, job creation and poverty eradication.[50] In other words, the White Paper promotes mitigation measures to effect sustainable development in socio-economic, as well as environmental terms. It will be demonstrated in Chapter 4 that both elements can be addressed through the utilisation of the CDM.[51]

A further document which has to be considered in conjunction with South Africa's climate change response, is the NDP.[52] Generally speaking, the NDP sets out a vision until 2030 for South Africa’s energy sector, including a reference to ‘environmental sustainability’ through efforts to reduce pollution and mitigate the effects of climate change. The NDP supports procurement of at least 20 GigaWatt (GW) of renewable energy by 2030 in its outline of the country's development path.[53]

As mentioned earlier, the Paris Agreement came into effect on 4 November 2016. South Africa managed to fast-track its domestic approvals process to ratify the Paris Agreement on 1 November 2016[54] - just in time for the COP22 meeting in Marrakech.[55] As South Africa is now a formal Party to the Paris Agreement, the country has an 'even higher responsibility to fight climate change and build a low carbon future'.[56] Consequently, in fulfilment of its role as a party to the Paris Agreement, South Africa submitted its INDC on 25 September 2015.

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[50] L Kotzé, T Humby, O Rumble, A Gilder & K Lehmann 'Chapter 1: Setting the scene' in T Humby, L Kotzé, O Rumble & A Gilder (eds) *Climate Change Law & Governance in South Africa* (Original Service 2016) at 1-6.

[51] Chapter 4 will examine the interaction between the White Paper mitigation approaches and their application to CDM projects.

[52] See National Planning Commission *National Development Plan 2030* (2011), available at http://www.gov.za/sites/www.gov.za/files/Executive%20Summary-NDP%202030%20-%20Our%20future%20-%20make%20it%20work.pdf, accessed on 17 December 2016.

[53] Greencape *Utility-scale renewable energy sectors 2016 – Market Intelligence Report* (2016) at 22, available at http://greencape.co.za/assets/GreenCape-Renewable-Energy-MIR-2016.pdf, accessed on 12 January 2017.

[54] South Africa had signed the Paris Agreement on 22 April 2016. Thereafter, on 20 October 2016, Cabinet announced its approval for the treaty to be submitted to Parliament for ratification. The ratification of the treaty was assented to by the National Council of Provinces on 27 October 2016, and the National Assembly on 1 November 2016.

[55] COP22 was held from 7 to 18 November 2016 in Marrakech, Morocco.

[56] WWF 'South Africa ratifies climate agreement in time for Marrakech COP22' (2016), available at http://www.wwf.org.za/?19301/SA-ratifies-Paris-Agreement, accessed on 13 August 2017.

The INDC targets a reduction in GHG emissions of between 398 and 615 $MtCO_2e$, over the period 2025 to 2030.[57] When South Africa ratified the Paris Agreement, the INDC was transformed into an NDC. The country's NDC is consistent with its pledge under the Copenhagen Accord, which proposes emissions reductions below business-as-usual (BAU) levels by 34 per cent in 2020 and 42 per cent in 2025. The South African NDC also highlights the fact that economic and social development as well as poverty eradication are South Africa's top priorities.[58]

Notwithstanding that South Africa is a developing country beset with some of the highest levels of social and economic inequality in the world, it has played a leading role in global climate change negotiations from (at least) COP13 hosted in Bali.[59] The country headed the vanguard in negotiations when it hosted COP17 in Durban, South Africa, in 2011. More recently, South Africa chaired the G77[60] at COP21, with some individuals playing a central role in the negotiations.[61]

Other policies emanating from the White Paper are, for example, the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP),[62] and the *White Paper on the Renewable Energy Policy*.[63] In the latter document, the South African government recognises that the development of fiscal, financial and legislative instruments will be required to stimulate the increased use of renewable energy technologies.[64] One such fiscal instrument is South Africa's proposed carbon tax, which is likely to come into effect within the next few years.[65] This is the subject matter of the next paragraph.

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57 South Africa (2015) Intended Nationally Determined Contribution (INDC) at 6, available at http://www4.unfccc.int/submissions/INDC/Published%20Documents/South%20Africa/1/South%20Africa.pdf, accessed on 29 March 2017.

58 South Africa *INDC* (n34).

59 Kotzé et al (n50) at 1-5.

60 The Group of 77 represents the largest intergovernmental organisation of developing countries in the UN. The G77 aims to promote its members' collective economic interests and to create an enhanced joint negotiating capacity in the UN. See http://www.g77.org/doc/, accessed on 7 August 2017.

61 Kotzé et al (n50) at 1-5. Bodansky et al (31) at 78-92 describe how the southern Africa-style traditional meeting technique of 'indabas' were used at the COP17. When these failed to resolve some key issues, another technique of 'huddles' were employed to break the impasse. Subsequent meetings tried (sometimes successfully) other methods to reach consensus on the legal form of the new agreement to be negotiated.

62 South Africa’s REIPPPP was among the programmes identified as a climate change flagship programme in the White Paper. Chapter 4 will examine the REIPPPP in greater detail.

63 Department of Minerals and Energy *White Paper on the Renewable Energy Policy of the Republic of South Africa* (GNR 513 in *GG* 26169 of 14 May 2004) at 27.

64 Ibid.

65 The development of the proposed carbon tax in South Africa is set out in Chapter 2.

1.1.3 Carbon tax and carbon offsets

The above must be seen against the backdrop of the interaction between two types of market-based instruments (MBIs), namely that of a carbon tax and a carbon offset, which are discussed in Chapter 2. One such carbon offset is the CDM of the Kyoto Protocol. Internationally recognised as a full-fledged carbon offset standard,[66] it is also domestically approved as a carbon offset methodology. Because South Africa will likely implement a new carbon tax in the foreseeable future, carbon offsets will probably come under greater scrutiny as a means of reducing the carbon tax liability. It is against this background that the theoretical foundation of this thesis is now addressed.

Governments have an array of environmental policies at their disposal, including regulations, information programmes, innovation policies, environmental subsidies and environmental taxes.[67] In general, policies to restrict GHG emissions (or, conversely, to promote reductions) may be classified into two categories, namely CAC and MBIs. The latter comprise regulations that encourage behaviours through market signals, rather than through explicit control directives.[68] On the other hand, conventional approaches to regulating the environment are referred to as CACs, as they allow little flexibility in the means of achieving goals.[69] Chapter 2 will delve into greater detail regarding these classifications, and will set out the characteristics inherent to MBIs.

Of relevance here, is that a range of MBIs exist to address environmentally-related market failures by way of a price mechanism. One such MBI is the use of environmental taxes.[70] The basic rationale for an environmental tax is clear: it applies the polluter-pays principle and intends to change the behaviour of taxpayers. On this basis, the rationale is to reduce pollution to a level that

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[66] A Kollmuss, H Zink & C Polycarp 'Making sense of the voluntary carbon market: A comparison of carbon offset standards' (2008) at 14, available at http://cetesb.sp.gov.br/wp-content/uploads/sites/28/2008/03/acomparisonofcarbonoffsetstandardsmakingsenseofthevoluntarycarbonmarket.pdf, accessed on 20 April 2017 state that a full-fledged carbon offset standard includes the following three components: accounting standards; monitoring, verification and certification standards; and registration and enforcement systems. Also, in adhering to all these accompanying requirements, the carbon offset standard is seen to be rigorous and enjoys wide support from carbon project developers.

[67] OECD *Environmental taxation – a guide for policy makers* (2011) at 1, available at https://www.oecd.org/env/tools-evaluation/48164926.pdf, accessed on 14 June 2017.

[68] RN Stavins 'Experience with market-based environmental policy instruments' *Handbook of Environmental Economics* (2003) at 231.

[69] Ibid.

[70] MG Faure & SE Weishaar 'Chapter 22: The Role of Environmental Taxation: Economics and the Law' *Handbook of Research on Environmental Taxation* (2012) provide an overview of taxation and other incentive-based regulations from an environmental law and economics perspective by addressing their strengths and weaknesses.

takes full account of both the costs of the pollution and the benefits of the polluting activity.[71] Taxes are often more effective than regulation as a way to achieve this.[72] An example of an environmental tax is the carbon tax.

A carbon tax is designed to encourage emission-reduction activities in certain sectors, through placing a price on carbon.[73] It therefore strives to internalise the cost of external GHG damages, thereby providing consumers and businesses with greater flexibility to decide how to change their behaviour and reduce harmful activity.[74] South Africa already makes use of two specific carbon taxes,[75] namely an electricity levy[76] and a CO_2 emissions levy on new motor vehicles imported into or manufactured in South Africa.[77] Following recommendations from energy scholars, the South African government has proposed the introduction of a comprehensive carbon tax.[78] The development and workings of the carbon tax are explored in Chapter 2.

It is anticipated that South Africa's carbon tax will come into effect in a phased manner at a marginal rate of R120 per tCO_2e.[79] Parties that conduct various activities in the manufacturing, construction, mining and transport sectors will be affected. The carbon tax liability is calculated as the tax base multiplied by the rate of carbon tax. The tax base refers to the total quantity of GHG emissions from combustion, fugitive and industrial processes, proportionately reduced by the tax-free allowances.

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[71] J Mirrlees, S Adam, T Besley, R Blundell, S Bond, R Chote, M Gammie, P Johnson, G Myles & JM Poterba 'Environmental Taxation' in Institute for Fiscal Studies & J Mirrlees (eds) *Tax by Design* (2011) at 231.

[72] Ibid.

[73] National Treasury *Carbon Offsets Paper* (2014) at 18, available at http://www.treasury.gov.za/public%20comments/CarbonOffsets/2014042901%20-%20Carbon%20Offsets%20Paper.pdf, accessed on 20 December 2016. The *Carbon Offsets Paper* complements National Treasury's *Carbon Tax Policy Paper*. It provides further details about the proposed carbon offset mechanism to accompany the carbon tax.

[74] OECD (n67) at 2.

[75] A range of other environmental levies exists, for example a levy on tyres. See http://www.sars.gov.za/Legal/Primary-Legislation/Pages/Schedules-to-the-Customs-and-Excise-Act.aspx, accessed on 12 August 2017.

[76] Customs and Excise Act 91 of 1964, Schedule 1, Part 3B.

[77] Customs and Excise Act 91 of 1964, Schedule 1, Part 3D.

[78] K Lehmann 'Chapter 8: South Africa's Climate Change Commitments and Regulatory Response Potential' in T Humby, L Kotzé, O Rumble & A Gilder (eds) *Climate Change Law & Governance in South Africa* (Original Service 2016) at 8-14.

[79] National Treasury *Carbon Bill B-2017* (2017) clause 5, available at http://www.treasury.gov.za/public%20comments/CarbonTaxBill2015/Carbon%20Tax%20Bill%20final%20for%20release%20for%20comment.pdf, accessed on 15 December 2016.

The carbon tax will likely be implemented with complementary measures, for example, a reduction in the electricity levy, as well as other measures, such as carbon offsets which firms can use to reduce their carbon tax liability. The Davis Tax Committee[80] considers it likely that investment in offsets could significantly promote sustainable development[81] in South Africa.

In some industries, GHG producers are unable to implement programmes to reduce GHG emissions, mostly due to technology and financing constraints. A carbon offset is an external investment that allows a company to access least cost mitigation options in a manner that is cheaper than investment in its own operations. In other words, carbon offsetting is the funding of an activity outside of one's own organisation that reduces emissions elsewhere, by the same amount as the emissions that need to be offset.[82]

Carbon offsetting is an increasingly popular means of taking action against climate change. By paying someone else to reduce GHG emissions elsewhere, the purchaser of a carbon offset aims to compensate for – or offset – their own emissions. Carbon offset markets exist both under compliance schemes as well as under voluntary programs. In order to be useful, carbon offset projects have to be evaluated and validated. A number of different carbon offset standards have been developed to achieve this. The CDM standard is often a mandatory one, given its wide international acceptance in the global regulated carbon markets. These standards will be elaborated on in Chapter 2.

It is anticipated that carbon offset mechanisms will increasingly come under the spotlight in South Africa as the carbon tax nears its implementation date. Consequently, the next paragraph provides a brief prologue to the CDM, followed by an introduction of the SDM.

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[80] The Davis Tax Committee was established on 17 July 2013 to assess South Africa's tax policy framework and its role in supporting the objectives of inclusive growth, employment, development and fiscal sustainability. See http://www.taxcom.org.za/, accessed on 10 July 2017.

[81] It will be seen in Chapter 4 that 'sustainable development' is referred to in the environmental right contained in South Africa's Constitution, as well as forming the foundation of the country's framework National Environmental Management Act 107 of 1998.

[82] Climate Neutral Group 'What is carbon offsetting?' (n.d.), available at https://www.climateneutralgroup.co.za/climate/what-is-carbon-offsetting/, accessed on 21 May 2016.

1.1.4 Carbon offsets under the Kyoto Protocol: the CDM

The CDM was established as part of the Kyoto Protocol and provides developed countries with a mechanism to reduce their own GHG emissions obligations by purchasing credits from CDM projects that avoid GHG emissions in developing countries.[83]

CDM projects facilitate financing and technology transfer for GHG reduction in developing countries. This mechanism includes projects in renewable energy, energy efficiency and other related fields designed to achieve emission reductions. Chapter 3 will provide an historical account of the CDM's development.

The carbon emission reduction credits from the CDM projects are known as Certified Emission Reductions (CERs) and are saleable to and usable only by developed countries for the purpose of meeting their legally binding emission reduction obligations.[84] To motivate non-Annex I countries (such as South Africa) to participate in the CDM they benefit from technology transfer for the projects, foreign funding for the projects and the possibility of trading the carbon credits gained from the projects with Annex I countries.[85]

The CDM is defined in Article 12 of the Kyoto Protocol, and is intended to meet two objectives:

1. To assist non-Annex I countries in achieving sustainable development and, in so doing, to contribute prevent dangerous climate changes; and
2. To assist Annex I countries in achieving compliance with their quantified emission limitation and reduction commitments.

The CDM addresses the second objective by allowing the Annex I countries to meet part of their emission reduction commitments buying CER from CDM emission reduction projects in

[83] The CDM was first mooted during July 2001, when the COP6 reached an outline agreement (the so-called Bonn Agreement) on an emissions trading system. The Bonn Agreement introduced rules for accounting for emissions reductions from carbon 'sinks' as well as a compliance regime. It also outlined a package of financial and technological support to help developing countries contribute to global action on climate change and address its adverse effects (Blodel et al *Handbook* n16 at 19). In late 2001, the COP7 adopted the detailed legal texts based on negotiations held in Marrakesh – these decisions became known as the Marrakesh Accords (Blodel et al *Handbook* n16 at 20). COP9, during December 2003, adopted decisions on afforestation and reforestation activities under the CDM (Blodel et al *Handbook* n16 at 20). The rules for the CDM came into effect on 16 February 2005 when the Kyoto Protocol was ratified by the requisite number of signatories.

[84] This explanation of the workings of the CDM and CERs were obtained from National Treasury *Explanatory Memorandum to the Taxation Laws Amendment Bill* (2013) at para 4.3.

[85] GS Little, T Maxwell & M Sutherland 'Accelerating the implementation of the clean development mechanism in South Africa' (2007) 10(4) *SAJEMS* 395-411 at 395.

developing countries. The projects and the issue of CERs are subject to approval to ensure that these emission reductions are real and 'additional'. The issue of additionality is complex and will be examined in Chapter 7 'Barriers' of this thesis.

During the COP18 meetings held in December 2012 in Doha, Qatar, the CDM was extended as a flexible mechanism under the Kyoto Protocol, enabling developing countries to continue their participation in the global carbon market. In order to enhance the uptake of CDM projects in South Africa, National Treasury introduced the section 12K tax incentive to the South African Income Tax Act No. 58 of 1962, as amended (the 'Income Tax Act') in 2009.[86] South Africa's fiscal policy (including tax incentives relating to the CDM and renewable energy) is addressed in Chapter 4 'Law and Policy' of this thesis.

Chapter 6 will provide more in-depth analytics regarding South Africa's CDM profile. At this stage, it is worth mentioning that South Africa currently has 56 registered CDM projects, with no new projects having been registered after 2014. This can likely be ascribed to the fact that the window of opportunity for CDM project implementation was drawing to a close when the first commitment period of the Kyoto Protocol came to an end.[87] Although it is not as yet clear whether the CDM will be replaced in its entirety or continue in 'a similar shape and form', the SDM of the Paris Agreement has 'strong echoes of the CDM'.[88] As such, the focus now shifts to the SDM.

1.1.5 Carbon offsets under the Paris Agreement: the SDM

As mentioned earlier, the Paris Agreement aspires to an ambitious, but nonbinding, goal to curb the increase in global average temperature caused by anthropogenic GHG emissions to 'well below' 2°C. One view of the Paris Agreement is that it 'seeks a Goldilocks solution that is neither too strong (and hence unacceptable to key states) nor too weak (and hence ineffective)'.[89] The

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[86] Essentially, section 12K exempts amounts received or accrued upon disposal of CERs for purposes of normal tax and capital gains tax. The capital gain or capital loss from the disposal of a section 12K asset that is used to produce amounts that are exempt from normal tax, must be disregarded in terms of para 64(*b*) of the Eighth Schedule to the Act. Section 12K was amended on 1 January 2013 so as to extend the exemption to 31 December 2020.

[87] It was expected that the Kyoto Protocol would have terminated by 2012 and been replaced by a new protocol.

[88] O Rumble, A Gilder & M Parker 'Chapter 20: Carbon Pricing in South Africa' in T Humby, L Kotzé, O Rumble & A Gilder (eds) *Climate Change Law & Governance in South Africa* (Original Service 2016) at 20-19.

[89] D Bodansky 'The Paris climate change agreement: a new hope?' (2016) 110(2) *American Journal of International Law* 288-319 at 289. The author explains that the Paris Agreement comprises both a bottom-up approach which reflects (rather than drives) national policy and a top-down approach whereby countries' NDCs are complemented by international norms.

architecture of the Paris Agreement is outlined in Chapter 3 where the historical development of the CDM and SDM is emphasised.

Of particular relevance to this thesis, is the proposed establishment of the SDM, titled 'mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development'.[90] The SDM is a successor-in-interest to the regulatory infrastructure established under the Kyoto Protocol's CDM and, according to some commentators, is set to replace the CDM from 2020 onwards.[91] It will be created and managed under the authority and rules of the UNFCCC Secretariat.[92] This thesis will compare and contrast the CDM and SDM in Chapter 3.

The SDM's essence is to deliver an emissions reduction against some reference which is contained within the NDC, but also to ensure an overall reduction in global emissions while delivering sustainable development benefits.[93] Thus, the SDM promotes GHG mitigation efforts above and beyond what a nation commits to under its NDC.[94]

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[90] Chapter 3.5.1 deals with the SDM in more detail. Article 6(4) of the Paris Agreement, available at: http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf, accessed on 2 June 2016, establishes the SDM 'under the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to this Agreement for use by Parties on a voluntary basis. It shall be supervised by a body designated by the Conference of the Parties serving as the meeting of the Parties to this Agreement, and shall aim:

a) To promote the mitigation of greenhouse gas emissions while fostering sustainable development;
b) To incentivize and facilitate participation in the mitigation of greenhouse gas emissions by public and private entities authorized by a Party;
c) To contribute to the reduction of emission levels in the host Party, which will benefit from mitigation activities resulting in emission reductions that can also be used by another Party to fulfil its nationally determined contribution; and
d) To deliver an overall mitigation in global emissions'.

[91] See, for example, J Voigt 'NGO Newsletter #14: Lessons from the CDM for the SDM and climate finance' (2016), available at http://carbonmarketwatch.org/watch-this-ngo-newsletter-14-lessons-from-the-cdm-for-the-sdm-and-climate-finance/, accessed on 15 July 2016.

[92] United Nations Framework Convention on Climate Change (UNFCCC) 'Adoption of the Paris Agreement - Proposal by the President' (Draft decision 1/CP.21) at para 38, available at http://www.un.org/ga/search/view_doc.asp?symbol=FCCC/CP/2015/L.9/Rev.1&Lang=E, accessed on 10 June 2016.

[93] For this reason, the mechanism is also referred to by some as the Emissions Mitigation mechanism (EMM). See, for example, International Emissions Trading Association (IETA) *A vision for the market provisions of the Paris Agreement* (2016) at 3, available at http://www.ieta.org/resources/Resources/Position_Papers/2016/IETA_Article_6_Implementation_Paper_May2016.pdf, accessed on 21 March 2016.

[94] In other words, all GHG emission reductions achieved under the SDM will therefore have to be in addition to those that would have otherwise occurred in the host party's jurisdiction.

The CDM became an important source of climate finance for developing countries, where the only real obligation on the part of the host country for a given project was to provide the necessary governance structure to ensure eventual issuance of the CERs.[95] However, this is no longer the case, as the provisions of the Paris Agreement, in particular Art 6, are now effectively the same for all countries.[96] Therefore, all countries will be able to generate and/or use offset credits, ie developed countries will compete with developing countries for the investment in mitigation activities.[97]

1.2 PROBLEM STATEMENT AND RESEARCH OBJECTIVES

The CDM was the first global, environmental investment and credit scheme of its kind, providing a standardised emission offset instrument. Although the CDM could in many ways be regarded by some as a 'trailblazer',[98] others are of the opinion that the CDM is 'cumbersome and unrewarding' and 'tangled in red tape'.[99] The CDM faces significant barriers; these include, amongst others, the dilemma of additionality, lower proportional CER credit revenues on the investment, and the lack of incentive for technology transfer.[100] Scholars appear to be divided as to the success of the CDM, especially in Africa.[101] The SDM, as proposed in the Paris Agreement,[102] will arguably face similar opportunities and challenges.

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[95] According to D Hone 'A new reality to come to terms with' (2016) available at: http://blogs.shell.com/climatechange/2016/05/newreality/, accessed on 7 June 2016.

[96] Ibid.

[97] Carbon Market Watch 'News: Paris treaty establishes new carbon trading mechanisms' (2016), available at http://carbonmarketwatch.org/news-paris-treaty-establishes-new-carbon-trading-mechanisms/, accessed on 8 June 2016.

[98] See Q Wang & Y Chen 'Barriers and opportunities of using the clean development mechanism to advance renewable energy development in China' (2010) 14(7) *Renewable and Sustainable Energy Reviews* 1989-1998.

[99] B Pearson 'Market failure: why the Clean Development Mechanism won't promote clean development' (2007) 15(2) *Journal of Cleaner Production* 247-252 at 247.

[100] Ibid.

[101] For an analysis of the CDM's success and failure on the African continent, see N Kreibich, L Hermwille, C Warnecke & C Arens 'An update on the Clean Development Mechanism in Africa in times of market crisis' (2016) 9(2) *Climate and Development* 178-190; for a global perspective of the CDM's performance, see D Watts, C Albornoz & A Watson 'Clean Development Mechanism (CDM) after the first commitment period: Assessment of the world's portfolio and the role of Latin America' (2015) 41 *Renewable and Sustainable Energy Reviews* 1176-1189. As regards the South African context, see W Greene 'Carbon Finance for South Africa – an Investor’s guide' *Africa practice* (2006); M Jung 'Host country attractiveness for CDM non-sink projects' (2006) 34(15) *Energy Policy* 2173-2184 and L du Toit 'Promoting Clean Development Mechanism Implementation in South Africa: Law and Policy' (2009) 1 *SA Public Law* 33-55 at 47.

This dichotomous view of the CDM informs the foundation upon which this thesis will be built. With many of the rules, modalities and procedures for the SDM yet to be defined, a unique opportunity exists to learn from the experience of the CDM.[103] It is therefore the purpose of this study to analyse the challenges and opportunities that exist for the proposed SDM, by applying lessons learned from its predecessor, the CDM.[104]

While it is uncertain at the time of writing (mid-2017) whether the CDM will continue to exist alongside the SDM or will be replaced by it,[105] the study investigates, among other things, questions around if and how the SDM refines and streamlines the CDM. It considers these questions in the context of not only the relevant international instruments, but more specifically against the backdrop of South Africa's climate-related laws and policy frameworks. The study will show that much of the ramifications and many of the details of the SDM still have to be ironed out.

It is posited that the CDM – and by extension the SDM – will come increasingly under the spotlight in South Africa, as it will serve as a useful mechanism for reducing (or offsetting) the impending carbon tax liability. The thesis finds that many of the principles listed for the SDM mirror those of the CDM. Yet, some sort of transition from Kyoto to Paris will be required to ensure that the SDM will realise its potential to mitigate emissions and support sustainable development.

To that end, the following research objectives have been identified:

- To understand South Africa's energy profile and responses to climate change, with specific reference to the CDM and SDM.
- To evaluate South Africa's law and policy framework for the regulation of the CDM, and by extension, the SDM.
- To ascertain the various factors that influence countries, in particular South Africa, both positively and negatively when considering implementing projects under the CDM.

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[102] Paris Agreement, Art 6(4).

[103] Also see in this regard the International Institute for Sustainable Development (IISD) 'Mitigation update: COP 21 carbon footprint released, CDM provides lessons learned for Paris Agreement' (2016) available at http://climate-l.iisd.org/news/mitigation-update-cop-21-carbon-footprint-released-cdm-provides-lessons-learned-for-paris-agreement/, accessed on 10 June 2016.

[104] Bodansky et al (n31) 193 are also of the opinion that lessons learned from the CDM are 'clearly relevant', although it is unclear at this stage how the SDM will build on the CDM.

[105] Although the Paris Agreement and its accompanying decision are silent on the future of the CDM, many commentators - including Bodansky et al (ibid), Voigt (n91), Hone *A new reality* (n95) and Carbon Market Watch (n97) - are of the opinion that the SDM is a new mechanism which merges the functionality of the CDM and JI in that it encompasses emissions reductions in both developed and developing countries.

- To examine the key elements of the SDM, especially the concepts of additionality, double counting and the establishment of transparent governance and verifiable accounting.
- In light of the lessons learnt from the CDM, to propose recommendations for the design and implementation of the SDM, specifically with regards to South Africa.

1.3 RESEARCH DESIGN, METHOD AND SCOPE

An interpretive research approach was adopted for this study as it seeks to understand and describe.[106] As with most legal interpretive research, this study adopts a doctrinal research methodology, as it provides a systematic exposition of the rules governing a particular legal category (in this case, the legal rules pertaining to the CDM and SDM), explains areas of difficulty and is based purely on documentary data.[107]

Both a desktop study and a quantitative study were performed. The desktop study entails a literature review of and reference to both foreign and local statutory laws, regulations and policy documents, as well as authoritative studies on the UNFCCC, MBIs, the CDM and SDM. The documentary data was obtained from published articles, chapters in books, journal and legal databases and reputable websites.

The quantitative study consists of a high-level analytical review of certain key indicators of CDM projects in South Africa and the other BRICS member countries. This approach comprises the CDM's project generation ability, its contribution to the economy, its investment capability and proposed emissions reduction. The study then analyses sustainable development impacts as described in the Project Design Documents (PDDs) of each of the 56 registered CDM projects in South Africa.

The research reflects the CDM project data, law and policy developments up to and including 30 September 2017, except in certain circumstances where more recent policy developments or legislative amendments appear particularly relevant.

1.4 IMPORTANCE AND VALUE OF THE RESEARCH

This thesis will demonstrate that most CDM projects in South Africa are energy related and contribute to sustainable development in the country. It could therefore be surmised that existing

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[106] E Babbie & J Mouton *The Practice of Social Research* (2009).

[107] MA McKerchar 'Philosophical paradigms, inquiry strategies and knowledge claims: applying the principles of research design and conduct to taxation' *eJournal of Tax Research* (2008) 6(1) 5-22.

CDM (and future SDM projects) will play a pivotal role in contributing to South Africa's sustainable energy future.[108] This study aspires to contribute to a climate change policy which would help ensure the energy security in South Africa, whilst at the same time contributing to national endeavours to honour the Paris Agreement pledges made by South Africa.

To that end, the researcher will undertake to disseminate the main research findings of this study through, for example, publication in peer-reviewed journals, presentations at conferences and participation in think-tanks and indabas. In particular, this study will inform the contribution the researcher hopes to make as part of her membership of various influential and worthy committees and organisations dealing with climate change,[109] taxation[110] and clean electricity.[111] Ultimately, it

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[108] The dependency on foreign energy imports, in combination with insufficient electricity supplies, will inevitably and primarily affect the poor and the employment sector. Indeed, the unreliable electricity supply in South Africa had already caused National Treasury to adjust its estimate in GDP growth downwards to one per cent for 2015 and 0.9 per cent for 2016. Given the energy crisis faced by South Africa – load shedding, the recent record fall of the Rand, credit rating downgrades, violent service delivery protests, illegal power connections and gross mismanagement of the power utility Eskom – a sustainable, energy policy is a serious and relevant matter that requires urgent attention and in-depth research. Moreover, the design of such an appropriate policy would assist in decoupling power supply in South Africa from internationally linked factors (such as the price of gas, oil and coal) as well as exchange rate fluctuations.

[109] The author represents her employer (the University of Stellenbosch Business School) as an academic stakeholder on the National Climate Change Committee (NCCC) referred to in n40. The NCCC holds quarterly meetings throughout the year to address key thematic issues, for example policy developments informing the negotiations to be held at COP23 in November of this year. See https://www.environment.gov.za/, accessed on 8 August 2017.

The author also has the honour of serving as the South African country manager for the global Climate Scorecard project. This is the result of a partnership between the non-profit organisations The Global Citizens' Initiative and EarthAction. Monthly thematic reports on the top 25 GHG emitting countries are compiled and shared on various social media platforms in an effort to engage all concerned citizens to support and implement the Paris Agreement. See http://climatescorecard.org/, accessed on 8 August 2017.

[110] The author holds the professional designation of Master Tax Practitioner (SA) and as such, is a member of the South African Institute of Tax Professionals (SAIT), the largest of the professional tax bodies in South Africa. SAIT actively contributes towards shaping tax policy in South Africa through participation in, and dialogue with, Parliament, National Treasury, the South African Revenue Service (SARS) and the Davis Tax Committee. As a member of SAIT, and specifically serving as a member on one of the professional exam committees, I have direct access to the teams who draft submissions to the aforementioned bodies. See http://www.thesait.org.za, accessed on 8 August 2017.

[111] Following on a well-received presentation at the 6th International Conference on Clean Electrical Power (ICCEP) held in Italy during 27-29 June, the author was invited to join the international steering committee as the only representative from Africa and to present at future biennial conferences. See http://www.iccep.net/, accessed 8 August 2017.

is hoped that this study will assist in improving and enhancing the usefulness of the SDM as a tool to incentivise climate change mitigation and contribute to sustainable development.

1.5 CHAPTER OVERVIEW

Having provided an overview in this introductory chapter this thesis is structured as follows:

Chapter 2 contextualises the thesis by drawing the relevant theoretical framework. This chapter introduces the broader theoretical discourse relating to MBIs, environmental taxes and carbon offsets. It is against this backdrop that the most prominent carbon offset, namely the CDM, will be examined in subsequent chapters.

Having laid the theoretical foundation in the previous chapter, Chapter 3 examines the Kyoto Protocol, in particular Art 12 which establishes the CDM. The chapter then investigates the theoretical and policy considerations underlying the legal aspects of the CDM with a view to assessing how they will be expanded upon by the SDM. The architectural components of the Paris Agreement are explored in order to contextualise the origin and proposed implementation of the SDM. In particular, the chapter compares the legal text of Art 12 of the Kyoto Protocol (ie the CDM) with Art 6(4) of the Paris Agreement (ie the SDM). Lastly, the chapter reflects on transitional arrangements for existing CDM projects.

In light of the above, Chapter 4 focuses on the legal and policy framework governing the CDM in South Africa. Fiscal laws are part of this framework; as such, a brief account of the tax incentives for clean (or renewable) energy is provided. This chapter also considers the domestic policy framework, including the White Paper, which could potentially create an enabling environment for the SDM. Thereafter, the role of local government in implementing green reform is explored.

The quantitative aspect of this thesis commences in Chapter 5, wherein the status of the CDM is analysed from an international perspective. This chapter also elaborates on the CDM network of the BRICS member countries, in particular China and India, as these countries are recognised as global leaders in the CDM environment.

Chapter 6 continues the analytical study by examining the sustainable development impacts of all of the CDM projects registered in South Africa. The resulting trends in reported impacts are subsequently presented by province and project type. The chapter concludes by considering a case study from South Africa, where the country's first CDM project has received mixed reviews.

The previous chapters considered the development of the CDM, the policy considerations underpinning its use, as well as the success of the CDM in the global arena and its contribution to sustainable development in South Africa. In Chapter 7, the focus shifts to the South African experience, highlighting problems experienced by local CDM project developers. Next, the chapter explores three proposals which are aimed at boosting the CDM uptake during the transition period and beyond 2020. Finally, the chapter considers a case study from Panama, which serves as a cautionary tale where insurmountable barriers (in the form of socio-economic factors) caused the demise of a CDM project. Chapter 7 therefore seeks to identify the barriers which prevent the further expansion of the CDM in order to provide some lessons for the SDM.

Chapter 8 concludes with a summary of the main research findings and recommendations.

Chapter 2

Theoretical Framework

2.1 INTRODUCTION

Prior to reviewing a country's legal framework (as will be done in Chapter 4), it is necessary to contextualise the relevant theoretical framework. Accordingly, this chapter introduces the broader theoretical discourse relating to market-based instruments (MBIs), environmental taxes and carbon offsets. It is against this backdrop that the most prominent carbon offset, namely the Clean Development Mechanism (CDM), will be examined in subsequent chapters.

The context provided in this chapter serves as the theoretical foundation for the remainder of the study. The next chapter traces the evolution of the CDM of the Kyoto Protocol to the proposed Sustainable Development Mechanism (SDM) of the Paris Agreement.

Employing the broadest lens first, this chapter firstly outlines the essentials of MBIs and contrasts these with Command-and-Control instruments (CACs). Next, environmental taxes will be outlined and contextualised in reference to the wider framing of MBIs. Thereafter, the formulation of a carbon tax, as a specific type of an environmental tax, will be examined. Finally, carbon offsets – as a means to reduce the carbon tax liability – will be addressed. In particular, the CDM will be introduced at this point.

Figure 2.1 illustrates the lens through which the theoretical framework will be presented, starting with MBIs and zooming in on the CDM.

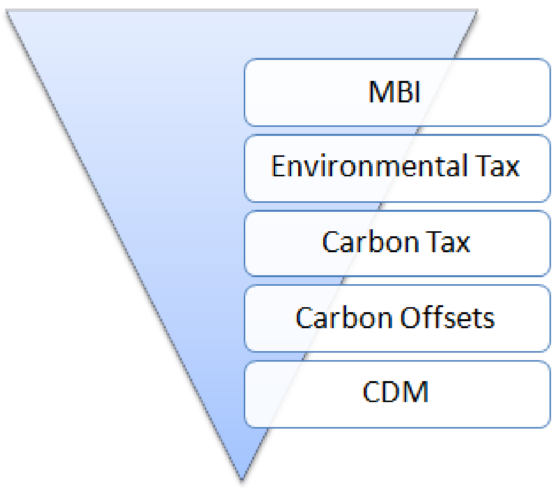

Figure 2.1 The theoretical framework of the CDM

(source: author's own)

Climate change mitigation and adaptation strategies include MBIs and CAC approaches. These are considered in the next section.

2.2 MARKET-BASED INSTRUMENTS

2.2.1 Introduction

To begin with, environmental challenges are increasing the pressure on governments to find ways to reduce environmental degradation, while minimising obstacles to economic growth.[1] Environmental policies usually combine the identification of an environmental goal with some means to achieve that goal.[2] Governments have a range of environmental policies at their disposal, including regulations, information programmes, innovation policies, environmental subsidies and environmental taxes.[3]

In general, policies to restrict Greenhouse Gas (GHG) emissions (or, conversely, to promote reductions) may be classified into two categories, namely CACs and MBIs. MBIs are regulations that encourage behaviours through market signals, rather than through explicit control directives.[4] On the other hand, conventional approaches to regulating the environment are referred to as CACs, as they allow little flexibility in the means of achieving goals.[5]

CAC instruments are regulatory in nature and operate by imposing mandatory obligations or restrictions on the behaviour of firms and individuals.[6] Two policies can be identified here, namely emissions legislation and technologies. The first comprises regulatory measures to correct environmental market failures, for example, emissions standards, zoning and quota restrictions.[7] The latter refers to banning deleterious technologies and promoting beneficial practices.[8]

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[1] OECD *Environmental taxation – a guide for policy makers* (2011) at 1, available at https://www.oecd.org/env/tools-evaluation/48164926.pdf, accessed on 14 June 2015.

[2] RN Stavins 'Experience with market-based environmental policy instruments' *Handbook of Environmental Economics* (2003) at 231.

[3] OECD (n1) at 1.

[4] Stavins *Experience* (n2) at 231.

[5] Ibid.

[6] L du Toit *Promoting renewable energy in South Africa through the inclusion of market-based instruments in South Africa's legal and policy framework with particular reference to the feed-in tariff* (Doctoral dissertation, University of Cape Town, 2014) at 92.

[7] Ibid.

[8] Ibid.

Table 2.1 below portrays this taxonomy of policy instruments, with an additional line item attributable to government production.[9]

Table 2.1: Taxonomy of Policy Instruments		
Policies	**Direct instruments**	**Indirect instruments**
Market-based instruments	Effluent or emission charges; tradable permits; deposit-refund systems	Input/output taxes and subsidies; differential tax rates
Command-and-control measures	Emission/effluent regulations (source-specific, non-transferable quotas)	Technology standards; regulation of equipment, processes, inputs and outputs
Government production or expenditure	Regulatory agency expenditures for clean-up, waste disposal, enforcement	Development of 'clean' technologies

The comparison of CAC with MBIs has been the subject of academic debate and literature on this topic is relatively extensive and well developed.[10] However, it is not the purpose of this study to

[9] Based on S Gupta (2015) 'Harnessing the market for environmental protection (slide show)' (2015), available at http://www.slideshare.net/ccsindia/ccs-chintan-shreekantfeb32015, accessed on 28 December 2016 and S di Falco 'Guidance notes on tools for pollution management' (n.d.) at 2, available at http://siteresources.worldbank.org/INTRANETENVIRONMENT/Resources/GuidanceNoteonMarketBasedInstruments.pdf , accessed on 28 December 2016.

[10] It should be pointed out that it is impracticable to provide a general comparison, as the superiority of the one or the other is very dependent upon the specific context (eg the type of pollutant regulated). See, for example, MG Faure, P Martin, L Zhiping & Q Tianbao 'Instruments for environmental governance: what works?' *Environmental Governance and Sustainability* (2012) at 17, where it is cautioned that both approaches require effective monitoring and enforcement systems.

The UNEP devised practical guidelines to assist policy makers, especially in developing countries, in choosing the types of MBIs that are likely to work in addressing their specific environmental problems. See in this regard B Bustos, N Borregaard & M Stilwell *The Use of Economic Instruments in Environmental Policy: Opportunities and Challenges* (2004).

National Treasury *Carbon Tax Discussion Paper* (2010) at 24, available at http://www.treasury.gov.za/public%20comments/Discussion%20Paper%20Carbon%20Taxes%2081210.pdf, accessed on 19 December 2016 analyses the differences between CAC measures and MBIs. Another useful overview of MBIs can be found in the Davis Tax Committee's *First interim report on carbon tax for the Minister of Finance* (2015) at 9-15, available at contribute to this debate, nor to offer an exposition of the strengths and weaknesses of CACs and MBIs.[11] Instead, this section touches on the broad classification of instruments in order to contextualise the development of the CDM.

CAC instruments tend to limit investment incentives, as companies are not induced to go beyond compliance, due to the possibility of stricter regulations in future.[12] In contrast, MBIs are not compulsory in nature and do not prescribe mandatory objectives or standards, but rather incentivise environmentally friendly behaviour or disincentivise environmentally unfriendly behaviour.[13]

CAC approaches have traditionally been the dominant instruments for environmental regulation.[14] These were 'generally prescriptive and highly targeted', in that particular substances were banned or limited or certain industries required to use specific technologies.[15] While CAC instruments are still dominant, there has been a move internationally towards 'environmental fiscal reform'.[16]

Traditional CAC mechanisms are now commonly employed in conjunction with MBIs.[17] This is due to the emergence of MBIs as significant mechanisms to realise environmental protection goals and better manage natural resources.[18] It will be seen in Chapter 3 that, under the Paris Agreement,

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http://www.taxcom.org.za/docs/20151116%20DTC%20Carbon%20Tax%20First%20Interim%20Report.pdf, accessed on 11 April 2016, and D Blodel, N Meyer-Ohlendorf, C Schlosser-Allera & P Steel *United Nations Framework Convention on Climate Change: Handbook* (2006) at 29-37.

For a more in-depth discussion of MBIs and CACs, including an account of MBIs that have been introduced to support renewable energy at the international level, see Du Toit (n6). S Whitten, M van Bueren & D Collins 'An overview of market-based instruments and environmental policy in Australia' (2003) *AARES Symposium* outline the role of MBIs in Australia.

[11] See, for example, SE Weishaar 'Chapter 2 Emissions trading and alternative instruments' in *Emissions trading design: a critical overview* (2014).

[12] Bustos et al (n10) at 27.

[13] Du Toit (n6) at 93.

[14] J Greene & NA Braathen (2014) 'Tax preferences for environmental goals: use, limitations and preferred practices' *OECD Environment Working Papers*, No 71, at 2.

[15] Ibid.

[16] Du Toit (n6) at 96 remarks that environmental fiscal reform has been implemented in a number of EU countries and essentially involves implementation of environmentally-related fiscal instruments. A number of terms have been used, sometimes interchangeably, to describe environmental fiscal reform instruments including 'economic instruments', 'market-based instruments' and 'economic incentives'.

[17] National Treasury *Draft Policy Paper: A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa* (2006) at 2, available at http://www.treasury.gov.za/public%20comments/Draft%20Environmental%20Fiscal%20Reform%20Policy%20Paper%206%20April%202006.pdf, accessed on 10 December 2016.

[18] Whitten et al (n10) at 1.

countries have voluntarily submitted Nationally Determined Contributions (NDCs) which include different types of targets for reducing GHG emissions. Unlike the Kyoto Protocol, which set commitment targets that have legal force, the Paris Agreement emphasises consensus building and therefore follows a 'bottom-up' approach. In a sense, the Paris Agreement therefore heralds a transition from CAC to MBI's.

Consequently, the next paragraph provides a concise account of the features inherent to MBIs.

2.2.2 Characteristics of MBIs

The theory of market-based approaches to environmental policy is hardly novel, having first been advanced in 1920 by the British economist, Arthur Cecil Pigou.[19] A Pigouvian tax, such as a carbon tax, is designed to correct a market activity that generates negative external effects.[20] In the case of climate change, MBIs are particularly well suited to control GHGs, both because 'emissions from most sources can be determined simply based on fossil fuel consumption and because location of emissions is irrelevant'.[21]

The two main MBIs for assigning a price to GHG emissions so as to achieve emission reductions are carbon emissions trading and carbon taxes.[22] The former sets targets for the level of emissions though trade in emissions allowances, while the latter sets a price for emissions directly.[23]

Carbon emissions trading are addressed by the Joint Implementation (JI) and International Emissions Trading (IET) mechanisms - two of the Kyoto Protocol flexible mechanisms which are examined in greater detail in the next chapter. The proposed South African carbon tax is discussed in para 2.4 below. At this stage, it is apposite to note that carbon taxes price GHG emissions directly and thus provide certainty with respect to price, but none with regard to emissions reductions.

MBIs attempt to address environmentally-related market failures by way of a price mechanism.[24] By endeavouring to alter the relative prices that individuals and firms face, MBIs could offer a more

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[19] AC Pigou *The economics of welfare* (2013).

[20] See A Sandmo 'Pigouvian taxes' in SN Durlauf & LE Blume (eds) *The New Palgrave Dictionary of Economics* (2008), available at http://www.dictionaryofeconomics.com/article?id=pde2008_P000351, accessed on 26 July 2017.

[21] K Harrison 'A tale of two taxes: The fate of environmental tax reform in Canada' (2012) 29(3) *Review of Policy Research* 383-407 at 385.

[22] National Treasury *Market-Based Instruments* (n17) at 10.

[23] Ibid.

[24] Id at i.

efficient way of addressing certain environmental concerns.[25] This is why MBIs are often described as 'harnessing market forces': if they are well designed and implemented, they encourage entities to undertake pollution control efforts that are in their mutual interest and so collectively meet policy objectives.[26] MBIs offer two notable advantages over traditional CAC approaches, namely cost effectiveness and dynamic incentives for technology innovation and diffusion.[27]

MBIs can be considered within four categories, namely pollution charges, tradable permits,[28] market barrier reductions[29] and government subsidy reductions.[30] The first category, namely pollution charges, is of relevance to this study. A pollution charge assigns a fee or tax on the amount of pollution that a firm or source generates.[31] The rationale behind a pollution charge is to provide sufficient impetus for the firm to reduce emissions to the point where its marginal abatement cost is equal to the tax rate.

The efficiency of MBIs not only depends on the degree of information the policymaker can secure regarding optimal pollution levels, but is also reliant on other factors:[32]

- *Ecological effectiveness*: this describes how well an instrument works to reach the environmental goal the policy focuses on – in this case, the reduction of the amount of carbon in the atmosphere. For example, the ecological effectiveness of a carbon tax system is dependent

[25] Ibid. However, it should be cautioned that price signals do not work in all circumstances. J Mirrlees, S Adam, T Besley, R Blundell, S Bond, R Chote, M Gammie, P Johnson, G Myles & JM Poterba 'Environmental Taxation' in Institute for Fiscal Studies & Mirrlees J (eds) *Tax by Design* (2011) at 238 point out that where individuals or firms are 'locked in' to particular technologies, imposing an MBI (such as a tax) may simply make them worse off. There may be other market failures that could result in incentives not feeding through to behaviour change.

[26] RN Stavins 'Market-based environmental policies' *Public Policies for Environmental Protection* (2000) at 1.

[27] Id at 2.

[28] Id at 4 explains that under a tradable permit system, an allowable overall level of pollution is established and allocated among firms in the form of permits. He further states that firms that keep their emission levels below their allotted level may sell their surplus permits to other firms or use them to offset excess emissions in other parts of their facilities.

[29] Id at 5 avers that 'substantial gains' can be made in environmental protection simply by removing existing explicit or implicit barriers to market activity. An example is information programs, such as energy efficiency product labelling requirements.

[30] Government subsidies are the opposite of taxes. Although they theoretically provide incentives to address environmental problems, Stavins *Policies* (n26) at 5 argues that, in practice, many subsidies promote economically inefficient and environmentally unsound practices.

[31] Stavins *Policies* (n26) at 4.

[32] SR Goers, AF Wagner & J Wegmayr 'New and old market-based instruments for climate change policy' (2010) 12(1) *Environmental Economics and Policy Studies* 1-30 at 16-23.

upon the tax rate, which should preferably be established with the knowledge of the marginal abatement costs.

- *Political feasibility*: this implies the level of acceptance in the public eye. The more people (including industry roleplayers) who are in favour of a certain policy, the easier it is for the political authority to implement this policy.
- *Financial impact*: this entails how consumers are affected in monetary terms, as companies will (at least to some extent) pass costs on to consumers.
- *Dynamic incentives*: the inducement for technological change and innovation are key aspects to consider when encouraging companies to continuously improve their emission reduction techniques.

Notwithstanding the policy debates surrounding the choice of a particular MBI, it seems clear that market-based approaches will enjoy increasing acceptance in the years ahead,[33] especially in light of the mechanisms proposed in the Paris Agreement.

2.2.3 Concluding remarks

MBIs have historically played a significant role in incentivising cooperation between developed and developing countries.[34] One example is Brazil's participation in the negotiations for the first commitment period of the Kyoto Protocol (Brazil was also the first country to sign the UNFCCC).[35] Notwithstanding that the Paris Agreement represents a momentous breakthrough to combat the climate change challenge, multilateral negotiations can be complex and could take several years to conclude. In the interim, further regional cooperation through the development and linking of MBIs – such as the CDM and carbon taxes – may be viewed as 'essential to increase key industrialised countries' ambitions'.[36]

Developed countries are more likely to consent to financial assistance for transition towards low-carbon economies in developing countries where 'economic interests converge'.[37] In South Africa,

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[33] Stavins *Policies* (n26) at 36.

[34] E de Lemos Pinto Aydos 'Paris: the dilemmas of international climate change negotiations and the role of linked Emissions Trading Schemes in the post-2020 regime' in NP Stoianoff, L Kreiser, B Butcher, JE Milne & H Ashiabor (eds) *Market Instruments and the Protection of Natural Resources* (2016) at 213.

[35] Brazil ratified the Kyoto Protocol in 1994.

[36] De Lemos Pinto Aydos (n34) at 214.

[37] Id at 216. The author further remarks that this linkage will 'enhance coordination towards an international climate policy framework post-2020 and is likely to attract large developing countries'.

MBIs (or incentive-based measures) have been explored in general by the National Treasury in its *Draft Policy Paper: A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa*.[38] This policy paper defines an environmental tax as a 'tax on an environmentally-harmful tax base'.[39] The notion of an environmental tax as an MBI is accepted practice in South Africa, as there are a number of environmental taxes currently in action, including an electricity levy, fuel levy, and plastic shopping bags levy.[40]

An environmental tax, as a particular type of MBI, is the focus of the next section.

2.3 ENVIRONMENTAL TAXES

The basic rationale for environmental taxes[41] rests upon the 'polluter pays' principle. Because pollution imposes environmental, economic and social costs on society that are not borne by the polluter, the imposition of a cost on the polluter ensures that the polluter internalises these wider costs when undertaking these polluting activities.[42] Taxes are among the most important economic instruments available to deal efficiently with pollution and thereby help protect the environment.[43]

Greene and Braathen provide a number of reasons for the use of environmental taxes, including:

- *Internalising an externality*: an environmental tax increases the price of a good (or activity) to reflect the cost of the environmental harm that it imposes on others, thereby ensuring that producers and consumers take these costs into account when making decisions.
- *Flexibility*: in contrast to regulations or subsidies, an environmental tax provides businesses and customers with greater flexibility to modify their behaviour and reduce harmful activities. This,

[38] National Treasury *Market-Based Instruments* (n17).

[39] Id at 3. The paper further explains that the tax base is a physical unit or proxy thereof which has a proven detrimental impact on the environment.

[40] See South African Revenue Service (SARS) *Environmental Levy Products* (2017), available at http://www.sars.gov.za/clientsegments/customs-excise/excise/Environmental-Levy-Products/Pages/default.aspx, accessed on 10 July 2017.

[41] MG Faure & SE Weishaar 'Chapter 22: The Role of Environmental Taxation: Economics and the Law' *Handbook of Research on Environmental Taxation* (2012) at 399 argue that environmental taxation differs from other forms of taxation. They base this on the premise that an environmental tax strives for 'fundamental and structural changes' in economic behaviour, rather than aiming primarily for revenue-raising. As such, they assert that an environmental tax has to be designed within a particular socio-political context.

[42] Mirrlees et al (n25) at 231.

[43] Ibid.

in turn, allows market forces to operate and determine the least-cost way to reduce environmental damage.

- *Incentivising continuous improvement*: environmental taxes provide an enduring drive to abate at all levels of emissions, even after significant abatement has already occurred.
- *Improving competitiveness*: environmental taxes enhance the demand for low-emission alternatives. This leads to economies of scale that assist in making such alternatives more viable, without requiring direct subsidies.
- *Encouraging innovation*: due to the 'polluter pays' principle, environmental taxes provide a strong incentive for firms to develop new innovations (and to adopt existing ones).
- *Transparency*: environmental taxes (if properly designed) are highly transparent in terms of their coverage and costs, by clearly communicating what is taxed, which polluters fall within the tax net as well as the cost per unit of pollution generated.
- *Cost certainty vs. environmental certainty*: environmental taxes increase the cost of particular products and activities in a fairly direct and generally predictable way. This makes it easier to judge the financial impact on consumers and firms; however, it is more difficult to determine the quantum of the environmental impact.[44]

Tax instruments involve the use of the tax system to adjust relative prices with a view to influencing producer or consumer behaviour in favour of goods or services that are considered to be environmentally beneficial.[45] These instruments effectively transfer resources from the taxpayer to the beneficiaries of the tax preference. The tax instruments can take several forms, namely tax expenditures, tax breaks, tax relief or tax subsidies.[46]

National Treasury's policy paper on MBIs recognised the role of environmentally-related taxes to complement existing regulatory policy interventions and address environmental problems such as

[44] Greene & Braathen (n14) at 2-3.

[45] Id at 5.

[46] Ibid. The latter type, namely a subsidy, necessitates the same degree of scrutiny and oversight as other forms of public expenditure. The authors also state that tax instruments are often used inappropriately, particularly when it comes to addressing negative externalities (eg situations where there is no market incentive for firms and households to control pollution). A comparative advantage offered by tax instruments is in providing support for positive externalities – these are situations in which a subsidy would help to deliver more social benefits than would otherwise be the case (eg government support for research and development).

climate change. The focus now turns to the most prominent environmental tax to likely be implemented in South Africa, namely the carbon tax.[47]

2.4 CARBON TAX

A carbon tax can be applied in a number of ways, namely a tax applied directly to measured GHG emissions; on fossil fuel inputs based on their carbon content (for example, crude oil and natural gas); or levied on energy outputs (for example, electricity).

The carbon tax was first proposed by Cabinet in 2007. Following a lengthy public consultation process and debates, National Treasury published the *Carbon Tax Discussion Paper* in 2010.[48] The national budget proposals of 2012 set out further details. The process culminated in the publication of the *Carbon Tax Policy Paper* in 2013.[49]

In November 2015, National Treasury introduced the Draft Carbon Tax Bill for public comment, following the announcement made by the Minister of Finance in the 2015 Budget Speech.[50] The design elements of the carbon tax in the Bill are largely uniform with those outlined in its predecessors, namely the Carbon Tax Discussion Paper and the Carbon Tax Policy Paper. The implementation of the carbon tax has been delayed numerous times. Although it was scheduled to come into effect during 2017, it is likely that further delays might ensue.

A carbon tax is designed to encourage emission-reduction activities in affected sectors, by placing a price on carbon.[51] This price acts as a signal that incentivises behavioural change and makes

[47] For an exposition of the key features of the carbon tax, as well as fiscal incentives for renewable energy, see L-A Steenkamp 'To incentivise or penalise: an analysis of the proposed carbon tax in South Africa' in SE Weishaar et al (eds) *Critical Issues in Environmental Taxation*, Vol XIX (2017).

For a discourse on how carbon taxation and emissions trading fit into the broader scheme of South Africa's climate change policy development, see A Gilder 'To tax or trade (or both or neither): the confusing South African status quo on carbon taxation and emissions trading' (2012) 4 *Carbon & Climate Law Review* 358-364.

[48] National Treasury *Carbon Tax Discussion Paper* (n10) at 24 endorses the approach of placing a lower initial price on carbon and thereafter gradually increasing it over time.

[49] National Treasury *Carbon Tax Policy Paper* (2013), available at http://www.treasury.gov.za/public%20comments/Carbon%20Tax%20Policy%20Paper%202013.pdf, accessed on 15 December 2016.

[50] The Draft Carbon Tax Bill, Bill B-2017, is available at http://www.treasury.gov.za/public%20comments/CarbonTaxBill2015/Carbon%20Tax%20Bill%20final%20for%20release%20for%20comment.pdf, accessed on 15 December 2016.

[51] National Treasury *Carbon Offsets Paper* (2014), available at

emission reduction projects more attractive.[52] The planned carbon tax is aimed at achieving South Africa's ambitious commitments to reduce GHG emissions by 34 per cent by 2020 and 42 per cent by 2025.[53]

It is anticipated that the carbon tax will come into effect in a phased manner at a marginal rate of R120 per ton of Carbon Dioxide equivalent (CO_2e).[54] Parties that conduct various activities in the manufacturing, construction, mining and transport sectors will be affected. The carbon tax liability is calculated as the tax base multiplied by the rate of carbon tax. The tax base refers to the total quantity of GHG emissions from combustion, fugitive and industrial processes, proportionately reduced by the tax-free allowances. It is likely to be implemented with complementary measures, for example, a reduction in the electricity levy, as well as other measures, such as carbon offsets which firms can use to reduce their carbon tax liability. The Davis Tax Committee[55] considers it likely that investment in offsets could significantly promote sustainable development[56] in South Africa.[57]

National Treasury has advanced the notion that, under the South African carbon tax, only entities *not* liable for the carbon tax will be permitted to implement emission-reduction projects and sell carbon offset credits to entities that are liable for the carbon tax (carbon offsets are discussed in the next section). The argument is as follows: if a company falling in the carbon tax net receives

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http://www.treasury.gov.za/public%20comments/CarbonOffsets/2014042901%20-%20Carbon%20Offsets%20Paper.pdf, accessed on 20 December 2016 at 18.

[52] Ibid.

[53] During the 2009 Copenhagen climate change negotiations, South Africa voluntarily announced that it would act to reduce domestic GHG emissions by 34 per cent by 2020 and 42 per cent by 2025 from business as usual (BAU) subject to the availability of adequate financial, technological and other support. See, in this regard, National Treasury (n10) at 3.

[54] Clause 5 of the Draft Carbon Tax Bill (n50).

[55] The Davis Tax Committee was established on 17 July 2013 to assess South Africa's tax policy framework and its role in supporting the objectives of inclusive growth, employment, development and fiscal sustainability.

[56] It will be seen in Chapter 4 that 'sustainable development' is referred to in the environmental right contained in South Africa's Constitution, as well as forming the foundation of the NEMA – the country's framework National Environmental Management Act.

[57] According to the Davis Tax Committee *First interim report* (n10) at 23, benefits of the proposed tax include:

- the channelling of capital to rural development projects;
- increasing employment opportunities;
- restoration of landscapes;
- reductions in land degradation;
- protection of biodiversity; and
- the encouragement of energy efficiency and low carbon growth.

income from an emission-reduction project that also reduces the company's overall emissions, a double incentive is effectively provided. These double-counting problems would be likely to occur, as there are incentives for mitigation in the form of both carbon tax liability reduction *and* revenue from carbon offset credits.

Consequently, the Davis Tax Committee has proposed that:[58]

- Credits for projects based only in South Africa should be used for offsets;
- The projects should be outside the scope of activities that are subject to the carbon tax;
- An initial list of eligible projects would be used to stimulate an offsets market; and
- Projects that have already been developed in South Africa under standards such as CDM, should be considered for use as offsets, provided they meet certain eligibility criteria.

As a result, the Committee intends that carbon offsets should also incentivise investment in least-cost mitigation options in the country, thereby driving investment in GHG-mitigation projects that deliver carbon emission reduction at a lower cost per CO_2e than the carbon tax.[59] The objective, therefore, is for a taxpayer to purchase carbon credits for cheaper than the cost of paying the carbon tax.

Carbon taxes are aimed at bringing about behavioural change, but they also raise revenue for the government. This tax revenue could be used to reduce other taxes, such as personal income tax. This, in turn, could result in higher rates of employment and economic growth. In general, revenue recycling includes tax shifting (ie decreasing other taxes), tax incentives for programmes (eg energy-saving incentives) and targeted assistance to low income households. National Treasury envisages that revenue collected from the carbon tax will be paid into the National Revenue Fund.[60] It remains to be seen whether the carbon tax revenue will, in fact, be recycled to fund other programs.

The proposed carbon tax has undergone extensive consultation and attracted many disparate views, including competitiveness concerns and distributional issues.[61] Ultimately, though, it aims to meet its main objective as an environmental tax, namely to reduce GHG emissions. In some industries, however, GHG producers are unable to implement programmes to reduce GHG emissions, often due to technology and financing constraints. Carbon offsets allow GHG emission reductions in one

[58] Ibid.

[59] Ibid.

[60] Clause 2 of the Draft Carbon Tax Bill (n50).

[61] For a weighing of the pros and cons, see, for example, Steenkamp (n47).

location to compensate for excess emissions in another.[62] The next section accordingly examines the carbon offset policy of National Treasury.

2.5 CARBON OFFSETS

2.5.1 Introduction

The *Carbon Offsets Paper* complements National Treasury's *Carbon Tax Policy Paper* and provides further details about the proposed carbon offset mechanism to accompany the carbon tax.[63] A carbon offset is defined as a 'measurable avoidance, reduction or sequestration of carbon dioxide (CO_2) or other GHG emissions'.[64] Through investment in carbon offset projects, entities will be able to reduce their own tax liability, through funding GHG-reduction measures implemented by other entities.[65] The *Carbon Offsets Paper* provides an overview of carbon offset principles,[66] project eligibility,[67] carbon offset standards[68] and the development of a South African carbon offset scheme.[69]

In June 2016, substance was given to the Draft Carbon Tax Bill with the release of the Draft Regulations on the Carbon Offset.[70] The Explanatory Note for the Draft Regulations was released at the same time.[71] National Treasury was expected to release a second draft of the Regulations for

[62] L Andanova & Y Sun *Private governance in developing countries: what are the drivers of voluntary carbon offset programs?* (2017) at 6, available at http://interconnections2017.org/wp-content/uploads/2017/02/andonova.pdf, accessed on 21 June 2017.

[63] National Treasury *Carbon Offsets Paper* (n51).

[64] Id at 12.

[65] Ibid.

[66] Id at 12-13. These principles include, inter alia, additionality, measurability, monitoring and verification, and synchronisation.

[67] Id at 16-22. Factors which influence the suitability of a project include, amongst others, the geographical location, carbon tax coverage and project methodologies.

[68] Id at 30-38.

[69] Ibid.

[70] The regulations were published in terms of clause 20*(b)* of the Draft Carbon Tax Bill (n50). The Draft Regulations are available at http://www.treasury.gov.za/public%20comments/CarbonTaxBill2016/Carbon%20offset%20Regulations.pdf, accessed on 31 January 2017. These regulations were developed jointly by National Treasury, the Department of Energy and the Department of Environmental Affairs.

[71] National Treasury *Explanatory Note for the Draft Regulations on the Carbon Offset: Published in terms of*

further public comment in mid-2017 (following the anticipated release of the revised Draft Carbon Tax Bill), but this too has been delayed.[72]

As mentioned earlier in para 2.4, the carbon offset system will only apply to those sectors and activities that are not covered by the proposed carbon tax.[73] The offset scheme will initially rely on international standards for carbon offset projects, most notably the CDM.[74] Other approved carbon offset projects includes the Verified Carbon Standard (VCS), Gold Standard (GS), or any other project that complies with another standard approved by the Minister of Energy or a delegated authority.[75]

The offset of an approved project against an entity's carbon tax liability is allowed in relation to any Certified Emission Reductions (CERs) in a specific time period.[76] Carbon offsets against the carbon tax liability can only be used for a stipulated number of years according to the type of project.[77] Only projects that are wholly undertaken in South Africa will qualify.[78] Moreover, projects benefitting from other government incentives, for example, the energy efficiency savings tax incentive[79] or Renewable Energy Independent Power Producer Procurement Programme (REIPPPP),[80] will not be eligible for the carbon offset allowance.[81]

South Africa's Designated National Authority (DNA), which was established along with the Department of Energy under the CDM (as will be discussed in Chapter 3), will administer the carbon offset scheme.[82] The administration of the carbon offsets entails the inspection and review of

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section 20(b) of the Draft Carbon Tax Bill, 2015 (20 June 2016), available at http://www.treasury.gov.za/public%20comments/CarbonTaxBill2016/Explanatory%20Note%20Carbon%20Offset%20Regulation.pdf, accessed on 31 January 2017.

[72] National Treasury's responses to issues raised by stakeholders on the Draft Regulations can be accessed here: http://www.treasury.gov.za/comm_media/presentations/Draft%20Regulations%20on%20the%20carbon%20offset%20(25%20November%202016)/NT%20-%20Summary%20of%20comments%20on%20the%20Draft%20Carbon%20Offsets%20Regulation%2025-11-2016.pdf, accessed on 31 January 2017.

[73] National Treasury *Carbon Offsets* (n51) at 21.

[74] Regulation 1 of the Draft Regulations (n70).

[75] Ibid.

[76] Regulation 2 of the Draft Regulations (n70).

[77] Regulation 3 of the Draft Regulations (n70).

[78] Regulation 2 of the Draft Regulations (n70).

[79] In terms of s12L of the Income Tax Act.

[80] The REIPPPP is later discussed in Chapter 4.

[81] Regulation 4 of the Draft Regulations (n70).

[82] Regulation 5 of the Draft Regulations (n70).

applications, as well as the managing of the offset registry.[83] In order to claim the carbon offset against the carbon tax liability,[84] the taxpayer will have to register the carbon offset and obtain a certificate.[85] Projects which are currently under development and which will be registered before the commencement of the carbon tax, as well as issues relating to credits following the introduction of the carbon tax, will have to be transferred from an international registry to the South African registry within six months of their issuance.[86]

Carbon offsets are typically measured in tons of CO_2e and are bought and sold through a number of international brokers, online retailers, and trading platforms.[87] By converting carbon emissions to a marketable commodity, they create flexible mechanisms for companies, organisations, and individuals to purchase carbon credits from offsets in a manner that is cheaper than investment in its own operations.[88]

Box 2.1 below presents a simplified depiction of the workings of a carbon offset.[89]

Box 2.1 The workings of a carbon offset

Say a wind energy company sells carbon offsets. The wind energy company benefits because the carbon offsets it sells make such projects more economically viable. The buyers of the offsets benefit because they can claim that their purchase resulted in new renewable energy, which they can use to mitigate their own GHG emissions. The buyers may also save money as it may be less expensive for them to purchase offsets than to eliminate their own emissions.

Carbon offset markets exist both under compliance schemes and as voluntary programs.[90] Compliance markets are created and regulated by mandatory regional, national, and international

[83] Regulation 5, 6 and 8 of the Draft Regulations (n70).

[84] Regulation 7 of the Draft Regulations (n70).

[85] Regulation 9 and 10 of the Draft Regulations (n70).

[86] National Treasury *Explanatory Note* (n71) at 7.

[87] P Clarke *An introduction to carbon offsets* (2000) at 4, available at https://c.ymcdn.com/sites/www.realpac.ca/resource/resmgr/industry_sustainability_-_research_reports/rpicfanintroductiontocarbono.pdf, accessed on 21 June 2017.

[88] Ibid.

[89] Based on an example in Clarke (n87) at 4.

[90] A Kollmuss, H Zink & C Polycarp *Making sense of the voluntary carbon market: A comparison of carbon offset standards* (2008) at v, available at

carbon reduction regimes, such as the Kyoto Protocol and the EU's Emissions Trading Scheme (ETS).[91] Under a mandatory scheme, an overall emission cap is set by public regulatory institutions and each emitter receives an emission target to comply with and is allowed to buy credits from offsets.[92] Voluntary offset markets function outside of the compliance markets and enable companies and individuals to purchase carbon offsets on a voluntary basis.[93] Under a voluntary scheme, emitters are not subject to binding emission limits, but still have incentives to purchase offsets.[94]

Successful carbon offset standards are those that are simple yet rigorous and which enjoy wide support from carbon project developers, offset traders and buyers, environmental Non-governmental Organisations (NGOs) and the financial industry.[95] In order to be useful, carbon offset projects have to be evaluated and validated. A number of different carbon offset standards have been developed to achieve this. The focus of this chapter now shifts to the leading carbon offset standards.

2.5.2 Carbon standards

As mentioned in para 2.5.1, National Treasury has approved three international carbon offset standards, namely the CDM, VCS and GS.[96] These are 'full-fledged' carbon offset standards, meaning they include the following three components: accounting standards; monitoring,

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http://cetesb.sp.gov.br/wp-content/uploads/sites/28/2008/03/acomparisonofcarbonoffsetstandardsmakingsenseofthevoluntarycarbonmarket.pdf, accessed on 20 April 2017.

[91] Ibid.

[92] Andanova & Sun (n62) at 6.

[93] Kollmuss et al (n90) at v-vi posit the following reasons for the promotion of the voluntary offset market:

- The possibility of broad participation: this enables those in unregulated sectors or countries that have not ratified Kyoto, such as the US, to offset their emissions.
- Preparation for future participation: this assists companies in gaining experience with carbon inventories, emissions reductions and carbon markets.
- Innovation and Experimentation: the voluntary market is not as rigid when it comes to the level of oversight, management, and regulation as the compliance market. Accordingly, project developers are more flexible to implement projects that might otherwise not be viable (eg projects that are too small or too disaggregated).
- Corporate goodwill corporations can benefit from the positive public relations associated with the voluntary reduction of emissions.

[94] Andanova & Sun (n62) at 6.

[95]Kollmuss et al (n90) at 14.

[96] Regulation 1 of the Draft Regulations (n70).

verification and certification standards; and registration and enforcement systems.[97] Although there are numerous other standards, this section will focus on these three approved standards.[98] In order to sketch a broader backdrop, two other full-fledged standards are also alluded to, namely the Voluntary Emission Reduction (VER+) and Chicago Climate Exchange (CCX) standards.

2.5.2.1 CDM

The CDM is one of the flexible mechanisms of the Kyoto Protocol and its related accords. It is administered by the United Nations Framework Convention on Climate Change (UNFCCC). The CDM enables industrialized countries to achieve emissions reductions by paying developing countries for CERs. Moreover, the CDM is the only flexible mechanism in the Kyoto Protocol open to participation by developing countries.

Established under Art 12 of the Kyoto Protocol, it provides developed countries with a mechanism to reduce their own GHG emissions obligations by purchasing credits from CDM projects that avoid GHG emissions in developing countries. These projects facilitate financing and technology transfer for GHG reduction in developing countries. This mechanism includes projects in renewable energy, energy efficiency and other related fields designed to achieve emission reductions.

The carbon emission reduction credits from the CDM projects are known as CERs and are saleable to and usable only by developed countries for the purpose of meeting their legally binding emission reduction obligations.[99] Non-Annex I countries (such as South Africa) are motivated to participate in the CDM by benefits such as technology transfer for the projects, foreign funding for the projects and the possibility of trading the carbon credits gained from the projects with Annex I countries.[100]

The CDM is defined in Article 12 of the Kyoto Protocol, and is intended to meet two objectives:

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[97] Ibid. These components are examined in greater detail in Chapter 3 as part of the discussion of the workings of the CDM.

[98] Other carbon offset standards which do not meet the full-fledged requirements will not be addressed here, as they are not comparable to the CDM. Kollmuss et al (n90) explores these, including the Climate, Community and Biodiversity Standard (CCBS), Voluntary Offset Standard, various Offset Protocols and other standard types.

[99] This explanation of the workings of the CDM and CERs was obtained from National Treasury *Explanatory Memorandum to the Taxation Laws Amendment Bill* (2013) at para 4.3, available at http://www.sars.gov.za/AllDocs/LegalDoclib/ExplMemo/LAPD-LPrep-EM-2013-02%20-%20Explanatory%20Memorandum%20Taxation%20Laws%20Amendment%20Bill%202013.pdf, accessed on 10 April 2016.

[100] GS Little, T Maxwell & M Sutherland 'Accelerating the implementation of the clean development mechanism in South Africa' (2007) 10(4) *SAJEMS* 395-411 at 395.

(i) To assist non-Annex I countries in achieving sustainable development and, in so doing, to contribute to the prevention of dangerous climate changes; and

(ii) To assist Annex I countries in achieving compliance with their quantified emission limitation and reduction commitments.

The CDM addresses the second objective by allowing the Annex I countries to meet part of their emission reduction commitments buying CERs from CDM emission reduction projects in developing countries. The projects and the issue of CERs are subject to approval to ensure that these emission reductions are real and 'additional'. The issue of additionality is complex and will be examined in Chapter 7 of this thesis.

During the COP18 meetings held in Doha in December 2012, the CDM was extended as a flexible mechanism under the Kyoto Protocol, enabling developing countries to continue their participation in the global carbon market. In order to enhance the uptake of CDM projects in South Africa, National Treasury introduced the section 12K tax incentive to the South African Income Tax Act No. 58 of 1962, as amended (‘the Income Tax Act') in 2009. South Africa's fiscal policy (including tax incentives relating to the CDM and renewable energy) is addressed in Chapter 4.

2.5.2.3 Verified Carbon Standard (VCS)[101]

The VCS is a non-profit NGO founded in 2005 by the Climate Group, International Emissions Trading Association (IETA) and the World Economic Forum (WEF), and later joined by the World Business Council for Sustainable Development (WBCSD).[102] The VCS classifies projects into categories known as sectoral scopes, which can range from energy efficiency to waste management, and is the world's most widely used voluntary GHG reduction programme.[103] Unlike the GS (see below), the VCS focuses on GHG reduction attributes only and does not require projects to have additional environmental or social benefits.[104]

The VCS operates by accepting methodologies that serve as the protocols for developing carbon credit projects.[105] Some of these methodologies are created through the VCS Association which

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[101] Formerly the 'Voluntary Carbon Standard'.

[102] See http://www.v-c-s.org/, accessed on 19 April 2016, for more information.

[103] Ibid.

[104] Kollmuss et al (n90) at 58.

[105] NA Munuo *Towards the design of a reflexive regulatory framework to" Reduce and control emissions from land deforestation and degradation and enhancing carbon stocks"(REDD+): a perspective from select developing countries* (Doctoral dissertation, University of Cape Town, 2016) at 117.

relies on expert committees from organisations such as the CDM Methodology Panel, the World Bank and leading non-profit and private sector organisations.[106] In addition, the VCS Association accepts methodologies adopted by the Executive Board of the CDM.[107] VCS approved carbon offsets are registered and traded as Voluntary Carbon Units (VCUs) and represent emissions reductions of one million ton of CO_2e ($MtCO_2e$).[108]

In order to obtain approval of a carbon project and the issuance of VCUs, a third-party verifier must validate the project design document submitted by the project developer, and verify the amount of GHG emissions actually reduced.[109] The VCS Association relies on third-party registries to actually issue the credits and maintain them on their registries.[110]

It is noteworthy that VCS projects represent more than ten per cent of CDM projects, both in terms of the number of projects and estimated emission reductions.[111] Thus, although it is a voluntary carbon offset standard, it contributes a significant portion to global offset schemes.

2.5.2.4 Gold Standard (GS)

The GS was developed by a group of environmental and social non-profit organisations to strengthen the social and environmental benefits of carbon offset projects.[112] It was nurtured under the leadership of the World Wildlife Fund (WWF) in order to make sure that emission reduction projects are real and provide social, economic and environmental benefits.[113] The GS can be used for voluntary as well as CDM projects.[114]

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[106] VCS (n102).

[107] Ibid. Kollmuss et al (n90) at 54 comment that the advantage of outsourcing is that the organisation can be kept lean. Also, by outsourcing tasks to specialists, the quality of work is greatly enhanced. Of course, as the authors rightly point out, the downside of this approach is that more decision making power is given to outside entities.

[108] Kollmuss et al (n90) at 58.

[109] Munuo (n105) 117.

[110] Kollmuss et al (n90) at 61. The authors explain that double counting is avoided by the VCS also maintaining a project database on its website which assigns a serial number to each project. It should be noted that the VCS Association does not directly play a role in the issuance of carbon credits for individual projects.

[111]Andanova & Sun (n62) at 15.

[112] Kollmuss et al (n90) at 30.

[113] Id at 54.

[114] Id at 30.

The GS CDM was launched in 2003 after a two year period of consultation with stakeholders, governments, NGOs and the private sector from over 40 countries.[115] The GS serves as a standard and certification body that aims to identify and encourage well-designed activities as the sources for credible GHG reductions that maximise wider sustainable development outcomes.[116] The GS accepts renewable energy (including methane-to-energy projects) and energy efficiency projects.[117]

2.5.2.5 Voluntary Emission Reduction (VER+) Standard

The VER+ standard was developed by TÜV SÜD, a German-based Designated Operational Entity (DOE) for the validation and verification of CDM projects.[118] Although it closely follows the Kyoto Protocol's project-based mechanisms, namely the CDM and JI, it does not focus on co-benefits.[119] Launched in mid-2007, it was designed for projects not yet implemented under the CDM, as it demonstrates pre-compliance with CDM principles.[120]

Projects are verified by a third party auditor which must be CDM/JI accredited.[121] All VER+ offset credits must be registered in TÜV SÜD's own BlueRegistry.[122] There are several reasons why project developers might choose VER+ over CDM. In comparison to CDM, VER+ provides more flexibility on methodologies, which speeds up validation and verification.[123] The fees for the incorporation of VER+ credits to the BlueRegistry are usually lower than those covered by

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[115] Id at 54 further remark that the Gold Standard Foundation is a non-profit organisation under Swiss Law, funded by public and private donors. Furthermore, they state that the operational activities of the GS are managed by the Gold Standard secretariat based in Basel, Switzerland, including capacity building, marketing and communications, certification, registration and issuance as well as maintenance of the GS rules and procedures.

[116] See http://www.goldstandard.org/, accessed on 19 April 2016, which states that GS projects have contributed to billions of dollars in climate and development outcomes in communities across the world.

[117] Kollmuss et al (n90) at 54 also point out that the GS excludes large hydro projects above 15 MW capacity.

[118] See https://shapingsustainablemarkets.iied.org/ver-standard, accessed on 21 June 2017.

[119] Kollmuss et al (n90) at 63.

[120] TÜV SÜD *A robust Standard for Verified Emission Reductions (Criteria Catalogue)* (n.d.), available at http://www.tuev-sued.de/uploads/images/1179142340972697520616/Standard_VER_e.pdf, accessed on 21 June 2017. This means that project developers may well be able to sell credits through the CDM in the future.

[121] Kollmuss et al (n90) at 63.

[122] Ibid. The BlueRegistry was launched in 2007 and prevents the double selling of credits.

[123] Id at 66 elaborate that a project specific approach as defined for the JI can be used for those project settings where a CDM approved methodology is not available or fully applicable.

UNFCCC for registration and issuance of CDM projects.[124] Credits certified under VER+ are traded in the voluntary market.

TÜV SÜD is currently both the certification body and the auditor, which perhaps raises questions of independence.[125] Although TÜV SÜD has a good reputation as a DOE and is a well-know auditor, it is difficult to know if project approval will always be strictly independent.[126]

2.5.2.6 Chicago Climate Exchange (CCX)

The CCX was a voluntary GHG emissions cap-and-trade scheme based in North America.[127] Although participation was voluntary, compliance with emission reduction objectives was legally binding once a member joined.[128] CCX had as part of its cap-and-trade scheme an offset programme with a full-fledged carbon offset standard.[129] CCX ceased trading carbon credits at the end of 2010 due to inactivity in the US carbon market.[130]

2.5.3 Carbon Tax and the CDM

It is clear that a carbon offset standard, most notably the CDM and its likely successor (the SDM), will increasingly come under the spotlight as the carbon tax nears its implementation date in South Africa. The use of carbon offsets to reduce the carbon tax liability for South African entities would mirror current trends in a number of jurisdictions that employ economic instruments to reduce GHG emissions, including the EU and Australia.[131] South African entities are currently able to develop and sell or purchase carbon offsets from international carbon offset markets that were developed under international standards, such as the CDM.[132]

Perceptions of carbon offsetting vary widely across the globe. In South Africa, there is less awareness about the mechanism of offsetting and its associated benefits. However, interest in the

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[124] Ibid.

[125] See https://shapingsustainablemarkets.iied.org/ver-standard, accessed on 21 June 2017.

[126] Kollmuss et al (n90) at 66.

[127] Ibid.

[128] Ibid.

[129] Ibid.

[130] See http://ghginstitute.org/2010/11/10/the-chicago-climate-exchange-closure-a-vote-for-robust-ghg-mrv/, accessed on 9 July 2017.

[131] National Treasury *Carbon Offsets* (n51) at 10.

[132] Ibid.

concept of CDM is 'rapidly increasing'.[133] The increased appeal of the CDM can likely be ascribed to the proposed carbon tax, in terms of which taxpayers may lower their tax liability by purchasing offsets from South African projects. In addition, more companies are realising that offsetting is an effective tool to cut their emissions cost-effectively, while simultaneously benefitting communities.[134]

2.6 CONCLUSION

Market-based policy instruments are now considered worldwide (including in South Africa) for nearly every environmental problem that is raised, ranging from endangered species preservation to the greenhouse effect and global climate change.[135] However, MBIs should not be viewed as a single solution in all circumstances, but as one component of a wider policy package.[136] MBIs should complement, rather than replace, existing CAC policies.[137] That being said, there is a range of MBIs designed to address environmentally-related market failures by way of a price mechanism. One such MBI is the use of environmental taxes.

The basic rationale for an environmental tax is clear: it applies the polluter-pays principle and intends to change the behaviour of taxpayers. On this basis, the rationale is to reduce pollution to a level that takes full account of both the costs of the pollution and the benefits of the polluting activity.[138] Taxes are often more effective than regulation as a way to achieve this.[139] As emphasised above, an example of an environmental tax is the carbon tax.

A carbon tax places a price on CO_2 emissions, thereby striving to internalise the cost of external GHG damages. It provides consumers and businesses with greater flexibility to decide how to change their behaviour and reduce harmful activity.[140] In addition, the South African government allows the use of carbon offsets to further mitigate the carbon tax liability.

Carbon offsetting is an increasingly popular means of taking action against climate change. By paying someone else to reduce GHG emissions elsewhere, the purchaser of a carbon offset aims to

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[133] Climate Neutral Group 'What is carbon offsetting?' (n.d.), available at https://acc.climateneutralgroup.co.za/climate/what-is-carbon-offsetting/, accessed on 21 May 2016.

[134] Ibid.

[135] Stavins *Experience* (n2) at 44.

[136] Bustos et al (n10) at 12.

[137] Ibid.

[138] Mirrlees et al (n25) at 231.

[139] Ibid.

[140] OECD (n1) at 2.

compensate for – or offset – their own emissions. Carbon offset markets exist both under compliance schemes as well as under voluntary programs. The CDM is a full-fledged, internationally regulated carbon offset standard which has also been domestically approved as a carbon offset methodology.

Making use of the current standards in existence to issue CERs will enhance the credibility and confidence in the market with regards to the carbon offset mechanisms. This will also ensure that a degree of local familiarity and existing competence in these standards could be capitalised on to implement and expedite the process of issuing CERs in South Africa. The above analysis has shown that South Africa has made significant progress towards putting a carbon tax in place. It will be shown in subsequent chapters that the CDM (as well as the SDM) requires similar attention.

Having provided the theoretical framework underpinning this thesis, the next chapter will examine the policy considerations of the Kyoto Protocol in general, and the CDM in particular. Thereafter, the chapter will trace the evolution of the CDM to its envisaged successor, the SDM, under the Paris Agreement.

Chapter 3

The historical development and workings of the CDM and the SDM

3.1 INTRODUCTION

Having laid the theoretical foundation in the previous chapter, this chapter examines the theoretical and policy considerations underlying the legal aspects of the Clean Development Mechanism (CDM). While it is uncertain at the time of writing (mid-2017) whether the CDM will continue to exist alongside the SDM or will be replaced by it, this chapter investigates, among other things, questions around if and how the SDM refines and streamlines the CDM. In so doing, a better understanding might be gained of the factors that will contribute to the success (or failure) of the SDM.

This chapter commences with an overview of the Kyoto Protocol and the establishment of the CDM under Art 12. Next, this chapter traces the evolution of the CDM and considers the new procedures and modalities for its ostensible successor, namely the SDM. The architectural components of the Paris Agreement will be explored in order to contextualise the origin and proposed implementation of the SDM. Lastly, the chapter will reflect on transitional arrangements for existing CDM projects.

As a point of departure, it should be emphasised that the CDM only applies to developing countries (or non-Annex I parties). The other two flexible mechanisms, namely the Joint Implementation (JI) mechanism under Art 6 and the International Emissions Trading (IET) mechanism under Art 17 of the Kyoto Protocol, only apply between Annex I Parties (or developed countries).

The JI mechanism allows a country with an emission reduction commitment under the Kyoto Protocol to earn Emission Reduction Units (ERUs) from an emission-reduction or emission removal project in another Annex I Party.[1] Each ERU is equivalent to one ton of CO_2 (tCO_2), which can be counted towards meeting its Kyoto target.[2] Joint implementation offers both Parties benefits:

[1]Art 6.1 of the Kyoto Protocol states -

> 'For the purpose of meeting its commitments under Article 3, any Party included in Annex I may transfer to, or acquire from, any other such Party emission reduction units resulting from projects aimed at reducing anthropogenic emissions by sources or enhancing anthropogenic removals by sinks of greenhouse gases in any sector of the economy ... '

[2]United Nations Framework Convention on Climate Change (UNFCCC) *Joint Implementation (JI)* (n.d.), available at http://unfccc.int/kyoto_protocol/mechanisms/joint_implementation/items/1674.php, accessed on 1 July 2017.

the host Party benefits from foreign investment and technology transfer, while the participating Party obtains a flexible and cost-efficient means of fulfilling a part of their Kyoto commitments.[3]

Art 17 of the Kyoto Protocol permits countries to trade with their allowances.[4] In other words, if a country does not emit its assigned amount of emissions, it can trade them with a country whose emissions are too high. The IET mechanism is a market-based instrument aimed at reducing Greenhouse Gas (GHG) emissions. Through emissions trading, an Annex I Party may transfer surplus carbon credits to, or acquire them from, another Annex I party. Developed countries that have exceeded their levels can either reduce GHG emissions, or borrow or buy carbon credits from developing countries. The IET mechanism encompasses both the secondary trading of JI and CDM carbon credits between Annex I countries, as well as a cap-and-trade market in emissions allowances.[5]

Figure 3.1 below is a simplified portrayal of the workings of the flexible mechanisms, which nonetheless helps to illustrate the basic differences between them.[6]

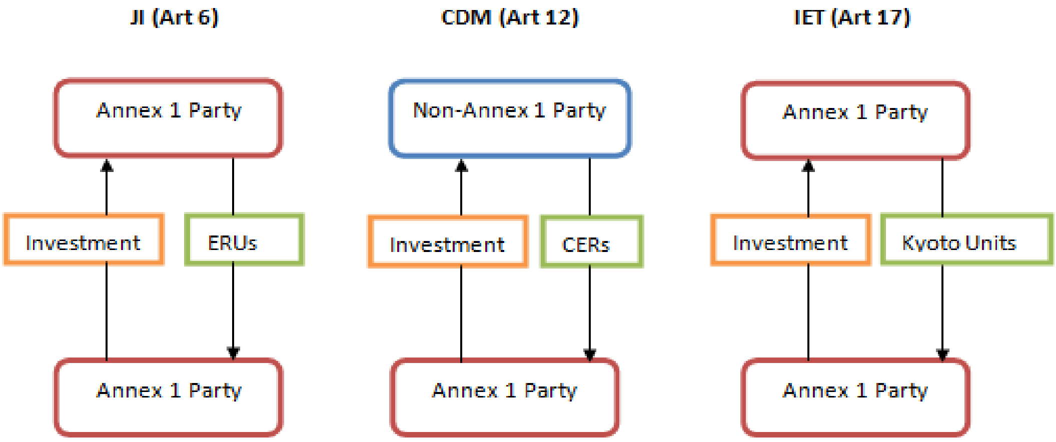

Figure 3.1 The three flexible mechanisms of the Kyoto Protocol

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[3] Ibid.

[4] Art 17 of the Kyoto Protocol determines that -

> 'The Conference of the Parties shall define the relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability for emissions trading. The Parties included in Annex II may participate in emissions trading for the purposes of fulfilling their commitments under Article 3. Any such trading shall be supplemental to domestic actions for the purpose of meeting quantified emission limitation and reduction commitments under that Article.'

[5] PA Ali & K Yano *Eco-finance: the legal design and regulation of market-based environmental instruments* (2004) at 45. The authors also state that the international market in JI and CDM carbon credits envisaged by the Kyoto Protocol is equivalent to the open markets in emissions credits.

[6] Derived from the CDM Rulebook, available at http://www.cdmrulebook.org/321.html, accessed on 9 November 2016.

The JI and CDM are project-based, whereas the IET is a trading arrangement. The World Bank played a key facilitating role in the early carbon market, mobilising the first carbon fund (known as the Prototype) with contributions from the public and private sector of around US$180 million, which it subsequently invested in a range of projects under the CDM and JI.[7]

As stated in Chapter 1, the United Nations Framework Convention on Climate Change (UNFCCC) took effect in 1994. Together with its accompanying Kyoto Protocol, the framework endeavours to embrace the interests and needs of all countries. The 39 states included in Annex I of the Kyoto Protocol have assented to cut their GHG emissions by an agreed percentage below their 1990 levels in the period between 2008 and 2012. In order to accomplish this pledge, the parties have to rely primarily on domestic action.[8] However, in acknowledgement of the importance of institutional flexibility and private sector involvement, the Kyoto Protocol introduced the three mechanisms mentioned earlier to supplement domestic action.[9] The mechanisms are also intended to lower the compliance costs for industrialised countries and allow for geographical and temporal flexibility.

The flexible mechanisms in general, and the CDM in particular, are 'among the most innovative aspects of the emerging climate change regime'.[10] The next section explores the historical development of the UNFCCC negotiations against the backdrop of decisions taken at select Conferences of the Parties (COP) to the UNFCCC.

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[7] D Freestone 'Chapter 5: The United Nations Framework Convention on Climate Change – the basis for the climate change regime' in KR Gray et al (eds) *The Oxford Handbook of International Climate Change Law* (2016) at 109. The Prototype is a partnership between 17 companies and six governments and became operational in April 2000. More information is available at http://wbcarbonfinance.org/PCF, accessed on 9 November 2016.

[8] In the preamble to the Marrakech Accords, the parties to the UNFCCC confirmed that

> 'the use of the [flexible] mechanism shall be supplemental to domestic action and that domestic action shall thus constitute a significant element in the effort made by each Party included in Annex I to meet its quantified emission limitation and reduction commitments included under Article 3, paragraph 1'.

[9] Per C Streck 'New partnerships in global environmental policy: The Clean Development Mechanism' (2004) 13(3) *The Journal of Environment & Development* 295-322 at 296.

[10] Ibid. The author also regards the flexible mechanisms as a solution to the problem of global warming on an international level and 'through mechanisms based on the principle of trading emission reduction offsets'. In this regard, the mechanisms might be viewed as a 'bridge between industrialised and developing countries' and a 'platform for a coordinated approach for public and private entities to implement' the Kyoto Protocol.

3.2 THE KYOTO PROTOCOL

3.2.1 A brief history

For many countries, their focus on the promotion of renewable energies stems from their obligations under the legal regime of the UNFCCC/Kyoto Protocol. Although South Africa is a non-Annex I country in the Kyoto Protocol, it is a signatory. It ratified the Kyoto Protocol on 31 July 2002, but as a developing country, does not have targets under the protocol.

Prior to judging the outcome of the UNFCCC, it is necessary to view this agreement in the context of the wider Rio+20 agenda. Bodansky et al observe that the UNFCCC can be broken into four phases, namely the agenda-setting phase (1985 to 1990), the constitutional phase (1990 to 1995), the regulatory phase (1995 to 2005) and the renegotiating phase (2005 to 2016).[11] Below is a brief outline of the key decisions that have taken place during the major UN climate negotiations over the past decades.[12]

- **UN Conference on the Human Environment: The Stockholm Conference (1972)**

  The Stockholm Conference sought to draw attention to the link between economic development and environmental degradation. The conference resulted in the formation of the UN Environment Programme (UNEP).

- **The Rio Earth Summit (1992)**

  The UN Conference on Environment and Development (UNCED) was conceptualised in 1987 to address the development needs of poorer countries while engaging the cooperation of developed countries. In 1988, the World Meteorological Organisation and the UNEP joined forces to create the Intergovernmental Panel on Climate Change (IPCC). The UNCED eventually took place in 1992, and was known as the Rio Earth Summit. Its agenda was not simply global warming and climate change, but the full impact of economic and social development on the environment. The tangible outcome of the UNCED was three agreements and two legally binding conventions, of which the UNFCCC is the focus of this thesis.[13]

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[11] D Bodansky, J Brunnée & L Rajamani *International Climate Change law* (2017) at 96.

[12] This précis is derived from the topography of international agreements and conferences in L Bossley 'Dealing with reality' (2012) 5(4) *The Journal of World Energy Law & Business* 345-365 and the overview of COP decisions of the Environmental and Energy Study Institute (EESI) *Timeline of Major UN Climate Negotiations* available at http://www.eesi.org/policy/international, accessed on 15 November 2016.

[13] These agreements were:

- The Agenda 21 agreement – a global action plan for sustainable development;
- The Rio Declaration on Environment and Development – principles defining the rights and obligations of states;

- **UNFCCC (1994)**

  The UNFCCC was adopted by the UN in New York on 9 May 1992 and was signed by 166 countries at the UNCED in June 1992. It entered into full force and effect on 21 March 1994.

  A key concept underlying the UNFCCC is that of 'common but differentiated responsibilities', as introduced in Art 4. It reflects the argument that developed countries have greater responsibility for the (then) current level of GHG in the atmosphere attributable to their past economic growth and should, accordingly, accept greater responsibility for solving the climate change problem. It also reflected the fact that countries party to the UNFCCC signed up under different categories with different obligations.[14]

  The UNFCCC sets no mandatory limits on GHG emissions. Instead, the treaty provides for future negotiations to set emission limits. The first principal revision was the Kyoto Protocol.[15]

- **COP1 (1995)**

  The first Conference of the Parties (COP1) was held in Berlin. Parties agreed that mechanisms under the UNFCCC were inadequate and agreed to what would later be referred to as the Berlin Mandate, which allows parties to make specific commitments. Non-Annex I parties are exempt from additional obligations. The outcome of COP1 provided a strong political mandate for strengthening the commitments in the convention, which led to the adoption of the text of the Kyoto Protocol in 1997.[16]

- The Statement of Forest Principles – principles underlying the sustainable management of forests worldwide;
- The Convention on Biological Diversity; and
- The UNFCCC.

[14] The various categories are:

- Annex I parties: the OECD and the Commonwealth of Independent States agreed to limit their own GHG emissions and return to levels of emissions evident in an earlier historic period;
- Annex II parties: the OECD agreed, in addition to their Annex I commitments, to pay the costs of developing countries in measuring and communicating their GHG emissions, to underwrite the cost of transferring green technology and to provide assistance to vulnerable developing countries in adapting to climate change;
- Non-Annex I parties: everyone else committed to cooperate with the process, by facilitating the monitoring and measuring of their own GHG emissions.

[15] It is worth drawing attention to the fact that the US has committed to the UNFCCC as an Annex I/Annex II party, despite rejecting the Kyoto Protocol.

[16] UNFCCC Handbook at 115, available at https://unfccc.int/resource/docs/publications/handbook.pdf, accessed on 11 August 2016.

- **Adoption of the Kyoto Protocol (1997)**

  Following intensive negotiations during COP3 held in December in Kyoto, Japan, the Kyoto Protocol was adopted. The protocol outlined the GHG emissions reduction obligation for Annex I countries, resulting in the mechanisms known as emissions trading, clean development and joint implementation. Time constraints prevented COP3 from teasing out the details of how the Kyoto Protocol should operate in practice.

- **Bonn Agreements (2000)**

  After negotiations faltered at the Hague, in the Netherlands, the parties met again in Germany. Consensus was reached on what was called the Bonn Agreements. Despite many details being left to flesh out at the next COP meeting, the Bonn Agreement had paved the way for ratification of the Kyoto Protocol, as well as its entry into force.

  With the exception of the US (which participated in observatory status only), all nations agreed on the mechanisms for the implementation of the Kyoto Protocol. In this regard, the Bonn Agreements may be viewed as a set of political compromises for many contentious issues that were left unresolved by the earlier Kyoto Protocol negotiations.

- **Marrakech Accords (2001)**

  The US withdrew from the Kyoto Protocol in March 2001 (although it remained committed to the UNFCCC as Annex I/Annex II party). At the COP7 held in Marrakech, Morocco, the remaining parties (subsequent to the US's withdrawal) sought to flesh out the detail of the Kyoto commitment. The Accords provided a detailed package for reporting and reviewing countries' inventories based on Intergovernmental Panel on Climate Change (IPCC) methodologies.

  The detailed rules for the implementation of the Kyoto Protocol were adopted and named as the Marrakech Accords. In essence, the outcome of this COP resulted in a commitment to cut GHG emissions by 5.2 per cent below 1990 levels in the 2008–2012 period. This was agreed to by 166 countries. Also, two important funds were established during the COP7, namely the Special Climate Change Fund (SCCF)[17] and the Least Developed Countries Fund (LDCF). The Marrakech Accords also cover the flexible mechanisms.

[17] The SCCF was formed to finance projects relating to adaptation; technology transfer and capacity building; energy transport, industry, agriculture, forestry and waste management; and economic diversification. The LDCF's objective is to assist Least Developed Country Parties to carry out, among other things, the preparation and implementation of national adaption programmes of action.

- **Coming into force of the Kyoto Protocol (2005)**

  COP3 (held in December 1997) was significant, as it adopted the Kyoto Protocol. The Protocol required ratification by 55 states, including those countries that contributed 55 per cent of 1990 emissions, before it could enter into full force and effect. Russia turned the scales with its ratification in October 2004 and the Kyoto Protocol entered into full force and effect on 16 February 2005. South Africa ratified the Kyoto Protocol on 31 July 2002. As a non-Annex I country, it does not have targets under the protocol.

  The Kyoto Protocol elaborates on the UNFCCC by placing more specific obligations on developed countries and Countries with Economies in Transition.[18] Essentially, the Kyoto Protocol translated the UNFCCC into a specific action plan. Annex I countries were obliged to reduce their overall emissions of six GHGs by at least five per cent below 1990 levels between 2008 and 2012 (the first commitment period, which would end on 31 December 2012).[19] Non-Annex I countries were not required to make any comparable cuts unless they chose to do so.[20]

- **Bali Roadmap (2007)**

  During the COP13 meeting in Bali, parties agreed to the Bali Action Plan. This plan did not require binding GHG targets for developing countries. It was during this conference that discussions to determine the Kyoto Protocol's successor began in earnest.

- **Copenhagen Accord (2009)**

  The COP15 meeting in Copenhagen, Denmark, failed to reach agreement on binding commitments after the Kyoto Protocol commitment period ended in 2012. At the eleventh hour of the summit, leaders from the USA, Brazil, India, China, Indonesia and South Africa agreed to what would be called the Copenhagen Accord.[21]

  The Accord started by noting that any future increase in global temperature should be below 2°C since pre-industrial times. As mentioned earlier, the UNFCCC did not bind the developing non-Annex I countries to any specific mitigating action. The Copenhagen Accord sought to

[18] J Glazewski & L du Toit 'Chapter 3: International climate change law' in J Glazewski & L du Toit (eds) *Environmental Law in South Africa* (2016) para 3.2.2.1.

[19] Ibid.

[20] Ibid.

[21] Significantly, this was the first time in nearly 20 years that a US president acknowledged anthropogenic global warming and accepted the need for human intervention to divert environmental catastrophe.

change that situation, by incentivising the participation of large developing countries (such as China and India) through new funding.[22]

- **Cancun Agreements (2010)**

  The COP16 parties officially adopted major tenets of the Copenhagen Accord in Cancun, Mexico. A Green Climate Fund (GCF) was mentioned in the Copenhagen Accord, but was formally established during the COP16 meeting. The GCF aims to assist government in scaling up the provision of long-term financing for developing countries.[23] The Cancun meeting established the GCF as an operating entity of Art 11 of the UNFCCC, a financial mechanism, governed by a board and administered by a trustee. The Cancun Agreements also undertook to establish clear goals and a timetable for reducing GHGs to contain the global average temperature rise to below 2°C.

- **Durban Platform (2011)**

  During the COP17 meeting in Durban, South Africa, parties agreed to the Durban Platform for Enhanced Action which is a framework to establish a new international emissions reduction protocol. The parties addressed the practical consequences of failing to provide for a successor to the Kyoto Protocol by 1 January 2013.[24]

- **Kyoto Protocol extended (2012)**

  The Rio +20 summit took place in June 2012 and was the precursor to the COP18 meeting. This was a meeting of the UN Conference on Sustainable Development, not of the UNFCCC. Thus, it had no authority or infrastructure to address the Kyoto Protocol or its succeeding treaty.[25]

  At the COP18 meeting in Doha, Qatar, parties agreed to extend the expiring Kyoto Protocol by creating a second commitment phase that would begin on 1 January 2013 and end on 31 December 2020. The concept of 'loss and damage' was introduced as developed countries

[22] This cash incentive envisaged by the Copenhagen Accord was aimed at enabling and supporting mitigation, adaptation, development and transfer of technology and capacity-building.

[23] The GCF will support projects, programmes, policies and other activities in developing country parties. See http://unfccc.int/cooperation_and_support/financial_mechanism/green_climate_fund/items/5869.php, accessed on 19 November 2016.

[24] Russia, Japan and Canada did not commit to new targets.

[25] The outcome document, 'The Future We Want', was put forward as the common vision of the heads of states and governments which are members of the UN. This group includes the US, China, Russia and India. The document is available at http://www.un.org/disabilities/documents/rio20_outcome_document_complete.pdf, accessed on 27 November 2016.

pledged to help developing countries and small island nations pay for the losses and damages from climate change that they were already encountering.

- **Paris Agreement (2015-2016)**

  The landmark Paris Agreement was negotiated by representatives of 195 countries at COP21 in Paris, France. It was adopted by consensus on 12 December 2015 and opened for signature on 22 April 2016. Following the ratification of the agreement by the EU in October 2016, there were enough countries to enable it to come into force. The Paris Agreement came into effect on 4 November 2016.

  South Africa had signed the Paris Agreement on 22 April 2016. Thereafter, on 20 October 2016, Cabinet announced its approval for the treaty to be submitted to Parliament for ratification. The ratification of the treaty was assented to by the National Council of Provinces on 27 October 2016, and by the National Assembly on 1 November 2016.

  Section 3.4 provides an overview of the key provisions of the Paris Agreement.

- **COP22 (2016)**

  Following the rapid entry into force of the Paris Agreement, governments took the next steps at the COP22 meeting in Marrakech, Morocco, to move forward on the implementation of this agreement.

  The Marrakech Action Proclamation was adopted by Heads of State, reaffirming their commitment to implement the Paris Agreement and mobilise US$100 million annually by 2020.[26]

  During the climate talks in Marrakech, two initiatives were launched to increase cooperation between all levels of government and accelerate the delivery of climate measures on the ground. The first, namely the *Marrakech Partnership for Global Climate Action*, focuses on bolstering investments from 2017 to 2020.[27] The second is the *2050 Pathways Platform*, which targets long-term deep decarbonisation action plans.[28]

[26] The Marrakech Action Proclamation is available at http://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/marrakech_action_proclamation.pdf, accessed on 20 November 2016.

[27] See http://newsroom.unfccc.int/climate-action/global-climate-action-agenda, accessed on 22 November 2016.

[28] See http://newsroom.unfccc.int/unfccc-newsroom/high-level-climate-champions-launch-2050-pathways-platform/, accessed on 22 November 2016.

A key element of the UNFCCC is that its text refers pertinently to several of the guiding principles laid down by the Rio Declaration.[29] The next paragraph focuses on two of these principles, namely mitigation and adaptation.

3.2.2 Mitigation and adaptation

As a point of departure, Art 3(3) of the UNFCCC stipulates that parties should take precautionary measures to anticipate, prevent or minimise the causes of climate change and mitigate[30] its adverse effects. To this end, such policies and measures should be comprehensive in nature, take into account different socio-economic contexts, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation,[31] and comprise all economic sectors.

In terms of Art 4(2)*(a)* of the UNFCCC, Annex I parties (ie developed countries) are committed to

> 'adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs'.

Moreover, Art 4(4) compels developed country parties to assist especially vulnerable developing country parties financially, so that they may meet the costs of adaptation.

It could be argued that adaptation and mitigation are complementary to each other.[32] For example, if mitigation measures are undertaken effectively, the impacts to which we will need to adapt will be reduced; similarly, if adaptation measures are strong, the impacts linked to climate change will be

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[29] S Carter & M Barnard 'Demystifying the Global Climate Change Regime' in Humby, Kotzé, Rumble & Gilder (eds) *Climate Change Law & Governance in South Africa* (Original Service 2016) at 3-6. These are:

- the principle of common but differentiated responsibilities and respective capabilities – Art 3(1), UNFCCC;
- the precautionary principle – Art 3(3), UNFCCC;
- the principle of sustainable development – Art 3(4), UNFCCC;
- the cost-effectiveness principle – Art 3(1) and 3(2), UNFCCC; and
- the principle of inter-generational equity – Art 3(1), UNFCCC.

[30] The IPCC *Climate Change 2001: Synthesis Report – Appendix B Glossary of Terms*, available at http://www.ipcc.ch/ipccreports/tar/vol4/index.php?idp=204, accessed on 28 December 2016, defines 'mitigation' as an anthropogenic intervention to reduce the sources or enhance the sinks of GHGs.

[31] IPCC (n30) defines 'adaptation' as an adjustment in natural or *human systems* to a new or changing environment. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation.

[32] Action on Climate Today (ACT) 'Adaptation and mitigation' (2015), available at http://www.actiononclimate.today/download/2016/01/ACT_information_mitigation.pdf, accessed on 28 December 2016.

lessened.[33] At any rate, according to Gilder, 'despite the fact that the ultimate objective of the UNFCCC includes both mitigation and adaptation considerations, it is mitigation that has seen the greatest development during the UNFCCC's history'.[34]

Over time, adaptation has received more attention, partly due to 'the efforts of individual UNFCCC country parties and negotiating blocs to retain focus on the issue'.[35] In particular, the release of the Third Assessment Report of the IPCC in 2001, as well as the Contribution of Working Group II, shifted the focus to climate impacts, adaptation and vulnerability.[36]

Interestingly, the potential for developing synergies between climate change mitigation and adaptation has received increasing attention from climate researchers and policymakers, with a focus on defining the optimal mix of mitigation and adaptation.[37] As regards South Africa, the need for a stronger focus on adaptation is espoused in the South African Intended Nationally Determined Contribution (INDC).[38] For example, reference is made to the development of a *National Climate Change Adaptation Strategy and Plan* to be integrated into all relevant sector plans and upon which the South African UNFCCC National Adaptation Plan (NAP) will be based.[39]

Although both mitigation and adaptation are crucial elements of any climate change response strategy, it is the latter which will enjoy more prominence in poorer, developing nations, like those in Africa. This is so because sustainable development and adaptation are mutually reinforcing. The IPCC concludes that adaptation measures, if taken up in a sustainable development framework, can diminish negative impacts from future climate change.[40]

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[33] Ibid.

[34] A Gilder 'Epilogue' in Humby, Kotzé, Rumble & Gilder (eds) *Climate Change Law & Governance in South Africa* (Original Service 2016) at Epilogue-20.

[35] Ibid. He continues by stating that 'mitigation is less of an issue while adaptation is of primary importance for Africa'.

[36] Carter & Barnard (n29) at 3-7. The Third Assessment Report is available at: http://www.ipcc.ch/ipccreports/tar/, accessed on 28 December 2016.

[37] For a review of some of these research findings, see S VijayaVenkataRaman, S Iniyan, & R Goic 'A review of climate change, mitigation and adaptation' (2012) 16(1) *Renewable and Sustainable Energy Reviews* 878-897 at 890.

[38] South African INDC (2016) available at http://www4.unfccc.int/ndcregistry/PublishedDocuments/South%20Africa%20First/South%20Africa.pdf, accessed on 20 December 2016.

[39] Id at 2. The National Climate Change Adaptation Strategy and Plan is informed by an assessment of sectoral, cross-sectoral and geographical vulnerabilities to the detrimental impacts of climate change. It will quantify and present pathways for adaptation towards a just transition for a climate resilient economy.

[40] B Osman-Elasha 'Climate change impacts, adaptation and links to sustainable development in Africa' (2017), available at http://www.fao.org/docrep/011/i0670e/i0670e03.htm, accessed on 15 October 2017.

To that end, it is encouraging to note that Africa is taking more of a leadership role in climate negotiations. For example, during recent meetings in Marrakech, 50 countries in the Climate Vulnerable Forum (CVF) pledged to achieve 100 per cent renewable energy between 2030 and 2050; Burkina Faso, Ethiopia, Rwanda, Madagascar and several other African states are part of this group.[41] Regrettably, South Africa is not part of this forum.

The Africa Renewable Energy Initiative (AREI)[42] also reported strong progress in setting up the infrastructure to deliver on its target of 300 GigaWatt (GW) of new renewable energy by 2030.[43] It is imperative that South Africa follows suit, as any further expansion of carbon-intensive infrastructure will 'make it impossible for South Africa to realise its international commitments'.[44] South Africa will have to maintain its progress on the National Adaptation Strategy, while the Integrated Energy Plan must focus on a renewable energy-based infrastructure rollout, coal-based power should be scaled down and investments in costly nuclear power should be avoided.[45]

Having provided an outline of the development of the Kyoto Protocol, the next section examines one of its flexible mechanisms, namely the CDM.

3.3 THE EVOLUTION OF THE CLEAN DEVELOPMENT MECHANISM

3.3.1 Introduction

Notwithstanding that the CDM was designed to promote sustainable development in developing countries and to enable emission reductions in the most cost-effective way, the CDM has many shortcomings that have to be tackled (these will be explored in Chapter 7). The advent of the Paris Agreement presents an opportunity for the refinement of the CDM with a view to informing the

[41] The CVF is an international partnership of countries that are highly vulnerable to a warming planet. The Forum serves as a South-South cooperation platform for participating governments to act together against climate change. For a list of member countries, see http://www.thecvf.org/web/climate-vulnerable-forum/cvf-participating-countries/, accessed on 22 November 2016.

[42] The AREI is an African-owned and African-led effort to develop the use of the continent's renewable energy potential. The AREI operates under the mandate of the African Union and is endorsed by African Heads of State and Government of Climate Change. For more information, see http://www.arei.org/, accessed on 26 November 2016.

[43] Per J du Toit, WWF South Africa's Climate Change Programme in 'Paris Agreement passes first stress test at COP22' (2016) available at http://www.wwf.org.za/media_room/news/?uNewsID=19621, accessed on 22 November 2016.

[44] Ibid.

[45] Ibid.

design of the SDM. Importantly, the SDM will have to consider wider social and environmental factors, other than just the amount of carbon being traded.[46]

The purpose of the CDM is to[47]

> 'assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments under Article 3'.

Under the CDM, developed countries implement 'project activities' in developing country parties, which must result in 'real, measurable and long-term benefits related to the mitigation of climate change'[48] and emission reductions that are additional to those that would otherwise have occurred.[49] These emission reductions are referred to as Certified Emission Reductions (CERs), with one CER equating to one metric ton of carbon dioxide equivalent (tCO_2e).[50]

The purpose of the CDM is to assist with the funding of certified project activities, when required.[51] The proceeds arising from certified project activities are to be used for administrative expenses and to help especially vulnerable developing countries to meet the costs of adaptation.[52] In terms of the Kyoto Protocol, both public and private entities are allowed to participate under the CDM.[53]

The basic model for the CDM is that an Annex I party (and/or entities authorised by such party) finances or implements an emission reduction project in a developing country that is also a party. The CDM is achieved by the issue of carbon credits by the UN (known as CERs) equal to the actual emission reductions achieved by the project, to the relevant Annex I party financier. The Annex I party financier can then either use the CERs to discharge any compliance obligation it may have, or sell them on to a third party who has a compliance obligation.

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[46] J Voigt 'Lessons from the CDM for the SDM and climate finance' (2016), available at http://carbonmarketwatch.org/watch-this-ngo-newsletter-14-lessons-from-the-cdm-for-the-sdm-and-climate-finance/, accessed on 31 July 2017.

[47] Kyoto Protocol, Art 12.

[48] Kyoto Protocol, Art 12(5)(*b*).

[49] Kyoto Protocol, Art 12(5)(*c*).

[50] L du Toit 'Promoting Clean Development Mechanism Implementation in South Africa: Law and Policy' (2009) 1 *SA Public Law* 33-55 at 40 explains that if a developed country exceeds its emission reduction target by five metric tonnes of carbon dioxide or equivalent, it is obliged to offset this excess by earning five CERs through CDM project activities implemented in developing countries, or by acquiring five CERs through the other flexible mechanisms provided for under the Kyoto Protocol.

[51] Kyoto Protocol, Art 12(6).

[52] Kyoto Protocol, Art 12(8).

[53] Kyoto Protocol, Art 12(9).

The CDM has evolved somewhat from this basic model to allow developing countries and entities authorised by them to carry out unilateral projects without an identified Annex I party participant.[54] The premise is that the CERs will be delivered to the non-Annex I party with the understanding that they will sell them in the market once they have been received.

Participation in the CDM is voluntary, and both the host and the Annex I party involved must approve the relevant project through that party's Designated National Authority (DNA). The CDM is supervised at an international level by the CDM Executive Board, which itself operates under the authority of the COP/MOP.[55] In order for a project to be eligible as a CDM project, it is required to undergo a rigorous approval and assessment process administered by the CDM Executive Board. This procedural process is described in para 3.3.3 below.

3.3.2 Politics and policies

The CDM was a latecomer in the negotiation of the Kyoto Protocol.[56] Prior to the drafting of the Kyoto Protocol, the discussions on emission offsets from projects had been limited to the JI.[57]

Drawing on Brazilian proposals concerning the GCF (refer to para 3.2.1),[58] which would collect revenues from fines imposed on Annex I parties and redistribute them as finance for projects in non-Annex I parties, the CDM draft text was reworked in informal contact groups in the final days of Kyoto to become a global carbon market mechanism.[59] Although China and the G77 endorsed

[54] Linklaters 'Carbon the Commodity' (2007), available at http://www.linklaters.com/pdfs/Insights/environment/InternationalEmissionsTrading.pdf, accessed on 9 November 2016.

[55] The Conference of the Parties serving as the meeting of the Parties to the Protocol (COP/MOP) currently meets every two years in conjunction with the regular meetings of the Conference of the Parties (COP) to the Convention on Biological Diversity. To date, the COP/MOP has held eight meetings. See http://bch.cbd.int/protocol/cpb_mopmeetings.shtml, accessed on 15 October 2017.

[56] J Werksman 'The clean development mechanism: unwrapping the "Kyoto Surprise"' (1998) 7 *Review of European Community and International Environmental Law* 147-158 at 7 describes this as the 'Kyoto surprise' because of the rapid and seemingly haphazard way in which it emerged.

[57] Streck (n9) at 300.

[58] The linking of the CDM with the GCF is proposed in Chapter 7 as a possible means of leveraging the positive attributes of both mechanisms.

[59] P Newell 'The international political economy of governing carbon' in A Payne & N Phillips (eds) *Handbook of the International Political Economy of Governance* (2014) at 421.

the GCF, developed countries were strongly opposed to penalties for non-compliance.[60] Moreover, developing countries were also staunch opponents of any mechanism that would replicate the logic of the JI.[61] Their concerns ranged from a feared 'neo-colonialism', to concerns that Annex I countries would be 'let off the hook'.[62] Yet, developing countries also had significant interest in channelling resources to their countries, which would enable them to implement adaptation and, to a lesser extent, mitigation measures.[63]

The political and commercial drivers for the CDM included the need to avoid imposing costs on powerful nations and sectors that feared loss of competitive advantage if emissions cuts were required of them, but not of their emerging competitors in countries such as India and China.[64] This logic underpinned the subsequent refusal by the US to ratify the Kyoto Protocol.[65]

During November 1997, the US and Brazilian negotiators aimed to reach an agreement by suggesting that the GCF be converted to a 'positive scheme', whereby countries with commitments under the Kyoto Protocol would be allowed to exceed their emissions quotas by supporting emission reduction projects in developing countries.[66] In contrast to the JI mechanism, the new mechanism would place as much emphasis on the promotion of sustainable development as on assisting developed countries to meet their commitments.[67] Following concentrated efforts to attain a resolution, the CDM was finally included as Art 12 of the Kyoto Protocol, signed on 11 December 1997.

Notwithstanding that Art 12 sets out important principles, the CDM was 'little more than an empty shell' after Kyoto.[68] The main operational guidelines of the CDM were only agreed upon in November 2001 as part of the Marrakech Accords.[69] The reasons it took the international

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[60] F Lecocq & P Ambrosi 'The clean development mechanism: History, status, and prospects' (2007) 1(1) *Review of Environmental Economics and Policy* 134-151 at 134.

[61] Ibid.

[62] Streck (n9) at 300.

[63] Id at 301.

[64] Newell (n59) at 421.

[65] Ibid. The author also mentions that an aggressive lobbying campaign by many US companies was embodied in the Byrd-Hagel Senate resolution that prevented the US from ratifying a treaty that did not include binding emissions cuts for leading developing countries.

[66] Lecocq & Ambrosi (n60) at 134.

[67] Id at 135.

[68] Id at 136.

[69] Ibid. The process was only completed in 2003, with the agreement over the rules governing forestry-related CDM projects in the so-called Land Use, Land-Use Change and Forestry (LULUCF) projects.

community four years to negotiate the Marrakech Accords go 'far beyond the CDM' and are related to uncertainty surrounding ambiguities in the text, as well as misunderstandings between the US and Europe.[70] The criticisms and uncertainties pertaining to the CDM will be addressed later in Chapter 7. In the interim, the procedural process for CDM projects will be discussed next.

3.3.3 The CDM approvals process

By taking into account the concerns of developing countries, the CDM established a scheme of JI between Annex I and non-Annex I parties.[71] In terms of the CDM, the parties participating in a CDM project must both be parties to the Kyoto Protocol[72] and are required to designate a national authority (a DNA) for the CDM.[73] As participation in the CDM requires ratification of and compliance with the Kyoto Protocol from all participating parties, the CDM also provides an opportunity to broaden the ratification of and compliance with the Protocol.[74]

The main criteria specified in the Marrakech Accords for the validation of a CDM project are as follows:

- the participation requirements have been satisfied;
- comments by local stakeholders have been considered and reported to the Designated Operational Entity (DOE);
- environmental impacts of the project activity have been properly assessed;
- the project reduces emissions below those that would have otherwise occurred (the principle of additionality); and
- the baseline and monitoring methodologies are compliant with the stipulated requirements of the Kyoto Protocol and the Marrakech Accords.

[70] Ibid.

[71] Streck (n9) at 302.

[72] COP Decision 3/CMP.1 *Modalities and procedures for a clean development mechanism as defined in Article 12 of the Kyoto Protocol* paras 30 and 31, available at https://cdm.unfccc.int/Reference/COPMOP/08a01.pdf, accessed on 27 November 2016.

[73] Id para 29.

[74] Streck (n9) at 302.

3.3.4 The CDM project cycle

As per the Marrakech Accords, the CDM project cycle may be summarised as follows[75] (and depicted in Figure 3.2 on the next page):

i) The project developer produces the Project Design Document (PDD).

- The developer could be the project sponsor, investor, potential carbon buyer or a third-party (eg a consultant company).
- The PDD includes, inter alia, a description of the project, an explanation of how the baseline and monitoring methodology will be applied, a discussion of the environmental impacts of the project, and a compilation of stakeholders' comments (if any).

ii) Letter of Approval

- The buyer(s) and seller(s) – even if they are private entities – must each get a Letter of Approval (LoA) from the entity in charge of reviewing CDM projects in their respective governments, namely the DNA.
- The LoA states that the country approves participation in the project and, for the host country that the project contributes to sustainable development.

[75] Supplemental information was derived from Linklaters (n54) at 4-5 and Lecocq & Ambrosi (n60) at 137.

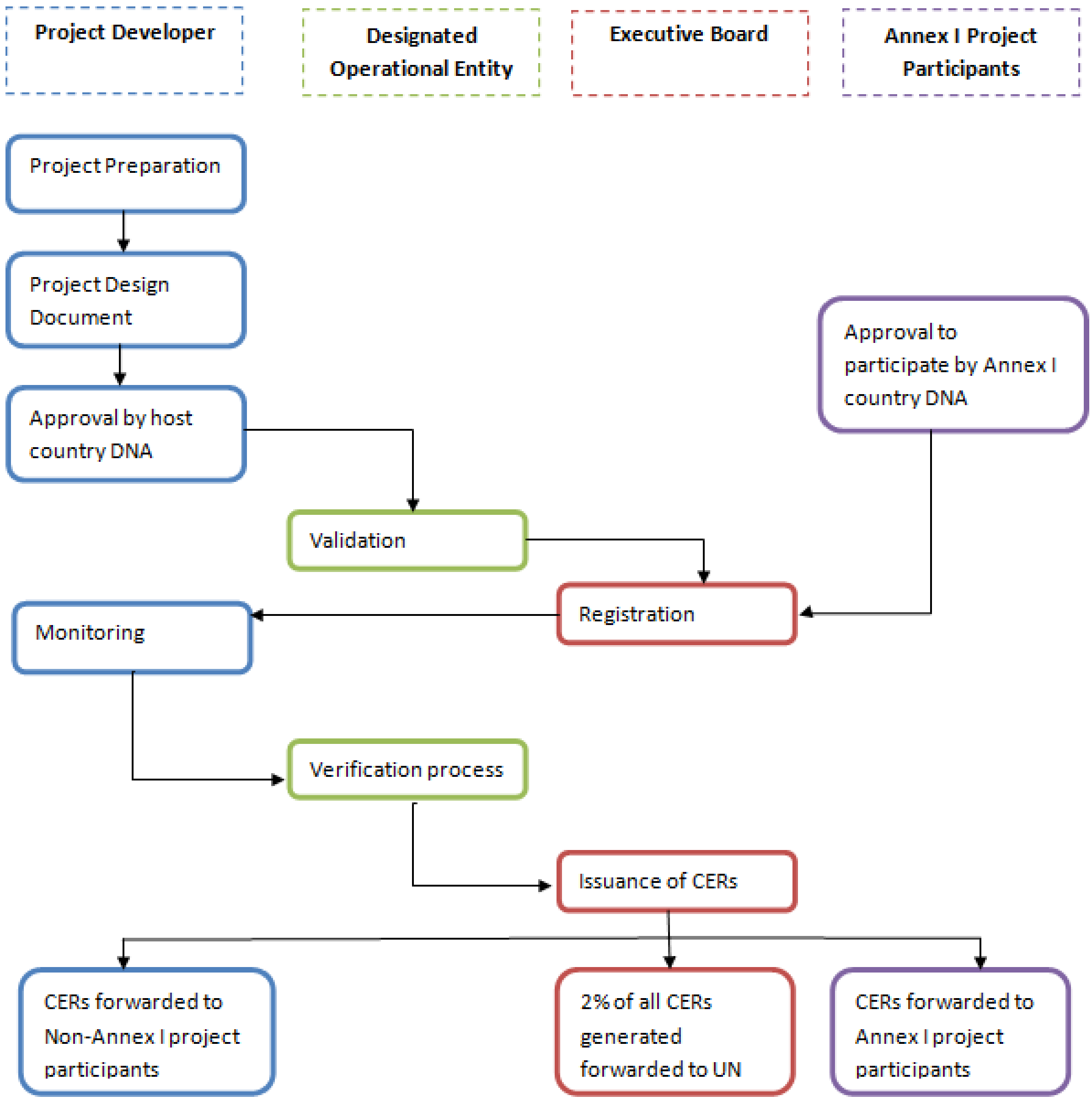

Figure 3.2 The CDM Project Cycle[76]

iii) Validation

- Once finalised, the PDD and the LoAs are validated by an independent third party (typically an auditing company) accredited by the CDM Executive Board, namely the DOE.
- The DOE reviews the PDD to determine whether the relevant requirements have been complied with. One such requirement is that the reductions in anthropogenic emissions are additional to any that would occur in the absence of the proposed activity.[77]

[76] Derived from Linklaters (n54) at 6.

- By validating the project, the DOE determines that the project has been approved by the parties involved, and that it correctly applies the selected baseline and monitoring methodology.

iv) Registration

- Once the validation is successful, the DOE has to submit a request for registration to the CDM Executive Board. This request takes the form of a validation report and includes the PDD and LoA.[78]
- The CDM Executive Board will register the project after an eight-week period, during which the validated project is publicised and third parties are given the opportunity to object to registration.[79]
- In the absence of an off-the-shelf baseline and monitoring methodology, the DOE first submits a new methodology for validation by the Executive Board. Once the methodology is approved, the DOE submits the PDD.

v) Verification

- Once the project is registered and has become operational, a second DOE is charged with reviewing and certifying the emission reductions generated by the project.
- With the exception of small scale CDM projects, the second DOE must be a different operational entity from the one that validates the project.

vi) Issuance of CERs

- Once verification is complete, the verification report is submitted to the CDM Executive Board.
- Once a project has been implemented, the CERs generated by the project are calculated according to the methodology included in the monitoring plan.[80] The DOE then verifies that the CERs calculated have actually resulted due to the project activity.[81]
- The CERs are formally issued by the Executive Board six weeks later (provided there were no objections) and transferred to the project participants' accounts.

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[77] Decision 3/CMP.1 (n66) para 37(*d*).

[78] Decision 3/CMP.1 (n66) para 40(*g*).

[79] Id para 41.

[80] Id para 59.

[81] Id para 61.

- At that point, the CERs are essentially fungible with other Kyoto allowances, such as Assigned Amount Units (AAUs) or Emission Reduction Units (ERUs).

3.3.5 Concluding remarks on the CDM

The CDM is a project-based scheme, which allows carbon credits to be claimed by developed, capped countries for emissions reductions in developing, uncapped countries.[82] This interchange aims to promote sustainable economic growth and has a concomitant benefit of clean technology transfer.[83] The result is an actual, net cost-effective global reduction in emissions.[84] The CDM 'has a key role' in helping countries achieve the goals of the UNFCCC in general, and the Paris Agreement in particular.[85] With almost 8 000 projects and close to 300 large-scale programmes of activities established in 125 countries, the CDM has been successful in 'generating climate action on the ground'.[86]

Despite criticisms levelled against the CDM (which will be explored in Chapter 7), the CDM became an important source of climate finance for developing countries. The only real obligation on the part of the host country was to provide the requisite governance structure to ensure the issuance of the CERs. But this will no longer be the case, given the provisions of the Paris Agreement. Whether one regards the CDM as a success or a failure, the CDM is not likely to be repeated or replicated, at least not under the terms that existed within the Kyoto Protocol.[87]

South Africa's law and policy framework for the regulation of the CDM is examined in the next chapter. The international status of the CDM is considered in Chapter 5, while Chapter 7 evaluates the barriers preventing the expansion of the CDM. As such, this chapter will not address these matters. The next section examines the Paris Agreement and its core components, followed by subsequent analyses of the envisaged SDM.

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[82] Bossley (n12) at 352.

[83] Ibid.

[84] Ibid.

[85] UN 'Governments see CDM as crucial for Paris Goals' (2016) available at http://newsroom.unfccc.int/paris-agreement/governments-see-cdm-as-crucial-for-paris-goals/, accessed on 25 November 2016.

[86] Ibid.

[87] D Hone 'A new reality to come to terms with' (2016), available at http://blogs.shell.com/climatechange/2016/05/newreality/, accessed on 7 June 2016.

3.4 THE ARCHITECTURAL FOUNDATIONS OF THE PARIS AGREEMENT

The Paris Agreement[88] entered into force on 4 November 2016 and is the culmination of many years of negotiations. It marks the end of the strict differentiation between developed and developing countries. Instead, a common framework is used that commits all countries to put forward their best efforts and to improve on these in years to come. Broadly, the Paris Agreement reflects a hybrid approach, blending bottom-up flexibility (to achieve broad participation) with top-down rules (to promote accountability and ambition).[89] This hybrid model recognises that climate change is a global challenge, but it requires political will to address it, which primarily occurs within the domestic realm.[90]

In order to contextualise the SDM, the following paragraphs provide a concise overview of a selection of key provisions in the Paris Agreement.[91]

3.4.1 Legal character

The legal character of the Paris Agreement has been the subject of some debate, but what is clear is that it is a treaty under international law, with only certain provisions being legally binding.[92] The Vienna Convention on the Law of Treaties (VCLT) defines a treaty as 'an international agreement concluded between states in written form and governed by international law'.[93] Treaties can be referred to by a number of different names: international conventions, international agreements,

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[88] United Nations *Paris Agreement* (2015) available at http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf, accessed on 11 March 2016.

[89] Centre for Climate and Energy Solutions (CCES) 'Outcomes of the UN Climate Change Conference in Paris' (2015) at 2, available at http://www.c2es.org/international/negotiations/cop21-paris/summary, accessed on 15 November 2016.

[90] D Bodansky & E Diringer *Building flexibility and ambition into a 2015 Climate Agreement* (2014), available at https://www.c2es.org/docUploads/int-flexibility-06-14.pdf, accessed on 19 July 2017.

[91] A detailed analysis of all of the provisions in the Paris Agreement fall outside the scope of this thesis. See, instead, Bodansky et al (n11) at 210-247 for an in-depth review of the Paris Agreement.

[92] D Bodansky 'The Paris climate change agreement: a new hope?' (2016) 110(2) *American Journal of International Law* 288-319 at 290.

[93] VCLT Art 2(*a*). The text of the VCLT (1969) is available at https://treaties.un.org/doc/Publication/UNTS/Volume%201155/volume-1155-I-18232-English.pdf, accessed on 3 November 2016.

covenants, final acts, charters, protocols, pacts, accords, and constitutions for international organisations.[94]

Although it now appears settled that the Paris Agreement will be a treaty within the definition of the VCLT, debate continues over which provisions of the agreement should be legally binding.[95] The issue of which provisions to make binding (expressed as 'shall', as opposed to 'should') was a central concern for many countries, in particular the US.[96] The Paris Agreement contains a carefully crafted 'mix of hard, soft and non-obligations, the boundaries between which are blurred'.[97] A final step in the Paris negotiations was a technical correction substituting 'should' for 'shall' in a provision calling on developed countries to undertake absolute economy-wide emissions targets.

3.4.2 Differentiation

The Paris Agreement includes references to developed and developing countries, stating in several instances that the developed countries should take the lead. Notably, it makes no mention of the Annex I countries and non-Annex I countries, as contained in the UNFCCC. In short, many provisions establish common commitments, while allowing flexibility to accommodate different national capacities and circumstances.[98] This is done by way of self-differentiation – as implicit in the concept of Nationally Determined Contributions (NDCs) – or through more detailed operational rules which have yet to be developed.[99]

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[94] Berkeley Law Library *Treaties and International Agreements* (2013) available at https://www.law.berkeley.edu/library/dynamic/guide.php?id=65, accessed on 15 November 2016.

[95] For an interesting exposition on the legal character of the Paris Agreement and its constituent parts, see D Bodansky (2015) 'Legally Binding versus Non-Legally Binding Instruments' in S Barrett et al (eds) (2015) *Towards a Workable and Effective Climate Regime*.

[96] Per CCES (n89) at 2, the US wanted an agreement the president could accept without congressional approval.

[97] For a narrative on the drafting of the provisions, see L Rajamani 'The 2015 Paris Agreement: Interplay Between Hard, Soft and Non-Obligations' (2016) 28(2) *Journal of Environmental Law* 337-358.

[98] Bodansky et al (n11) at 62 explain that participation is enhanced because flexible standards lower the risks related to longer-term commitments.

[99] Per CCES (n89) at 3.

3.4.3 Long-term goal

The goal[100] of containing average warming below 2°C is reaffirmed in the Paris Agreement.[101] Moreover, parties are urged to 'pursue efforts' to limit this to 1.5°C, which is a top priority for developing countries that are highly vulnerable to climate impacts.[102]

3.4.4 Mitigation

The Paris Agreement articulates two long-term emission goals: first, a peaking of emissions as soon as possible, followed by a goal of net GHG neutrality in the second half of this century.[103] The agreement commits parties to 'pursue domestic measures with the aim of achieving the objectives' of their NDCs,[104] but does not make the implementation or achievement of NDCs a binding obligation.[105] It also encourages, but does not require, countries to develop and communicate long-term low-emission development strategies.

The core mitigation commitments are common to all parties, but there is some differentiation in the expectation set: developed countries 'should' undertake absolute economy-wide reduction targets, while developing countries 'are encouraged' to move towards economy-wide targets over time.[106] In addition, developing countries are to receive support to implement their commitments.[107] NDCs will be recorded in a public registry maintained by the UNFCCC secretariat, rather than in an annex to the agreement, as some countries had proposed.[108]

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[100] Bodansky et al (n11) at 228 remark that parties had explored different options for formulating long-term mitigation goals. These goals comprise a limitation on temperature increase, a GHG emissions reduction goal (50 per cent by 2050 for example) or as a time frame for peaking of emissions.

[101] Paris Agreement, Art 2(1)(*a*).

[102] Ibid.

[103] In respect of the first goal, it is recognised that it will take longer for developing countries; as regards the second goal, this neutrality is expressed as 'a balance between anthropogenic emissions by sources and removals by sinks'. CCES (n89) at 3 remarks that the latter was an alternative to terms like 'decarbonisation' and 'climate neutrality' espoused by some parties.

[104] Paris Agreement, Art 4(2).

[105] CCES (n89) at 3.

[106] Paris Agreement, Art 4(4).

[107] Paris Agreement, Art 4(5).

[108] Paris Agreement, Art 4(12).

3.4.5 Adaptation

A major priority for many developing countries was strengthening adaptation efforts under the UNFCCC.[109] The Paris Agreement does that by:

- Establishing a global goal of 'enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change';[110]
- Requiring all parties, 'as appropriate', to plan and implement adaptation efforts;[111]
- Encouraging all parties to report on their adaptation efforts and/or needs;[112]
- Committing enhanced adaptation support for developing countries;[113] and
- Including a review of adaptation progress, and of the adequacy and effectiveness of adaptation support, in the global stocktake to be undertaken every five years.[114]

Bodansky et al point out that the Paris Agreement[115] extends the progression principle beyond mitigation to also include adaptation and support.[116] Thus, although each party has a different starting point (as reflected in their self-differentiated NDCs), the principle of progression ensures that all parties travel in the same direction towards more ambitious and rigorous actions.[117]

3.4.6 Carbon markets

During the negotiations leading up to the Paris Agreement, it was uncertain which states would agree to the inclusion of market-oriented language in the final accord.[118] Eventually, proponents of market mechanisms succeeded in including a separate article on markets.[119] So as to also

[109] CCES (n89) at 4.

[110] Paris Agreement, Art 7(1).

[111] Paris Agreement, Art 7(9).

[112] Paris Agreement, Art 7(10).

[113] Paris Agreement, Art 7(13).

[114] Paris Agreement, Art 14.

[115] Paris Agreement, Art 3.

[116] Bodansky et al (n11) at 235.

[117] Id at 236.

[118] Ibid. The authors comment that a small number of states had strongly opposed the inclusion of such a provision. However, in the end, more than half of the INDCs submitted contemplated the use of international carbon markets.

[119] Ibid.

accommodate market opponents, Art 6 does not directly refer to 'markets'.[120] The article also explicitly recognises the important of non-market approaches.[121]

Article 6 effectively provides for two market-based mechanisms. The first refers to 'cooperative approaches' in terms of which parties may use Internationally Transferred Mitigation Outcomes (ITMOs) to implement their NDCs (this is referred to again later in para 3.5.4).[122] The second is the creation of the SDM, which is discussed in greater detail in section 3.5 below.[123]

3.4.7 Stocktake

The Paris Agreement establishes two linked processes, each on a five-year cycle, so as to promote rising ambition. The first process is a global stocktake to assess collective progress towards meeting the agreement's long-term goals. The first stocktake took place in 2012. The second process is the submission by parties of new NDCs, 'informed by the outcomes of the global stocktake'.[124]

The global stocktake is necessary to gauge whether national efforts (as expressed in each party's NDC) as a collective add up to what is required to limit temperature increase to below 2°C.[125] Broad guidance is provided on the nature, purpose, tasks and outcome of the stocktake.[126] It is left up to the COP serving as the Meeting of the Parties to the Paris Agreement (COP/CMA) to determine the mechanics of the stocktake.[127]

3.4.8 Transparency

Because the Paris Agreement does not contain binding obligations of result (as regards the commitments in parties' NDCs), it relies on transparency as a means of holding countries accountable.[128] All countries are required to submit emissions inventories and the 'information

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[120] Ibid.

[121] Ibid.

[122] Paris Agreement, Art 6(2).

[123] Paris Agreement, Art 6(4).

[124] Paris Agreement, Art 4(9).

[125] Bodansky et al (n11) at 244.

[126] COP Decision 1/CP.21 'Adoption of the Paris Agreement' paras 90-101, available at http://unfccc.int/meetings/paris_nov_2015/session/9057/php/view/decisions.php#c, accessed on 20 November 2016.

[127] Bodansky et al (n11) at 244.

[128] Bodansky et al (n11) at 242 explain that this is based on the premise that peer and public pressure is used to influence behaviour in an attempt to be as effective as legal obligation.

necessary to track progress made in implementing and achieving' their NDCs.[129] With the exception of least developed and small island countries, these reports are to be submitted at least every two years.[130]

In addition, developed countries shall report on support provided;[131] developing countries should report on support received;[132] and all should report on their adaptation efforts.[133] Information reported by countries on mitigation and support will undergo 'expert technical review' and each party must participate in 'a facilitative, multilateral consideration of progress' in implementing and achieving its NDC.[134]

3.4.9 Implementation and compliance

A new compliance mechanism is established by the Paris Agreement to 'facilitate implementation' and 'promote compliance'.[135] This mechanism takes the form of a committee of experts and is to be 'facilitative' in nature and operate in a 'non-adversarial and non-punitive' manner.[136] It will report annually to the COP.[137] The fact that the Paris Agreement addresses 'compliance' - and not just implementation – speaks to the concerns that the Paris Agreement would recreate a Kyoto-like compliance with enforcement and consequences for non-compliance.[138]

3.4.10 Finance

As was the case in past COP meetings, finance was a contentious issue in Paris.[139] The Paris Agreement commits developed countries to provide finance for mitigation and adaptation in

[129] Paris Agreement, Art 13(7)(*b*).

[130] Decision 1/CP.21 (n126) at para 90.

[131] Paris Agreement, Art 13(9).

[132] Paris Agreement, Art 13(10).

[133] Paris Agreement, Art 13(8).

[134] Paris Agreement, Art 13(11). CCES (n89) at 4 states that the review is a form of peer review.

[135] Paris Agreement, Art 15(1).

[136] Paris Agreement, Art 15(2).

[137] Paris Agreement, Art 15(3).

[138] Bodansky et al (n11) at 246.

[139] CCES (n89) at 4.

developing countries.[140] Other parties are encouraged to provide such support voluntarily.[141] In addition to reporting on finance already provided and received, developed countries commit to submit, every two years, 'indicative quantitative and qualitative information' on future support, including, 'as available', projected levels of public finance. Other countries, in contrast, are encouraged to do so voluntarily.[142] Finance will also be considered in the global stocktake (mentioned in para 3.4.7 above).[143]

3.4.11 Loss and damage

The Paris Agreement includes a free-standing provision which extends the Warsaw International Mechanism (WIM) for Loss and Damage.[144] The mechanism, established as an interim body at COP19, is charged with developing approaches to help vulnerable countries cope with unavoidable

[140] Paris Agreement, Art 9(1). CCES (n89) at 4 remarks that the US stipulated that the finance is 'in continuation of their existing obligations under the Convention', so that the agreement would not create new binding financial commitments requiring congressional approval.

[141] Paris Agreement, Art 9(2).

[142] Paris Agreement, Art 9(5).

[143] Paris Agreement, Art 9(6).

[144] Article 8 of the Paris Agreement pertains to loss and damage, stating (at para 1) that 'Parties recognize the importance of averting, minimizing and addressing loss and damage associated with the adverse effects of climate change, including extreme weather events and slow onset events, and the role of sustainable development in reducing the risk of loss and damage'. The UNFCCC defines 'loss and damage' as the 'actual and/or potential manifestation of impacts associated with climate change in developing countries that negatively affect human and natural systems', and includes impacts from extreme events and slow-onset events. See UNFCCC (2012) 'A literature review on the topics in the context of thematic area 2 of the work programme on loss and damage: A range of approaches to address loss and damage associated with the adverse effects of climate change (UNFCCC Subsidiary Body for Implementation (SBI), FCCC/SBI/2012/INF.14. 2012)' at 3, available at http://unfccc.int/resource/docs/2012/sbi/eng/inf14.pdf, accessed on 15 February 2017.

The issue of 'loss and damage' is a complex and controversial area, not least because of the concept of extreme event attribution (for example floods and droughts). For example, views range from no attribution, to every extreme event being ascribed to climate change. The scientific position is more nuanced. See, in this regard, R James, F Otto, H Parker, E Boyd, R Cornforth, D Mitchell & M Allen 'Characterizing loss and damage from climate change' (2014) 4(11) *Nature Climate Change* 938-939, wherein the losses and damages relevant to the WIM are discussed. Criticism levelled against the WIM abounds. See, for example, CA Johnson 'Holding Polluting Countries to Account for Climate Change: Is "Loss and Damage" Up to the Task?' (2017) 34(1) *Review of Policy Research* 50-67 at 52, who argues that instead of assigning responsibility for past and future losses and damages, the WIM has 'gravitated toward a more technocratic/bureaucratic exercise aimed at collecting data, enhancing knowledge, and making policy recommendations'.

impacts, including extreme weather events and slow-onset events, such as sea-level rise.[145] At the insistence of developed countries (led by the US), the accompanying COP decision specifies that the loss and damage provision 'does not involve or provide a basis for any liability or compensation'.[146]

Bodansky et al emphasise the importance of Art 8 for two reasons.[147] First, the issue of loss and damage now falls within the ambit of the Paris Agreement.[148] Second, they argue that because it is a free-standing article, it delineates loss and damage from adaptation (as was long sought after by developing countries).[149]

3.4.12 Concluding remarks on the Paris Agreement

While countries continue to work post-COP22 to finalise the fine print of the Paris Agreement, it is evident that more needs to be done in coming years to clarify the consistency of national targets. Over time, NDCs will expand to cover all GHG emissions in all economies.[150] Every NDC, either specifically or notionally, is linked to a quantitative carbon budget and there is an expectation from the Paris Agreement that these budgets will be delivered.[151]

The following features of the Paris Agreement is worth highlighting:[152]

- It is a legally binding instrument (with many non-binding elements);
- It has a global reach and applies to both developed and developing countries;
- It specifies the same core obligations for all countries;
- It establishes a long-term, durable architecture;
- It institutionalises an iterative process, in which parties will take stock of progress every five years;
- It creates an expectation of progressively stronger action over time;
- It establishes an enhanced transparency and accountability framework; and
- It commands near-universal acceptance.

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[145] CCES (n89) at 4 also remarks that potential approaches include early warning systems and risk insurance.

[146] COP Decision 1/CP.21 (n126) para 51.

[147] Bodansky et al (n11) at 239.

[148] Ibid.

[149] Ibid.

[150] Hone *A new reality* (n87).

[151] Ibid.

[152] Bodansky *A new hope* (n92) at 290-291.

Having concluded the discussion of the Paris Agreement, the next section examines the nascent SDM.

3.5 THE SUSTAINABLE DEVELOPMENT MECHANISM

3.5.1 Introduction

Central to the subject matter of this thesis is Article 6 of the Paris Agreement. This article contains three different provisions, namely a general framework for approaches that involves the transfer of mitigation options, now termed 'cooperative approaches'; a separate SDM; and a framework for non-market approaches. The focal point of this section is an analysis of the text of Art 6(4), namely the SDM.[153] Paragraph 3.5.4 briefly compares the cooperative approaches and the SDM, as it is unclear how they will interact with each other and the varied NDC landscape.

It is suggested that the SDM is a successor-in-interest to the regulatory infrastructure established under the Kyoto Protocol's CDM and is set to replace the CDM from 2020 onwards.[154] It will be created and managed under the authority and rules of the UNFCCC Secretariat.[155] The SDM's core purpose could be defined as the delivery of an emissions reduction against some reference which is contained within the NDC, but also to ensure an overall reduction in global emissions, while delivering sustainable development benefits. Thus, the SDM promotes GHG mitigation efforts above and beyond what a nation commits to under its NDC.[156]

The CDM became an important source of climate finance for developing countries, where the only real obligation on the part of the host country for a given project was to provide the necessary governance structure to ensure eventual issuance of the CERs.[157] However, this is no longer the case, as the provisions of the Paris Agreement and Art 6 are now effectively the same for all

[153] The text of which may be found in Annexure A of this thesis.

[154] J Voigt 'NGO Newsletter #14: Lessons from the CDM for the SDM and climate finance' (2016), available at http://carbonmarketwatch.org/watch-this-ngo-newsletter-14-lessons-from-the-cdm-for-the-sdm-and-climate-finance/, accessed on 15 July 2016..

[155] COP Decision 1/CP.21 (n126) para 38.

[156] In other words, all GHG emission reductions achieved under the SDM must therefore be in addition to those that would have otherwise occurred in the host party's jurisdiction.

[157] Hone *A new reality* (n87).

countries.[158] Therefore, all countries will be able to generate and/or use offset credits, ie developed countries will compete with developing countries for the investment in mitigation activities.[159]

Ultimately, the major difference between the new SDM and the old CDM is that carbon markets will no longer be limited to developed country parties. Instead, all parties will be able to participate in this mechanism. The remainder of this chapter will investigate if, and how, the SDM effectively refines and streamlines the CDM.

3.5.2 The genesis of the SDM

The International Centre for Climate Governance prepared a comprehensive and enlightening paper which presents the evolution of the ideas contained in Art 6 of the Paris Agreement.[160] The report provides an insightful view of how the ideas emanating from the negotiation process were captured in textual form in different drafts of the agreement.[161] This section will highlight aspects of this report, in order to trace the origins of the SDM.[162]

The markets/non-markets text in the Paris Agreement was one of the last issues to be agreed upon on the last night of COP21.[163] The inclusion of markets provisions (via Art 6) can be seen as a 'major success, and a minor miracle', as the prediction throughout 2015 was for a diminutive reference (or even total omission) of anything related to markets.[164]

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[158] Ibid.

[159] Carbon Market Watch 'News: Paris treaty establishes new carbon trading mechanisms' (2016), available at http://carbonmarketwatch.org/news-paris-treaty-establishes-new-carbon-trading-mechanisms/, accessed on 8 June 2016.

[160] A Marcu 'Carbon market provisions in the Paris Agreement (Article 6)' *ICCG Reflection No. 45/February 2016* (2016), available at http://www.iccgov.org/wp-content/uploads/2016/02/45_Andrei-Marcu.pdf, accessed on 30 December 2016.

[161] The provisions progressed from the paper that the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) carried to the Paris session (draft 6 November 2015, revised 10 November 2015), the paper that the ADP forwarded to the COP (5 December 2015), as well as papers that emerged from the Committee de Paris process under the COP (9-10 December 2015).

[162] This is important, as understanding the origin and development of provisions will assist in the preservation of institutional memory when it comes to subsequent debates, re-interpretation and attempts at renegotiation.

[163] Marcu (n160) at 2.

[164] Ibid.

Art 6 groups together issues that had originally been spread over a number of articles – both in drafts of the Paris Agreement, as well as in drafts of the related COP decision.[165] Three issues were central to the debate on the scope of the SDM:[166]

a) Which parties can host the SDM?

b) Which parties can use the product of the SDM?

c) Is the SDM one or more than one mechanism? Alternatively, is it narrowly defined or does it provide space for many approaches that may emerge in the future?

Each of these matters will now be considered in turn.

3.5.2.1 Which parties can host the SDM?

As a basis, it should be noted that no reference is made in paras 6.4 to 6.7 of the Paris Agreement to any differentiation or limitation that would prohibit certain parties from participating in the SDM. Paragraph 6(4)(*c*) only refers to the 'host Party' – no qualifiers are provided. All parties to the Paris Agreement undertake through their NDCs to contribute to mitigation efforts. It follows, therefore, that all parties that have NDCs should have access to the SDM.[167]

In this context, the November 2014 submission of Brazil refers to an 'enhanced Clean Development Mechanism or CDM+'. There is also a reference in the 10 November draft of the Paris Agreement to 'build on the mechanism defined in Article 12 of the Kyoto Protocol'.[168] This could be interpreted as a 'general demand to build on what was learnt from the CDM experience'.[169]

Later, the Brazil-EU submission[170] introduced differentiation in a direct way –

> 'mechanism to contribute to the mitigation of greenhouse gas emissions and to support sustainable development [in developing countries]'.

This theme was carried through to the 10 December draft, but was challenged by many developed countries, as well as a few developing countries.[171] Their contention was to ensure that the SDM

[165] Id at 3.

[166] Id at 13.

[167] Id at 13. The author also remarks that voluntary cooperative approaches and ITMOs are tools that are available to all parties to use towards their NDCs.

[168] Ibid, referring to Art 3ter, Option II, 2c of the 10 November draft.

[169] Marcu (n160) at 13.

[170] On 8 December 2015.

[171] Marcu (n160) at 14.

was a 'resilient mechanism, which would be fit for the long-term'.[172] This argument prevailed in the final version of the Paris Agreement, as Art 6 makes no reference to any type of differentiation.

3.5.2.2 Which parties can use the product of the SDM?

A similar debate took place on the issue of 'who can use the mitigations outputs of the SDM'.[173] The Brazil-EU submission limited use of the output of the SDM to countries that had NDCs with absolute caps:[174]

> 'Assist Parties with a ### that reflects an absolute target in relation to a base year to fulfil their ###, through the use of emission reductions from mitigation activities [in developing countries]'.

This language was then included in the 9 and 10 December 2015 versions of the draft Paris Agreement:[175]

> 'Enhance mitigation ambition by [developing country] Parties [, by incentivising supplementary voluntary climate action, beyond their ###]'.

Again, there was robust opposition from both developed and developing countries, as they felt that all parties, regardless of the type of NDC they had put forward, should have the option of having access to the output of the SDM.[176] The final text of Art 6 contains no differentiation and mention is made that 'another Party' can use the output of the SDM.

3.5.2.3 Is the SDM more than one mechanism?

Article 6(4) of the Paris Agreement refers to the fact that 'a mechanism to contribute ... is hereby established ...'. This allusion to 'a mechanism' and the interpretation thereof was also a bone of contention during negotiations.[177] Two opposing arguments were put forward in this regard.

The first is that the SDM is a single mechanism. The line of reasoning is that if the mechanism 'had been detailed to a high level of granularity' in the Paris Agreement, the creation of additional mechanisms would require amendments to the Paris Agreement.[178] Since amending the Paris

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[172] Ibid.

[173] Ibid.

[174] On 8 December 2015.

[175] See Article 3ter, Mechanism 1, para 1c of the draft Paris Agreement, available at http://unfccc.int/resource/docs/2015/cop21/eng/da02.pdf, accessed on 30 December 2016.

[176] Marcu (n160) at 14.

[177] Ibid.

[178] Id at 15.

Agreement would entail a complex and drawn-out process, which no one would really want to consider, the text would rule out the creation of other mechanisms.[179]

The second argument interprets the text in such a way that multiple approaches are identifiable in Art 6 and, indeed, possible.[180] The basis for this view is that there is no specific language in Art 6 that would definitely preclude such interpretation.[181] Moreover, the Kyoto Protocol experience shows that numerous types of projects and activities were accepted in the CDM over time, so that 'a mechanism' cannot be interpreted as a unique approach.[182]

In addition, Art 6(4) to Art 6(7) refer to mitigation activities and the 'reduction of emission levels in the host Party'. This could be regarded as a broad interpretation of the type of activities covered, as both reductions and removals lead to a reduction in emission levels.[183] Accordingly, the 'multiple mechanisms' notion is plausible, as many types of mitigation approaches can be defined under the paragraphs of this Article.[184]

3.5.3 Interpretational issues with the SDM

In this next section, a number of interpretational issues are assessed, commencing with a comparison of the legal text of the CDM and SDM.

3.5.3.1 Comparison of the legal text

The CDM is defined in Art 12(2) of the Kyoto Protocol as follows:

> ‘The purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist Parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments under Article 3.’

The SDM is defined in Art 6(4) of the Paris Agreement in this way:

> ‘A mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development is hereby established under the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to this Agreement for use by Parties on a voluntary basis...’.

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[179] Ibid. The author points out that non-CDM type mechanisms could be created domestically and their ITMOs transferred and used towards NDCs under paras 6.2 and 6.3.

[180] Ibid.

[181] Ibid.

[182] Ibid.

[183] Ibid.

[184] Ibid.

In many ways the SDM is remarkably similar to the CDM, as set out in Table 3.1 below.[185]

Table 3.1 Similarities between the CDM and SDM	
CDM (Art 12, Kyoto Protocol)	**SDM (Art 6.4-7 & para 37-38, Paris Agreement)**
Resulting in certified emission reductions	Verification and certification of emission reductions
Achieving sustainable development and contributing to the ultimate objective of the UNFCCC	Contribute to the mitigation of GHG emissions and support sustainable development
Additional to any that would occur in the absence of the certified project activity	Additional to any that would otherwise occur
Supervised by an executive board of the CDM	Supervised by a body designated by the COP/CMA
Approval of the party involved	Incentivise and facilitate participation ... by public and private entities authorised by a party
May use the certified emission reductions ... to contribute to compliance	Be used by another party to fulfil its NDC
Share of the proceeds from certified project activities is used to cover administrative expenses as well as to assist developing country parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation	Share of the proceeds from activities ... is used to cover administrative expenses as well as to assist developing country parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation
Elaborate modalities and procedures	Adopt rules, modalities and procedures
Voluntary participation	On a voluntary basis

Despite these similarities, there are also significant differences:[186]

- The distinction between Annex I and non-Annex I parties is omitted from the SDM. Consequently, both developed and developing countries can now host mitigation projects, and also purchase ERUs.
- The CDM is project-based. In contrast, the SDM does not specify the scope of the mitigation activities and could be considered as a sectoral mechanism.

[185] Derived from M Cames, S Healy, D Tänzler, L Li, J Melnikova, C Warnecke, M Kurdziel *International market mechanisms after Paris – Discussion Paper* (2016) 17-18, available at https://newclimate.org/2016/11/17/international-market-mechanisms-after-paris/, accessed on 2 January 2017.

[186] Ibid.

- The CDM is an offset mechanism, but does not directly contribute to the reduction of *global* GHG emissions. The SDM, however, includes a provision that it shall aim to deliver an overall mitigation in global emissions.[187]

The first interpretational issue which might prove problematic pertains to the scope of the SDM.

3.5.3.2 The scope of the SDM

As mentioned earlier, the SDM does not specify the scope of the mitigation activities covered by the mechanism. This arguably provides more flexibility in terms of which types of mitigation activities can be addressed by the SDM.[188] The scope of project- and programme-based activities under the CDM could be extended to entire sectors or even to policies.[189] Whether or not parties will agree on regulating the scope or providing full flexibility, largely depends to which extent mitigation outcomes of larger scopes can be accurately identified and monitored.[190]

A concomitant issue for parties to consider is whether an initial investment in new technologies, as in the case of the CDM and JI, is required or whether activities which are mainly operational in nature may qualify under the SDM as well.[191] Notwithstanding the challenges involved in determining additionality of an initial investment, it remains easier than determining additionality of purely operational activities.[192]

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[187] Admittedly, it remains to be seen how that requirement can be operationalised, but it seems clear that the SDM should aim to exceed pure offsetting.

[188] Cames et al (n185) at 19.

[189] Ibid.

[190] Ibid. In this context, the authors suggest a number of questions which country negotiators must address (at 19):

- How could a sector or policy be exactly delineated from another? For sectors, international classifications are available, but these may not be appropriate for emissions reduction monitoring, as they were elaborated from an economic and financial perspective.
- How will the heterogeneity in terms of potential mitigation technologies be dealt with? Some technologies may be applicable across many sectors, while others may cover only a certain sector.
- How will shortcomings in data availability be addressed? There may be no appropriate data to identify base year emissions or to estimate BAU emission projections. A lack of appropriate data may require the insertion of several years of data monitoring prior to the start of a mitigation policy.

[191] Ibid.

[192] Ibid.

3.5.3.3 Relationship to nationally determined contributions

Unlike the CDM, which only allows the generation of CERs in countries without targets, the SDM can be used by all parties. Under the Paris Agreement, almost all parties have NDCs, which include different types of targets. This results in a number of interpretational hurdles which will have to be navigated – whether an activity is within or beyond the coverage of the NDC; the transfer of credits generated from activities which fall in the scope of the list of policies and measures; differentiation of NDCs between unconditional and conditional parts, and strengthening of the NDCs.[193]

3.5.3.4 Linkage between NDCs

Art 6 of the Paris Agreement contains a number of safe haven provisions for the development of market and non-market mechanisms to drive future mitigation. The relevant provision covers any linkage[194] that might exist between NDCs, such as that which could occur between cap and trade systems residing in different countries:[195]

> 'Parties shall, where engaging on a voluntary basis in cooperative approaches that involve the use of internationally transferred mitigation outcomes towards nationally determined contributions, promote sustainable development and ensure environmental integrity and transparency, including in governance, and shall apply robust accounting to ensure, inter alia, the avoidance of double counting, consistent with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to this Agreement'.[196]

In other words, emissions reductions occurring outside of the geographic jurisdiction of a party to the Paris Agreement can be counted toward achieving that party's NDC via ITMOs. Consequently, exchanges between compliance entities within the jurisdictions of two different parties are now allowed, not merely the government-to-government trading under the IET mechanism of Art 17 of the Kyoto Protocol.[197]

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[193] These quandaries are examined in some by detail Cames et al (n185) at 19-21.

[194] As per D Hone 'Developing Article 6' (2016), available at https://blogs.shell.com/2016/02/22/article6/, accessed on 29 December 2016. The term 'linkage' refers to connections among policy systems that allow for emission reduction efforts to be reallocated across systems.

[195] One example is between the US and Canada, where the state of California's economy-wide cap and trade programme was linked to that of Québec on 1 January 2014. For more information, see http://www.c2es.org/us-states-regions/key-legislation/california-cap-trade, accessed on 29 December 2016.

[196] Paris Agreement, Art 6.2.

[197] See RN Stavins 'Market mechanisms in the Paris Climate Agreement: international linkage under Article 6.2' (2016), available at http://www.rff.org/blog/2016/market-mechanisms-paris-climate-agreement-international-linkage-under-article-62, accessed on 29 December 2016, for an explanation of the three types of heterogeneity which are important in regard to linkage under Art 6(2).

Art 6(4) could prove to be a seminal proposal, with the potential to drive new investment and markets. The SDM aims -

1. To promote the mitigation of greenhouse gas emissions, while fostering sustainable development;
2. To incentivise and facilitate participation in the mitigation of greenhouse gas emissions by public and private entities authorised by a party;
3. To contribute to the reduction of emission levels in the host party, which will benefit from mitigation activities resulting in emission reductions that can also be used by another party to fulfil its nationally determined contribution; and
4. To deliver an overall mitigation in global emissions.

The text above does not refer to project activity or identify developing countries as the beneficiaries of the activities undertaken. This is in contrast to Art 12 of the Kyoto Protocol, which evidently identified such a role for the CDM. Instead, Art 6(4) of the Paris Agreement is defined more broadly as a mechanism to contribute to the mitigation of GHG, while promoting sustainable development.[198] Accordingly, the SDM could have a 'very wide scope and operate on many fronts'.[199]

The SDM could be designed so as to establish sector baselines and issue sovereign credits for performance in excess of those baselines.[200] These credits might then be purchased by external climate funds to channel investment.[201] In this way, the SDM would resemble the CDM. Under the CDM, crediting from one country acting as a direct offset in another country was possible, because the project host country had not quantified an emissions management goal.[202] As such, national

[198] It is for this reason that the SDM is also referred to as the 'Emissions Mitigation Mechanism' (EMM), as it is a mitigating mechanism that supports sustainable development, and not a sustainable development mechanism which happens to result in an emissions burden. As such, according to Hone *Developing Article 6* (n194), it may be 'short sighted' to refer to the SDM as the CDM 2.0. For the sake of consistency, this study will refer to the SDM (and not the EMM).

[199] Ibid. Hone also proposes that the SDM could become a crediting unit within a baseline system that could operate across an entire NDC or within a sector covered by an NDC.

[200] D Hone 'A vision for Article 6 of the Paris Agreement' (2016), available at https://blogs.shell.com/2016/05/13/article6vision/, accessed on 29 December 2016.

[201] Ibid.

[202] International Emissions Trading Association (IETA) (2016) *A vision for the market provisions of the Paris Agreement* at 3.

accounting effectively took place on one side only. However, unlike the CDM, the provisions of Art 6(5) of the Paris Agreement prevent one-sided accounting:

> 'Emission reductions resulting from the mechanism referred to in para 4 of this Article shall not be used to demonstrate achievement of the host party's nationally determined contribution if used by another Party to demonstrate achievement of its nationally determined contribution.'

As a result, the transfer of credits from a project across a national border – in the style of the CDM –will impact the national inventory reports of both parties. These transfers will then have to be executed in a similar fashion as the JI, whereby emissions are governed by an allocation of ERUs.[203] This accounting dilemma will be explored in further detail in Chapter 7.

3.5.3.5 Governance

Similar to the CDM, the SDM will be supervised by a body under the guidance of the COP/CMA. The Executive Board (EB) of the CDM could thus serve as a role model for this body, with rules and procedures for decision-making built on those for the CDM.

The composition of the body may differ from that of the EB, as Art 6 does not assign certain roles to groups of countries. Accordingly, the formation of the SDM body may perhaps not be proportionate with respect to the share of developed and developing countries.[204]

In addition, the competencies of the SDM body, such as accreditation of independent verifiers, issuance of units etc, will have to be agreed upon by the parties, but may be developed incrementally by the body after its establishment.[205]

3.5.3.6 Purpose

In comparison with the CDM, the purpose of the SDM is quite general and seems to be more open to other purposes than merely contributing to the attainment of targets under the UNFCCC. In fact, despite the more limited purpose of the CDM, it, too, could be used for purposes other than compliance with mitigation obligations under the UNFCCC, such as the following:[206]

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[203] Ibid. IETA explains that the JI style effectively requires an adjustment to the project host country's national goal if the crediting unit was to be used by another party to meet their goal.

[204] Cames et al (n185) at 21 remark that this could contribute to establishing a less politicised body than the EB.

[205] Id at 22.

[206] These extended purposes were identified by Cames et al (n185) at 22.

- Private entities cancelled CERs to voluntarily offset emissions not covered by any obligation (for example, flights); the EB responded by creating a platform whereby private entities were allowed to cancel CERs directly under the UNFCCC for offsetting any private emissions.
- The methodologies and tools developed by the CDM may also be used in the context of results-based carbon funding.
- CERs may also be used to offset CO_2e from international aviation above the 2020 baseline emissions.

It is reasonable to assume that these extended purposes will become even more prominent under the SDM, since the scope of the Paris Agreement is 'larger and more heterogenic' than the Kyoto Protocol.[207] After all, crediting mechanisms are catalysts for competitive mitigation options, as they provide incentives to public and private entities to gain financial support for the implementation of a broad range of climate mitigation technologies.[208]

3.5.4 Comparing cooperative approaches and the SDM

Article 6(1) of the Paris Agreement opens by recognising that certain parties choose to pursue voluntary cooperation in the implementation of the NDCs. One form of voluntary cooperation is set out in Art 6(2), known as the Cooperative Approaches (CAs). CAs enable parties to use ITMOs towards their NDCs and require parties to apply robust accounting, which avoids double counting.

Although it is not the main purpose of this chapter to analyse the CAs, it is worthwhile highlighting some key features,[209] as this might help to shed light on the interaction between CAs and the SDM, as well as their interaction within the general construct of the Paris Agreement.

- **Voluntary nature**

  Parties must accede to CAs on a voluntary basis. Thus, no provisions in terms of the accounting structure underpinning CAs can be imposed on parties not engaging in them. Consequently,

[207] Ibid.

[208] Ibid.

[209] For a more detailed discussion of these attributes, see P Martins & G Barata 'Study on approaches to incorporation of mitigation contributions in international market mechanisms, including through development standards for setting emissions reference levels' *International Emission Transfers after 2020* (2016) at 22-29, available at http://get2c.pt/get2c/wp-content/uploads/2016/09/Parisian-Market-Accounting-FINAL_PMB_clean3.pdf, accessed on 5 January 2017 and Cames et al (n185) at 11-17.

such infrastructure as may be necessary for tracking the transfer of units must be accepted by parties at a national level.

- **ITMOs**

Art 6(2) establishes ITMOs, which may be used towards NDCs. It seems probable that ITMOs should follow similar common metrics across a diversity of NDCs and are likely to be expressed as an emission unit (e.g. one tCO_2e) or as an emission reduction.[210] The transfer of mitigation outcomes across national borders is a process with various stages, as depicted in Figure 3.3 on the next page.[211]

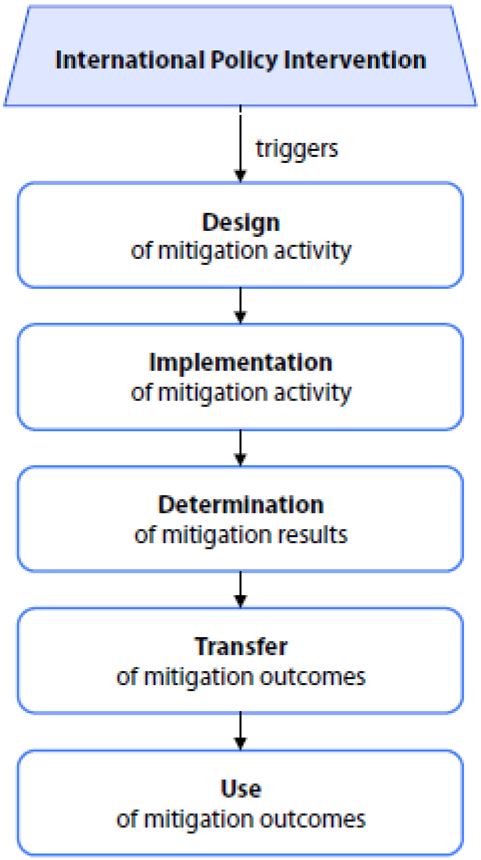

Figure 3.3 Stages of the process of transferring mitigation outcomes

[210] This view is based on a joint reading of paras 31 and 32 of Decision1/CP.21 with Art 6.

[211] N Kreibich & L Hermwille 'Understanding Environmental Integrity Challenges' (2016) *JIKO Policy Paper No 02/2016* at 5-6 available at http://www.carbon-mechanisms.de/fileadmin/media/dokumente/Publikationen/PP_2016_02_Robust_Transfers_bf.pdf, accessed on 7 January 2017 describe the different stages of the process. The authors address the risks associated with each of these steps at 7-13.

- **Environmental integrity and transparency**

  CAs must ensure 'environmental integrity and transparency', thus indicating the need for any CAs to report internationally in terms of the underlying mechanism, the generation of ITMOs, the governance system and, potentially, an assessment of their environmental integrity.

- **Use towards NDCs**

  CAs involve the use of ITMOs towards NDCs. Therefore, domestically transferred units and any units that are not used towards a party's NDC are excluded.[212] The wording of 'mitigation outcome' also seems to raise a number of questions: it appears to purposefully broaden the scope of what could be internationally transferred, without a strict one-to-one relation to unit holdings in a registry. This, in turn, raises the possibility of periodic reconciliation between parties (net transfer accounting) based on a mutually agreed definition of mitigation outcome.

- **Promotion of sustainable development**

  This replicates earlier language from the CDM, although it might be difficult, in practical terms, to agree on the operative conditionality of a sustainable development or co-benefit criterion.

- **Robust accounting**

  The reference to 'robust accounting' demonstrates a keen awareness of the threat of double counting and emphasises the importance of developing multilateral guidance, which is to be adhered to.

Table 3.2 offers a comparison of the main elements of the CAs and the SDM.[213]

[212] Martins & Barata (n209) at 23 argue that the phrase 'use towards NDCs' is indicative of the fact that parties decided to exclude issues of generation or transfer from the purview of the Article, except if these were to have an impact on the use towards NDCs.

[213] Martins & Barata (n209) at 30.

Table 3.2 Comparison of the Cooperative Approaches and the SDM	
Cooperative Approaches **(Art 6.2-3, Paris Agreement)**	**The SDM** **(Art 6.4-7, Paris Agreement)**
Implied to be bilateral or among a group of parties	Multilateral, under the authority and guidance of the COP/CMA, supervised by a body designated by the COP/CMA
Robust accounting shall be applied, consistent with guidance adopted by CMA Subsidiary Body for Scientific and Technological Advice (SBSTA) to develop and recommend guidance	SBSTA to develop and recommend rules, modalities, and procedures
'ensure the avoidance of double counting'	'shall not be used to demonstrate achievement of the host Party's NDC if used by another Party to demonstrate achievement of its NDC'
General role for private entities unclear	Incentivise and facilitate participation by public and private entities
'promote sustainable development'	'foster sustainable development'
-	'contribute to the reduction of emission levels in the host Party'
-	'deliver an overall mitigation in global emissions'
-	Share of proceeds for administrative expenses and for adaptation in vulnerable countries

At present, it is unclear how the CAs and SDM will interact with each other and the diverse NDC landscape.[214] The guidance that the Subsidiary Body for Scientific and Technological Advice (SBSTA) has been requested to develop and recommend in para 37 of Decision 1/CP.21 refers to Art 6(2), but not specifically to Art 6(4). Does this mean that the units produced by the SDM differ from the ITMOs in Art 6(2)? Will they be counted differently to ITMOs?

A related issue is the level of governance. One interpretation of the text of Art 6(2) is that CAs are bilateral or collective initiatives between a group of parties not entirely under the auspices of the COP/CMA, while the SDM is established under the authority and guidance of the COP/CMA. The question then arises as to how much oversight the COP/CMA will have when it comes to the CAs

[214] The subsequent research questions are based on issues identified by Martins & Barata (n209) at 29-30.

of the parties. Another issue of contention is the role of private entities in CAs: both public and private entities have a clear role in the SDM, but CAs mention no presumed role for the latter.

An additional point to consider is that, while CAs are meant to 'promote' sustainable development, the SDM is supposed to 'foster' sustainable development. Is there a difference between 'promoting' and 'fostering' sustainable development? And will a requirement check actually be operationalised for either of these provisions?

Finally, while the SDM is meant to 'contribute to the reduction of emission levels in the host Party', the lack of a similar provision under CAs would seem to imply that there is no obligation for a host party's own contribution (as the contribution is deemed to be the NDC itself).

These wrinkles remain to ironed out in the coming years before the SDM and CAs can be successfully launched. Another important issue is the transition of existing CDM projects – this will be considered in the next section.

3.6 EXISTING CDM PROJECTS

Given that there is no sunset clause for the Kyoto Protocol or its CDM, such projects can formally continue to exist beyond 2020.[215] Whether the CDM can generate new credits after 2020 is a legally contentious issue.[216] However, even if there was a clear consensus that the CDM could continue to issue credits post-2020, it is uncertain whether parties would be likely to politically agree on the continuation of these mechanisms.[217]

The first apparent challenge relates to the overlap of projects. CDM projects currently undergoing validation and registration under the Kyoto Protocol (or those already registered) will, based on current guidance and unless decided otherwise, be allowed to issue units under Kyoto for a number of years into the first and second cycles of contributions under the Paris Agreement.[218] This overlap will evidently present problems in terms of double counting. One way of resolving this would be only to allow a contribution under the Paris Agreement to overlap with the scope of a CDM project

[215] Cames et al (n185) at 23 remark that the administration of mechanisms is likely to continue for approximately three years beyond 2020 to ensure that all requirements for the second commitment period of the Kyoto Protocol can be appropriately processed.

[216] Ibid.

[217] Ibid. The authors contend that it seems 'very unlikely' that the CDM will continue to issue credits, because as soon as the SDM comes into force, there is little sense in maintaining other crediting mechanisms which aim to reduce the same emissions and are largely based on the same concepts, but which do not take into account the new context under the Paris Agreement.

[218] Martins & Barata (n209) at 34.

if the emission reduction is not counted towards any other contribution for the same period.[219] Given that NDCs will become operational as of 2020, it is imperative to manage such an overlap.

The second difficulty refers to a potential overlap between the scope of the CDM and the SDM. To the extent that these overlap, parties should not be allowed to arbitrage[220] between these mechanisms.[221]

Both these issues imply the need for a clear and well planned transition period. One option is for parties to either progressively convert such projects into their own crediting schemes, or to take charge of the projects and count these projects towards their contributions.[222] Another issue which a transition from CDM to SDM would create is a separate formal transition period and an evaluation of the ways in which current CDM projects satisfy key criteria for the SDM.[223] In the case where issuance of CERs has already more than absorbed costs for the project, it would make economic sense for parties to gather such 'low-hanging fruit'.[224]

Between the two extremes of the discontinuation of existing projects and quasi-automatic continuation under the SDM, are a range of non-mutually exclusive options which would allow some projects to continue generating credits under the SDM:[225]

- Continuation of certain project types;[226]
- Continuation only in certain countries;[227]
- Continuation after an adjustment of the baseline which takes the host country's NDC into account; or

[219] Ibid.

[220] In economics and finance, arbitrage is the practice of taking advantage of a price difference between similar financial instruments on different markets or in different forms. Arbitrage exists as a result of market inefficiencies. See Investopedia, available at http://www.investopedia.com/terms/a/arbitrage.asp?optly_redirect=integrated&lgl=term-video-bid, accessed on 15 October 2017.

[221] Martins & Barata (n209) at 34 explain that arbitrage occurs when parties select the mechanism with the least oversight and environmental integrity.

[222] Ibid.

[223] Ibid. The authors observe that a similar precedent existed for the transition of certain projects from the Activities Implemented Jointly (AIJ) pilot programme to either CDM or JI at the onset of the Kyoto Protocol.

[224] Ibid.

[225] Cames et al (n185) at 23.

[226] For example, those at great risk of the cessation of mitigation activity should no further revenues from credits be expected.

[227] For instance, many least developed countries (LDCs) did not have the capacity to develop projects in the early years of the CDM and started to make use of the mechanism at a very late stage.

- Continuation after a re-registration of the project under the rules, modalities and procedures of the SDM.

An important criterion for judging which option (or combination of options) is most appropriate is their potential contribution to reducing global GHG emissions.[228]

3.7 CONCLUSION

Annex I parties, through participation in the Kyoto Protocol, made a commitment to reduce a quantified amount of six specific GHGs measured by a given methodology. An element of flexibility to increase efficiency in reducing emissions was added through three flexible mechanisms. Under the Kyoto Protocol, parties may satisfy their commitments by reducing domestic emissions, enhancing domestic carbon sinks, as well as through investments in emission reductions or sinks in developing countries that have ratified the Kyoto Protocol (through the CDM), investments in emission reductions or sinks in other industrialised countries (the JI), and the acquisition of ERUs from other parties (through the IET).

Against the backdrop of the Paris Agreement, the SDM was analysed and found to have many interpretational issues which remain to be resolved in the coming years. In terms of the design of the two market mechanisms pursuant to Art 6(2) and 6(4) (namely, CAs and the SDM), the international dialogue has only just started. Many fundamental or more technical questions still have to be negotiated and it is not yet clear which positions individual parties will take.[229] Although the SDM can (and should) build on experiences from the CDM, a number of issues have yet to be discussed among UNFCCC parties before the SDM can effectively be implemented. This is of particular importance if the SDM is to be applied at the sector, instead of the project level.

This chapter highlighted two key differences between the CDM and SDM. First, under the Paris Agreement, all parties submitted NDCs to contribute to mitigation and should therefore have access to the SDM to fulfil their NDCs, whereas the CDM was based on the distinction between Annex I and non-Annex I countries. Thus, developing countries can now participate in carbon markets under the SDM. Second, the SDM aims 'to deliver an overall mitigation in global emissions'.[230] With the CDM, every tCO_2 reduced in a non-Annex I country was used to allow for an additional tonne to be

[228] Martins & Barata (n209) at 23. The authors further counsel that these projects should be clearly reflected in the inventory and that the appropriate accounting of their CERs should be ensured.

[229] Cames et al (n185) at 27 mention that some of these questions are overarching and similar for both mechanisms, such as the relationship to NDCs or procedures to ensure robust accounting. Others, for example the nature of the ITMOs or governance, are quite different and very specific for each of the mechanisms.

[230] Paris Agreement, Art 6(4)(*d*).

emitted in an Annex I country. This was, at best, a zero sum game. Now, the SDM aims to ensure an *overall* reduction in global emissions.

The Paris Agreement established a new paradigm in international climate policy. The Kyoto Protocol was based on so-called 'targets & timetables', while the Paris Agreement, on the other hand, is based on a so-called 'pledge & review' hypothesis.[231] The Kyoto Protocol was based on commonly agreed targets for Annex I countries and stringent provisions for emissions accounting and compliance control under the UNFCCC, including enforcement provisions.[232] Conversely, the Paris Agreement refers to 'nationally determined contributions', instead of 'targets'. Also, notwithstanding that the Paris Agreement includes an Article on compliance, it does not refer to enforcement. Rather, it highlights that this process shall be 'facilitative in nature and function in a manner that is transparent, non-adversarial and non-punitive'.[233]

It is evident that the Paris Agreement has introduced a very different world of international emissions trading to the one that has existed under the Kyoto Protocol. Although there is still a long way to go in designing the concepts laid down in Art 6 of the Paris Agreement at COP22 in Marrakech, this landmark agreement marks a decisive and positive change towards climate action. The Paris Agreement has moved purposefully beyond the categories of Annex I and non-Annex I parties. South Africa thus finds itself in a markedly different environment and will have to 'redouble its efforts to implement its national climate policy, and to make contributions to the global efforts set out under the Paris Agreement'.[234] In light of the aforementioned, the next chapter will describe the law and policy framework that facilitates (or hinders) the CDM – and, by extension, the SDM – in South Africa.

[231] Cames et al (n152) at 7.

[232] Kyoto Protocol, Art 18.

[233] Paris Agreement, Art 15

[234] MAPS 'What might the Paris Agreement mean for South Africa?' (2016) available at http://mapsprogramme.org/outputs/what-might-the-paris-agreement-mean-for-south-africa/, accessed on 10 January 2017.

Chapter 4

South Africa's law and policy framework for the regulation of the CDM

4.1 INTRODUCTION

Having examined the theoretical and policy considerations underlying the Clean Development Mechanism (CDM) in the context of the Paris Agreement, including the evolution from the CDM to the Sustainable Development Mechanism (SDM), this chapter now focusses on the legal and policy framework governing the CDM in South Africa. As such, the chapter provides an overview of the South African legislation and policies that facilitate (or hinder) the CDM. These comprise a broad array of laws from environmental assessment provisions to fiscal laws, including a brief account of the tax incentives for clean (or renewable) energy. This chapter also outlines the funding solutions and incentive opportunities available to green technology producers and consumers.

In general, the political stability and effectiveness of laws have a significant impact on how potential investors view a country.[1] In order to qualify as a host country for the CDM, South Africa was required to establish the necessary policies and legislative measures to be considered eligible. This 'policy readiness' also influences the revenue-generating potential of the CDM. Ultimately, South Africa's capacity to develop and implement SDM law and policy could have an important role to play in attracting foreign investment inflows. As such, apart from the various legislative enactments, this chapter also considers the domestic policy framework, including the National Climate Change Response Strategy, which could potentially create an enabling environment for the SDM.

Lastly, this chapter highlights some of the practicalities that emanate from the above policy and legal frameworks. These range from implementing Carbon Capture and Storage (CCS) technology to the role of local government in implementing green reform.

[1] Evidence of this is the decline in foreign direct investment following the perceived political instability and concern over the recent credit ratings downgrades in South Africa. See, for example, the International Monetary Fund (IMF) *South African Country Report no. 16/217 'Article IV Consultation – press release; staff report; and statement by the Executive Director for South Africa'* (2016), available at http://www.imf.org/external/pubs/ft/scr/2016/cr16217.pdf, accessed on 7 March 2017.

4.2 SOUTH AFRICA'S POLICY FRAMEWORK[2]

4.2.1 Introduction

The South African government, through its primary agent for climate change mitigation – the Department of Environmental Affairs – has developed a plethora of climate change response policies over the last decade.[3] This section will highlight the policies that are of relevance to the

[2] Some parts of this section are drawn from a paper which this author presented at the 6th International Conference on Clean Electrical Power (ICCEP) held in Ligure, Italy, on 26 to 29 June 2017, and which was subsequently published as L-A Steenkamp 'A review of policy options for clean electricity supply in South Africa' (2017) *Clean Electrical Power (ICCEP), 2017 6th International Conference IEEE* 94-102.

[3] A set of key policy documents contribute to the control, guidance and growth of the energy sector. These include (but are not limited to):

- The *Integrated National Electrification Programme* (INEP) is a government initiative launched in 1991 to provide capital subsidies to municipalities in order to address the electrification backlog of permanently occupied residential dwellings. For more policy documents regarding INEP, see http://www.energy.gov.za/files/policies/p_electricity.html, accessed on 13 December 2016.
- The *White Paper on Energy Policy* intends to minimise environmental impact and manage supply and demand. It was released by the Department of Energy (known then as the Department of Minerals and Energy) in 1998. Available at http://www.gov.za/sites/www.gov.za/files/26169_1.pdf, accessed on 14 December 2016.
- The Energy Efficiency Strategy was published in 2001 in light of South Africa's high levels of greenhouse gas emissions, as well as its high energy intensity. The strategy document aims to improve energy efficiency by 12% by 2015, to be achieved in three phases. Available at
- http://www.energy.gov.za/files/esources/electricity/ee_strategy_05.pdf, accessed on 14 December 2016.
- In the 2006 *Draft Policy Paper: A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa*, the South African National Treasury explored market-based instruments, or incentive-based measures, in some detail. Available at
- http://www.treasury.gov.za/public%20comments/Draft%20Environmental%20Fiscal%20Reform%20Policy%20Paper%206%20April%202006.pdf, accessed on 10 December 2016.
- The *Energy Security Master Plan – Electricity* was released in 2007 to plan for electricity supply until 2025. Available at http://www.gov.za/documents/energy-security-master-plan-electricity, accessed on 14 December 2016.
- The *Biofuels Industrial Strategy of the Republic of South Africa* (the Biofuels Strategy) introduced a target of a 2% penetration of biofuels into the market in 2007. Available at http://www.energy.gov.za/files/esources/renewables/biofuels_indus_strat.pdf(2).pdf, accessed on 14 December 2016.
- In January 2008, the (former) Department of Minerals and Energy released the *National Response to South Africa's Electricity Shortage*: *Interventions to address electricity shortages.* The document detailed interventions to reduce 'the risk of load shedding'. Available at http://www.gov.za/sites/www.gov.za/files/resp_elec.pdf, accessed on 15 December 2016.

CDM context and will do so in accordance with the timeline of their development (see Figure 4.1 below).

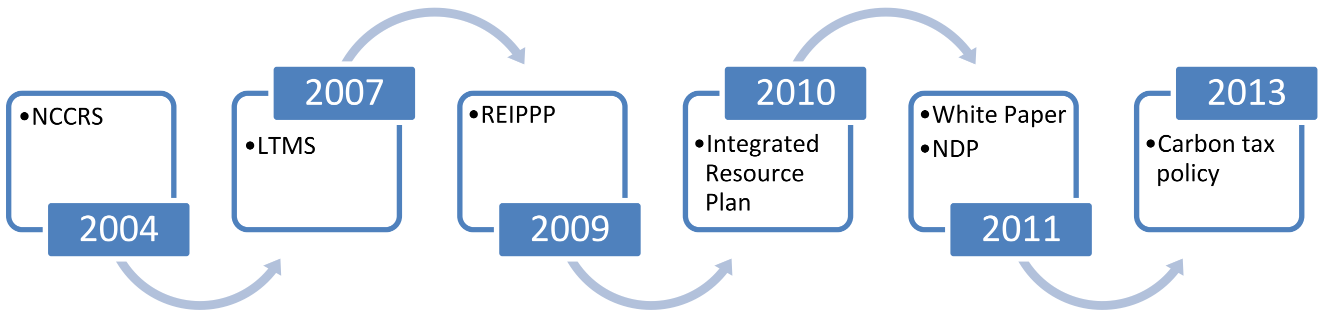

Figure 4.1 Timeline of South Africa's climate change policies

4.2.2 National Climate Change Response Strategy

South Africa's obligations under the UNFCCC were crystallised in the *National Climate Change Response Strategy for South Africa to Address Climate Change* (NCCRS) in 2004.[4] The NCCRS outlines the steps that should be taken by government and other role players at a national level to respond to climate change. A number of principles and factors guided the formulation of the NCCRS, including poverty alleviation, access to basic amenities, as well as infrastructure

- The (former) Department of Minerals and Energy published the *Nuclear Energy Policy* in 2008. The policy views nuclear energy as a way of providing energy diversification, energy security and a way of reducing GHG emissions. Available at http://www.energy.gov.za/files/policies/policy_nuclear_energy_2008.pdf, accessed on 15 December 2016.
- The *South African Renewables Initiative* aims to mobilise domestic and international funding, and sector expertise, to support South Africa to scale up renewable energy. Available at http://www.gov.za/south-african-renewables-initiative, accessed on 17 December 2016.
- In November 2011, the *Green Economy Accord* was signed as an agreement between government, labour and business. It seeks to shift the country's economy towards sustainable development, the creation of 'green' jobs and industrial development. Available at http://www.economic.gov.za/communications/publications/green-economy-accord, accessed on 1 February 2017.
- Government and its social partners signed a *Local Procurement Accord* in October 2011, as an outcome of social dialogue on the New Growth Path. The agreement aspires towards the use of products that are manufactured locally (75% of all products used should be manufactured locally). Available at http://www.economic.gov.za/communications/publications/local-procurement-accord, accessed on 1 February 2017.

[4] Department of Environmental Affairs *National Climate Change Response Strategy (NCCRS)* (2004), available at https://unfccc.int/files/meetings/seminar/application/pdf/sem_sup3_south_africa.pdf, accessed on 23 January 2017.

development, job creation, rural development, foreign investment, human resource development and improved health.[5] These ambitious principles aim to result in sustainable economic growth.[6]

South Africa's responsibilities, as contained in the NCCRS, include the establishment of a national inventory of greenhouse gases (GHGs), the Long Term Mitigation Scenario and the Technology Needs Assessment Report. The following paragraphs address the manner in which these obligations relate to the CDM.

4.2.2.1 A national inventory of GHGs

The NCCRS states that South Africa 'shall monitor and periodically report to the international community the country’s GHG inventory, steps taken and envisaged to implement the UNFCCC and any other information relevant to the achievement of the objective of the UNFCCC including information relevant for the calculation of global emission trends'.[7]

During June 2014, the Minister of Environmental Affairs published the National Greenhouse Gas Inventory for South Africa, for the period 2000 to 2010, for public comment.[8] The objective of this inventory is to ensure that South Africa comprehends its emissions profile and the key drivers of change in emissions.[9] In 2014, South Africa submitted its first Biennial Update Report to the UNFCCC. More recently, in September 2016, South Africa submitted its second Biennial Update Report.[10]

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[5] Id at vi.

[6] Ibid.

[7] Department of Environmental Affairs *National GHG Inventory and tracking GHG emissions Session 21: Using data effectively to track the transition to a low carbon South Africa* (2014) at 3, available at https://www.environment.gov.za/sites/default/files/docs/nationalghginventoryandtracking_ghgemissions.pdf, accessed on 22 January 2017.

[8] Department of Environmental Affairs *National Greenhouse Gas Inventory for South Africa (2000 to 2010)* (2014) in GG No 37701.

[9] Per the Department of Environmental Affairs *Inventory* (n7) at 34, the reporting of the emissions is in line with the IPCC 2006 guidelines in order to ensure that the GHG inventory report is accurate, consistent, complete and transparent.

[10] Department of Environmental Affairs *South Africa’s 2nd Biennial Update Report* (2016), available at https://www.environment.gov.za/sites/default/files/reports/2ndBUR2000_2012_draftforpubliccomments.pdf, accessed on 23 January 2017.

These comprehensive inventory reports can be used to organise approved CDM methodologies throughout the country in an effort to reduce GHGs.[11] In other words, the level of GHGs can serve as the baseline against which improvements can be measured.[12]

4.2.2.2 Long Term Mitigation Scenario[13]

The Long Term Mitigation Scenarios (LTMS) Research Project took place in South Africa between 2005 and 2008.[14] It was hailed as a 'seminal and resounding success', because it successfully placed climate change mitigation on the formal domestic policy agenda.[15] The LTMS project was a Cabinet-mandated process, led by the (former) Department of Water and Environmental Affairs.[16]

At a technical level, the LTMS was a unique blend of facilitated stakeholder process and rigorous research. It was implemented using a scenario-building team, composed of strategic thinkers from government, business and civil society.[17] The credibility of the study came from the robustness of data and analysis.[18] At the time, there was limited experience of analysing national mitigation options. However, it was recognised that the key to the success of the LTMS was a process to

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[11] DF Humphris *South Africa's law and policy framework for the regulation of the Clean Development Mechanism* (LLM dissertation, North-West University, 2011) at 32.

[12] Ibid.

[13] This section is drawn from a monthly report which this author compiled in her capacity as South Africa's country manager for the Climate Scorecard citizens' initiative. See L-A Steenkamp 'South Africa: The Long Term Mitigation Scenarios Research Project' (December 2016) in L Barber & R Israel (eds) *Climate Scorecard Report #5: Leading Climate Change Research Studies*, available at http://climatescorecard.org/wp-content/uploads/2016/12/ClimateScorecardReport5.pdf, accessed on 30 July 2017.

[14] For the detailed technical report comprising the Long Term Mitigation Scenarios, see H Winkler *Long Term Mitigation Scenarios Technical Report* (2007), available at http://dspace.africaportal.org/jspui/bitstream/123456789/33713/1/07-Winkler-LTMS-Technical%20Report.pdf?1, accessed on 15 February 2017.

[15] MAPS 'The Long Term Mitigation Scenarios: a decade later' (n.d.), available at http://mapsprogramme.org/outputs/the-long-term-mitigation-scenarios-a-decade-later/, accessed on 12 November 2016.

[16] The department is now known as the Department of Environmental Affairs. See https://www.environment.gov.za/, accessed on 12 November 2016.

[17] For more in-depth reports related to energy and the LTMS, see UCT's Energy Research Centre documents at http://uct.academia.edu/Departments/Energy_Research_Centre/Documents?page=11, accessed on 16 November 2016.

[18] The study drew on strong local academic institutions and stakeholder engagement. A broad technical research team was established, consisting of approximately 30 researchers from different institutions. This broad collaborative approach provided the best available scientific data on energy, emissions and economic impacts.

accumulate information, to analyse it in a consultative way and to present the results in such a manner as to assist policy makers.

The LTMS research was peer-reviewed twice and was found to be of best practice to the extent that reviewers recommended sharing the experience with other developing countries. The LTMS approach drew on international best practice, notably a report written by the UN, titled *Economics of Greenhouse Gas Limitation: Technical Guidelines*.[19]

The LTMS study was conducted during a period when little was known about the scale of the climate change problem in South Africa and the options to address it. The research teams gathered large amounts of data to conduct modelling and assessments. The LTMS developed national and sub-national mitigation scenarios for South Africa under plausible future climate conditions and development pathways. The LTMS was the first interpretation of international climate mitigation policy in a domestic developing country context.

The LTMS team explored a wide range of detailed mitigation actions and proposals for four strategic options that South Africa could pursue.[20] The LTMS process design centred around two 'outer' scenarios, called 'envelopes'. The first is the Growth Without Constraints (GWC) Scenario, which is a 'no action' scenario, with a projection that GHG emissions will rise dramatically. The fourth scenario is purely notional, showing what would happen if we restrained the economy towards an emission target required by climate science in order to stabilise the climate – known as the Required by Science (RBS) scenario.

To address the gap between the GWC and RBS scenarios, the researchers identified technology, market and policy actions which could be implemented by government. These second and third scenarios comprised the current development plans to increase growth, with the addition of some emission reduction plans. Figure 4.2 below depicts the scenarios explored in the LTMS process.

[19] A Markandya *Economics of Greenhouse Gas Limitations* (1998), available at http://unfccc.int/resource/cd_roms/na1/mitigation/Resource_materials/UNEP_Economics_Greenhouse_Gas_Limitations_Guidelines_1999/UNEPMethGuidelines.pdf, accessed on 23 January 2017.

[20] For a summary of the various phases of the LTMS research project, see SANBI *The Long-Term Adaptation Scenarios Flagship Research Programme (LTAS) for South Africa* (2016), available at http://www.sanbi.org/biodiversity-science/state-biodiversity/climate-change-and-bioadaptation-division/ltas, accessed on 15 February 2017.

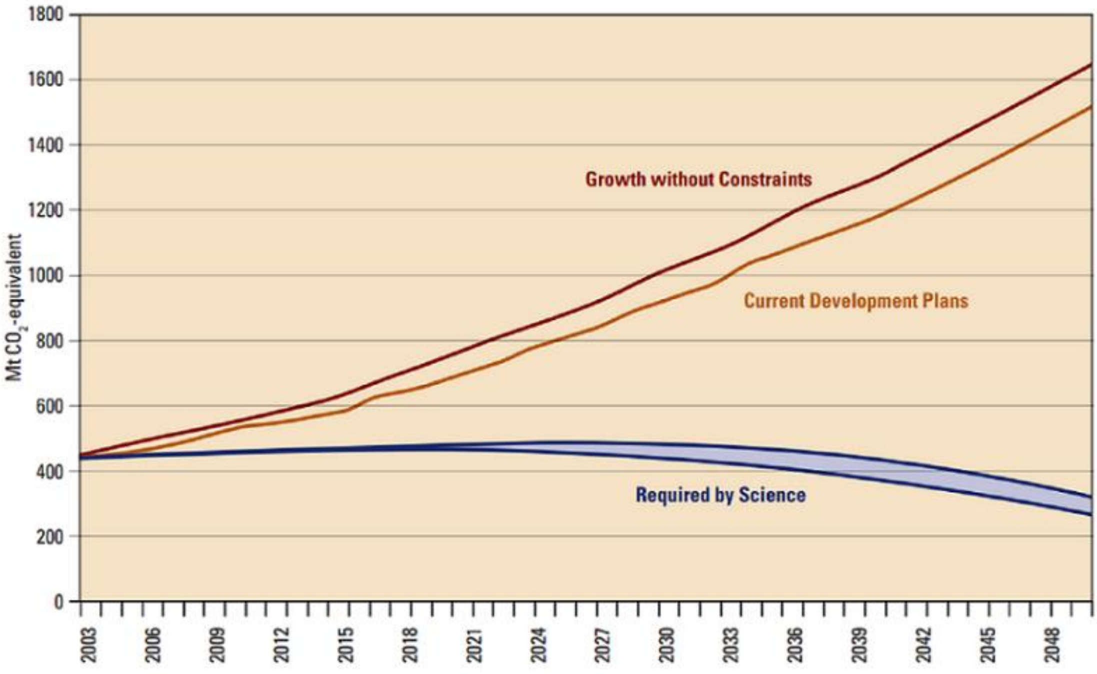

Figure 4.2: The gap in GHG emissions in the four scenarios[21]

The LTMS provides a policy response comprising six broad themes.[22] Unfortunately, almost a decade later, it is apparent that the LTMS was not successfully integrated into the policy agenda of any departments other than its champion, the Department of Environmental Affairs. Another limiting factor is that the LTMS occurred in a time of a 'domestic policy vacuum', which resulted in a lack of momentum to sustain its implementation.[23]

The government followed the LTMS study by committing to a peak, plateau and decline trajectory in carbon emissions from 2030 to 2035, through a reduction in coal dependence, an increased use of renewable energy sources and the adoption of clean energy technologies (including carbon capture

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[21] Source: Case studies available at http://www.ggbp.org/case-studies/south-africa/long-term-mitigation-scenarios, accessed on 16 November 2016.

[22] The policy themes are available at https://www.iea.org/policiesandmeasures/pams/southafrica/name-24380-en.php, accessed on 23 January 2017 and are as follows:

- GHG emission reductions and limits;
- Build on, strengthen and/or scale up current initiatives;
- Implementing the 'business unusual; call for action;
- Preparing for the future;
- Vulnerability and adaptation; and
- Alignment, coordination and cooperation.

[23] MAPS (n15).

and storage).[24]

However, it should also be borne in mind that South Africa's economy is very reliant upon coal-based energy and energy-intensive mineral extraction. This arguably causes powerful push-back and resistance towards a low-carbon transition. Ultimately, the government's commitment to reduce emissions, whilst simultaneously ensuring economic development, can be met through instruments such as the CDM. This is due, in part, to the private sector's profit motive and, to a lesser extent, the sector's corporate social responsibility goals. Both can be met through investing in CDM projects.

4.2.2.3 South Africa's Technology Needs Assessment Report

In order to meet the third obligation under the NCCRS, South Africa had to undertake a Technology Needs Assessment (TNA).[25] The TNA report was submitted to the UNFCCC secretariat as a National Communication to the Convention.[26] Developed country parties can use the report as a means to cooperate with developing countries in order to meet their obligations in terms of technology transfer with respect to climate change.[27]

The TNA report remarks on the many advantages that large-scale investments in renewable energies have effected in other countries, including significant job creation and technology innovation. The report emphasises that 'South Africa could harness financial benefits through global funding mechanisms, including the Clean Development Mechanism'.[28] In other words, developed country parties can use the TNA report to identify the specific needs where investment in South Africa will be most beneficial, and use the CDM as a means to achieve this.[29]

The Department of Energy first launched a programme to provide grants to renewable energy projects in 2005/2006, continuing to 2008. The Renewable Energy Finance and Subsidy Office (REFSO) was set up within the department to handle the programme. Its mandate is to manage renewable energy subsidies and offer advice to developers and other stakeholders on renewable

[24] A Niemack *The effectiveness of the clean development mechanism and emissions trading within the climate change regime* (Master's dissertation, University of Witwatersrand, 2011) at 1.

[25] Department of Science and Technology *South Africa's Climate Change Technology Needs Assessment Synthesis Report* (2007), available at http://www.gov.za/sites/www.gov.za/files/DST_SA-climate-change-technology-needs-assessment_25102007_0.pdf, accessed on 24 January 2017.

[26] Id at v.

[27] Ibid.

[28] Id at 6.

[29] Per Humphris (n11) at 33.

energy finance and subsidies.[30] The type of financing options available to developers included grants for feasibility studies; long- and short-term finance; export credits and soft loans; equity or loans; and the purchase of carbon emission reduction credits.[31] Similar support programmes would offer a valuable tool to project developers to help gain sufficient access to capital in the development of a CDM project.[32]

In spite of production costs of renewable energy declining each year, renewable energy in South Africa still requires an enabling environment to become even more competitive relative to traditional energy sources. One policy instrument which could add impetus to the renewable energy agenda, is the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

4.2.3 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)[33]

In its *White Paper on the Renewable Energy Policy*,[34] the South African government laid the foundation for policies to stimulate the uptake of renewable energy. One such policy is the REIPPPP, which was among the programmes identified as a climate change flagship programme in the White Paper.[35]

The REIPPPP replaced the 2009 Renewable Energy Feed-in Tariff (REFIT) programme.[36] The National Energy Regulator of South Africa (NERSA) had commissioned the development of a

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[30] Department of Energy *Renewable Energy Finance and Subsidy Office* (n.d.), available at http://www.energy.gov.za/files/esources/renewables/r_refso.html, accessed on 24 January 2017.

[31] International Energy Agency *Renewable Energy Subsidies DME* (2013), available at https://www.iea.org/policiesandmeasures/pams/southafrica/name-23044-en.php, accessed on 24 January 2017.

[32] Based on the argument put forward by Humphris (n11) at 34, when commenting on the original REFSO.

[33] This section is derived from portions of a chapter which this author has co-contributed to a new book that addresses energy law and policy in Africa from various perspectives. The book forms part of an inaugural collaborative research project within the CCLA-NIALS partnership. See J Glazewski, L-A Steenkamp & PK Oniemola 'Promoting renewable energy in African countries: An outline of fiscal and financial incentives in South Africa and Nigeria' (accepted for publication).

[34] Department of Energy *White Paper on the Renewable Energy Policy of the Republic of South Africa* (2003), available at http://www.polity.org.za/article/white-paper-on-the-renewable-energy-policy-of-the-republic-of-south-africa-2004-06-11, accessed on 14 December 2016.

[35] L McDaid 'Renewable Energy Independent Power Producer Procurement Programme Review 2014' at 3 *Electricity Governance Initiative South Africa, supported by World Resources Institute* (2014), available at http://www.egi-sa.org.za/wp-content/uploads/2011/10/EGI-REI4P-review-2014-pdf.pdf, accessed on 25 February 2017.

[36] For a comprehensive analysis of the REFIT, see L du Toit *Promoting renewable energy in South Africa through the inclusion of market-based instruments in South Africa's legal and policy framework with particular reference to the*

REFIT for South Africa in 2007, under its authority to regulate electricity tariffs in the country. Essentially, the REFIT required Eskom to purchase renewable energy from qualifying generators at pre-determined prices. The motivation behind the REFIT programme was certainly commendable: by securing the prices, renewable energy developers and private investors were to be incentivised and financial risks were to be reduced, which would have resulted in greater market clarity.

Unfortunately, the REFIT programme did not realise its objectives, largely due to uncertainty regarding the legal basis of the REFIT, as well as concerns about the potential cost of the programme.[37] Yet, Du Toit posits that a properly designed and implemented feed-in tariff policy need not be expensive and could provide security and stability to investors.[38] This, in turn, would encourage investment and growth in the renewable energy sector.[39]

Jointly launched by the Department of Energy, NERSA and Eskom in 2011, the REIPPPP is a tendering programme tasked with deploying 3 725 MW of renewable energy by 2016.[40] The REIPPPP is meant to be the model for 'private participation' in the turf of South Africa’s state monopolies.[41] It could be regarded as one of the most important acts of privatisation in the past decade and has led to private investors putting down billions to build wind and solar power plants.[42] The REIPPPP covers a variety of renewable energy technologies, including onshore wind, solar photovoltaic (PV), concentrated solar power, landfill gas, biomass, small hydro and biogas.[43]

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feed-in tariff (Doctoral dissertation, University of Cape Town, 2014) as well as L du Toit 'Promoting Renewable Energy in South Africa: An overview of recent legal and policy developments' (2012) 19(2) *South African Journal of Environmental Law and Policy* 75-107.

[37] Du Toit *Feed-in tariff* (n36) at 339.

[38] Ibid. The author proposes a framework for a feed-in tariff policy and makes a number of key recommendations, including the setting of a national, binding target for renewable energy and refining certain definitions and eligibility criteria.

[39] Ibid.

[40] Department of Energy 'Fact Sheet for the Media Briefing Session on 31 August 2011 re the Renewable Energy Independent Power Producer (IPP) Programme' (2011), available at http://www.energy.gov.za/IPP/Aug%202011/Fact%20Sheet%20for%20the%20Media%20Briefing%20Session%20on%2031%20August%202011%20re%20the%20REIPPP.pdf, accessed on 20 February 2017.

[41] D van Rensburg 'Eskom's green gaffe' (2016), available at http://city-press.news24.com/Business/eskoms-green-gaffe-20160817, accessed on 20 February 2017.

[42] Ibid.

[43] G Nhamo & C Mukonza 'Policy, institutional and programme readiness for solar energy uptake in South Africa' (2016) 45(4) *Africa Insight* 69-90 at 70.

The REIPPPP consists of two phases. First, bidders are required to meet numerous qualification criteria relating, inter alia, to environmental, legal and financial requirements.[44] Thereafter, bidders are evaluated with regard to bid price and a number of economic development objectives (in other words, the fixed price element of REFIT has been removed).[45] The REIPPPP included five bidding windows, the last of which was known as window 4.5. All winning bidders receive a 20-year power purchase agreement with Eskom, backed by government guarantees that already total more than R200 billion.[46] The guarantees were crucial to making the programme work, because they make the projects automatically bankable and fundable.[47]

The main evaluation criterion for the bid selection process is pricing, which carries a 70 per cent weighting.[48] Other factors, such as job creation, local content and black economic empowerment, weigh 30 per cent.[49] This encourages joint ventures with local renewable energy companies and encourages foreign firms to set up local factories, catering for export.[50] Funding is provided through a mix of foreign private equity, local private equity and large commercial and development banks.[51]

The REIPPPP is designed to contribute to meeting the national renewable energy target, while encouraging foreign investment and developing socio-economic and environmentally sustainable growth. Ultimately, the programme aims to stimulate the renewable industry in South Africa. In comparison with the REFIT programme, which never really got off the ground, the REIPPPP could be regarded as a success.[52]

Provided it is run properly, the REIPPPP could prove to be instrumental in meeting South Africa's energy demand. Furthermore, it could mitigate slowed economic development growth caused by unpredictable provision of power, encourage foreign investment and result in a number of socio-

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44 L du Toit & J Glazewski 'Chapter 18: Energy law and the environment' in J Glazewski & L du Toit (eds) *Environmental Law in South Africa* (2016) at para 18.8.3.

45 Ibid.

46 Van Rensburg (n41).

47 Ibid.

48 Energy Intelligence 'REIPPP: all you need to know!' (2016), available at http://www.energyintelligence.co.za/reippp-all-you-need-to-know/, accessed on 20 February 2017.

49 Ibid.

50 Ibid. As a result, some international PV production facilities, such as JinkoSolar, SMA Solar Technology, ILB Helios, JA Solar, ABB, SunTech and SunPower have set up local production units.

51 Ibid. Some of the funding is composed of local private equity funds for black economic empowerment purposes to represent surrounding communities.

52 Nhamo & Mukonza (n43) at 79.

economic benefits related to job creation and skills development.[53] The contribution of renewable energy to South Africa's primary energy supply will be examined in Chapter 6, where an assessment of CDM projects in the country is made.

More generally, apart from specific programmes such as the REIPPPP, energy policy in South Africa is governed by two policies: the Integrated Energy Plan (IEP)[54] and the Integrated Resources Plan (IRP).[55] These are considered in the next section.

4.2.4 Integrated Resource Plan for Electricity

The IEP is an overarching plan that informs the development of various parts of the energy policies and roadmaps, such as the IRP. The latter focuses specifically on electricity generation and sets out the development of new generation capacity for South Africa.

During South Africa's 2008 energy crisis, the Department of Energy commissioned the *2010 Integrated Resource Plan for Electricity,* which would help to meet the country's energy demands for the next 20 years.

Although the IRP 2010 does not address the optimisation of the country's energy mix, this plan was a major step towards fulfilling South Africa's commitments to mitigating climate change, as expressed at the Copenhagen climate change summit. Written during a time of crisis, it called for a doubling of the national grid and was based on ambitious growth rates. A number of government departments are involved in various capacities in the execution of the IRP 2010 and IEP, including

[53] In fact, as pointed out by T Murombo *Law, regulation, and the promotion of renewable energy in South Africa* (Doctoral dissertation, University of the Witwatersrand, 2016) at 80, Eskom’s unstable electricity supply partly explains the commitment with which the REIPPPP was executed.

[54] The development of a national Integrated Energy Plan (IEP) was envisaged in the *White Paper on Energy Policy* of 1998 and the Minister of Energy, as entrenched in the National Energy Act of 2008, is mandated to develop and publish the IEP on an annual basis. The latest update was effected in 2016. See Department of Energy *Integrated Energy Plan – 2016 update* (2016), available at http://www.energy.gov.za/files/IEP/2016/Integrated-Energy-Plan-Report.pdf, accessed on 7 March 2017.

[55] Department of Energy *Integrated Resource Plan for Electricity 2010-2030* (2011), available at http://www.energy.gov.za/IRP/irp%20files/IRP2010_2030_Final_Report_20110325.pdf, accessed on 13 December 2016.

National Treasury,[56] the Department of Environmental Affairs,[57] the Department of Trade and Industry (DTI)[58] and the Department of Public Enterprises.[59]

Updated in 2013, the IRP now takes the impact of recent developments on demand projections and generation capacity requirements to 2030 into account. However, Eskom apparently would not use the 2013 update for its projections as Cabinet had not signed off on it.[60]

The IRP 2010 identified the preferred generation technology required to meet expected demand growth up to 2030. It was indicated at the time that the IRP 2010 should be a 'living plan', which would continue to be revised by the Department of Energy.[61] Since the promulgation of the IRP 2010,[62] the policy-adjusted IRP has incorporated a number of government objectives.[63]

While the IRP 2010 remains the official government plan for new generation capacity until its replacement by an updated plan, a number of assumptions have changed. On 25 November 2016, the Department of Energy published a Draft IEP report and the *IRP Update Assumptions, Base Case Results and Observations* for public comment.[64] An update was necessitated due to adjustments to the following assumptions:[65]

- The altered electricity landscape over the past three years, particularly in electricity demand and the underlying relationship with economic growth;
- New developments in technology and fuel options (locally and globally);
- Scenarios for carbon mitigation strategies and the impact on electricity supply up to 2050; and

[56] As regards the determination of value for money, affordability and sovereign guarantees.

[57] The Department of Environmental Affairs fulfils the role of environmental custodianship.

[58] The DTI shapes industrial policy, local content, import control and broad-based black economic empowerment.

[59] The Department of Public Enterprises is a shareholder in Eskom and is involved with local procurement.

[60] See S Kings *Politics of power ignores reality* (2015), available at http://mg.co.za/article/2015-01-09-politics-of-power-ignores-reality, accessed on 15 May 2016. Eskom's sluggishness to transition to renewable energy may well be ascribed to the socio-political environment it operates in, rather than policies founded on credible scientific research. See, in this regard, Murombo (n53) at 194, who comments that the politics of energy was apparently intertwined with the final policy adjustments made to the IRP 2010.

[61] Department of Energy *Integrated Resource Plan 2016* (n55) at i .

[62] In GN 908 in GG 32342 on 6 May 2011.

[63] According to the Department of Energy *Integrated Resource Plan* 2016 (n55) at 6, these include: affordable electricity, carbon mitigation, reduced water consumption, localisation and regional development, producing a balanced strategy toward diversified electricity generation sources and gradual decarbonisation of the electricity sector.

[64] In GN 14321 in GG 40445 on 25 November 2016.

[65] Department of Energy *Integrated Resource Plan* 2016 (n55) at 6.

- The affordability of electricity and its impact on demand and supply.

As regards the assumptions underlying a proposed energy mix, preliminary results from the carbon budget scenario indicate a significant change in the energy mix and timing, with increased renewables, no new capacity from coal and nuclear due to come online around 2026.[66] It is suggested that the increased focus on renewable energy presents an opportunity for CDM project investment in alternative energy production in terms of a recognised CDM methodology.

On the other hand, it could be argued that the driving force pushing South Africa into renewable energy policies was not a major commitment to address the issues of climate change, but was rather triggered by a crisis in the supply of electricity. This supply predicament was a result of the load shedding (or rolling blackouts) initiated by the power utility, Eskom, in 2008 and again in 2014. The need for broader mix of energy supply became more apparent than ever.

All of the above developments laid the basis for South Africa's National Climate Change Response Policy, which was published as a White Paper in 2011 – prior to hosting the hosting the 17th session of the Conference of the Parties (COP17) to the UNFCCC in Durban.[67]

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[66] Id at 27. H Winkler 'South Africa's new energy plan has sparked strong emotions' (2016), available at http://www.moneyweb.co.za/moneyweb-opinion/soapbox/south-africas-new-energy-plan-has-sparked-strong-emotions/, accessed on 24 January 2017 presents the main points of the most likely scenario, referred to as the 'base case':

- Electricity demand between 310 and 355 TWh (TeraWatt hours) in 2030 (about 100 TWh lower than envisaged in the 2010-2030 plan), with demand rising to between 390 and 530 TWh in 2050. This is based on projection models developed at the Council for Scientific and Industrial Research.
- The construction of 37.4 GW (1 000 GigaWatts equal 1 TeraWatt) of wind capacity and 17.6 GW of solar photovoltaic capacity between 2020 and 2050.
- The gradual decommissioning of most existing coal power stations by 2050, in line with international carbon emission agreements.
- A substantial increase (35.3 GW) in electricity generation from gas. Due to the high cost of gas, it is generally used only as a backup. It would, in any event, contribute only about seven per cent of total energy generation.
- The construction of just over 20 GW of nuclear power. But this would only gradually come on line between 2037 and 2050. Given that construction of the plants would take ten years, the decision to go ahead with the nuclear build could still be delayed for another decade.

[67] The White Paper was approved by Cabinet in October 2011, GG 34695 (19 October 2011), available at https://www.environment.gov.za/sites/default/files/legislations/national_climatechange_response_whitepaper.pdf, accessed on 29 January 2017.

4.2.5 The National Climate Change Response Policy White Paper ('White Paper')[68]

4.2.5.1 Introduction

The White Paper is South Africa's first policy focusing specifically on climate change. It represents the culmination of an iterative and participatory policy development process that was started in October 2005. It is founded on s24 of the Constitution, namely protecting the right to a healthy environment. The White Paper also supports the sustainable development objectives of the NEMA (most notably the social development aspects), the NDP and international instruments to which South Africa has agreed, such as the Millennium Declaration and the UNFCCC.

The Department of Environmental Affairs delivered presentations on the developments that led to the White Paper and on the strategies outlined in the policy. In 2005, a ground-breaking climate change conference was held, which yielded the LTMS process addressed in para 4.2.2.2 above. As mentioned earlier, this process outlined two major scenarios (GWC and RBS) and subsequently modelled the results of different strategies to close the gap between the two scenarios. Carbon pricing was found to be the most effective strategy overall. A draft Green Paper was published in November 2010, followed by a wide consultative process with stakeholder participation and review, which saw 4 000 issues raised. The White Paper was subsequently adopted in 2011.

The White Paper provides an overarching policy framework for facilitating a just transition to a low-carbon, climate-resilient economy. It presents the South African government's vision for an effective climate change response and has two objectives, namely:[69]

- Effectively manage climate change impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity; and
- Contribute fairly to the global effort of stabilising GHG concentrations.

The policy provides for the use of incentives and disincentives (or penalties), including regulatory, economic and fiscal measures.

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[68] This section is based on a monthly report which this author compiled in her capacity as South Africa's country manager for the Climate Scorecard citizens' initiative. See L-A Steenkamp 'South Africa: National Climate Change Response Policy White Paper' (November 2016) in L Barber & R Israel (eds) *Climate Scorecard Report #4: Description of Leading Climate Change Policies*, available at http://climatescorecard.org/wp-content/uploads/2016/11/ClimateScorecardReport4.pdf, accessed on 30 July 2017.

[69] Department of Environmental Affairs 'Minister Edna Molewa addresses media on recently approved National Climate Change Response White Paper' (2011), available at https://www.environment.gov.za/speech/molewa_mediabrieing_climatechange_policy, accessed on 12 October 2017.

A Climate Change Response Measurement and Evaluation System (hereinafter referred to as the 'MRV') was formulated to measure the cost, outcome and impact of responses to climate change. This allows the monitoring of the success of these responses, and the replication of those that prove to work well. The White Paper frames MRV in terms of 'Monitoring and Evaluation', which is a function established in the Presidency, headed by a Minister in the highest political office.[70]

4.2.5.2 The White Paper and the CDM

The White Paper conveys the South African government's vision for an effective climate change response via two overarching objectives, namely to effectively manage climate change impacts and to stabilise GHG concentrations.[71]

Chapter 6 of the White Paper presents South Africa's mitigation approach. The South African government recognises that:[72]

> 'As a responsible global citizen and as a global citizen with moral as well as legal obligations under the UNFCCC and its Kyoto Protocol, South Africa is committed to contributing its fair share to global GHG mitigation efforts in order to keep the temperature increase well below 2°C.'

This acknowledgement from the government of its association with international agreements, such as the Kyoto Protocol, is notable, as it arguably gives more credibility to CDM projects.[73]

The key objectives of the White Paper mentioned earlier should be viewed within the context of South Africa's developmental challenges. Indeed, the White Paper states that[74]

> '[T]he country must ensure that the necessary climate change-related investments contribute to building South Africa's future economic competitiveness and economic growth and contribute to its over-riding national priorities for sustainable development, job creation, improving public and environmental health and poverty eradication.'

In other words, the White Paper promotes mitigation measures to effect sustainable development in socio-economic, as well as environmental terms. Both elements can be addressed through the

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[70] For more information regarding South Africa's approaches to measuring, reporting and verifying, see A Boyd, B Rennkamp, H Winkler, R Larmour, T Letete, S Rahlao & A Trikam 'South African approaches to measuring, reporting and verifying: A scoping report' in *The Measurement and Performance Tracing Project* (2012), available at http://www.erc.uct.ac.za/sites/default/files/image_tool/images/119/Papers-2012/12-Boyd-etal_Approches_to_MRV.pdf, accessed on 14 December 2016.

[71] Department of Environmental Affairs *White Paper* (n67) at 11.

[72] Id at 25.

[73] Humphris (n11) at 35.

[74] Department of Environmental Affairs *White Paper* (n67) at 10.

utilisation of the CDM, as the additionality component of the CDM is likely to promote sustainable development.[75] The inflow of foreign capital speaks to the socio-economic element, as an increased inflow of foreign capital results in monetary investment and job creation.[76]

The White Paper recognises that responding to climate change is 'expensive and will require a comprehensive resource package'.[77] The mobilisation of resources is crucial for both mitigation and adaptation responses and includes 'financial resources, technical cooperation and technology transfers at domestic, sub-regional, regional and international levels'.[78]

International cooperation and finance is central to CDM investment. As such, the remainder of this section will examine the key elements of the White Paper mitigation approach, viewed through the lens of CDM advancement. Table 4.1 below depicts the interaction between the White Paper mitigation approaches and their application to CDM projects.

Table 4.1 The White Paper mitigation approach and CDM projects

White Paper mitigation approach key element	Objective of the key element	Application of the CDM[79]
Setting the performance benchmark *White Paper para 6.1.1*	Benchmark a National GHG Emissions Trajectory Range, against which the collective outcome of all mitigation actions are measured.	The Trajectory Range can be used as a 'baseline' against which the effectiveness of the CDM for certain sectors can be measured.
Identifying desired sectoral mitigation contributions *White Paper para 6.1.2*	Defining desired emission reduction outcomes for each sector and sub-sector of the economy based on an in-depth assessment of the mitigation potential, best available mitigation options, science, evidence and a full assessment of costs and benefits.	The costs and benefits of CDM projects will be measurable prior to implementation.
Defining carbon budgets for significant GHG emitting sectors and/or sub-sectors *White Paper para 6.1.3*	Adopting a carbon budget approach to provide for flexibility and least-cost mechanisms for companies in relevant sectors and/or sub-sectors. Translating carbon budgets into company level desired emission reduction outcomes.	CDM projects will take place in the private sector and investors will be aware of this. The carbon budget approach will identify optimal combinations of mitigation actions at the least cost with the most sustainable benefits.

[75] Humphris (n11) at 35.

[76] Ibid.

[77] Department of Environmental Affairs *White Paper* (n67) at 43.

[78] Ibid.

Mitigation Plans *White Paper para 6.1.3*	Requiring companies and economic sectors or sub-sectors for whom desired emission reduction outcomes have been established to prepare and submit mitigation plans that set out how they intend to achieve the desired emission reduction outcomes.	This can be an enabling factor for CDM implementation by forming part of possible mitigation plans. As a consequence, it could change the culture with which companies approach projects and business by placing sustainability at the forefront of strategic planning.
The use of different types of mitigation approaches, policies, measures and actions. *White Paper para 6.1.4*	Developing and implementing a wide range and mix of different types of mitigation approaches, policies, measures and actions that optimise the mitigation outcomes, as well as job creation and other sustainable developmental benefits. This optimal mix of mitigation actions will be developed to achieve the defined desired emission reduction outcomes for each sector and sub-sector of the economy by ensuring that actions are specifically tailored to the best available solutions and other relevant conditions related to the specific sector, sub-sector or organisation concerned.	The CDM features as a possible mitigation measure, as identified in the White Paper, and therefore enjoys greater prominence.
Using the market *White Paper para 6.1.5*	Deploying a range of economic instruments to support the system of desired emissions reduction outcomes, including the appropriate pricing of carbon and economic incentives, as well as the possible use of emissions offset or emission reduction trading mechanisms for those relevant sectors, sub-sectors, companies or entities where a carbon budget approach has been selected.	The price of CERs could become an increasingly popular tradable commodity.
Monitoring and evaluation *White Paper para 6.1.6*	Establishing a national system of data collection to provide detailed, complete, accurate and up-to-date emissions data in the form of a GHG Inventory and a Monitoring and Evaluation System to support the analysis of the impact of mitigation measures.	With additionality as a requirement for a successful CDM project, the monitoring and evaluation methods are already part of the process.

The White Paper upholds the energy efficiency and increased investment in a renewable energy programme in the electricity sector as the 'most promising' mitigation option.[79] The CDM has an essential role to play in South Africa's mitigation approach, as energy efficiency and optimal energy consumption can be achieved through the CDM, whilst simultaneously providing for environmental and monetary incentives.

South Africa's climate change response has to be considered in conjunction with its national development approach, which is the focus of the next section.

[79] Department of Environmental Affairs *White Paper* (n67) at 26.

4.2.6 National Development Plan

Generally speaking, the National Development Plan (NDP) of 2011 sets out a vision until 2030 for South Africa's energy sector, including a reference to 'environmental sustainability' through efforts to reduce pollution and mitigate the effects of climate change.[80] The NDP supports procurement of at least 20 GigaWatt (GW) of renewable energy by 2030 in its outline of the country's development path.[81] It can thus be considered as a blueprint for how the country can eradicate poverty and reduce inequality by the year 2030.

Chapter 5 of the NDP,[82] titled 'Ensuring environmental sustainability and equitable transition to a low-carbon economy', points out that South Africa has taken major steps to formulate and implement measures to adapt to and mitigate climate change.[83] These steps are based on the country's commitment to reduce its emissions to below a baseline of 34 per cent by 2020 and 42 per cent by 2025. The NDP aims for the transition of South Africa to an 'environmentally sustainable, climate change resilient, low-carbon economy and just society' to be well under way by 2030.[84] It aims to achieve this in a number of related objectives. In the context of the CDM, these include:[85]

> 'Growth in the renewable energy sector by 2030, as envisaged in the IRP 2010, launches in response to falling technology costs, government's bold support for the sector and the introduction of targeted carbon-pricing mechanisms to facilitate private investment in renewable energy. The development and marketing of niche products and services, coupled with mutually beneficial partnerships with neighbouring countries, create jobs in domestic manufacturing of renewable energy technologies.
>
> South Africa reduces its carbon emissions, in line with its international commitments, while maintaining its competitiveness in the global economy by carefully managing investments in local and regional renewable energy resources and aggressively promoting just and equitable trading arrangements.'

The NDP goes on to state that, based on international experience, the most effective way to manage the transition to a low-carbon economy and encourage emitters to change their behaviour is to internalise the social and environmental costs of their behaviour.[86] The NDP therefore advocates a

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80 National Planning Commission *National Development Plan 2030* (2011), available at http://www.gov.za/sites/www.gov.za/files/Executive%20Summary-NDP%202030%20-%20Our%20future%20-%20make%20it%20work.pdf, accessed on 17 December 2016.

81 Greencape *Utility-scale renewable energy sectors 2016 – Market Intelligence Report* (2016) at 22, available at http://greencape.co.za/assets/GreenCape-Renewable-Energy-MIR-2016.pdf, accessed on 12 January 2017.

82 National Planning Commission (n80) at 179-193.

83 J Glazewski & L du Toit 'Chapter 3: International climate change law' in J Glazewski & L du Toit (eds) *Environmental Law in South Africa* (2016) at para 3.4.3.8.

84 National Planning Commission (n80) at 199.

85 Ibid.

86 Id at 207.

carbon-pricing strategy, with a related carbon budget approach.[87] A carbon budget sets the amount of carbon that can be emitted in a given amount of time, benchmarked against the national GHG trajectory range.[88] Notwithstanding that the proposed carbon tax is yet to be implemented in South Africa, the NDP recognises that the principle of a carbon tax as a mechanism for establishing a domestic price for carbon has been accepted by the government.[89] Consequently, the country's carbon tax policy is an important component of South Africa's climate change response.

4.2.7 Carbon Tax Policy Paper

Turning to fiscal policies specifically, National Treasury published the *Carbon Tax Policy Paper: Reducing greenhouse gas emissions and facilitating the transition to a green economy* (the Carbon Tax Policy Paper) in 2013.[90] The Carbon Tax Policy Paper deals with a number of background issues (which were also discussed in a foregoing Carbon Tax Discussion Paper), including the rationale for, and international experiences with, carbon pricing.[91] This policy paper also clarified the design elements of the proposed carbon tax, namely the tax base, the tax level and the use of the revenue.[92] These elements have been developed further in the Carbon Tax Bill, published during 2017, as was alluded to earlier in Chapter 2.

While there is no legislation that deals specifically with climate change, there are a number of laws that are of relevance to climate change.[93] These are discussed below as part of South Africa's legal framework.

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[87] Ibid.

[88] Ibid.

[89] Id at 208.

[90] National Treasury *Carbon Tax Policy Paper: Reducing greenhouse gas emissions and facilitating the transition to a green economy* (2013), available at http://www.treasury.gov.za/public%20comments/Carbon%20Tax%20Policy%20Paper%202013.pdf, accessed on 15 December 2016.

[91] Glazewski & du Toit (n83) at para 3.4.3.11.

[92] Ibid.

[93] Id at para 3.4.4 highlight the follow legislation:

- The National Environmental Management Act 107 of 1998 (the NEMA);
- The National Environmental Management: Air Quality Act 39 of 2004 (the NEMAQA);
- The National Water Act 36 of 1998;
- The National Energy Act 34 of 2008;
- The National Environmental Management: Waste Act 59 of 2008;
- The Conservation of Agricultural Resources Act 43 of 1983; and
- The Disaster Management Act 57 of 2002.

4.3 SOUTH AFRICA'S LEGAL FRAMEWORK

4.3.1 Introduction

South Africa's environmental law framework is embedded in the Bill of Rights of the Constitution. Section 24 of the Constitution provides, inter alia, for the right of everyone to an environment that is not detrimental to their health or well-being. In addition to the Constitution, the National Environmental Management Act[94] (NEMA) and the National Environmental Management: Air Quality Act[95] (NEMAQA) are two key statutes that contain general and specific provisions related to air quality management. These provisions are also indirectly related to the combating and mitigation of climate change.[96]

4.3.2 The Constitution

In South Africa, sustainable development has become a key feature of the domestic constitutional and statutory law framework.[97] It is entrenched in the environmental right provided by the Constitution[98], namely that everyone has the right:[99]

> '(*a*) to an environment that is not harmful to their health or well-being; and
>
> (*b*) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that—
>
> (i) prevent pollution and ecological degradation;
>
> (ii) promote conservation; and
>
> (iii) secure *ecologically sustainable development* and use of natural resources while promoting justifiable economic and social development' [own emphasis].

As part of the Constitution, the Bill of Rights provides for a substantive and enforceable environmental right. The Constitution affords the respect, protection and fulfilment of the rights referred to in the Bill of Rights, including the s24 environmental right.[100] The government is specifically mandated to enact legislation and to take various other measures to protect the

94 107 of 1998.

95 39 of 2004.

96 J Glazewski 'Chapter 5: The Bill of Rights and environmental law' in J Glazewski & L du Toit (eds) *Environmental Law in South Africa* (2016). It should be pointed out that there are many other environmental statutes. Only the most pertinent ones, directly relating to the objectives of the CDM and SDM, are discussed in this chapter.

97 L Kotzé, T Humby, O Rumble, A Gilder & K Lehmann 'Chapter 1: Setting the scene' in T Humby, L Kotzé, O Rumble & A Gilder (eds) *Climate Change Law & Governance in South Africa* (Original Service 2016) at 1-18.

98 Constitution of the Republic of South Africa 1996.

99 Constitution, s24.

100 Constitution, s7(2).

environment,[101] although it is acknowledged that any attempt to apply this clause to climate change presents a challenge.[102]

To begin with, the Constitution obliges courts to consider international law when interpreting the Bill of Rights,[103] as well as obliging courts to interpret legislation in conformity with international law.[104] According to the Constitutional Court, section 39(1)(*b*) of the Constitution comprises both binding and non-binding instruments of international law.[105] Binding instruments include treaties to which South Africa is a party, or binding obligations resulting from such a treaty, as well as customary international law.[106] The Constitution therefore makes provision for South Africa to adopt international agreements. As regards the question whether the Paris Agreement is a legally binding instrument, see para 3.4.1 of the previous chapter.[107]

Sustainable development is entrenched in the Constitution and therefore acts as a foundational principle of South Africa's primary environmental framework law, namely the NEMA.[108]

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[101] Constitution, s24(*b*).

[102] For a discourse on how the inclusion of an environmental right in the Bill of Rights was developed in the broader context of the array of policies, principles, legislation and case law following the enactment of the Constitution, see Glazewski (n96).

[103] Constitution, s 39(1)(*b*).

[104] Constitution, s239(1) and s23. According to J Glazewski 'Chapter 2A: International environmental law: The international dimension' in J Glazewski & L du Toit (eds) *Environmental Law in South Africa* (2016) at para 2A.1.2, the leading case dealing with these provisions is the Constitutional Court decision in *Glenister v President of the Republic of South Africa* 2011 (3) SA 347 (CC). The court stated (amongst other things) at para 205 that: '. . . any obligation binding upon the Republic under international law must not conflict with express provisions of the Constitution, including those in the Bill of Rights'.

[105] E De Wet & A Du Plessis 'The meaning of certain substantive obligations distilled from international human rights instruments for constitutional environmental rights in South Africa' (2010) 10(2) *African Human Rights Law Journal* 345-376 at 347.

[106] Ibid. The authors state that non-binding instruments include those which are not open to ratification.

[107] Humphris (n11) at 23 posits that, despite the fact that South Africa agreed to the climate change mitigation targets in the Kyoto Protocol voluntarily, this would be of a binding nature in light of the Constitution. In a similar vein, it could be argued that once the Paris Agreement's obligations are enacted into national law, they will become binding on a domestic level.

[108] Per Kotzé et al (n97) at 1-19.

4.3.3 The National Environmental Management Act (NEMA)

4.3.3.1 Sustainable development

The NEMA serves as South Africa's environmental legislation framework.[109] A number of national environmental management principles are contained within in the NEMA, one of which is the notion of sustainable development.[110] The NEMA bases the environmental management principles which underpin this Act on the general provision that 'development must be socially, environmentally and economically sustainable'.[111] The NEMA defines 'sustainable development' as[112] –

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

Moreover, the tenet of sustainable development is also directly linked to the principle of sustainability, as contained in the UNFCCC[113] -

> 'The Parties have a right to, and should, promote sustainable development. Policies and measures to protect the climate system against human-induced change should be appropriate for the specific conditions of each Party and should be integrated with national development programmes, taking into account that economic development is essential for adopting measures to address climate change.'

Domestically, 'sustainable development' has been considered in a number of cases. For example, in *BP Southern Africa (Pty) Ltd v MEC for Agriculture, Conservation and Land Affairs*,[114] it was stated that sustainable development is a 'fundamental building block around which environmental legal norms have been fashioned, both internationally and in South Africa'.[115] The Constitutional Court endorsed not only sustainable development but also co-operative governance in *Fuel*

[109] JG Nel & W Du Plessis 'An evaluation of NEMA based on a generic framework for environmental framework legislation' (2001) 8 *SAJELP* 1-36 at 35. The authors conclude that the NEMA complies 'more or less' with the generic characteristics of international environmental framework legislation, viz. it is flexible, and deals with the issue of overarching and sectoral-specific issues and includes policy and/or principles.

[110] It is not, however, the purpose of this chapter to elaborate on these environmental management principles. For a discussion of these, see, for example, J Glazewski 'Chapter 7: The National Environmental Management Act' in J Glazewski & L du Toit (eds) *Environmental Law in South Africa* (2016) at para 7.2.2.

[111] NEMA, s3(2).

[112] NEMA, s1, Definitions.

[113] UNFCCC, art 3(2). The objective of sustainable development is also reiterated in the Kyoto Protocol and Paris Agreement.

[114] 2004 (5) SA 124 (W).

[115] At 144A-144C.

Retailers Association of Southern Africa v Director-General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province.[116]

Sustainable development lies at the heart of the CDM. The institutional and legal provisions for the CDM in South Africa are laid out in the *Regulations for the Establishment of a Designated National Authority for the Clean Development Mechanism*.[117] These regulations have been promulgated under s25(3) of the NEMA. The regulations define a number of key terms, such as CDM, Designated National Authority (DNA) and Steering Committee, as well as setting out the duties of each party to the CDM project. The role of the DNA was discussed in Chapter 3, which included, among other things, evaluating a CDM project proposal in order to determine if it would contribute to sustainable development in the host country. To this end, the South African DNA has adopted the 'sustainable development' definition enshrined in the NEMA.[118]

The private sector is also allowed to enter into a voluntary agreement with certain regulatory authorities for the purpose of promoting compliance with the principles laid down in the NEMA.[119] Such agreements are referred to as Environmental Management Co-operation Agreements (EMCAs) and may have bearing on the CDM. In terms of EMCAs, the private sector can also negotiate CDM project implementation with investor countries on a voluntary basis.[120] This, in turn, will give effect to the above-mentioned legislation, as well as the Kyoto Protocol.[121] Following the same line of reasoning, EMCAs would also be of relevance for the SDM.

South Africa's global and international responsibilities relating to the environment are also provided for in the NEMA, in that the actions of the state must be discharged in the national interest.[122] This provision correlates with the application of the UNFCCC and the Kyoto Protocol and acknowledges that South Africa has international obligations that are of importance to the environment.[123]

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[116] 2007 (6) SA 4 (CC).

[117] GN R721 in GG 27788 (22 July 2005).

[118] G Nhamo 'Institutional and legal provisions for the Clean Development Mechanism in South Africa' (2006) *Environmental Economics and Investment* 167-176 at 171.

[119] NEMA, s35.

[120] Humphris (n11) at 25.

[121] Ibid.

[122] NEMA, s2(4)*(n)*.

[123] Humphris (n11) at 25. The author further comments that the importance of this became evident when the Minister of Environmental Affairs published the Montreal Protocol in the Government Gazette for general information. This is an indication that South Africa's climate change responses (including involvement in CDM projects) should be in the interest of the country, and not only to the benefit of the international community. The *Montreal Protocol on Substances that Deplete the Ozone Layer* in GN 201 in GG 33005 of 8 March 2010.

It is evident that sustainable development is a central aspect of South Africa's climate policy framework.[124] In this regard, three key dimensions of sustainable development are used by the Department of Energy for CDM project evaluation. These comprise economic, social and environmental aspects,[125] with a related number of indicators,[126] which are elaborated on in Chapter 6. Concomitant to sustainable development, is the tenet of environmental assessment, which is highlighted in the next paragraph.

4.3.3.2 Environmental assessment

An environmental assessment is conducted prior to a proposed project's being approved and is a decision-making tool which accounts for environmental factors in a planning or development decision.[127] Indeed, environmental assessment is essential to modern environmental management.[128] All of the environmental assessment tools have sustainability as an underlying principle.[129] In South Africa, environmental assessment is one of the main measures of achieving the environmental sustainability of development.[130]

Chapter 5 of the NEMA, titled *Integrated Environmental Management*, lays down the legislative basis for environmental assessment in South Africa. A key principle in the NEMA is that 'the social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment'.[131] The NEMA is augmented by a set of Environmental Impact

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[124] Kotzé et al (n97) at 1-19.

[125] These principles are derived from s2(3) of the NEMA.

[126] See generally LJ Kotzé 'Phiri, the plight of the poor and the perils of climate change: time to rethink environmental and socio-economic rights in South Africa?' (2010) 1(2) *Journal of Human Rights and the Environment* 135-160. Kotzé provides an informative account of how these socio-economic rights were considered in the Constitutional Court judgment of *Mazibuko v City of Johannesburg* 2010 (4) SA 1 (CC).

[127] J Glazewski & S Brownlie 'Chapter 10: Environmental Assessment' in J Glazewski & L du Toit (eds) *Environmental Law in South Africa* (2016) at para 10.1.1.

[128] F Kidd & M Retief 'Chapter 27: Environmental Assessment' in RF Fuggle & MA Rabie (eds) *Environmental Management in south Africa* (2009) at 971. The authors provide an account of the historical evolution of the environmental assessments in South Africa.

[129] Glazewski & Brownlie (n127) at para 10.1.1. The authors mention that a number of professions, ranging from engineers to management consultants to lawyers, have become involved in carrying out environmental assessments because of their interdisciplinary nature.

[130] Kidd & Retief (n128) at 971.

[131] NEMA, s2(4)(*i*).

Assessment Regulations.[132] These contain the general regulatory framework for the purpose, procedures, contents, qualifications of environmental assessment practitioners, and related matters.[133]

Environmental assessments recently came to the fore when the South African High Court adjudicated on climate change for the first time and handed down judgment in favour of non-governmental organisation (NGO) EarthlifeAfrica.[134] The Department of Environmental Affairs was ordered to first consider a full and final climate impact report, along with public comment on the issue, before the construction of the Thabametsi coal-fired power station in Limpopo could go ahead. EarthlifeAfrica had previously challenged the department's decision to sign off the power plant without a comprehensive climate change impact assessment.

The Minister's arguments provide some insight into the government's current climate change management approach.[135] Of particular relevance to this study, are the following points[136] –

- Until such time as the Paris Agreement's obligations are enacted into national law, they are not binding on any party on a domestic level (including Thabametsi);
- South Africa's transition to a low-carbon economy is anticipated to be rigid and slow;
- Current challenges faced by the energy sector are acknowledged in the Nationally Determined Contribution (NDC); and
- The Thabametsi project will establish a high efficiency power plant with modern emission abatement technology that complies with the government's obligations under the Paris Agreement.

The next sections will demonstrate how the three arms of sustainable development permeate to South Africa's climate change response policies, as well as how domestic policies and legislation provide the necessary vehicles to promote the CDM. Furthermore, Chapter 6 will analyse South Africa's registered CDM projects, measuring the sustainable development goals mentioned in each

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[132] R 982 (Environmental Impact Assessment Regulations 2014); R 983 (Listing Notice 1); R 984 (Listing Notice 2); and R 985 (Listing Notice 3) *GG* 38282 (4 December 2014).

[133] Glazewski & Brownlie (n127) at para 10.3.3.2 examine the regulations.

[134] *EarthlifeAfrica Johannesburg v Minister of Environmental Affairs and Others* 2017 (2) All SA 519 (GP).

[135] Available at http://cer.org.za/wp-content/uploads/2014/06/First-Second-and-Third-Respondents-Answering-Affidavit.pdf, accessed on 6 March 2017.

[136] Derived from the Answering Affidavit (n135) and a summary provided by S Gore & A Pienaar 'Paris to Pretoria: High Court to adjudicate on climate change for the first time' (2017), available at https://www.fanews.co.za/article/legal-affairs/10/general/1120/paris-to-pretoria-high-court-to-adjudicate-on-climate-change-for-the-first-time/21870, accessed on 6 March 2017.

project design document against the key sustainable development criteria. While the NEMA provides the overall legislative framework to further sustainable development, specific legislation relating to air quality is now ensured by way of the NEMAQA.

4.3.4 The National Environmental Management: Air Quality Act (NEMAQA)

The NCCRS identified the NEMAQA as an important instrument in combating climate change in the context of GHG emissions. To achieve this objective, the NEMAQA provides for a number of regulatory mechanisms. For example, the Act empowers the Minister of Environmental Affairs to make regulations in certain instances.[137] These instances include, amongst others, any matter necessary to give effect to the government's obligations in terms of an international agreement relating to air quality and climate change.[138]

The NEMAQA aspires to protect the environment through reasonable measures for[139] –

- protecting and enhancing the country's air quality;
- preventing air pollution and ecological degradation; and
- securing ecologically sustainable development, while promoting justifiable economic and social development.

In light of the above, it is contended that the Minister is empowered to actively promote the CDM as a climate change mitigation mechanism, as well as a tool to enforce air quality compliance through the setting of standards.[140]

A national framework for achieving the above objectives was established in 2007 and was subsequently repealed and replaced by an amended national framework in 2013.[141] The framework is a 'broad document' which deals, inter alia, with the legislative and policy approach to air quality governance.[142]

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[137] NEMAQA, s53.

[138] NEMAQA, s53*(a)*.

[139] NEMAQA, s2.

[140] Humphris (n11) at 26.

[141] Department of Environmental Affairs *National Environmental Management: Air Quality Act (39/2004): Amendment to the 2007 National Framework for Air Quality Management in the Republic of South Africa* in GN 919 in GG 37078 (29 November 2013).

[142] J Glazewski & L Du Toit 'Chapter 22: Atmospheric pollution' in J Glazewski & L du Toit (eds) *Environmental Law in South Africa* (2016) at para 22.5.3.

The framework includes a number of stipulated features, including various mechanisms, systems and procedures to comply with ambient air quality standards, national norms and standards and international obligations.[143] These standards open the possibility for GHG mitigation standards, such as those envisaged by the CDM methodology,[144] and have the capability to assist local government in playing an active role in the CDM process.[145] Moreover, the CDM can be used as a vehicle through which emission controls concerning GHGs can be established.[146] This is made possible through the utilisation of the CDM methodology as a baseline measuring method for compliance.[147]

Chapter 6 of the NEMAQA pertains to international air quality management and empowers the Minister of Environmental Affairs to investigate any situation with regard to transboundary air pollution and air pollution that may violate international agreements.[148] The Minister may therefore apply pressure on neighbouring countries (signatories to the Kyoto Protocol) to utilise the methodologies used for the CDM.[149]

The success of a comprehensive climate change response is dependent upon adequate resources to implement the various policies and regulations. One mechanism of accelerating the uptake of a transition to cleaner technology is that of so-called 'green taxes'. These taxes offer incentives by way of tax exemptions or deductions to reduce the taxes owed to government. For example, in attempt to enhance the uptake of CDM projects in South Africa, National Treasury introduced income tax relief in 2009. This, together with other green tax incentives, is examined in the next section.

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143 NEMAQA, ss7(1)(*a*)-(*g*).

144 The UNFCCC approved methodologies available under the CDM can be viewed at https://cdm.unfccc.int/methodologies/documentation/index.html, accessed on 19 January 2017.

145 Humphris (n11) at 27.

146 Ibid.

147 Ibid. Section 53(*m*) of the NEMAQA provides for requirements in respect of monitoring. This could be done via an emission database.

148 NEMAQA, s50(1).

149 Humphris (n11) at 28 refers to this pressure being applied in an endeavour to become a 'good neighbour'. The author continues (at 29) to aver that the CDM can be a vehicle through which the methodologies identified can evolve into mandatory methods of pollution minimisation.

4.4 SOUTH AFRICA'S GREEN TAX INCENTIVES

4.4.1 Section 12K exemption[150]

The tax relief came in the form of an exemption, contained in s12K of the South African Income Tax Act No. 58 of 1962, as amended (the Income Tax Act). Section 12K provides an exemption from income for any amount received by or accrued to a person in respect of the disposal of any Certified Emission Reductions (CERs) derived by that person in the furtherance of a qualifying CDM project carried on by that person. The exemption came into effect on 11 February 2009 and applies in respect of disposals on or after that date.

National Treasury addressed the limited uptake of CDM projects in South Africa by providing for greater tax relief.[151] This decision was considered part of South Africa's domestic policy response to climate change and was intended to overcome the market failure associated with environmental protection.[152] This incentive is available for any person holding a CDM project registration while that person implements the project. Essentially, amounts received or accrued upon disposal of these CERs are exempt from normal tax and capital gains tax.[153]

Initially, s12K contained a sunset clause to coincide with the expiry of the Kyoto Protocol on 31 December 2012. However, during the COP18 meetings held in December 2012, the CDM was extended as a flexible mechanism under the Kyoto Protocol, enabling developing countries to continue their participation in the global carbon market. Consequently, s12K was amended on 1 January 2013 and the exemption was extended to 31 December 2020.

There are no tax consequences at the time that the CER is granted to the taxpayer. When the CERs are subsequently disposed of for proceeds, s12K deems that there is no resulting taxable income. The expenses incurred in securing the approval and registrations required for the CERs will not qualify for a taxable deduction, as these expenses were not incurred in order to produce taxable

[150] This section is drawn from a chapter which this author contributed to a book. See L-A Steenkamp 'Chapter 13: Fiscal incentives to advance the uptake of renewable energy in South Africa' in OC Ruppel & B Althusmann (eds) *Perspectives on energy security and renewable energies in Sub-Saharan Africa: Practical opportunities and regulatory challenges*, 2[nd] ed (2016).

[151] National Treasury *Explanatory Memorandum on the Taxation Laws Amendment Bill* (2009) at 27, available at http://www.sars.gov.za/AllDocs/LegalDoclib/ExplMemo/LAPD-LPrep-EM-2009-01%20-%20Explanatory%20Memorandum%20Taxation%20Laws%20Amendment%20Bill%202009.pdf, accessed on 15 May 2016, explains that the lack of uptake stemmed mainly from high financial (and bankable) hurdle rates, given the risks associated with CDM project activities. In addition, from a tax perspective, the disposal of CERs was largely untested, thereby creating further uncertainty for CDM projects.

[152] Id at 28.

[153] Capital gains or losses are disregarded in terms of paragraph 64(*b*) of the Eighth Schedule to the Income Tax Act.

income.[154] Furthermore, by virtue of the fact that there is no receipt of taxable income, the value of CERs held by the taxpayer at year-end will not be taken into account as closing or opening stock.[155]

Box 4.1 below illustrates the workings of s12K by way of an example.[156]

Box 4.1 Example to illustrate the workings of the Section 12K exemption

Hypothetical case: SA Ltd is a South African company acting as a project developer in a small scale CDM project in Cape Town. This project was developed to retrofit 2 000 low-income houses in an urban township of Cape Town with solar water geysers, thereby improving thermal performance of low-income housing units and thus reducing GHG emissions.

The UNFCCC Executive Board issues CERs worth R5 million to SA Ltd on 10 June 2010. SA Ltd disposes of the CERs to a foreign company for R12 million on 10 July 2012.

Results: The mere receipt of CERs (i.e. R5 million) by SA Ltd from the UNFCCC Executive Board is a non-taxable event under common law principles. The proceeds from the disposal of the CERs (i.e. R12 million) are included in SA Ltd's gross income, but are then fully exempt in terms of s12K. The net effect on SA Ltd's taxable income is therefore Rnil.

As no taxable income results from the disposal of CERs, any expenditure incurred by SA Ltd will not qualify for a deduction. This is due to the workings of s11(*a*), read with s23(*f*), of the Income Tax Act. Similarly, because there is no taxable income, the value of the CERs held by SA Ltd will not be taken into account under s22 of the Income Tax Act as closing or opening stock.

4.4.2 Other 'green' income tax incentives

In addition to the s12K incentive, there are numerous other income tax provisions aimed at encouraging investment in renewable energy and conserving the environment – these are summarised in Table 4.2 below.

[154] National Treasury *Explanatory Memorandum* (n151) at 28, in conjunction with the workings of s23(*f*) of the Income Tax Act. Normally, non-capital expenditure actually incurred in the production of income and in the carrying on of a trade would qualify for a deduction from taxable income, in terms of s11(*a*) of the Income Tax Act.

[155] Ibid. Section 22 of the Income Tax Act deals with trading stock.

[156] Adapted from National Treasury *Explanatory Memorandum* (n151) at 28.

Table 4.2 Environmentally-related Income Tax incentives		
Renewable energy machinery	Section 12B	Accelerated wear-and-tear allowance for movable assets used in the production of renewable energy. The taxpayer may claim 50% in year one, 30% in year two and 20% in year three.
Industrial policy project allowance	Section 12I	• 35%-55% or R550m-R900m for Greenfield projects • 35%-55% or R350m-R550m for Brownfield projects.
Energy efficiency savings	Section 12L	95c/kWh deduction on energy saved.
Special Economic Zones	Section 12R (will come into effect from a date still to be announced)	Range of tax benefits, including: • 15% corporate tax • Employment tax incentive • Accelerated capital allowance for buildings.
Supporting infrastructure for large scale renewable energy projects	Section 12U	100% deduction for roads and fences which support renewable energy production. Projects have to generate electricity exceeding 5MW.
Mining companies	Section 37A	Deduction for mining companies which pay cash into a rehabilitation fund for mining areas.
Environmental treatment and recycling assets	Section 37B	Wear-and-tear allowance for assets related to environmental treatment and recycling, waste disposal and a deduction for post-trade environmental expenses
Environmental conservation and maintenance	Section 37C	Deduction for environmental maintenance rehabilitation and management expenses. Also a deduction of the loss of land use rights associated with formal conservation agreements in some circumstances.
Land conservation	Section 37D	Allowance for land declared as conservation for nature reserves or national parks.
Sustainable agriculture	First Schedule, para 12	Deduction for capital expenses incurred for farming operations, including game farming, which focus on sustainable agriculture.

Besides the tax incentives outlined above, there are numerous funding solutions which are available to green technology manufacturers and service companies, as well as those who make use of such services. These include, amongst others, financing by way of loans, equity, grants and subsidies and are listed in Annexure B. A good grasp of the various tax incentives and funding opportunities can enable investors and suppliers of green technology solutions to pass those benefits on to their customers or clients, thereby improving the viability and attractiveness of their products and projects.

Having examined the policy and legal framework that interplay with CDM projects, the next section considers some practical issues and responses emanating from these frameworks.

4.4 PRACTICALITIES

It will be seen in Chapters 5 and 6 that South Africa's economy is heavily reliant on coal. Furthermore, the International Energy Agency (IEA) ranks South Africa as fifth in the list of net coal-exporting nations, as depicted in Table 4.3 below.[157]

Table 4.3 Global net exporters of coal (2016 provisional data)	
Net exporters	**Mt**
Australia	389
Indonesia	367
Russian Federation	147
Colombia	83
South Africa	76
United States	46
Mongolia	26
Kazakhstan	26
Canada	24
Democratic People's Republic of Korea	21
Others	8
Total	**1 213**

The question then arises: how much coal reserves remain for South Africa to extract? The most recent report of Statistics South Africa places the country's coal reserves at 66 700 Mt in 2014.[158]

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[157] International Energy Agency (IEA) *Key World Energy Statistics* (2017) at 17, available at https://www.iea.org/publications/freepublications/publication/KeyWorld2017.pdf, accessed 14 October 2017.

[158] Statistics SA *Environmental Economic Accounts Compendium* (2017) at 15, available at http://www.statssa.gov.za/publications/Report-04-05-20/Report-04-05-20March2017.pdf, accessed on 14 October 2017.

However, depletion rates vary greatly. For example, the South African Chamber of Mines regards the country's coal reserves to be sufficient 'for more than a century' if current production rates are maintained.[159] This is in contrast to the Department of Energy's estimate of 50 years of coal supply.[160] Yet another approximation is 256 years,[161] while Eskom projects 200 years.[162]

Whatever estimate is used, Eskom acknowledges that the burning of coal (for South Africa's electricity production) results in 'the most waste problems of all energy sources'.[163] This waste includes sulphur and nitrogen oxides, organic compounds, heavy metals, radioactive elements, GHGs and a large amount of ash.[164]

With plenty of both high- and low-grade coal, the South African government is mindful of mitigating its GHG emissions from its many coal-based power plants. In addition to carbon offsets (as exemplified by the CDM), Carbon Capture and Storage (CCS) is an important technology which is considered in the next section. In fact, CCS projects have the potential to qualify as CDM projects and thus generate CER revenue.

4.4.1 Carbon Capture and Storage (CCS)

CCS is a technology that can capture up to 90 per cent of the CO_2 emissions produced from the use of fossil fuels in electricity generation and industrial processes.[165] In so doing, it can prevent CO_2 from entering the atmosphere.[166] The CCS chain consists of three parts, namely capture, transportation and storage of the CO_2.[167]

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159 Chamber of Mines 'Coal' (n.d.), available at http://www.chamberofmines.org.za/sa-mining/coal, accessed 14 October 2017.

160 Department of Energy 'Coal Resources' (n.d.), available at http://www.energy.gov.za/files/coal_frame.html, accessed on 14 October 2017.

161 Statistics South Africa (n149) at 13.

162 Eskom 'Coal Power' (n.d.), available at http://www.eskom.co.za/AboutElectricity/ElectricityTechnologies/Pages/Coal_Power.aspx, accessed on 14 October 2017.

163 Ibid.

164 Ibid.

165 Carbon Capture and Storage Association *What is CCS?* (n.d.), available at http://www.ccsassociation.org/what-is-ccs/, accessed on 31 January 2017.

166 Ibid. The Association also states that the use of CCS with renewable biomass is one of the few carbon abatement technologies that can be used in a 'carbon-negative' mode, that is, removing CO_2 from the atmosphere.

167 Ibid.

The White Paper briefly refers to a 'Carbon Capture and Sequestration Flagship Programme', which is led by the Department of Energy in partnership with the South African Energy Research Institute.[168] The programme includes, among other proposals, the 'development of a Carbon Capture and Sequestration Demonstration Plan to store the process emissions from an existing high carbon emissions facility'.[169]

The South African authorities have embarked on a long-term study to investigate the feasibility of CCS in South Africa.[170] More recently, the South African Centre for Carbon Capture and Storage (SACCCS)[171] commenced with a Pilot CO_2 Monitoring Capacity Building Project (PMP).[172] The PMP aims to use findings gathered from the monitoring research to establish a baseline monitoring for the Pilot CO_2 Storage Project (PCSP).[173]

As is the nature of large-scale integrated projects, there are a number of challenges to overcome, for example, technical issues of integration and scale-up, legal and regulatory requirements to reduce investor risk, policies to create market drivers and mitigate economic impacts (including fluctuating electricity prices) and financing mechanisms to facilitate investment in the technology.[174]

The CCS is likely to be instrumental in the expansion of the CDM and its successor in South Africa. There is a direct financial incentive for this, as the CCS qualifies as an eligible project activity under the CDM.[175] Provided that CCS projects result in 'real, measurable and long-term benefits

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168 Department of Environmental Affairs *White Paper* (n67) at 32.

169 Ibid.

170 For a comprehensive report on the interaction of the various environmental laws with CCS and recommendations for a longer term dedicated CCS legal and regulatory regime, see J Glazewski, A Gilder & E Swanepoel *Carbon Capture and Storage: Towards a regulatory and legal regime in South Africa* (2012) IMEL and ACDI: University of Cape Town, available at http://www.imel.uct.ac.za/usr/law/imel/downloads/CCS_Report.pdf, accessed on 31 January 2017.

171 The SACCCS is a division of the South African National Energy Development Institute (SANEDI), a state-owned entity established under s7 of the National Energy Act 34 of 2008.

172 SACCCS 'South Africa embarks on capacity building for CO2 Storage Project' (2016), available at https://www.sacccs.org.za/Newsroom/index.php/;focus=HETZA_cm4all_com_widgets_News_931752&path=?m=d&a=20161122081955-3449&cp=1#HETZA_cm4all_com_widgets_News_931752, accessed on 31 January 2017.

173 Ibid. The PMP is conducted at the natural CO_2 release sites located within Mbizana (in the Wild Coast region of the Eastern Cape) and Harding (in the South Coast of KwaZulu-Natal).

174 N Kulichenko & E Ereira 'Carbon Capture and Storage in Developing Countries: a Perspective on Barriers to Deployment' (2011) *World Bank Group*, available at http://elibrary.worldbank.org/doi/abs/10.1596/978-0-8213-9609-4, accessed on 15 February 2017 assess some of the most important barriers facing CCS deployment within developing and transition economies.

175 Glazewski et al *CCS* (n170) at 12. This is based on Decision 10/CMP.7 *Modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities.*

related to the mitigation of climate change', achieve emission reductions that are additional to those that would otherwise have occurred, and assist in their host countries achieving sustainable development, such projects have the potential to earn CERs under the CDM.[176]

Notwithstanding the obstacles faced by CDM projects, local governments are arguably best positioned to champion CDM projects. As such, the next section considers the role that cooperative local governance can play in promoting CDM projects.

4.4.2 Local Governance

In order to bring a CDM project to fruition, two components are essential. First, the municipality must have someone to champion the project, navigate regulatory hurdles and garner support among councillors and officials.[177] Equally important is a transaction advisory team, with the requisite technical, CDM, legal and financial skills to support the 'champion'.[178]

Secondly, the municipality must ensure that all procedural and regulatory approvals have been identified and are being addressed.[179] These approvals may include:[180]

- procurement and supply chain management requirements;
- environmental approvals; and
- local and international CDM-specific approvals.

In the context of a public-private partnership, in the case where the municipality is developing the CDM project itself, the selection of and negotiation with the private party must be done following a procedure which, on the one hand, complies with local government legislation and, on the other hand, is seen by potential buyers as 'streamlined and efficient' and not 'cumbersome and overly bureaucratic'.[181] The role of local governments in environmental governance should be viewed against the broader responsibilities envisaged by the UN, as elaborated on below.

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[176] Id at 12-13.

[177] K Reynolds 'Municipalities and clean development projects' (2006) 8 (4) *Local Government Bulletin* 13-14.

[178] Ibid.

[179] Ibid.

[180] Ibid.

[181] Ibid.

The UN's adoption of Local Agenda 21[182] and the launch by the International Council for Local Environmental Initiatives (ICLEI)[183] of a number of flagship local government proposals, have aided our understanding of the position and role of cities and local governments in environmental governance.[184] Local Agenda 21 was, in short, an attempt to implement at the local level the global environmental strategy that came out of the 1992 Earth Summit in Rio. Over the following decade, Local Agenda 21 impelled over 6 000 initiatives to locally adapt and adopt the global programme.[185] Yet, despite its robust consultative processes, Local Agenda 21 was often weak in implementation.[186]

At the UN Sustainable Development Summit on 25 September 2015, world leaders adopted the *2030 Agenda for Sustainable Development*, which includes a set of 17 Sustainable Development Goals (SDGs) to end poverty, fight inequality and injustice, and tackle climate change by 2030.[187] Of especial relevance to this section of the study, is the inclusion of SDG 11 on Sustainable Cities and Human Settlements. This is the only goal of the 2030 Agenda to have a sub-national focus and represents 'unprecedented recognition of local governments in the international development agenda'.[188] Consequently, it may be argued that municipalities enjoy 'considerable global

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[182] Agenda 21 is a non-binding, voluntarily implemented action plan of the UN with regard to sustainable development. It was adopted in 1992 at the UN Conference on Environment and Development in Rio de Janeiro. See United Nations (UN) *Agenda 21* (1992), available at https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf, accessed on 20 February 2017.

[183] The ICLEI is an international association of local governments and national and regional local government organisations that have made a commitment to sustainable development. More information is available at http://www.iclei.org/, accessed on 20 February 2017.

[184] J Glazewski & O Rumble 'Chapter 6: Administration and governance' in J Glazewski & L du Toit (eds) *Environmental Law in South Africa* (2016) at para 6.7 discuss the respective rights and duties of the national, provincial and local spheres of government in the context of environmental concerns.

[185] Per T Ribera 'Want sustainable urban development? It's time for Local Agenda 2030' (2017), available at http://citiscope.org/habitatIII/commentary/2017/01/want-sustainable-urban-development-its-time-local-agenda-2030, accessed on 18 July 2017, who further remarks that the project raised the question of environment at the local level but also promoted a comprehensive approach to dealing with the interdependent issues of sustainable development.

[186] Ibid.

[187] United Nations (UN) *Transforming our world: the 2030 Agenda for Sustainable Development* (2015), available at https://www.un.org/pga/wp-content/uploads/sites/3/2015/08/120815_outcome-document-of-Summit-for-adoption-of-the-post-2015-development-agenda.pdf, accessed on 18 July 2017. It will be recalled from Chapter 1 that the SDGs build on the eight Millennium Development Goals (MDGs).

[188] The Global Network of Cities, Local and Regional Governments (UCLG) (n.d.) 'The 2030 Agenda for Sustainable Development', available at: https://www.uclg.org/en/issues/2030-agenda-sustainable-development, accessed on 18 July 2017.

recognition' for their role in responding to climate change.[189] Moreover, local authorities operate at the level of government closest to the people, as well as 'closest to the effects of climate change'.[190]

Du Plessis remarks that, despite the belief that local authorities have a 'significant function in the world's transition to an inclusively perceived sustainable future', domestic law and policy makers continue to 'grapple with the details of the role that local authorities can play in this pursuit'.[191] Indeed, an earlier review of the REIPPPP system revealed a lack of clarity regarding the role of local municipalities in engaging with renewable energy projects within their municipal boundaries.[192] The review also found that there is 'no structured partnership with the local municipality and local government is only engaged in a fragmented, peripheral and uncoordinated manner with renewable energy projects'.[193]

In terms of the South African Municipal Systems Act,[194] local government has formal legal processes to consult communities in the development of general local government plans. Public meetings are required in the wards, and ward committees are conceived as the formal conduit for community structures to engage with political leadership around local development.[195] However, a subsequent review process (in 2014) showed that renewable energy projects often operate outside such structures.[196] This results in the creation of 'multiple parallel private sector driven processes', which determine economic priorities within the same geographical area as that which should be governed by local authorities.[197]

Given the challenges faced by local government to operate transparently and to consult meaningfully with the public, the review also remarks that it is 'not surprising that renewable energy

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[189] A du Plessis & LJ Kotzé 'The heat is on: local government and climate governance in South Africa' (2014) 58(1) *Journal of African Law* 145-174 at 173.

[190] Id at 174.

[191] AA du Plessis 'The "brown" environmental agenda and the constitutional duties of local government in South Africa: A conceptual introduction' (2015) 18(5) *PER: Potchefstroomse Elektroniese Regsblad* 1846-1880 at 1847. Du Plessis provides a compelling examination of the interplay between the so-called brown and green environmental agendas and local government in the South African context. The author also offers a response to what the conceptual framing of South Africa's constitutional environmental right beyond the green agenda promises for communities and implies for local government.

[192] McDaid (n35) at 22.

[193] Ibid.

[194] Act 32 of 2000.

[195] McDaid (n35) at 23.

[196] Ibid.

[197] Ibid.

developers should also be sceptical of engaging local government'.[198] After all, the amounts of money that will flow into communities for economic benefits are substantial, and developers (rightly or wrongly) have a perception that this money will not find its way into community projects.[199]

At any rate, it could be argued that local municipalities must be informed and directed by s24 of the Constitution as regards the quantity, quality and sustainability of basic municipal services to be provided.[200] These range from water and sanitation services to electricity and local planning, and interplay with the green agenda of environmental protection.

This study concurs that local governments must improve their institutional planning processes, increase transparency around local development decision-making processes and emphasise meaningful public participatory processes.[201] Moreover, it is advisable that social economic plans, developed by renewable energy projects, are aligned with local government development planning processes.

The South African government acknowledged that 'the perceived efficiency of the government in a potential CDM host country influences investors' decisions whether or not to invest in a country'.[202] Accordingly, in order to increase the uptake of the CDM, government has to increase its capacity and perceived efficiency. Similarly, the government has to ensure that inter-departmental cooperation is promoted.[203] These, and other obstacles which face the CDM, will be addressed in Chapter 7.

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[198] Ibid.

[199] Ibid.

[200] Du Plessis (n191) at 1848.

[201] McDaid (n35) at 35-36.

[202] Department of Energy *White Paper on the Renewable Energy Policy of the Republic of South Africa* (2003) at 25, available at http://www.polity.org.za/article/white-paper-on-the-renewable-energy-policy-of-the-republic-of-south-africa-2004-06-11, accessed on 14 December 2016.

[203] L du Toit 'Promoting Clean Development Mechanism Implementation in South Africa: Law and Policy' (2009) 1 *SA Public Law* 33-55 at 50 rightly comments that climate change and the CDM are 'cross-cutting issues' and that various government departments are affected by these, including the Departments of Environmental Affairs, Energy, Agriculture, Trade and Industry, and Water Affairs and Forestry,

4.5 CONCLUSION

This chapter reviewed the underlying policy and legislative frameworks, as well as some practical considerations, which set the stage for the implementation of the SDM. The analysis reveals that there have been significant policy developments from the South African government towards ensuring the country's energy security, but that limited progress has been made towards securing *sustainable* energy security.

The successful implementation of the Paris Agreement (and SDM) will depend on the modalities and procedures that will guide the implementation of the cooperative approaches. This implementation will not bear fruit if parties do not 'seek the opportunity for complementary action and do not show the willingness to link domestic action with action under the provisions of the Paris Agreement'.[204]

The South African government's willingness to implement market-based mechanisms as a means of responding to climate change is evident from the various White Papers, policies and other instruments that it has developed. This effort was kick-started by the LTMS study and continued with numerous legislative responses. It is evident that South African policies and legislation provide for the requisite vehicles to promote the CDM. For example, NEMAQA makes it possible to promulgate regulations specific to CDM projects concerned with air quality and to promote the CDM amongst other signatory countries on the African continent.

The EarthlifeAfrica judgment will be an important indicator of the extent to which the Paris Agreement will bring climate change to the forefront of development disputes. While there are manifold domestic regulations and legislation which deal, inter alia, with energy, electricity, coal, gas and liquid fuels, none deals specifically with climate change.[205] Indeed, the prevailing opinion among certain leading South Africa climate change scholars seems to be that there is little appetite for the development of a dedicated Climate Change Act.[206] This could be ascribed to the fact that there are many useful laws in place, but that they lack proper implementation.[207]

Nevertheless, there are other scholars who argue for new legislation that will translate the government's policy positions on renewable energy into binding legal obligations. Murombo, for

[204] C Streck, P Keenlyside & M von Unger 'The Paris Agreement: a new beginning' (2016) 13(1) *Journal for European Environmental & Planning Law* 3-29 at 17.

[205] Per L du Toit *Promoting CDM* (n203) at 44, who mentions the stance of the Department of Environmental Affairs (in 2009) that such legislation was not (at the time) necessary, as climate change can be dealt with sufficiently through the amendment of other legislation.

[206] Kotzé et al (n97) at 1-25.

[207] Ibid.

instance, remarks that South African laws have primarily regarded climate change as an environmental matter, but that the evidence demonstrates that it is a 'multidisciplinary cross-sectoral challenge that requires co-ordinated and integrated regulatory and implementing action'.[208] Taylor et al call for greater legislative clarity on mandates and reforms to simplify the working of local government.[209] Certainly, cooperative governance is an essential ingredient in overcoming the challenges of environmental planning and sustainable development.[210]

Ultimately, it would appear that the South African government is promoting a mix of regulatory measures, which effectively shifts the state's role from a 'regulator/enforcer' to a 'conductor/facilitator'.[211] A vast opportunity exists for 'creative governance arrangements', especially in light of the Paris Agreement's recognition of the role of non-state parties.[212] Whether these regulatory vehicles are adequately powered and directed, is another matter entirely. The successes and failures related to the country's legal and policy frameworks will be discussed in Chapter 7, together with possible solutions for overcoming these barriers.

The next chapter will reflect on the status of the CDM internationally, thereby considering prospects for the implementation of the SDM. The chapter also discusses the CDM network of China and India in more detail, as these countries are recognised as global leaders in the CDM environment.

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[208] T Murombo 'Chapter 18: South Africa's energy mix – towards a low-carbon economy' in T Humby, L Kotzé, O Rumble & A Gilder (eds) *Climate Change Law & Governance in South Africa* (Original Service 2016) at 18-26. He uses the REIPPPP (at 18-25) as an example that no specific renewable energy law or climate change law may be required at this stage, as amendments to the fossil fuel-focussed legislation have enabled the regulators and government to promote renewable energy.

[209] A Taylor, H Davies, G Oelofse & S Roux 'Chapter 11: Urban adaptation' in T Humby, L Kotzé, O Rumble & A Gilder (eds) *Climate Change Law & Governance in South Africa* (Original Service 2016) at 11-2 argue that local government has a 'key role' to play when it comes to planning and facilitating climate change adaptation in South Africa's urban areas. The authors caution (at 11-37) that access of local governments to climate finance resources must be facilitated urgently at a national level.

[210] See, in this regard, LK Mahlatsi 'Chapter 4: Co-operative governance and intergovernmental relations' *Developmental mandate of district municipalities in the Free State: challenges in promoting environmental rights* (Doctoral dissertation, North West University, 2010).

[211] Per Kotzé et al (n97) at 1-25.

[212] Ibid.

Chapter 5

The status of the CDM internationally

5.1 INTRODUCTION

Previous chapters have examined the theoretical and policy considerations of the Kyoto Protocol; the architectural foundations of the Paris Agreement; the progression of the Clean Development Mechanism (CDM) and Sustainable Development Mechanism (SDM); and the legal and policy framework informing the CDM in South Africa. Having considered the policies and politics which inform the workings of the CDM, this chapter will observe the status of the CDM from an international perspective. In so doing, the prospects for the SDM will become increasingly apparent. The next chapter will hone in on the status of the CDM in South Africa specifically.

This chapter also elaborates on the CDM network of the Brazil, Russia, India, China and South Africa (BRICS) member countries (refer to section 5.3.1), in particular China and India, as these countries are recognised as global leaders in the CDM environment. This comparison is done with the object of identifying the elements that should be included in any future SDM policy in South Africa.

The first section of this chapter considers the global contribution of the CDM by providing high-level analytics of the geographical distribution of CDM projects, as well as using various indicators to gain insight on CDM participation among countries and regions.

5.2 THE GLOBAL CONTRIBUTION OF THE CDM

The equitable distribution of the CDM project has been a major concern since the inception of the mechanism, with smaller and least developed countries (LDCs) slow to pick up pace in the implementation thereof.[1] Since the onset of the CDM's implementation, a few well developed host countries have represented the bulk of CDM project development.[2] In particular, India was among the early promoters of the CDM and took the lead in project development in 2003 to 2004.[3]

[1] S Lütken 'Indexing CDM distribution: Levelling the playing field' *UNEP Risø Centre on Energy, Climate and Sustainable Development* (2011) at 1, available at http://orbit.dtu.dk/files/5571867/Indexing_CDM_distribution.pdf, accessed on 9 October 2016.

[2] Id at 4.

[3] Ibid.

The first CDM project was registered in Brazil[4] and, by the end of 2005, there were 63 registered projects – of which India hosted 17.[5] The great breakthrough for the CDM project came in 2006, when 409 projects were registered.[6] Brazil took the lead with 83, India with 124 and the newcomer in the market, China, hosting 33.[7]

In order to provide a broad view of the global CDM uptake, the following graphs are shown: Figures 5.1 through 5.3 depict the geographical distribution of CDM projects in Asia, Latin America and Africa respectively.[8] China, India, Brazil and South Africa emerge as the clear leaders in the various regional clusters. This result further strengthens the case for focusing the remainder of this chapter on the BRICS grouping.

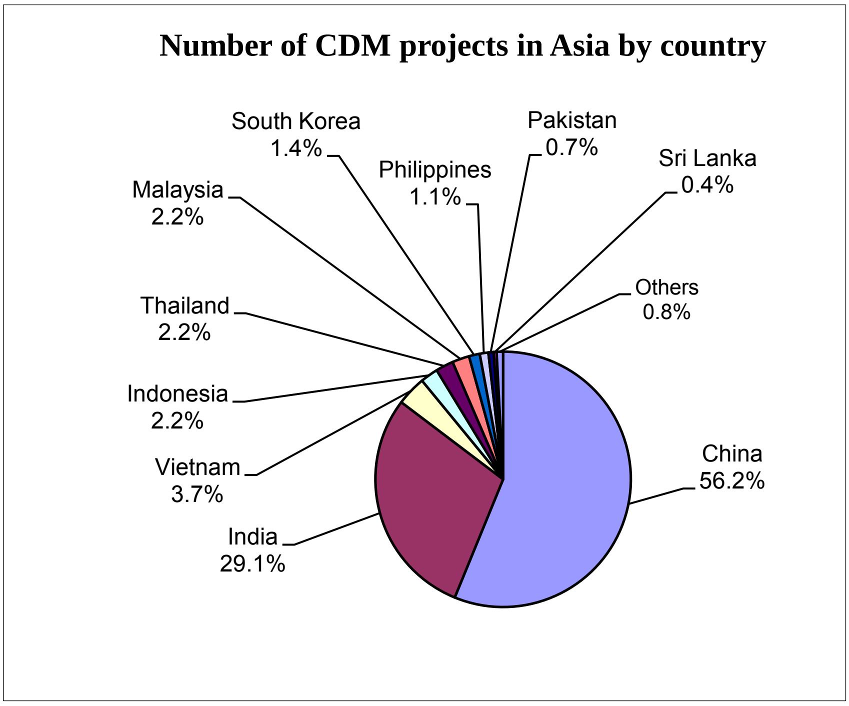

Figure 5.1: Geographical distribution of CDM projects in Asia[9]

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[4] The project is located in the state of Rio de Janeiro, Brazil. It aims to reduce GHG emissions from a landfill site by capturing methane for use in generating electricity for the local community of Nova Igacú. See United Nations (UN) 'The Kyoto Protocol's Clean Development Mechanism takes off: first CDM project registered' (2004), available at https://cdm.unfccc.int/press/releases/2004_02.pdf, accessed on 26 March 2017.

[5] Lütken (n1) at 4.

[6] Ibid.

[7] Ibid.

[8] It should be noted that all subsequent graphs and analyses are based on data as at 1 March 2017.

[9] All graphs are based on analyses conducted by the UNEP DTU Partnership (formerly UNEP Risø Centre) on regularly updated information. The partnership collaborates with the energy branch of the UN Environment's Economy Division. It is a leading international research and advisory institution on energy, climate and sustainable

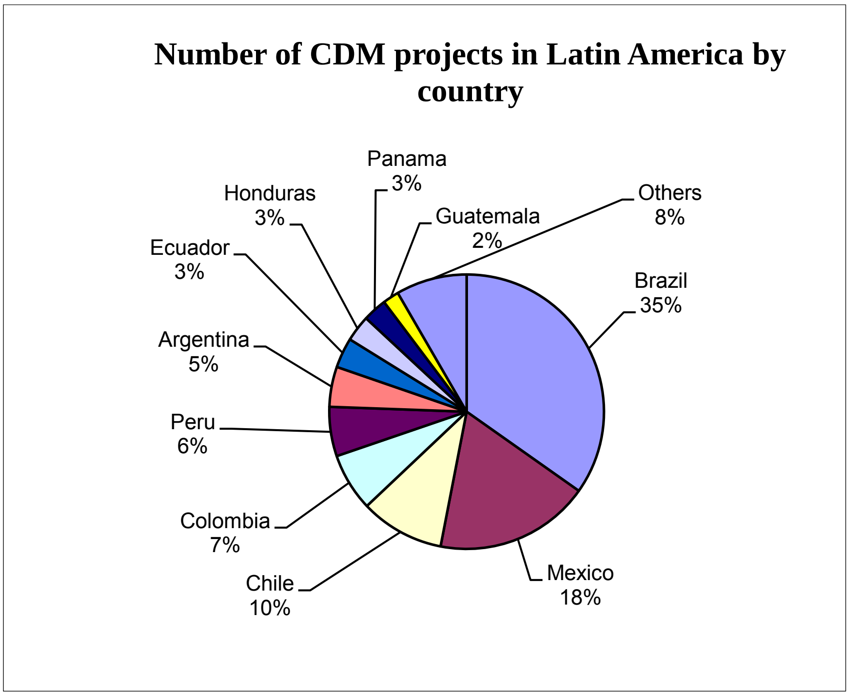

Figure 5.2: Geographical distribution of CDM projects in Latin America[10]

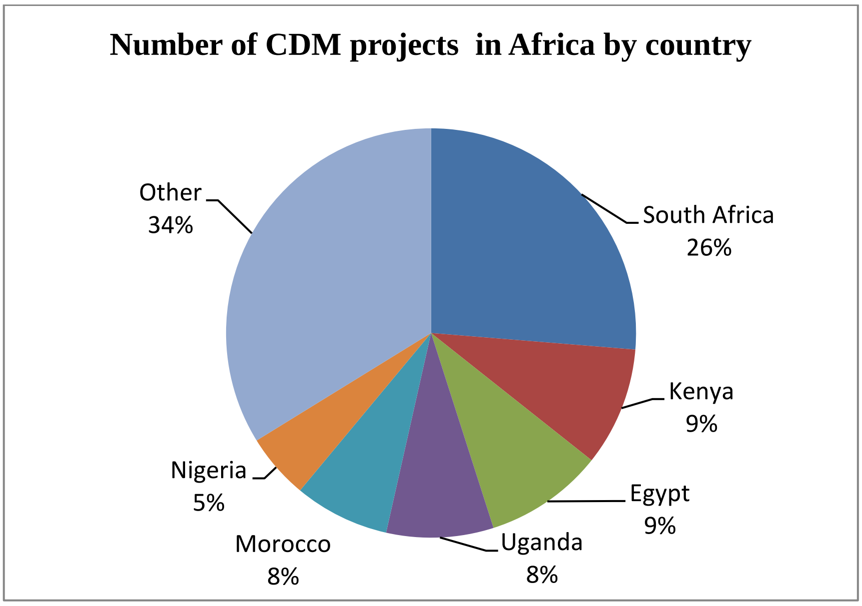

Figure 5.3: Geographical distribution of CDM projects in Africa[11]

development. For more information, see http://www.unepdtu.org/, accessed on 26 March 2017. Refer to *CDM Pipeline* spreadsheet 'Regions'.

[10] Ibid.

[11] Source: Author's own, based on data from UNEP DTU (n9) *CDM Pipeline* spreadsheet 'Regions'.

As regards the equitable distribution of CDM projects across the globe, Bodansky et al point out that since the start of CDM negotiations many LDCs and African nations were apprehensive that, given the limited scope to reduce emissions in their countries, they would receive very few CDM projects.[12] Eventually, these countries' calls resulted in efforts to address the lack of CDM projects in LDCs and small island states, including through financial and other support.[13] Despite attempts to enhance the equitable geographical distribution of CDM projects, market forces have continued to skew the distribution, whereby the private sector prefers low-risk and high-opportunity locations and projects.[14]

However, in contrast to the traditional approach of tallying the number of projects per country, a more nuanced analysis indicates a more equal distribution of the uptake of the CDM, even in LDCs.[15] There are many ways to apply relativity and, accordingly, the four approaches discussed below shed a different light on CDM participation among countries and regions.[16] These approaches comprise the CDM's project generation ability, its contribution to the economy, its investment capability and actual emissions reduction.

5.2.1 Indicator 1: Project generation ability

One way to estimate a country's likelihood to participate in the CDM project is to consider its national carbon emissions.[17] Notwithstanding that the emissions data is incomplete and excludes methane emissions, it does indicate the level of activity in a country and the emissions attributable to it.[18] Thus, it is possible to determine both the level of current emissions that might be reduced and the level of future emissions that could be avoided. For most CDM projects, the latter is the more common argument.[19]

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[12] D Bodansky, J Brunnée & L Rajamani *International Climate Change Law* (2017) at 189. The authors also mention that simplified modalities and procedures, as well as methodologies more suited to small-scale projects, have also proven helpful.

[13] Ibid.

[14] Id at 190.

[15] Lütken (n1) at 1.

[16] These four indicators were first introduced by Lütken (n1).

[17] Id at 9. These emissions were calculated in 2008 by the Carbon Dioxide Information Analysis Centre for the UN, available at http://cdiac.ornl.gov/, accessed on 26 March 2017.

[18] Ibid.

[19] Ibid.

It should be pointed out that, for all four indicators discussed in this section, countries have been grouped together in five regions participating in the CDM, namely Asia, Africa, Latin America, Middle East and Eurasia, as well as a group for the LDCs.[20] South Africa is included in the 'Africa' category.

The first indicator considers the number of CDM projects relative to a host country's emissions. This is an indirect indicator of a country's ability to identify emissions reduction options and transform them into actual projects.[21] This reveals the prominence of CDM in relation to the actual opportunity for emissions reduction and may be a result of heightened awareness.[22] It could also be the product of a high Gross Domestic Product (GDP) carbon intensity.[23] Figure 5.4 illustrates the project generation ability of specific country groupings; that is, the number of projects divided by the national carbon emissions.

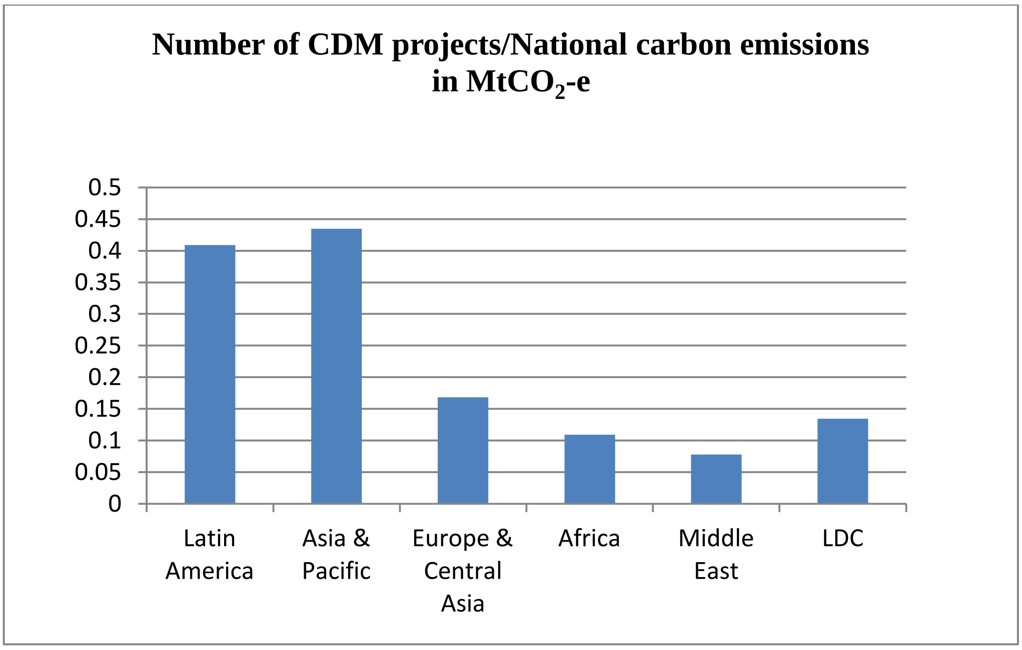

Figure 5.4: Project generation ability[24]

[20] Id at 11.The author explains that the basis for calculation is the countries that have actually participated in the CDM at any level of participation (implying that even a project under validation is sufficient to enter the statistics).

[21] UNEP DTU Partnership (n9) *CDM Pipeline* spreadsheet.

[22] Ibid.

[23] Ibid.

[24] Ibid.

5.2.2 Indicator 2: Contribution to the economy

Another measure of relativity is based on the size of the economy of a particular host country. The GDP is used to gauge the health of a country's economy. Despite being an appropriation, GDP may be employed as a more consistent platform – compared to Foreign Direct Investment (FDI), for example – for providing an estimate of a country's project financing capacity.[25]

Evaluations compared to GDP may be twofold: either in comparison to the expected amount of Certified Emission Reductions (CERs) from all projects for a given host country, or in comparison to number of CDM projects in the pipeline.[26] The former indicator measures the CDM's contribution to the economy. The amount of CERs generated from CDM projects relative to the GDP of a host country is an immediate expression of the importance of CDM to the economy, as well as the prominence of CDM compared to other economic activities.[27] This indicator is depicted in Figure 5.5.

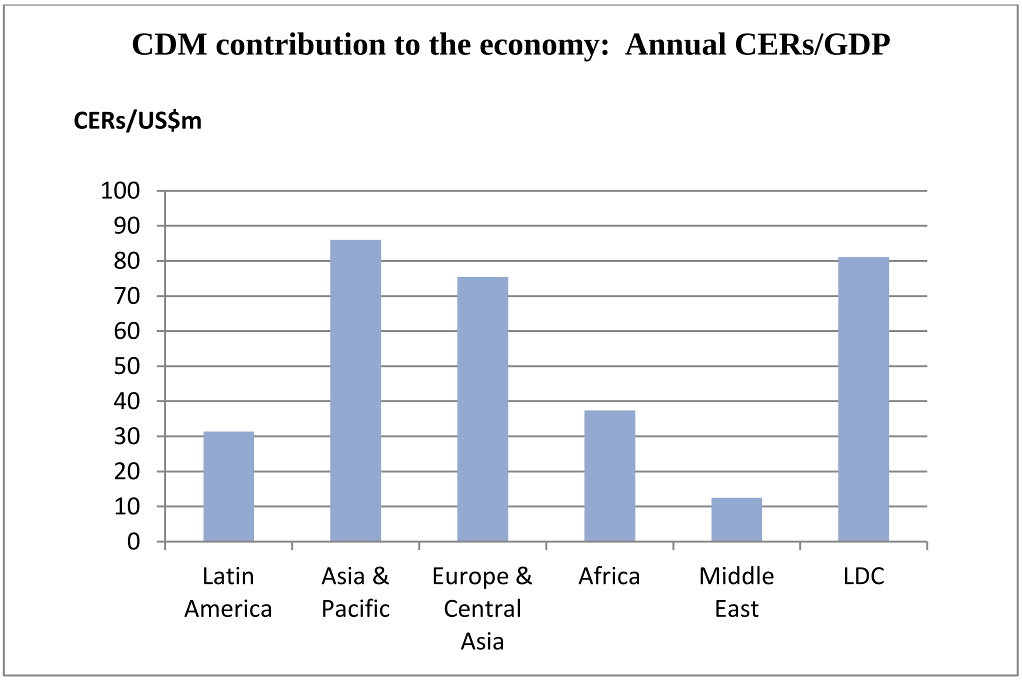

Figure 5.5: CDM contribution to the economy[28]

[25] Lütken (n1) at 10 states that, while in an idealised scenario CDM projects would materialise on a basis of FDI, the reality is that more projects materialise predominantly on local finance. The size of the FDI is not necessarily linked to the size of the economy, though, but rather to the investment climate. However, finance figures fluctuate considerably and are unfit as single point observations. Hence, GDP is a more appropriate measure.

[26] Ibid.

[27] UNEP DTU Partnership (n9) *CDM Pipeline* spreadsheet 'Indicators'.

[28] Ibid.

5.2.3 Indicator 3: Investment capability

As mentioned in para 5.2.2 above, one of the evaluations used to compare GDP refers to the number of CDM projects in the pipeline. This indicator is thought to illustrate the project financing capability of a given host country, regardless of the country's actual emissions.[29] Applying this reasoning therefore negates the case for eliminating the emission intensity argument for the first indicator. It should be cautioned, however, that project options and project sizes vary between countries and could consequently skew the results.[30]

This third indicator therefore corresponds to the first indicator, but eliminates the emission intensity of a host country. Thus, this indicator is focused on a country's financing capacity; or, phrased differently, on the ability to attract external (non-domestic) financing, independently of the actual emissions reduction options.[31] Figure 5.6 illustrates the investment capability of countries, ie the number of projects divided by the country's GDP.

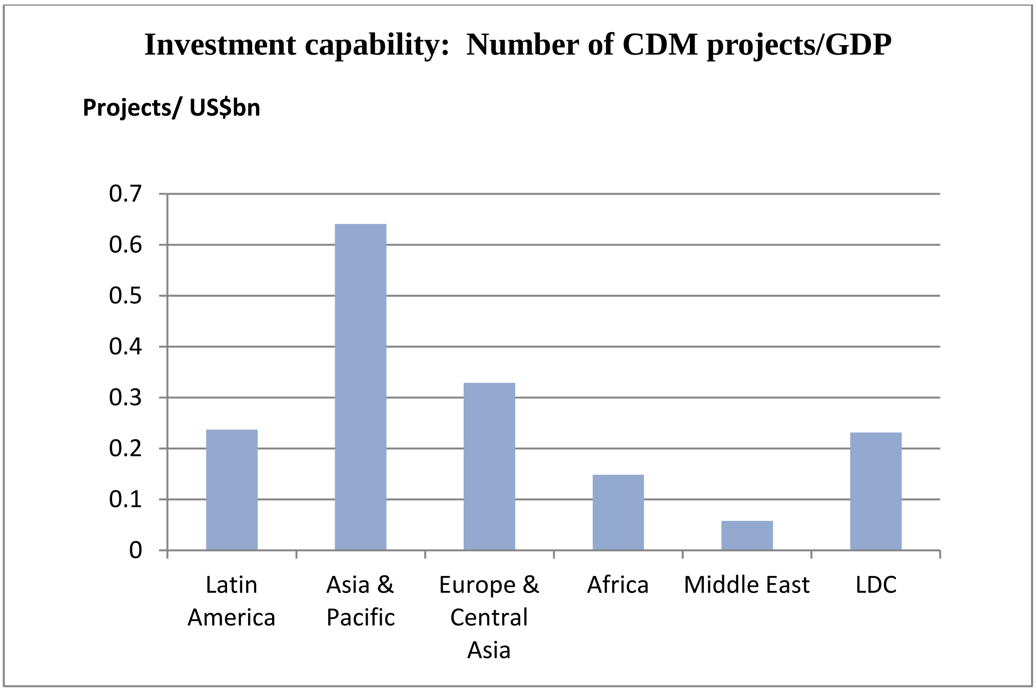

Figure 5.6: Investment capability[32]

[29] Lütken (n1) at 10.

[30] Ibid. The author illustrates this limitation as follows: assuming comparable levels of GDP, country A may have ten small scale project options and developers to exploit them, while country B may develop a single project that compares to the ten in terms of investment. While the two countries may perform equally well in terms of CER generation, country A with its many projects reveals a higher level of economic activity related to CDM. This, in turn, could be indicative of the involvement of more developers and financing institutions.

[31] UNEP DTU Partnership (n9) *CDM Pipeline* spreadsheet 'Indicators'.

[32] Ibid.

5.2.4 Indicator 4: Actual emission reduction

The fourth indicator is a factual one. If the emissions which are expected to be reduced through CDM projects in a given host country are compared to the national carbon emissions, a rough estimate of the country's domestic emissions reduction effort may be established.[33] These reductions are established on a basis of domestic financing. In other words, these are actual project activities, as compared to reductions achieved by Annex I countries, where a significant share is achieved through offsets.[34]

The fourth indicator therefore demonstrates to what extent CDM is supporting the emissions reduction efforts in a given host country.[35] Figure 5.7 portrays the actual emissions reduction, ie the percentage of country emissions covered by CERs.

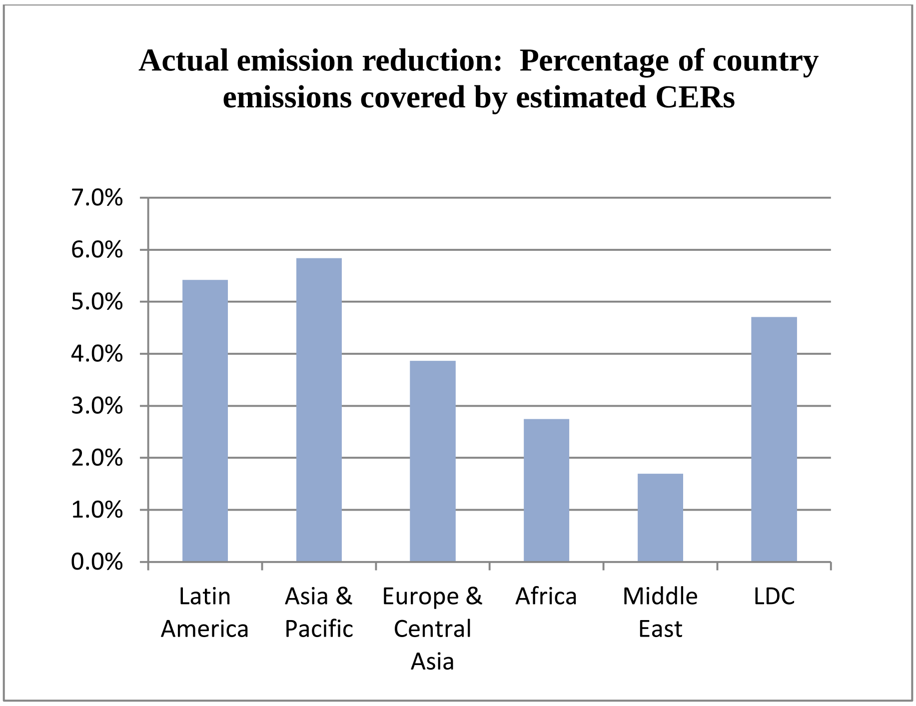

Figure 5.7: Actual emission reduction[36]

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[33] Lütken (n1) at 13.

[34] Ibid.

[35] UNEP DTU Partnership (n9) CDM Pipeline spreadsheet 'Indicators'.

[36] Ibid.

5.2.5 Observations about the CDM's global contribution

Each indicator paints a different picture of the regions' comparative performance. For the **first** indicator, it is evident that:

- The project generation capability of Latin America (0.41%) and Asia (0.43%) are on par, both significantly outperforming the rest.
- Africa is not the lowest performing region, as is traditionally thought. Standing at 0.11%, it performs somewhat better than the Middle East (at 0.08%).

Concerning the **second** indicator, the CDM's contribution to the economy, it is evident that:

- Asia (85.98), LDCs (81.06) and Eurasia (75.41) are closely matched.
- In this metric, Africa (at 37.36) narrowly outperforms Latin America (at 31.37), with the Middle East again coming in last at 12.53.

With regard to the **third** indicator of investment capability:

- Asia clearly ranks the highest at 0.64.
- Eurasia performs approximately half as well as Asia, standing at 0.33.
- They are followed by Latin America and the LDCs, which are virtually tied at 0.24 and 0.23 respectively.
- The Middle East is clearly lagging at 0.06.

As regards the **fourth** indicator, that of actual emissions reductions, the following observations can be made:

- Three regions perform approximately equally well at around 5% - namely Asia (5.4%), Latin America (5.8%) and the LDCs (4.7%). It is not surprising that Asia holds the lead, as the two largest CDM participators (China and India) are included in this mix.
- Africa is not faring too well (at 2.7%), which may be indicative of drawbacks in financing capability and challenges in the energy sector. It attains only about half the performance of the previous three regions, although still fares considerably better than the Middle East (at 1.7%).

In general, Africa – which is typically thought of as the 'lost continent in CDM' – is not so lost after all.[37] On all parameters, Africa is faring better than the Middle East, although it is evident that there is plenty of room for improvement.

[37] Lütken (n1) at 13.

As stated earlier, it is both appropriate and necessary to conduct a comparative analysis of the BRICS countries. The next section examines the energy context and CDM uptake of these countries.

5.3 THE ENERGY CONTEXT IN THE BRICS COUNTRIES

5.3.1 Introduction

The BRIC (Brazil, Russia, India and China) concept was first conceived in 2001 by Goldman Sachs as part of an economic modelling exercise to forecast global economic trends over the next half century. South Africa was invited to attend the third BRIC summit in Sanya, China, on 14 April 2011[38] and subsequently became a member, changing the acronym to BRICS.

The BRICS countries are characterised by rapidly growing economies and increasing international influence.[39] With over 40 per cent of the world's population, the BRICS countries contribute more than 20 per cent of global GDP, with some economists predicting that Brazil, China, India and Russia will join the US as the five largest economies in the world by 2050.[40] The BRICS members are all developing or newly industrialised countries, but they are distinguished by their large, fast-growing economies and significant influence on regional and global affairs.[41] Moreover, all five countries are G-20 members.[42]

It could be argued that, provided comparable preconditions prevail, it is worth contemplating the experiences of other legal systems and benefiting from certain experiences that have proved themselves in practice. In light of South Africa's membership of BRICS and similarities in their economies, the energy context of these countries merits further exploration.

Table 5.1 portrays key indicators of the BRICS countries' (excluding Russia) economies and emissions. Russia is excluded, as it does not participate in the CDM project.

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[38] See http://www.brics5.co.za/about-brics/, accessed on 14 November 2015.

[39] B O'Boyle 'Explainer: what are the BRICS?' (2014), available at http://www.as-coa.org/articles/explainer-what-are-brics?gclid=CjwKEAjwgPe4BRCB66GG8PO69QkSJAC4EhHhx7KLgq7CvBvEDb3vNAVFR5FKXGzOuDUUo7m2DgwQCRoCOWnw_wcB, accessed on 25 April 2016.

[40] Ibid.

[41] GL Ribeiro & T Dwyer *Social, Political and Cultural Challenges of the BRICS* (2015) at 168.

[42] The G-20 is an international network of finance ministers and central bankers from eleven developed countries and eight less-developed countries, as well as representatives from the European Union, the International Monetary Fund and the World Bank.

Table 5.1: Key indicators in BRICS countries					
	No. of CDM projects registered as at 1 March 2017[43]	**Population (millions)**	**GDP (2010 US$ billion)**	**CO_2 emissions ($MtCO_2$)**	**Total expected annual reduction in $KtCO_2e$**
South Africa[44]	56	54.00	411.04	437.37	11 858
Brazil[45]	342	206.08	2 412.23	476.02	54 361
India[46]	1 639	1 295.29	2 195.65	2 019.67	195 293
China[47]	3 763	1 364.27	8 230.12	9 086.96	620 263

Next, Table 5.2 offers a rudimentary comparison of various measures of the success of the CDM in these countries. It is acknowledged that this is an overly simplified depiction of the CDM contribution in BRICS countries, but it does offer a starting point for comparative analysis.[48]

[43] UNFCCC *Project search*, available at https://cdm.unfccc.int/Projects/projsearch.html, accessed on 1 March 2017.

[44] Based on the indicators used in the IEA South African statistics, available at https://www.iea.org/statistics/statisticssearch/report/?country=SOUTHAFRIC&product=indicators&year=Select, accessed on 19 March 2017.

[45] Based on the indicators used in the IEA Brazilian statistics, available at https://www.iea.org/statistics/statisticssearch/report/?country=BRAZIL&product=indicators&year=2014, accessed on 19 March 2017.

[46] Based on the indicators used in the IEA Indian statistics, available at https://www.iea.org/statistics/statisticssearch/report/?year=2014&country=INDIA&product=Indicators, accessed on 19 March 2017.

[47] Based on the indicators used in the IEA Chinese statistics, available at https://www.iea.org/statistics/statisticssearch/report/?country=CHINA&product=indicators&year=2014, accessed on 19 March 2017.

[48] An in-depth review across all indicators is considered to be beyond the scope of this thesis. This could, however, be the subject matter of future research, including an analysis of year-on-year comparisons, CER date, size of investments, etc.

Table 5.2: A comparison of the CDM contribution in BRICS countries				
	CDM/population (no. per capita)	**CDM/GDP (no. per thousand 2010 US$)**	**CO_2/population (tCO_2 per capita)**	**CO_2e reduction/CDM projects (Kt per project)**
South Africa	1.04	0.14	8.10	212
Brazil	1.66	0.14	2.31	159
India	1.27	0.75	1.56	119
China	2.76	0.46	6.66	165

As a proportion of the population size, South Africa (at 1.04 CDM projects per person) underperforms compared to the other countries, with China in the lead (at 2.76). When CDM is expressed relative to GDP, South Africa is on par with Brazil (both at 0.14 projects per thousand US$), with India in the lead (at 0.46).

Although South Africa has a far smaller population and economy compared to the other BRICS countries, it is by far the largest carbon dioxide (CO_2) emitter on a per capita basis (coming in at 8.10 tCO_2 per person), followed by China (6.66), Brazil (2.31) and India (1.56). Perhaps the most telling indicator is the anticipated success of the CDM, measured as the estimated emission reductions in metric tonnes of CO_2e p.a. Using this indicator, South Africa ranks first, with an estimated 212 Kt of CO_2e reduction per CDM project. China is next (at 165), followed by Brazil (159) and India (119). However, it should be cautioned that these rankings are based on the *expected* emissions reductions – not on the actual. Further in-depth research would be required to establish the true outcomes and impact of CDM projects.

The remainder of this section will delve into each member country's energy mix and CDM participation in more detail, starting with Brazil.

5.3.2 Brazil

5.3.2.1 Energy profile

Brazil is the eighth-largest energy consumer in the world and the third-largest in the Americas, behind the US and Canada.[49] Due to sustained economic growth, the total primary energy consumption in Brazil has nearly doubled in the past decade, with the largest share of energy consumption going to oil and other liquid fuels, followed by hydroelectricity and natural gas.[50] At the same time, Brazil is an important oil and gas producer in the region.[51] Figure 5.8 depicts the total primary energy supply in Brazil.

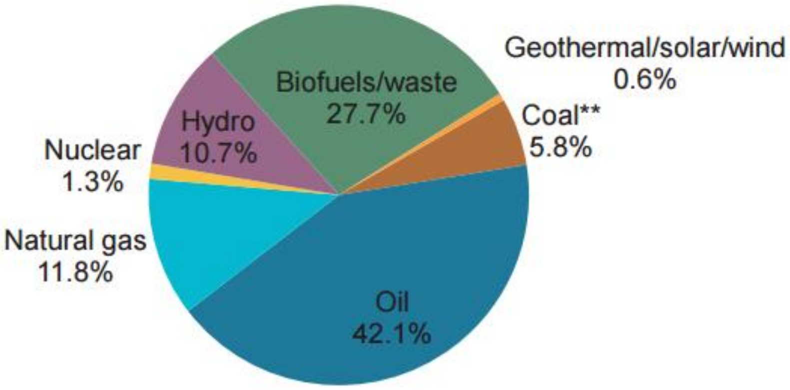

Figure 5.8 Total primary energy supply in Brazil[52]

Brazil has a clean, low-carbon energy mix in which renewable energy sources (mainly hydropower and biofuels) accounted for approximately 40 per cent of total primary energy supply in 2014. As a result, Greenhouse Gas (GHG) emissions from energy generation and use are relatively low compared to many OECD countries.[53]

Brazil's emissions profile is very different to that of South Africa (refer to Tables 5.1 and 5.2). In 2014, Brazil produced 476.02 $MtCO_2$. While this largely corresponds with that produced by South Africa, namely 437.37 $MtCO_2$, the two countries differ drastically in terms of per capita emissions. Brazil's per capita emissions are only 2.31 tCO_2/capita, compared to South Africa's 8.10tCO_2/capita.

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[49] US Energy Information Administrator (EIA) *Brazil*, available at https://www.eia.gov/beta/international/analysis_includes/countries_long/Brazil/brazil.pdf, accessed on 4 February 2016.

[50] Ibid.

[51] Ibid.

[52] International Energy Agency (2014) *Share of total primary energy supply in 2014 – Brazil*, available at http://www.iea.org/stats/WebGraphs/BRAZIL4.pdf, accessed on 19 March 2017.

[53] OECD *Environmental Performance Review: Brazil 2015* at 23.

This can probably be attributed, in part, to the fact that coal accounts for only 5.8 per cent of the primary energy supply in Brazil, whereas in South Africa, coal contributes nearly 70 per cent of the primary energy supply. Brazil is the world's seventh-highest emitter, but much of its emission is due to deforestation of the Amazon, rather than the burning of fossil fuels.[54]

Since 2006, the International Energy Agency (IEA) has established increasingly closer co-operation with Brazil, whom it considers a key partner country, including the signing of bilateral work programmes at the IEA Ministerial meetings in 2011 and 2013.[55] Brazil’s energy policy choices and achievements measure up well against some of the world’s most urgent energy challenges.[56] A concerted policy effort has meant that access to electricity is now almost universal across the country.[57]

5.3.2.2 CDM profile

As discussed earlier in Chapter 2, Brazil was the first country to sign the UNFCCC (on 4 June 1992) and also played a seminal role in establishing the CDM under the Kyoto Protocol. Brazil's institutional infrastructure for climate change is regarded by some as 'well prepared' to deal with CDM projects.[58]

The Designated National Authority (DNA) in Brazil is the Interministerial Committee for Global Climate Change (Comissão Interministerial de Mudança Global do Clima), which was created with the purpose of coordinating government action.[59] The DNA is chaired by the Minister of Science

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[54] C Mooney & D Phillips 'Brazil just ratified the Paris climate agreement. Here's why that's a really big deal' (2016), available at https://www.washingtonpost.com/news/energy-environment/wp/2016/09/12/brazil-just-ratified-the-paris-climate-agreement-heres-why-thats-a-really-big-deal/?utm_term=.cc3a758002e1, accessed on 20 March 2017.

[55] IEA *Brazil Partner Country* available at https://www.iea.org/countries/non-membercountries/brazil/, accessed on 22 March 2016.

[56] Ibid.

[57] Ibid.

[58] UNIDO *Clean Development Mechanism (CDM) investor guide: Brazil* (2003) at 75, available at https://www.unido.org/fileadmin/user_media/Publications/Pub_free/CDM_investor_guide_Brazil.pdf, accessed on 19 March 2017.

[59]FGV Editora *The CDM: a Brazilian implementation guide* (2002) at 20, available at http://www.mct.gov.br/upd_blob/0013/13748.pdf, accessed on 19 March 2017. This DNA was established by Presidential Decree on 7 July 1999.

and Technology and the vice-chair is the Minister of the Environment.[60] The commission has the authority to authorise individual projects as CDM projects, and thus make CER units available.

Brazil currently has 342 registered CDM projects (refer to Table 5.1). A number of these projects relate to the production of energy from hydro and sugarcane bagasse, which is a remnant from sugarcane processing and a renewable source of energy.[61] Eco-innovation is among the priorities of Brazil's innovation strategy, with Brazil developing a specialisation in environmental technology, in comparison with the other BRICS countries.[62] Moreover, Brazil has generated the world's third-largest amount of CER credits under the CDM, which has been a key driver of technology transfer and has also encouraged domestically-driven innovation.[63]

5.3.3 Russia

Russia is the world's largest producer of crude oil, the second-largest producer of dry natural gas and also the producer of significant amounts of coal.[64] The Russian economy is highly dependent on its hydrocarbons; oil and natural gas revenues account for more than half of the federal budget reserves – as illustrated by Figure 5.9.[65]

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[60] Ibid. The DNA also comprises members of the following ministries: Foreign Relations; Agriculture, Livestock and Supply; Transportation; Mines and Energy; Development, Industry and Foreign Trade, and the Chief of Staff (*Casa Civil*) of the Presidency of the Republic.

[61] L du Toit 'Promoting Clean Development Mechanism Implementation in South Africa: Law and Policy' (2009) 1 *SA Public Law* 33-55 at 49.

[62] OECD *Environmental Performance* (n53) at 32.

[63] Ibid.

[64] US Energy Information Administrator (EIA) *Russia*, available at https://www.eia.gov/beta/international/analysis.cfm?iso=RUS, accessed on 14 February 2016.

[65] Ibid.

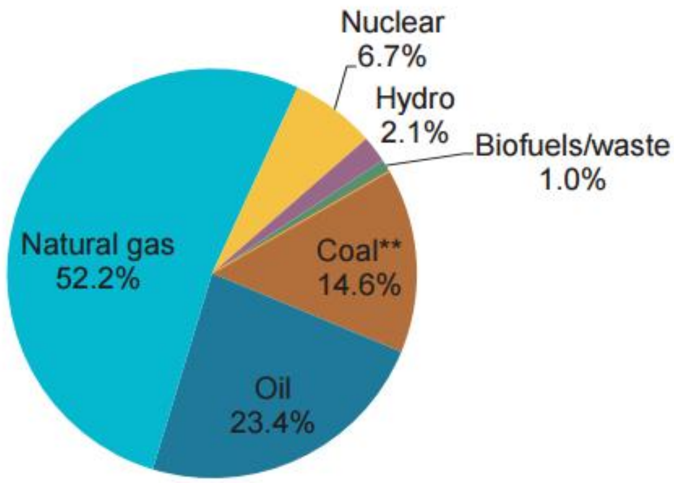

Figure 5.9 Total primary energy supply in Russia[66]

Russia maintains its position as one of the world's most important energy players, continuing its essential role in global energy supply and holding among the world's largest resources of gas, oil and coal.[67] Although the IEA recognises the long-standing co-operation between the IEA and Russia, it also acknowledges that the carbon intensity of the Russian economy, as measured by CO_2 emissions per real GDP, is 60 per cent higher than the average of IEA member countries and that 'there is much scope to limit CO_2 emissions'.[68] Indeed, Russia is one of the world's largest CO_2 emitters.[69]

The modernisation of the Russian energy sector depends to a large extent on energy efficiency deployment and infrastructure investments, especially in the industrial, residential and transport sectors, as well as the district heating and power generation sectors.[70] Notwithstanding that Russia is pursuing ambitious energy policy goals of improving energy efficiency, increasing the share of renewable energy and modernising its energy sector, efforts to integrate climate and energy policy objectives into a coherent energy and climate policy package remain very limited.[71]

[66] International Energy Agency (IEA) *Share of total primary energy supply in 2014 – Russian Federation* (2014), available at http://www.iea.org/stats/WebGraphs/RUSSIA4.pdf, accessed on 19 March 2017.

[67] International Energy Agency (IEA) *Russian Federation* (2017), available at https://www.iea.org/countries/non-membercountries/russianfederation/, accessed on 22 March 2017.

[68] Ibid. The co-operation between the IEA and Russia dates back to 1994 and covers energy security, energy efficiency, energy statistics, energy policy reviews and technologies.

[69] International Energy Agency (IEA) *Beyond IEA Countries: Russia* (2014) at 63, available at https://www.iea.org/publications/freepublications/publication/Russia_2014.pdf, accessed on 12 December 2016.

[70] IEA *Russian Federation* (n67).

[71] Id at 63.

5.3.4 India

5.3.4.1 Energy profile

India was the fourth-largest energy consumer in the world after China, the US and Russia in 2011, and despite having notable fossil fuel resources, the country has become increasingly dependent on energy imports.[72] India's largest energy source is coal, followed by traditional biomass and waste and petroleum. The country's need for energy supply continues to climb as a result of dynamic economic growth and modernisation over the past several years.[73] Figure 5.10 illustrates the total primary energy supply in India in 2014.

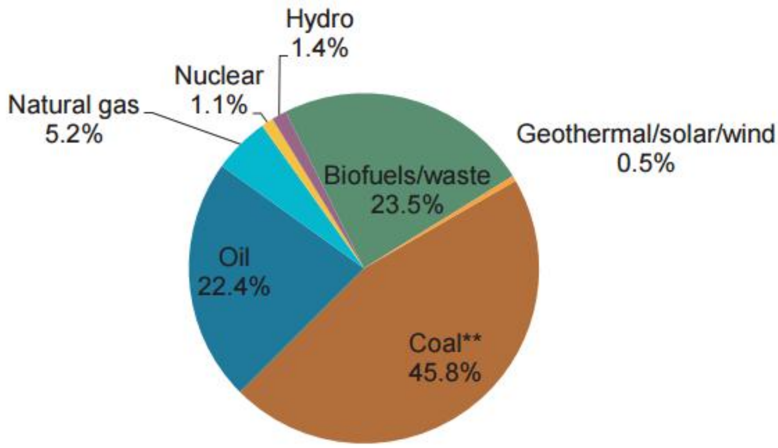

Figure 5.10 Total primary energy supply in India[74]

That said, India is increasingly engaged in reducing carbon emissions and alleviating environmental degradation.[75] The government seeks to balance the country's growing need for electricity with environmental concerns due to the use of coal and other energy sources to produce that electricity.[76] Frequent flooding and droughts, deforestation and desertification, as well as possible glacial melting

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[72] US Energy Information Administrator (EIA) *India,* available at https://www.eia.gov/beta/international/analysis.cfm?iso=IND, accessed on 22 April 2016.

[73] Ibid.

[74] International Energy Agency (IEA) *Share of total primary energy supply in 2014 – India* (2014), available at http://www.iea.org/stats/WebGraphs/INDIA4.pdf, accessed on 19 March 2017.

[75] International Energy Agency (IEA) *Understanding energy challenges in India: policies, players and issues* (2012) at 17, available at https://www.iea.org/publications/freepublications/publication/India_study_FINAL_WEB.pdf, accessed on 14 March 2016.

[76] EIA *India* (n71).

in the Himalayas have sharpened the focus on climate change and provide a strong impetus towards India's transition to a low-carbon economy.[77]

India's emissions profile offers a stark contrast to that of South Africa (refer to Tables 5.1 and 5.2). In 2014, India produced 2 019.67 $MtCO_2$. While this is much higher than the CO_2 emissions generated by South Africa, namely 437.37 $MtCO_2$, the two countries are vastly different in terms of per capita emissions. Notwithstanding that both countries are heavily reliant on coal, India's per capita emissions are much lower – only 1.56 tCO_2/capita, compared to South Africa's 8.10 tCO_2/capita.

However, India's CO_2 emissions should be viewed through two lenses. One the one hand, per capita emissions are extremely low (standing at just one-quarter of China's). The reason for this is that India has a much larger population than South Africa. In fact, India is expected to overtake China to become the world's most populous country in the early 2020s, with its population exceeding 1.6 billion by the end of the period.[78] On the other hand, India is the third-largest country in terms of the volume of CO_2 emissions in the world, lagging behind only China and the US.[79] Rapidly growing power generation and continued reliance on coal as the fuel of choice for generation make India a significant contributor to growing CO_2 emissions from the power sector.[80]

The IEA and India benefit from a long, ongoing bilateral relationship built on co-operation in a broad range of areas, including energy security, statistics, efficiency, market analysis, implementation agreements and technology.[81] A priority area for co-operation is oil and gas security, and the IEA and the Ministry for Petroleum and Natural Gas signed a Memorandum of Understanding in 2011.[82] In 2016, India and the IEA signed a Statement of Intent to enhance co-

[77] IEA *Energy challenges in India* (n75) at 17.

[78] International Energy Agency (IEA) *Energy Climate and Change: World Energy Outlook* (2016) at 44, available at http://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html, accessed on 12 February 2017.

[79] International Energy Agency (IEA) *World Energy Outlook – Special Report India* (2015) at 48, available at https://www.iea.org/publications/freepublications/publication/IndiaEnergyOutlook_WEO2015.pdf, accessed on 11 February 2017.

[80] Id at 87. In fact, in the period to 2040, India's CO_2e from power generation is expected to grow by nearly two-and-a-half-times, making its power sector the second-largest emitter from power generation in the world.

[81] IEA *India (key partner country),* available at https://www.iea.org/countries/non-membercountries/india/, accessed on 23 March 2016.

[82] Ibid. This was the first time that the IEA signed a memorandum of understanding with a key partner country in the area of emergency preparedness.

operation in numerous fields, including forecasting and data.[83] The IEA and India also collaborate on renewable energy.[84]

5.3.4.2 CDM profile

India currently has 1 639 registered CDM projects (refer to Table 5.1). The Central Government constituted the National Clean Development Mechanism Authority in December 2003. The Secretary of the Ministry of Environment and Forest was elected as the Chairperson, tasked with according Host Country Approval to the CDM projects.[85] The Indian government has also mandated large-scale CDM projects to commit two per cent of revenue generated from the sale of CERs to support sustainable development activities for the local communities.[86]

Most of the CDM projects in India are concentrated in a few sectors, with about 82 per cent of the registered CDM projects categorised under energy industries.[87] Several kinds of renewable energy projects have been registered under the CDM, with wind energy dominating other forms of renewable energy production.[88] Indeed, the most promising renewable source of energy is wind.[89]

China and India could be seen as comparable case studies when it comes to an analysis of independent criteria, as, based on the scope of CDM projects, China and India are the top two. The two countries' size, economy and fossil fuel dependence are also similar. In addition, China and India are the two most populated countries in the world with similar economic conditions (they belong to the lower middle-income and low-income category, respectively). The two countries are alike in terms of fossil fuel consumption, with coal dominating the primary energy supply of both countries.

India is undergoing a rapid social and economic transformation, in which strong economic growth, a burgeoning middle class and large-scale urbanisation underpin broader development.[90] The country is seeking to balance its development needs with the need to increase the share of low-

[83] Ibid.

[84] Ibid.

[85] National CDM Authority, Government of India *Constitution* (2009), available at http://www.cdmindia.gov.in/constitution.php, accessed on 19 March 2017.

[86] Ibid.

[87] K Ranganathan & MK Goyal 'Clean development mechanism–an opportunity to mitigate carbon footprint from the energy sector of India' (2015) 109(4) *CURRENT SCIENCE* 672-678 at 676.

[88] Ibid.

[89] Ibid. The authors point out that, at the end of 2013, India was the fifth-largest wind energy producer in the world.

[90] IEA *India special report* (n79) at 53.

carbon sources in the energy mix.[91] The country's vision provides a continued, important place for coal, alongside a strong push in favour of renewable sources of energy, particularly solar and wind power.[92]

5.3.5 China

5.3.5.1 Energy profile

China 'lies at the centre of the world's energy issues', being the world's largest energy consumer (23 per cent of global energy consumption), largest energy producer (19 per cent of global energy supply) and largest oil importer and CO_2 emitter in 2014.[93] The Chinese government is aiming for a transition to a low-carbon economy, as it faces the challenges of increasing constraints on resources and the environment.[94] Figure 5.11 shows the total primary energy supply in China in 2014.

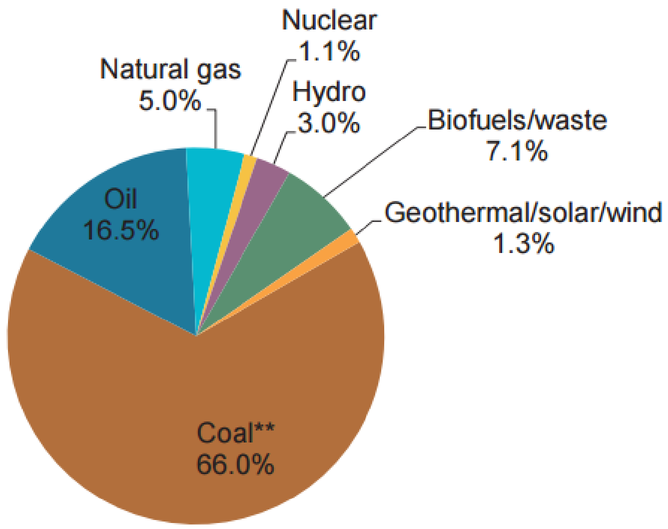

Figure 5.11 Total primary energy supply in China[95]

Despite a much larger economy and population size, China's emissions profile is not very different to that of South Africa (refer to Tables 5.1 and 5.2). In 2014, China produced 9 086.96 $MtCO_2$. While this is much more than the CO_2 emissions generated by South Africa, namely 437.37 $MtCO_2$,

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[91] Ibid.

[92] Ibid.

[93] International Energy Agency (IEA) *China's engagement in global energy governance* (2016) at 7, available at https://www.iea.org/publications/freepublications/publication/PartnerCountrySeries_ChinasEngagementinGlobalEnergyGovernance_Englishversion.pdf, accessed on 27 June 2016.

[94] Id at 42.

[95] International Energy Agency (IEA) *Share of total primary energy supply in 2014 – China* (2014), available at http://www.iea.org/stats/WebGraphs/CHINA4.pdf, accessed on 19 March 2017.

the two countries are fairly close in terms of per capita emissions. Both countries depend heavily on coal, although China's per capita emissions are lower, at 6.66 tCO_2/capita, compared to South Africa's 8.10 tCO_2/capita.

The development of China's infrastructure in recent decades relied heavily on energy-intensive industrial sectors, notably steel and cement. However, energy demand from these sectors is now past its peak, with the projected decline to 2040 lowering China's industrial coal use in its wake.[96] Almost all the growth in China's power generation comes from sources other than coal, of which the share in the power mix is expected to fall from about two-thirds today to less than 45 per cent in 2040.[97]

At the IEA Ministerial meeting in 2015, China became one of the first countries to activate Association status with the Agency.[98] The IEA has since worked with China to assist the country in its transition to a more sustainable energy economy and to provide a greater understanding of China's energy system. The IEA has established in-depth bilateral co-operation with China in a wide range of areas, including energy security, energy statistics, energy markets (coal, oil, gas, renewables, and energy efficiency), the IEA Technology Collaboration Programmes, and energy technology in cleaner coal, industry, buildings and transportation.[99]

In 2016, China was the world's largest investor in renewable energy and employed more than 40 per cent of the sector's worldwide workforce.[100] As a case in point, China is currently building the world's largest solar farm in Qinghai province[101] and the world's largest wind farm in Gansu province.[102] China is also planning two major green initiatives. The One Belt One Road initiative

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[96] Ibid.

[97] Ibid.

[98] According to the International Energy Agency (IEA) *China, People's Republic of (Association country)* (2017), available at https://www.iea.org/countries/non-membercountries/chinapeoplesrepublicof/, accessed on 22 March 2017, this development builds on relations that date back to a Memorandum of Policy Understanding in the Field of Energy in 1996.

[99] Ibid.

[100] City Weekend 'The climate pivot: how China became the world's new climate leader' (2017), available at http://www.cityweekend.com.cn/beijing/article/climate-pivot-how-china-became-world%26rsquo%3Bs-new-climate-leader, accessed on 20 March 2017.

[101] T Phillips 'China builds world's biggest solar farm in journey to become green superpower' (2017), available at https://www.theguardian.com/environment/2017/jan/19/china-builds-worlds-biggest-solar-farm-in-journey-to-become-green-superpower, accessed on 20 March 2017. The Longyangxia solar farm now has the capacity to produce 850MW of power and is spearheading a 'global photovoltaic revolution'.

[102] The Jiuquan Wind Power Base is located on the edge of the Gobi Desert and has more than 7 000 turbines. According to JC Hernandez 'It can power a small nation. But this wind farm in China is mostly idle' (2017), available

entails infrastructure and technology investments along the ancient Silk Road trade route through Asia, Europe and northern Africa. The other initiative is a South-South Cooperation, which is a UN framework encouraging joint projects among countries in the global south.[103] Notwithstanding that China remains the world's biggest emitter, it has also become an improbable leader in the battle against climate change. While President Donald Trump's decision to withdraw the US from the Paris Agreement is disheartening, it also presented an opportunity for other countries to step up and fill that vacuum - and China aims to do exactly that.[104]

5.3.5.2 CDM profile

Although the international community and investors from the Annex I countries have shown much interest in China as a potential CDM market with a favourable investment environment, China made a relatively slow start in establishing domestic institutions to host CDM projects, in comparison with India and several Latin American countries. After China ratified the Kyoto Protocol in 2002, the Chinese National Development and Reform Commission, together with the National Scientific Technology Ministry, promulgated the 'Interim Measures for Operation and Management of Clean Development Mechanism Projects in China' in 2004, which contains rules and procedures on CDM project activities in China.[105] The National Development and Reform Commission is China's DNA.

Until the Kyoto Protocol entered into force in 2005, the Chinese government showed 'little enthusiasm' regarding the CDM.[106] However, by 2012, the end of the Kyoto Protocol's first commitment period, China had built the most extensive CDM programme in the world, specifically

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at https://www.nytimes.com/2017/01/15/world/asia/china-gansu-wind-farm.html?_r=0, accessed on 20 March 2017, a nationwide economic slowdown has reduced demand for electricity to such an extent that 60 per cent of the power generated by the turbines is unused.

[103] City Weekend (n99).

[104] See L-A Steenkamp, A Smit, J Volschenk & P Naudé 'Trump's withdrawal from Paris Agreement could ultimately harm US economy' (2017), available at http://www.bizcommunity.com/Article/196/356/163134.html, accessed on 20 June 2017.

[105] Y Xing & W Xi 'Chapter 5: CDM in China' in KL Koh (ed) *Crucial issues in climate change and the Kyoto Protocol: Asia and the world* (2010) at 129.

[106] S Shin 'The domestic side of the clean development mechanism: the case of China' (2010) 19(2) *Environmental Politics* 237-254. The author ascribes this to several reasons: the Chinese government was not convinced that the Kyoto Protocol would come into force; the international rules for the CDM were still uncertain; and China had enough foreign direct investment from other sources, compared to other developing countries.

encouraging renewable energy and energy efficiency measures.[107] In 2010, China became the leading country based on registered CDM projects (751 projects, representing 36.4 per cent of the world total), the volume of annual expected CER units (205 $MtCO_2e$, or 59.4 per cent of the total), and actual CER certificates issued (48 per cent).[108]

Financing is a key issue in addressing climate and environmental challenges. As a signatory of the Kyoto Protocol, China is a major beneficiary of the CDM, with more than US$81 million in grants committed to support over 200 projects under the China Clean Development Mechanism Fund (CDMF).[109]

5.3.6 South Africa

5.3.6.1 Energy profile

According to the IEA, South Africa accounted for more than one-third of the total energy-related CO_2 emissions on the African continent.[110] The same report states that emissions in South Africa are projected to follow a 'peak, plateau and decline' trajectory, largely due to improved energy efficiency and a turn towards renewables and nuclear energy.[111]

South Africa’s energy and electricity supplies are dominated by coal. In 2014, almost 70 per cent of South Africa’s total primary energy supply was supplied by coal. South Africa’s total primary energy supply is illustrated in Figure 5.12.

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[107] International Energy Agency (IEA) *Energy Technology Perspectives* (2014) at 366, available at http://www.iea.org/publications/freepublications/publication/energy-technology-perspectives-2014.html, accessed on 20 March 2017.

[108] Ibid.

[109] IEA *China's engagement* (n93) at 41.

[110] International Energy Agency (IEA) *Energy Climate and Change: World Energy Outlook* (2015), available at https://www.iea.org/Textbase/npsum/WEO2015SUM.pdf, accessed on 14 April 2016.

[111] Ibid.

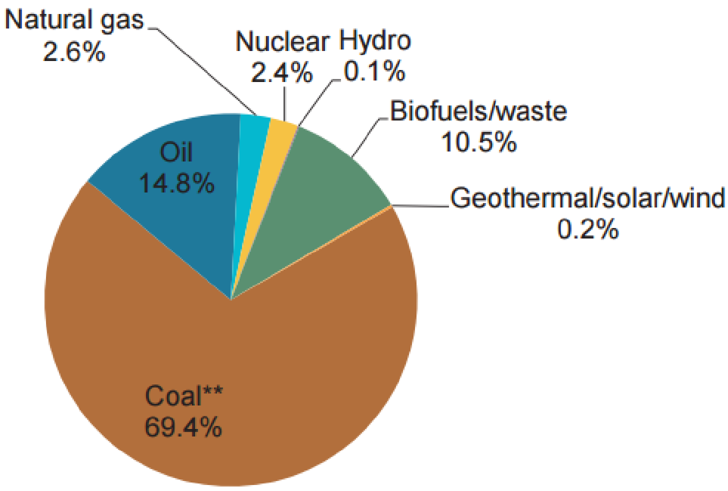

Figure 5.12 Total primary energy supply in South Africa[112]

South Africa's state-owned power utility, Eskom, generates approximately 95 per cent of the electricity used in South Africa and around 45 per cent of the electricity used in Africa.[113] The balance of the country's requirements is supplied by a few independent power producers and imports from neighbouring countries.

Eskom has nominal installed power generation capacity of 44.2 GigaWatt (GW), although much of its actual power generation has been constrained in recent years due to the historical lack of investment in new plants, an increase in unplanned outages and a failure to maintain its existing fleet.[114]

5.3.6.2 CDM profile

Chapter 6 will provide more in-depth analytics regarding South Africa's CDM profile. Here it is highlighted that South Africa currently has 56 registered CDM projects (refer to Table 5.1). Figure 5.13 indicates a peak in registrations during 2012, with no new projects having been registered after 2014. This zenith can likely be ascribed to the fact that the window of opportunity for CDM project

[112] International Energy Agency (IEA) *Share of total primary energy supply in 2014 – South Africa* (2014), available at https://www.iea.org/stats/WebGraphs/SOUTHAFRIC4.pdf, accessed on 17 March 2017.

[113] ESKOM *Company information overview* (2017), available at http://www.eskom.co.za/OurCompany/CompanyInformation/Pages/Company_Information.aspx, accessed on 12 March 2017.

[114] J Wakeford 'The South African Energy Context' in J Glazewski & S Esterhuyse (eds) *Hydraulic Fracturing in the Karoo: critical legal and environmental perspectives* (2016).

implementation was drawing to a close when the first commitment period of the Kyoto Protocol came to an end.[115]

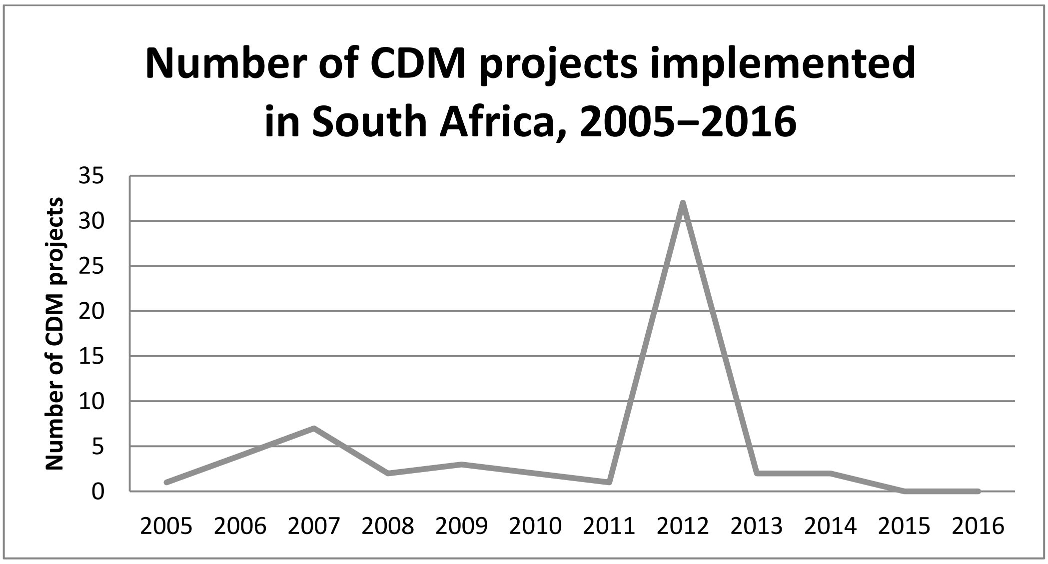

Figure 5.13 Total number of CDM projects in South Africa through 2016[116]

South Africa's DNA was established with the Department of Energy (as discussed in Chapter 3). The CDM includes various project types, such as hydroelectricity, improved public transport and industrial energy efficiency. The geographical distribution across provinces in South Africa will be examined in Chapter 6.

Having analysed the international status of the CDM, it is now necessary to extend our focus to the future in an attempt to gauge the global appetite for SDM projects. To that end, the last section of this chapter offers an overview of the ratification status of the Paris Agreement by the BRICS countries.

5.4 RATIFICATION OF THE PARIS AGREEMENT

5.4.1 Introduction

It was stated earlier in Chapter 1 that the Paris Agreement[117] entered into force on 4 November 2016. The Paris Agreement is founded on nationally determined contributions (NDCs) by countries

[115] It was expected that the Kyoto Protocol would have terminated by 2012 and been replaced by a new protocol.

[116] Source: Author's own, based on information from South Africa's registered projects documentation.

[117] United Nations (UN) *Paris Agreement – Status of Ratification* (2017), available at http://unfccc.int/paris_agreement/items/9444.php, accessed on 20 March 2017.

themselves, in keeping with their specific situation. To ensure the success of the Paris Agreement, it is imperative that parties translate their NDCs into specific policies and measures.

The CDM framework is available to parties, also as a domestic instrument, and can be used to achieve some of the key elements needed for NDC implementation. It could therefore be argued that the status of a country's ratification of the Paris Agreement could be indicative of its willingness to implement market-based instruments as part of its mitigation action. This section will accordingly examine the status quo of ratification of the Paris Agreement in each of the BRICS countries as a means of gauging the possible success of the SDM there.

5.4.2 Brazil

During September 2015, Brazil announced its intended nationally determined contribution (INDC), with an emissions target of 1.3 $GtCO_2e$ by 2025 and 1.2 $GtCO_2e$ by 2030.[118] This is equivalent to 37 per cent and 43 per cent, respectively, below 2005 emissions levels, including Land Use, Land-Use Change and Forestry (LULUCF).[119] Additionally, the document lists sectoral measures to achieve these targets. Brazil officially ratified the Paris Agreement on 21 September 2016, transforming the INDC into a NDC.[120]

According to Climate Action Tracker's[121] analysis, Brazil's emissions reduction targets are 'at the least ambitious end of a fair contribution to global mitigation'.[122] Their research shows that Brazil is set to meet its 2025 target, but would need to enhance its efforts to reach the target emissions levels

[118] Federative Republic of Brazil *Intended Nationally Determined Contribution towards achieving the objective of the United Nations Framework Convention on Climate Change* (2016) at 1-2, available at http://www4.unfccc.int/ndcregistry/PublishedDocuments/Brazil%20First/BRAZIL%20iNDC%20english%20FINAL.pdf, accessed on 20 March 2017.

[119] Ibid.

[120] United Nations *Status of Ratification* (n117).

[121] Climate Action Tracker (CAT) is an independent scientific analysis produced by three research organisations, tracking climate action and global efforts towards the globally agreed aim of holding warming below 2°C, since 2009. The CAT consortium comprises Climate Analytics (a non-profit climate science and policy institute based in Germany), Ecofys (a leading international energy and climate consultancy which forms part of Navigant's global energy practice) and the NewClimate Institute (which supports research and implementation of action against climate change around the globe). For more information, see http://climateactiontracker.org/about.html, accessed on 20 March 2017.

[122] Climate Action Tracker *Brazil* (2016), available at http://climateactiontracker.org/countries/brazil/2016.html#Footnotes, accessed on 20 March 2017.

for 2030. This discrepancy (between the NDC and Paris Agreement goals) can be attributed to increasing energy demand and an implementation lag that affects climate policy in Brazil.[123]

On a positive note, Brazil's NDC proposes an 'absolute target'[124], which actually constrains emissions.[125] Moreover, the NDC sets out a clear plan to achieve this target, including the goal of reaching a 45 per cent share of renewables in its primary energy mix by 2030.[126]

5.4.3 Russia

In March 2015, the Russian Federation submitted its INDC, proposing to reduce emissions by 25 to 30 per cent below 1990 levels by 2030.[127] The Russian government officially signed the Paris Agreement on 22 April 2016. However, at the time of writing (September 2017), the ratification of the agreement and thus the submission of the definitive NDC are still pending.[128]

Russia's targets could be viewed as 'inadequate'.[129] The significant fall in emissions in the early 1990s means that Russia can, in fact, increase its emissions until 2030 without missing its goal.[130] In addition, as indicated in its INDC, the Russian boreal forests have global significance for mitigating climate change, protecting water resources, preventing soil erosion and conserving biodiversity on the planet.[131] The rational use, protection, maintenance and forest reproduction are

[123] Ibid. It is also noted that emissions in most sectors are expected to continue rising until at least 2030.

[124] Ibid. This is a target relative to emissions in a historical year, as opposed to reductions below BAU (or an intensity target).

[125] Ibid.

[126] Brazil *INDC* (n118) at 3. The NDC suggests the following:

- expanding the use of renewable energy sources other than hydropower in the total energy mix to between 28 per cent and 33 per cent by 2030;
- expanding the use of non-fossil fuel energy sources domestically, increasing the share of renewables (other than hydropower) in the power supply to at least 23 per cent by 2030, including by raising the share of wind, biomass and solar; and
- achieving 10 per cent efficiency gains in the electricity sector by 2030.

[127] Russian Federation *Intended Nationally Determined Contribution* (unofficial translation) (2016), available at http://www4.unfccc.int/submissions/INDC/Published%20Documents/Russia/1/Russian%20Submission%20INDC_eng_rev1.doc, accessed on 29 March 2017.

[128] United Nations *Status of Ratification* (n117).

[129] Climate Action Tracker *Russia* (2016), available at http://climateactiontracker.org/countries/russianfederation.html, accessed on 29 March 2017.

[130] Ibid.

[131] Russia *INDC* (n127).

important elements of the Russian policy to reduce GHG emissions.[132] Consequently, Russia's calculation of its GHG emissions should be reduced by the factor attributable to Russia's boreal forests (thus, excluding LULUCF).[133]

As the world's third largest emitter, and one of the most important fossil fuel producers, Russia has large mitigation potential and 'should play a major role in international climate policies'.[134]

5.4.4 India

On 2 October 2016 – symbolically coinciding with Mahatma Gandhi's birthday – India ratified the Paris Agreement.[135] Prior to this, on 1 October 2015, India had submitted its NDC, which aims to lower the emissions intensity of GDP by 33 to 35 per cent below 2005 levels by 2030.[136] With greater emphasis on solar and wind energy sources, the document aspires to increase the share of non-fossil based power generation capacity to 40 per cent of installed electric power capacity by 2030 (equivalent to 26 to 30 per cent of generation in 2030), and to create an additional (cumulative) carbon sink of 2.5 to 3 $GtCO_2e$ through additional forest and tree cover by 2030.[137]

The targets set under India's NDC are challenging, considering that the country has approximately 300 million people without access to electricity and is home to 30 per cent of the global poor.[138] As in the case of Brazil, these targets may not be consistent with limiting warming to below 2°C.[139]

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[132] Ibid.

[133] Climate Action Tracker *Russia* (n129).

[134] Ibid. The analysis reveals that, in 2014, Russia's emissions (excluding LULUCF) were 30 per cent lower than in the base year of 1990. Consequently, Russia would not need to implement any new policies to achieve its current target.

[135] United Nations *Status of Ratification* (n117). India made the following declaration upon ratification of the Paris Agreement:

> 'The Government of India declares its understanding that, as per its national laws; keeping in view its development agenda, particularly the eradication of poverty and provision of basic needs for all its citizens, coupled with its commitment to following the low carbon path to progress, and on the assumption of unencumbered availability of cleaner sources of energy and technologies and financial resources from around the world; and based on a fair and ambitious assessment of global commitment to combating climate change, it is ratifying the Paris Agreement'.

[136] India *Intended Nationally Determined Contribution: working towards climate justice* (2016), available at http://www4.unfccc.int/ndcregistry/PublishedDocuments/India%20First/INDIA%20INDC%20TO%20UNFCCC.pdf, accessed on 22 March 2017.

[137] Ibid.

[138] Id at 5.

[139] Climate Action Tracker *India* (2016), available at http://climateactiontracker.org/countries/india.html, accessed on 22 March 2017.

This view is due, in part, to a lack of transparency in India's NDC in terms of describing the GHGs and the manner in which the country envisages it will achieve the non-fossil power capacity target.[140]

At the G8+5 Summit[141] in Germany in 2007, then Indian Prime Minister Singh pledged that India's per capita emissions would never exceed those of the developed world.[142] Given India's low per capita emissions, meeting this pledge does not require any additional emissions reductions compared to the current policy projections up to 2030.[143]

5.4.5 China

During June 2015, China announced its INDC which endeavours to reduce the emissions intensity of GDP by 60 to 65 per cent below 2005 levels by 2030.[144] China ratified the Paris Agreement on 3 September 2016, transforming the INDC into a NDC.[145] The policies which are in place to reach the NDC goals include the goal for CO_2 emissions to peak by 2030 at the latest, increasing the share

[140] Ibid.

[141] The Group of Eight + Five (G8+5) was an international group that consisted of the leaders of the heads of government from the G8 nations, plus the heads of government of the five leading emerging economies (Brazil, India, China, Mexico and South Africa). The Global Legislators Organisation (GLOBE International) held a meeting of the G8+5 Climate Change Dialogue in Washington, D.C., where a non-binding agreement was reached to cooperate on tackling global warming. See http://globelegislators.org/, accessed on 26 March 2017.

[142] NP Rastogi 'Winds of change: India's emerging climate strategy' (2011) 46(2) *The International Spectator* 127-141.

[143] Climate Action Tracker *India* (n139). The researchers acknowledge that India's pledges are in line with effort sharing approaches that focus on equal cumulative per capita emissions. They point out that approaches which focus on historical responsibility and capability would require more stringent emissions reductions.

[144] China *Enhanced Actions on Climate Change: China's Intended Nationally Determined Contributions* (unofficial translations) (2015) at 5, available at http://www4.unfccc.int/ndcregistry/PublishedDocuments/China%20First/China%27s%20First%20NDC%20Submission.pdf, accessed on 26 March 2017.

[145] United Nations *Status of Ratification* (n117). China made the following declaration upon ratification of the Paris Agreement:

> 'In accordance with the Basic Law of the Hong Kong Special Administrative Region of the People's Republic of China and the Basic Law of the Macao Special Administrative Region of the People's Republic of China, the Government of the People's Republic of China decides that the Agreement applies to the Hong Kong special Administrative Region and the Macao Special Administrative Region of the People's Republic of China'.

of non-fossil energy carriers of the total primary energy supply to around 20 per cent by that time, and increasing its forest stock volume by 4.5 billion cubic metres, compared to 2005 levels.[146]

As with Brazil and India's rating, China's estimated emission levels for 2025 and 2030, resulting from all aspects of the NDC, except the carbon intensity target, may not be consistent with limiting warming to below 2°C.[147] However, the emissions resulting from the 2030 carbon intensity targets – if viewed in isolation – are 'significantly higher and would be rated as inadequate'.[148] This could be ascribed to the view that the weak NDC carbon intensity targets would only be reached at the expense of important national policies and actions, including in relation to reduced air pollution.[149]

On the upside, China is implementing noteworthy climate change policies and recent research suggests that coal consumption may well have peaked; the analysis seems to indicate that China will achieve both its 2020 pledge and its 2030 plans.[150] China's peak in CO_2 emissions will have a major impact on global CO_2 emissions in the period after 2030.[151] The country's participation in international climate change negotiations is gradually moving to centre stage.[152] Whether or not its commitments to cap its carbon emissions are sufficiently ambitious, other key players are likely to follow suit.

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146 China INDC (n144) at 5.

147 Climate Action Tracker *China* (2016), available at http://climateactiontracker.org/countries/china.html, accessed on 26 March 2017.

148 Ibid.

149 Ibid.

150 Ibid. The researchers draw attention to the fact that China's total GHG emissions are likely to continue increasing until 2030, as the country has not yet implemented sufficient policies addressing non-CO_2 GHG emissions. It is therefore encouraging to note that China's NDC acknowledges that addressing these gases is important and requires further action.

151 Ibid.

152 Z Zhang 'Are China's climate commitments in a post-Paris agreement sufficiently ambitious?' (2016) *Wiley Interdisciplinary Reviews: Climate Change* 1-20 at 14 also opines that China 'has shown great flexibility in making several significant concessions' in enabling the Paris Agreement to come to fruition.

5.4.6 South Africa

In September 2015, South Africa submitted its INDC, which included a target of reducing GHG emissions to between 398 and 615 $MtCO_2e$ (including LULUCF), over the period 2025 to 2030.[153] South Africa ratified the Paris Agreement on 1 November 2016.[154] The country's NDC is consistent with its pledge under the Copenhagen Accord, which proposes emissions reductions below business-as-usual (BAU) levels by 34 per cent in 2020 and 42 per cent in 2025.

Interestingly, Bodansky et al mention that in the lead up to Paris, South Africa was among the many countries who had called for an obligation that parties should be required to achieve their NDCs.[155] They further remark that this view was 'strenuously opposed' by some other countries (including the US, China and India) who did not wish to be subject to legally binding obligations of result.[156] Now, of course, it is apparent that the Paris Agreement deferred to the latter countries in this respect.[157]

Notwithstanding that the South African NDC assumes the finalisation of an ambitious, fair, effective and binding multilateral agreement under the UNFCCC at COP21,[158] it also highlights the fact that economic and social development and poverty eradication are South Africa's top priorities.[159] However, as was the case with the other BRICS nations, South Africa's commitment could be considered as 'inadequate' in reaching the 2°C pathway.[160]

Thus, it is cautioned that care should be taken to ensure that the emissions reduction target is strengthened to reflect South Africa's responsibility to act based on its historical emissions, as well as the country's comparatively high emissions per capita.[161]

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[153] South Africa *Intended Nationally Determined Contribution (INDC)* (2015) at 6, available at http://www4.unfccc.int/submissions/INDC/Published%20Documents/South%20Africa/1/South%20Africa.pdf, accessed on 29 March 2017.

[154] United Nations *Status of Ratification* (n117).

[155] Bodansky et al (n12) at 231 also point out that the other countries in support of this view were the EU and the small island states.

[156] Ibid.

[157] Ibid. To ensure that parties act in good faith, Art 13(7)(*b*) of the Paris Agreement requires each party to provide the information necessary to track progress in the implementation and achievement of its NDC.

[158] South Africa *INDC* (n153) at 3.

[159] Id at 7.

[160] Climate Action Tracker *South Africa* (2015), available at http://climateactiontracker.org/countries/southafrica.html, accessed on 29 March 2017.

[161] Ibid.

The next chapter will consider the measure of South Africa's success with CDM project participation in the years leading up to the Paris Agreement.

5.5 CONCLUSION

This chapter examined the global contribution of the CDM, with a focus on the BRICS countries. A comparative analysis was conducted among geographical regions, which highlighted the CDM's project generation ability, contribution to the economy, investment capability and actual emission reductions. In all four indicators, Asia ranked first. This is not surprising, as the two largest CDM participants (China and India) are included in this regional cluster. For all four parameters, Africa fared somewhat better than the Middle East, but it was found that there is considerable scope for improvement.

A more nuanced analysis of the BRICS countries revealed that South Africa's CDM per capita ranked lowest. Regrettably, the country also had (by a far margin) the highest CO_2 emissions per capita. When applying a different metric, namely that of CDM as a percentage of GDP, South Africa was on par with Brazil. Encouragingly, South Africa ranked first in terms of the estimated CO_2e reductions per CDM project.

The energy context of each of the BRICS countries was also considered, as well as their CDM profile. It became apparent that further in-depth study of South Africa's CDM projects was required in order to truly evaluate its success – this will be done in the next chapter.

Finally, this chapter examined the status of each BRICS country's ratification of the Paris Agreement and commitments made under their NDCs. This was performed as a means of gauging the possible appetite of participating in the SDM. With the notable exception of Russia (which also does not participate in the CDM), it was noted that all BRICS countries have ratified the Paris Agreement. As regards the commitment to reduce GHG emissions, however, it was found that all the countries fell short in their targets to limit warming to below 2°C.

The next chapter will provide a quantitative analysis of all 56 registered CDM projects in South Africa, by assigning sustainable development criteria to the goals stated in each project design document. The analysis is aimed at enhancing South Africa's participation in future global SDM projects.

Chapter 6

The status of the CDM in South Africa

6.1 INTRODUCTION

This chapter builds on the analysis conducted in the previous chapter, wherein the global contribution of the Clean Development Mechanism (CDM) was considered. Article 12 of the Kyoto Protocol lists the contribution to sustainable development in host countries as the primary objective of the CDM. It is awarded the same level of importance as assisting Annex I parties to meet their emissions reduction targets.

This chapter aims to understand and assess the extent to which the CDM has, in fact, contributed to sustainable development in South Africa. First, an overview of the criteria currently used by Designated National Authorities (DNAs) to assess sustainable development contributions of CDM projects is provided. This chapter then presents the analysis undertaken for this study on the reporting of sustainable development impacts in registered Project Design Documents (PDDs). The resulting trends in reported impacts are subsequently presented by province and project type.

The chapter concludes by considering a case study from South Africa, where the country's first CDM project has received mixed reviews.

6.2 THE CDM'S CONTRIBUTION TO SUSTAINABLE DEVELOPMENT

It will be recalled from Chapter 4 that South Africa's National Environmental Management Act (NEMA) defines sustainable development as 'the integration of social, economic and environmental factors into planning, implementation and decision-marking so as to ensure that development serves present and future generations'. The UN, in its Brundtland Report, *Our Common Future*,[1] describes sustainable development as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. The report 'sparked an extensive body of literature on the concept of sustainable development as well as numerous attempts to measure whether specific actions contribute to sustainable development'.[2]

[1] World Commission on Environment and Development *Our Common Future* (1987) at 8, available at http://www.un-documents.net/our-common-future.pdf, accessed on 9 April 2017.

[2] United Nations Framework Convention on Climate Change (UNFCCC) *Benefits of the Clean Development Mechanism* (2012) at 13, available at https://cdm.unfccc.int/about/dev_ben/index.html, accessed on 21 March 2017.

Operationally, the concept of sustainable development encompasses three dimensions: the social, the economic and the environmental.[3] Each pillar has a number of indicators, which elaborate on its contribution.[4] There are ten indicators in total, as described in Table 6.1 below.[5]

Table 6.1: Sustainable development dimensions and indicators for CDM projects

Dimension	Indicator	Description
Economic	Stimulation of the local economy, including job creation and poverty alleviation	• Economic improvements for the population through direct or indirect job creation or retention of jobs, during the operation and construction phases; • Domestic or community costs savings; • Financial benefits of the project for the national economy of the host country; • Enhancement of local investment and tourism; • Improvement of trade balance for the country; • Reinvestment of CDM proceeds into the community; • Creation of tax revenue for the community.
	Development and diffusion of technology	Development, use, improvement and/or diffusion of a new local or international technology, international technology transfer or development of an in-house innovative technology.
	Improvement to infrastructure	Creation of infrastructure (eg roads and bridges) and improved service availability (eg health centres and water availability).
Environmental	Reduction of pollution	• Reducing gaseous emissions other than Greenhouse Gases (GHGs), effluents and odour, and environmental and noise pollution; • Enhancing indoor air quality.
	Promotion of reliable and renewable energy	• Supplying more or making less use of energy; • Stabilising energy for the promotion of local enterprises; • Diversifying the sources of electricity generation; • Converting or adding to the country's energy capacity that is generated from renewable sources; • Reducing dependence on fossil fuels; • Helping to stimulate the growth of the renewable power industries.
	Preservation of natural resources	• Promoting comprehensive utilisation of the local natural resources (ie utilising discarded biomass for energy rather than leaving it to decay, utilising water and solar resource);

[3] Id at 15.

[4] Ibid.

[5] Ibid.

		• Promoting efficiency (eg compact fluorescent lamps rather than incandescent lamps); • Recycling; • Creating positive by-products; • Improvement and/or protection of natural resources, including the security of non-renewable resources, such as fossil fuels, or of renewable resources such as soil and soil fertility, biodiversity (eg genetic diversity, species, alteration or preservation of habitats existing within the project's impact boundaries and depletion level of renewable stocks like water, forests and fisheries), water, availability of water and water quality.
Social	Improvement of health and safety	• Improvements to health, safety and welfare of local people through a reduction in exposure to factors impacting health and safety, and/or changes that improve their lifestyles, especially for the poorest and most vulnerable members of society; • Improved human rights.
	Engagement of local population	• Community or local/regional involvement in decision-making; • Respect and consideration of the rights of local/indigenous people; • Promotion of social harmony; • Education and awareness of local environmental issues; • Professional training of unskilled workers; • Reduction of urban migration.
	Promotion of education	• Improved accessibility of educational resources (reducing time and energy spent by children in collecting firewood for cooking, having access to electricity to study at night, and supplementing other educational opportunities); • Donating resources for local education.
	Empowerment of women, care of children and the frail	• Provision of and improvements in access to education and training for young people and women; • Enhancement of the position of women and children in society.

Owing, partly, to the absence of an accepted international definition for sustainable development, the responsibility for determining whether a CDM project contributes to national sustainable development, as defined by the host country, currently resides with its DNA.[6] The DNA therefore states in its letter of approval of the CDM project that, in its judgement, the proposed CDM project will contribute to the country's sustainable development.[7] A Designated Operational Entity (DOE)

[6] Ibid.

[7] Ibid.

must ensure confirmation by the DNA of the host country that the project activity does, in fact, assist in achieving sustainable development in the host country.[8]

On a macro level, some of the global benefits of the CDM can be listed as follows:[9]

- *Attracts clean energy investment*: CDM projects attract foreign and domestic funding for projects aimed at reducing GHG emissions and generation of clean energy; this can also foster partnerships to promote low-carbon growth.
- *Global environmental benefits*: Companies and governments are encouraged to participate in projects aimed at sequestering or reducing GHG emissions, which further reduce global warming.
- *Enhanced transfer and sale of clean and green technologies*: The use of low-carbon technologies and processes is promoted by the CDM. This, in turn, leads to transfer of technologies between regions and to enhanced sale and purchase of high-end technologies.
- *Reduced dependence on fossil fuels*: CDM advances generation of energy from renewable (or non-fossil) sources, thereby leading to conservation of already scarce fossil fuels. This leads to a reduction in atmospheric emissions.
- *Enhanced role of private sector in addressing the issue of climate change*: The private sector is encouraged to play an active role in mitigating climate change.
- *Enhanced awareness and creation of a knowledge base*: In addition to the creation of a knowledge base for evaluating and monitoring GHG mitigation projects, the CDM also contributes to creating awareness about the impact of GHGs on climate. It also promotes educational activities and dissemination of information and research on this subject.
- *Job creation*: CDM results in new employment opportunities, including income generation.
- *Economic benefits to local stakeholders*: CDM projects lead to new industrial activities and business opportunities, inflow of funds and technologies, growth of infrastructure, and enhanced productivity.

The sustainable development indicators (as listed in Table 6.1) are required to measure how a CDM project contributes to sustainable development on a national level. Consequently, the next section examines the contribution of CDM projects to sustainable development in South Africa.

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[8] Ibid.

[9] R Spalding-Fecher, AN Achanta, P Erickson, E Haites, M Lazarus, N Pahuja, N Pandey, S Seres & R Tewari 'Assessing the impact of the clean development mechanism' *Report commissioned by the High Level Panel on the CDM Policy Dialogue* (2012) at 57, available at http://www.cdmpolicydialogue.org/research/1030_impact.pdf, accessed on 2 April 2017.

6.3 CONTRIBUTION OF CDM PROJECTS IN SOUTH AFRICA

6.3.1 Distribution by region

As at 30 September 2017, there are 56 registered CDM projects in South Africa, spread over all nine provinces of the country. Following on the preliminary analysis conducted in the previous chapter, this chapter has cross-referenced the information contained in the PDDs with the United Nations CDM registry.[10] Only registered projects were included in the analysis (ie excluding projects in the pipeline, for example, in the validation phase). Figure 6.1 demonstrates an uneven distribution across regions, with a small number of provinces hosting the majority of CDM projects.[11]

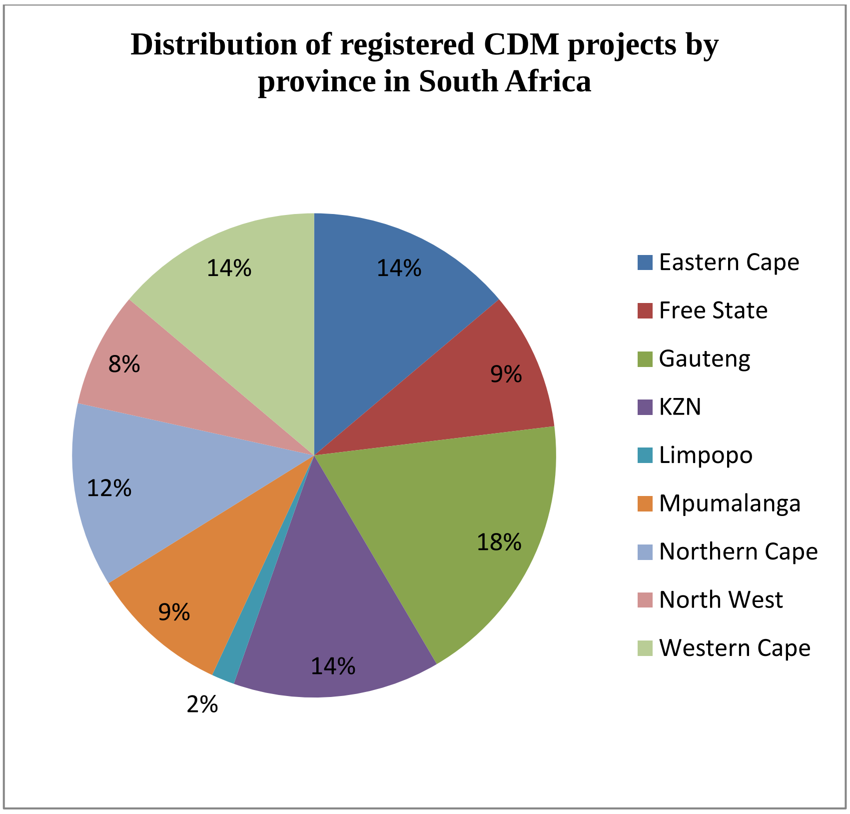

Figure 6.1 Geographical distribution of CDM projects in South Africa (author's own)

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[10] All graphs are based on analyses conducted by the UNEP DTU Partnership (formerly UNEP Risø Centre) on regularly updated information. The partnership collaborates with the energy branch of the UN Environment's Economy Division. It is a leading international research and advisory institution on energy, climate and sustainable development. For more information, see http://www.unepdtu.org/, accessed on 30 September 2017. Refer to *CDM Pipeline* spreadsheet 'Regions', available at http://www.cdmpipeline.org/cdm-projects-region.htm.

[11] Where a CDM project is jointly hosted by a number of provinces, this was counted as a project in each of the provinces. For example, project no. 7478 deals with energy efficiency households and is co-hosted by Gauteng, Free State, Limpopo, Mpumalanga and Northern Cape.

Gauteng is the dominant region for CDM projects (at 18%), followed by the Western Cape, Eastern Cape and KwaZulu-Natal (KZN) (all at 14%). These four provinces account for over half of all CDM projects in South Africa. The lowest number of CDM projects is found in North West (8%) and Limpopo (2%).

The uneven distribution may be indicative of the uneven spread of economic wealth in the various provinces, as Gauteng and the Western Cape are generally considered as the economic hubs of the country. Figure 6.2 depicts the average Gross Domestic Product (GDP) growth per province from 2004 to 2014.

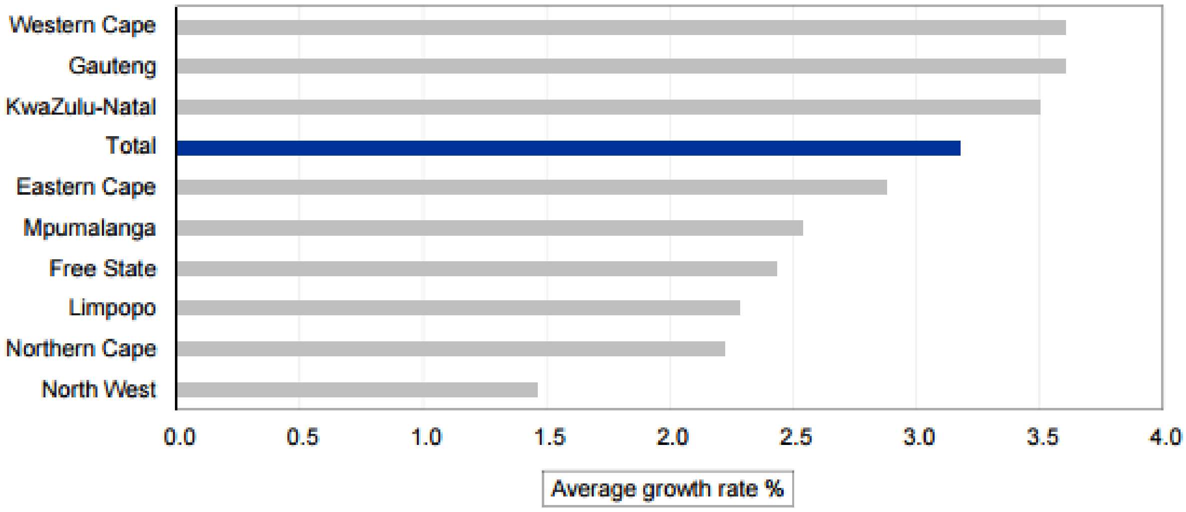

Figure 6.2 Average GDP growth per province, 2004 - 2014[12]

The Western Cape, Gauteng, KZN and the Eastern Cape outperform the other provinces, with the Western Cape and Gauteng on par. Compared to the rest of the country, where growth averaged 3.1 per cent between 2004 and 2014, growth in the Western Cape averaged 3.7 per cent. Over the period 2004 to 2014, the Western Cape registered the joint fastest growth, along with Gauteng.[13] The distribution of economic growth correlates with the geographical distribution of CDM projects. Accordingly, it could be surmised that the wealth of a province serves as an indicator of their

[12] Western Cape Government Provincial Treasury *Provincial Economic Review and Outlook 2016* (2016) at 44, available at https://www.westerncape.gov.za/assets/departments/treasury/Documents/Research-and-Report/2016/2016_pero_to_printers_23_september_2016_final.pdf, accessed on 3 April 2017.

[13] Ibid.

willingness to host CDM projects. It could also be indicative of the provincial authority's ability to attract foreign investors and create an enabling financial environment within which to operate.

Furthermore, the provincial spread could be demonstrative of the enthusiasm of local government in driving CDM projects – in other words, a province's appetite to host CDM projects and to mitigate climate change. The following are examples of provincial initiatives to respond to climate change:[14]

(i) KwaZulu-Natal

The Durban Adaptation Charter (DAC) commits local governments to local climate action in their jurisdiction that will assist their communities to respond to and cope with climate change risks.[15] By signing the DAC they commit, inter alia, to:

- Providing key information of all local government development planning;
- Ensuring that adaptation strategies are aligned with mitigation strategies;
- Promoting the use of adaptation that recognises the needs of vulnerable communities and ensuring sustainable local economic development;
- Prioritising the role of functioning ecosystems as core municipal green infrastructure; and
- Seeking innovative funding mechanisms.

To aid in the implementation of the DAC, a Central KwaZulu-Natal Climate Change Compact was formed to facilitate information sharing and collaboration on climate change adaptation projects. As the metropolitan, district and local municipalities of central KwaZulu-Natal are signatories to the DAC, they have committed themselves to take local climate action in their jurisdiction.

(ii) City of Cape Town

The GreenCape[16] initiative has undertaken the project management, on behalf of the Department of Trade and Industry (DTI), the Western Cape Government and the City of Cape Town, in the

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[14] These examples were derived from a monthly report which this author compiled in her capacity as South Africa's country manager for the Climate Scorecard citizens' initiative. See L-A Steenkamp 'South Africa: Regions/Provinces/States' (February 2017) in L Barber & R Israel (eds) *Climate Scorecard Report #7: Sub-national Best Practices*, available at http://climatescorecard.org/wp-content/uploads/2017/02/ClimateScorecardReport7.pdf, accessed on 30 July 2017.

[15] See http://www.durbanadaptationcharter.org/contact, accessed on 10 December 2016.

[16] GreenCape is a non-profit organisation, which was established in 2010 and aims to unlock the investment potential of green business, technologies and manufacturing. See http://www.green-cape.co.za/, accessed on 10 December 2016.

application for the designation of a Greentech Special Economic Zone (SEZ) in Atlantis.[17] The term 'Greentech' refers to low-carbon and resource-efficient technologies. This SEZ has the potential to create 2 500 direct jobs, whilst also contributing to environmental efforts. Significant tax breaks are offered to companies operating within an SEZ.

(iii) Gauteng

The Gauteng Climate Adaptation Forum is a platform for cities in the province to hone their skills and cross-pollinate ideas on climate change adaptation for sustainable development and the wellbeing of their residents.[18] The focus is placed especially on the urban poor (such as residents of informal settlements), who bear the brunt of climate change in developing countries. The forum also aims to promote coordination of climate change issues amongst institutions.

The forum provides a platform for sharing experiences, practical approaches and frameworks relating to climate change adaptation. Membership includes representatives from civil society, government, parastatals, academia and business.

6.3.2 Distribution by type

There are 24 different CDM project types or technologies (refer to Table 6.2 on the next page), of which 13 are employed in South Africa.[19]

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[17] Atlantis is a town in the City of Cape Town Metropolitan Municipality and is located in the Western Cape.

[18] See http://www.adaptationnetwork.org.za/2016/02/gauteng-provincial-climate-change-forum/, accessed on 10 December 2016.

[19] UNFCCC *Benefits* (n2) at 78.

Table 6.2 Definitions of project types applicable for the projects analysed in this study	
Project type	**Definition**
Afforestation and reforestation	According to land use, land-use change and forestry rules
Agriculture	Irrigation, alternative fertilisers and rice crop methane avoidance
Methane avoidance	Biogas from manure, waste water, industrial solid waste and palm oil solid waste, or methane avoidance by composting or aerobic treatment
Biomass energy	New plant using biomass or existing ones changing from fossil fuels to biomass; also biofuels
Cement	Projects where lime in the cement is replaced by other materials, or neutralisation with lime is avoided
CO_2 capture	Recovered CO_2 from tail gas substituting fossil fuels for production of CO_2
Coal bed/mine methane	CH_4 is collected from coal mines or coal beds, including ventilation air methane
Energy distribution	Reduction in losses in transmission/distribution of electricity/district heat; country interconnection
Energy efficiency: households	Energy efficiency improvements in domestic houses and appliances
Energy efficiency: industry	End-use energy efficiency improvements in industry
Energy efficiency: own generation	Waste heat or waste gas used for electricity production in industry
Energy efficiency: service	Energy efficiency improvements in buildings and appliances in public and private service
Energy efficiency: supply side	More efficient power plants producing electricity and district heat, coal field fire extinguishing
Fossil fuel switch	Switch from one fossil fuel to another fossil fuel (including new natural gas power plants)
Fugitive	Recovery instead of flaring of CH_4 from oil wells, gas pipeline leaks, charcoal production and fires in coal piles
Geothermal	Geothermal energy
HFCs	HFC-23 destruction
Hydro	New hydro power plants
Landfill gas	Collection of landfill gas, composting of municipal solid waste, or incinerating of the waste instead of land filling
N_2O	Reduction of N_2O from production of nitric acid, adipic acid and caprolactam
PFCs and SF_6	Reduction of emissions of PFCs and SF_6
Solar	Solar photovoltaic, solar water heating and solar cooking
Tidal	Tidal power
Transport	More efficient transport

Figure 6.3 illustrates the spread of the various project types in South Africa.

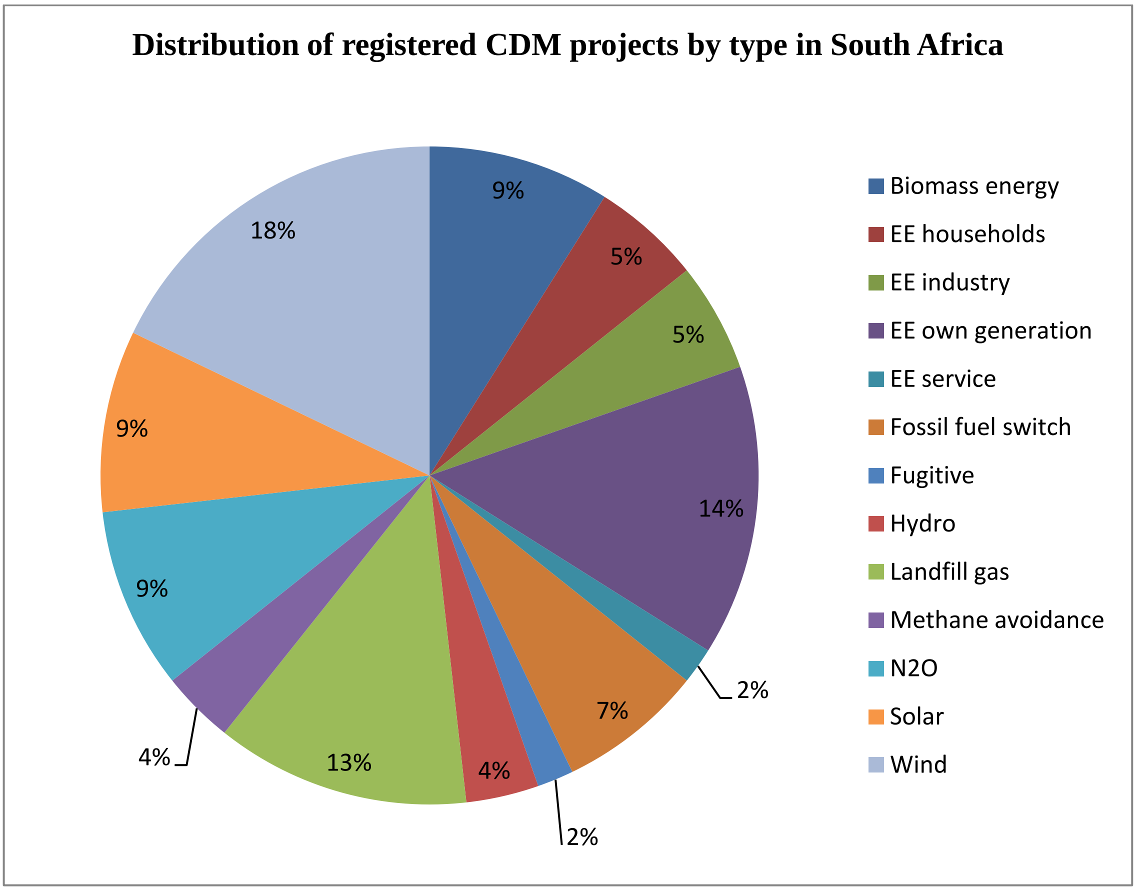

Figure 6.3 Distribution of CDM projects by type (author's own)

The most dominant of all technologies – by a clear margin – is wind technology at 18%, followed by energy efficiency own generation at 14%. These two project types constitute approximately one-third of the total CDM projects in South Africa, with the lowest number of CDM projects being in energy efficiency services and fugitive (both at 2%).

Given that there are 13 different project technologies, with only two project types constituting the majority of all projects, it would appear that South Africa's project type distribution is also uneven. Surprisingly, despite the abundance of sunshine in South Africa (refer to Figure 6.4), solar energy CDM projects only comprise nine per cent of the total projects – half that of wind power.

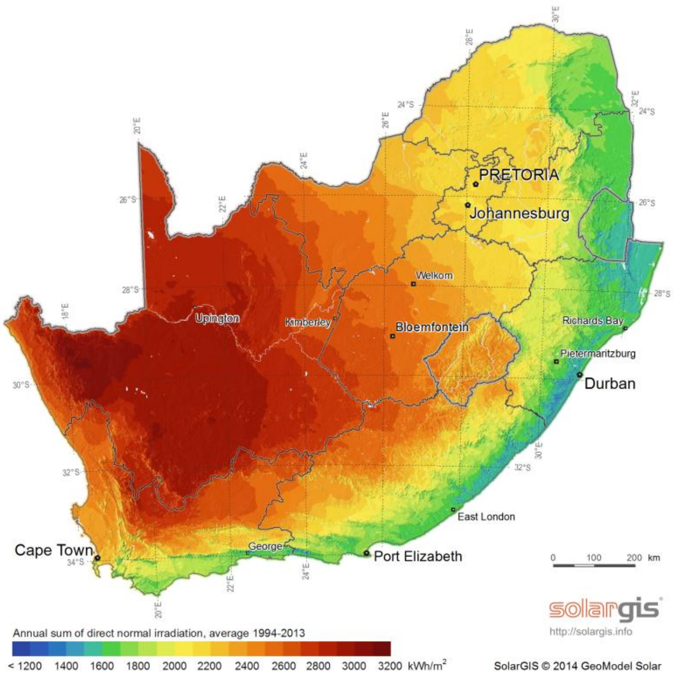

Figure 6.4 Direct Normal Solar Irradiation (DNI) map of South Africa[20]

6.3.3 Evaluating South Africa's CDM projects

One method of assessing the contribution of CDM projects to sustainable development in a region is the systematic examination of the supporting PDDs.[21] The PDDs of all 56 registered CDM projects in South Africa were therefore scrutinised in order to measure their contribution to sustainable development. The sustainable development claims in the PDDs of these projects were tabulated using the indicators in Table 6.1. It should be cautioned that the indicators are based on information in the PDDs, which reflects the expected contributions at the time the project is being validated. The actual contributions may differ.[22]

[20] Centre for Renewable and Sustainable Energy Studies 'New solar resource maps for South Africa' (2014), available at http://www.crses.sun.ac.za/research-publications-resources, accessed on 3 April 2017.

[21] See, for example, S Sirohi 'CDM: Is it a "win-win" strategy for rural poverty alleviation in India?' (2007) 84(1) *Climatic Change* 91-110; C Sutter & JC Parreno 'Does the current Clean Development Mechanism (CDM) deliver its sustainable development claim? An analysis of officially registered CDM projects' (2007) 84(1) *Climatic Change* 75-90; and S Pillay 'The impact of Clean Development Mechanism projects on sustainable development in South Africa' (2015) 14(6) *International Business & Economics Research Journal* 777-790.

[22] The comparison of expected versus actual outcomes could be the subject matter of future research, wherein the sustainable development claims could be independently verified (also see next footnote).

The aim of this review is to provide high-level insight in terms of the sustainable development benefits at the project level.[23] The analysis was conducted in an Excel spreadsheet (contained in Annexure C of this thesis), with the findings illustrated in Figure 6.5 below.

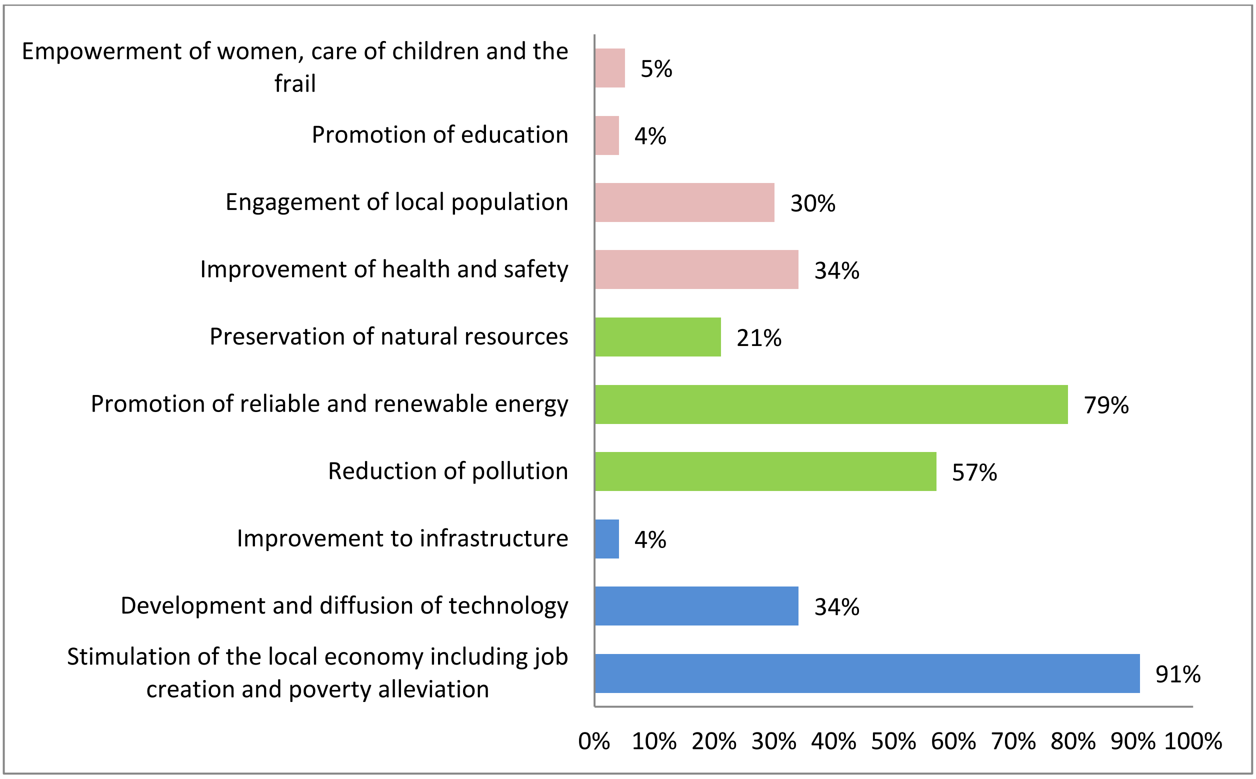

Figure 6.5 Percentage of South African PDDs mentioning various indicators (author's own)

When referring to the economic sustainable development criteria in Figure 6.5, it is evident that nearly all (91%) of CDM projects addressed employment generation and poverty alleviation, 34% addressed technology transfer and only 4% addressed improvement to infrastructure. The technology benefits were primarily as a result of installation or creation of new machines or equipment, which would assist in the reduction of GHGs.

As regards environmental criteria, the majority of projects (79%) focus on the promotion of reliable and renewable energy. This was followed by the reduction of pollution (57%), with the preservation of natural resources coming in last (21%).

[23] It is acknowledged that a possible limitation on this type of analysis is that some information might have been omitted from the PDD, or that some views in the PDD may be over- or understated. A future research opportunity could be to perform a comprehensive review in later stages of the project life cycle to evaluate whether PDD targets were met. This could be done by way of interviews with the project managers.

Social criteria seem to be lowest on the priority list: the improvement of health and safety claimed the top position (at 34%), followed by the engagement of the local population (30%), empowerment of women, care of children and the frail (5%), and the promotion of education (4%).

The chapter concludes with a brief account of the country's first registered CDM project and why it is considered both a success and a failure.

6.4 THE KUYASA PROJECT – AN AMBIVALENT TALE

South Africa's first registered CDM project is the *Kuyasa Low-income Housing Energy Upgrade* project, located in Khayelitsha (an impoverished township in Cape Town).[24] Developed by the Non-governmental Organisation (NGO) SouthSouthNorth (SSN), the project was registered by the CDM Executive Board on 27 August 2005,[25] with the City of Cape Town as the project owner.[26] Kuyasa is also the world's first CDM project to be validated against the Gold Standard (GS).[27]

The project presented an opportunity to roll out energy efficient technologies as part of the CDM carbon credits facility.[28] The premise was to retrofit over 2 300 low-income houses with solar water

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[24] For more information, see http://kuyasacdm.co.za/, accessed on 21 July 2017.

[25] Project Design Document 0079, available at https://cdm.unfccc.int/Projects/DB/DNV-CUK1121165382.34/view, accessed on 21 July 2017.

[26] The CDM project is the result of a partnership between the City of Cape Town, the Department of Environmental Affairs (formerly the national Department of Water and Environmental Affairs), the Provincial Department of Housing and Local Government, the South African Export Development Fund and the community of Kuyasa.

[27] See Chapter 2 for a comparison of the GS and other prominent carbon offset standards.

[28] According to S Rosenberg 'A “prompt start” for the CDM? Lessons from early experiences from South Africa' (2007) at 10, available at http://www.basic-project.net/data/final/Paper11SouthAfrica%20CDM%20Experiences%20and%20Lessons2.pdf, accessed on 21 July 2017, Kuyasa was in many respects a seminal project, as it:

- Was the first African CDM project to be registered by the UNFCCC CDM Executive Board (EB);
- Established the principle of suppressed demand for energy services;
- Contributed to the debate resulting in Montreal guidance on the Programmatic CDM;
- Was the first African CDM project to be registered by the UNFCCC CDM EB;
- Was the first CDM project to be validated against the GS;
- Established the potential for public sector engagement in the CDM;
- Highlighted the barriers to renewable energy and energy efficiency project implementation; and
- Reviewed national policy, especially as regards the provision of low-income housing.

geysers, insulated ceilings and compact fluorescent light (CFL) bulbs.[29] By 2003, ten demonstration installations were completed.[30] However, implementation and funding model problems resulted in the project coming to a standstill for over two years.[31] By 2014, the Kuyasa project had installed solar water heaters, ceilings and CFLs on 2 100 houses and created 85 full time jobs.[32] The project saves households money that would have been spent on coal-fired electricity and supplementary paraffin, improves indoor air quality and reduces GHG emissions by approximately 2.85 tons per low-income house per year.[33]

Not only was this South Africa's pilot CDM project, Kuyasa was also unique in obtaining the active support of the local community.[34] However, Kuyasa may be regarded as both an 'extraordinary success and a dismal failure'.[35] The carbon value of the project was pre-sold to the UK government to offset emissions of the G8+5 summit in 2008,[36] but failed to actually deliver.

As at 28 February 2014, no Certified Emission Reductions (CERs) certificates had been issued. This can mostly be ascribed to the transaction costs involved in validating and issuing CDM and GS credits as well as the small nature of the project.[37] Thereafter, Kuyasa decided to switch from the CDM and GS to the Credible Carbon registry and its voluntary carbon market standard, with the switch backdated to 1 December 2010.[38] Table 6.3 presents a comparative analysis of the cost and

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[29] M Goldman 'Kuyasa CDM Project: Renewable Energy Efficient Technology for the Poor' *GIM Case Study No. B070* (2010), at 3 available at http://www.growinginclusivemarkets.org/media/cases/SouthAfrica_Kuyasa_2010.pdf, accessed on 21 July 2017.

[30] Ibid.

[31] Ibid.

[32] Credible Carbon 'Kuyasa' (n.d.), available at https://www.crediblecarbon.com/offset-projects/kuyasa/, accessed on 21 July 2017.

[33] Goldman (n29) at 2.

[34] VI Grover *Global Warming and Climate Change: Ten Years after Kyoto and Still Counting* (2016) at 436.

[35] SouthSouthNorth (SSN) 'Comment on Draft Regulations: Carbon Offsets' (2016) at 1, available at http://www.southsouthnorth.org/wp-content/uploads/SSN-Comments-on-Draft-Policy.pdf, accessed on 21 July 2017.

[36] The UK Department for Environment, Food and Rural Affairs (Defra) states that the carbon credits would be used to offset the emissions associated with air travel, local transport, hotel accommodation and meeting venues. See http://webarchive.nationalarchives.gov.uk/20070101092801/http://www.defra.gov.uk/environment/climatechange/carboncost/carbon-offsetting/presidency.htm, accessed on 21 July 2017.

[37] SSN (n35) at 3.

[38] Credible Carbon (n32). The first Kuyasa audit revealed that the project had delivered 23 683 tCO2 reduction for the period 1 December 2010 to 30 September 2014. The verification report is available at https://www.crediblecarbon.com/resources/docs/Kuyasa/Kuyasa_verification_report_2010-12-1_to_2014-09-30_TGH_2014_12_03.pdf, accessed on 21 July 2017.

time involved of the CDM GS versus Credible Carbon registry, using the Kuyasa project as illustration.[39]

Table 6.3 Comparative analysis of the cost and time for validating the Kuyasa CDM project		
	CDM GS	**Credible Carbon**
Time to validate	2 years	1 month
Cost to validate	Approximately R3m	Nil
Time to verify	> 6 years and ongoing	< 3 months
Cost to verify	Approximately R2m and counting	R30 000 (paid by Credible Carbon at their own risk and recovered from first CER sales)
Time to first cash return	> 6 years since completion and still waiting	< 1 years
Money spent on foreign based consultants	€140 000	Nil

The Kuyasa project addresses environmental, social and economic aspects. It delivers energy efficient and cost savings systems to the local community while also providing skills training, creating environmental awareness and job opportunities.[40]

The lesson to be learnt from the Kuyasa experience is that in order for small scale initiatives to be successful, an 'appropriate, affordable and effective' validation and verification mechanism is required.[41] Although the South African government's funding support is commendable, it does not present a sustainable financial model.[42] Unless development finance is sourced from elsewhere, the CDM (and even the GS) will prove too high a hurdle to traverse for local small scale projects.[43]

[39] SSN (n35) at 4.

[40] R Donaldson, D Du Plessis, M Spocter & R Massey 'The South African area-based urban renewal programme: experiences from Cape Town' (2013) 28 (4) *Journal of Housing and the Built Environment* 629-638 at 634.

[41] Id at 1.

[42] Grover (n34) at 438.

[43] In this regard H Winkler & D van Es 'Energy efficiency and the CDM in South Africa: constraints and opportunities' (2007) 18(1) *Journal of Energy in Southern Africa* 29-38 at 36 remark that it is not only for Government to take action - it is also in the interest of the private sector.

6.5 CONCLUSION

The empirical analysis demonstrates that – on paper, at least – CDM projects do have a positive impact on the various facets of sustainable development in South Africa. The indicators mentioned most frequently were job creation and poverty alleviation, the promotion of reliable and renewable energy and the reduction of pollution. Interestingly, these findings corroborate an earlier global study undertaken by the UN.[44] The focus on job creation is not surprising, especially in light of South Africa's socio-economic challenges. Indeed, South Africa's NDC explains that the country[45]

> ' ... faces significant rigidity in its economy and any policy-driven transition to a low carbon and climate resilient society must take into account and emphasise its overriding priority to address poverty and inequality'.

A more cynical view is that employment opportunities are the consequence of investments in GHG-reducing technologies and that any health benefits only arise as a by-product of CO_2e reductions.[46] One way of achieving a greater contribution to sustainable development in South Africa would be for the CDM policy to increase its focus on promoting sustainable development criteria as a whole, and not exclusively on GHG reductions.[47]

Two possible policies could be considered to achieve this end. The first is the implementation of a points system, which allocates points based on development aspects of CDM projects. All projects could be required to attain a minimum level of points in order for sustainable development benefits to be accepted.[48] The second is a CER value adjustment to be made in the case where CDM projects favour high CERs, but low sustainable development or distributional benefits.[49] The first policy would require the buy-in of all stakeholders, as the weighting of points must be regarded as fair and agreeable to them.[50] The second policy would have to be carefully crafted, so as not to lead to a market distortion of CERs by artificially altering their value.[51]

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[44] UNFCCC (n2).

[45] South Africa *Intended Nationally Determined Contribution (INDC)* (2016) at 6, available at http://www4.unfccc.int/ndcregistry/PublishedDocuments/South%20Africa%20First/South%20Africa.pdf, accessed on 20 December 2016.

[46] Pillay (n21) at 787.

[47] Ibid.

[48] Ibid.

[49] Ibid. The author explains that this would compel project designers to focus on a more equivalent distribution of sustainability benefits at inception of the project.

[50] Ibid.

[51] Ibid.

The UNFCCC has identified 24 different CDM project types or technologies (refer para 6.3.2), of which 13 are employed in South Africa. This chapter illustrated that most CDM projects in South Africa are energy related. It could therefore be surmised that existing CDM (and future SDM projects) play a vital role in contributing to South Africa's sustainable energy future. The Kuyasa project revealed that small scale initiatives required an appropriate, affordable and effective verification mechanism, together with a sustainable financial model.

In light of the status of the CDM globally (as outlined in Chapter 5) and in South Africa (this chapter), the next chapter will seek to identify barriers preventing the expansion of the CDM. In particular, Chapter 7 will examine the problems encountered with the concepts of additionality, technology transfer, double counting and the plummeting of the carbon market in 2008/2009.

Chapter 7

Barriers preventing the expansion of the CDM – and suggestions to overcome them

7.1 INTRODUCTION

The previous chapters considered the development of the Clean Development Mechanism (CDM), the policy considerations underpinning its use, as well as the success of the CDM in the global arena and its contribution to sustainable development in South Africa. Notwithstanding that the CDM has achieved some level of success, it became apparent that certain impediments hinder a more extensive roll-out of CDM projects. This chapter seeks to identify the barriers which prevent the expansion of the CDM in order to apply these lessons to the Sustainable Development Mechanism (SDM).

Due to the low demand for Certified Emission Reductions (CERs) and the resulting generally low carbon price (see paragraph 7.2.1 below), many CDM projects have ceased to issue CERs.[1] The decline in CDM activity has continued to affect the CDM's third-party validators and verifiers, namely the Designated Operational Entities (DOEs).[2] Furthermore, the CDM faces uncertainty regarding whether and how it could be used beyond 2020.

According to a recent annual report of the CDM Executive Board (EB), in 2016 the CDM continued to face low demand for CERs, compared to that in the first commitment period of the Kyoto Protocol (which ended in 2012).[3] This is reflected in continuing low levels of project registration and issuance of CERs. However, there was an increase in project registration in 2016, compared with 2015.[4]

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[1] United Nations Framework Convention on Climate Change (UNFCCC) *Annual report of the Executive Board of the clean development mechanism to the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol* (2016) at 5, available at http://unfccc.int/resource/docs/2016/cmp12/eng/04.pdf, accessed on 24 April 2017. The report states that approximately 42 per cent of the projects that had CERs issued up to 31 December 2012 have not had any further CERs issued.

[2] Ibid. The report notes that in the current reporting period, three DOEs voluntarily withdrew their accreditation in its entirety.

[3] Ibid.

[4] Ibid.

It is not all bad news, though. To date, the CDM has catalysed the registration of more than 8 000 projects and Programme of Activities in 111 countries and has issued more than 1.7 billion CERs.[5] The CDM has therefore demonstrated its potential as a tool for mobilising finance for climate action and sustainable development, albeit to a limited extent for developing countries. Until such time as the CDM is formally terminated, it continues to be used both by countries to meet their commitments under the Kyoto Protocol and by non-party stakeholders for other purposes.[6] Furthermore, the World Bank has continued to use the CDM for its results-based finance programmes.[7]

This chapter is devoted to an analysis of barriers preventing the expansion of the CDM, as well as proposals for overcoming them. The next section examines these inhibiting factors, which include a fluctuating carbon market, problems with additionality and accounting, issues associated with technology transfer, policy and legislative hurdles in host countries, as well as high transaction costs.

The focus then shifts to the South African experience, highlighting problems experienced by local CDM project developers. Thereafter, the chapter explores three proposals which are aimed at boosting the CDM uptake during the transition period and beyond 2020. Finally, the chapter considers a case study from Panama, which serves as a cautionary tale where insurmountable barriers (in the form of socio-economic factors) caused the demise of a CDM project.

7.2 INHIBITING FACTORS

7.2.1 Carbon market

As mentioned earlier in Chapter 2, the Kyoto Protocol provides for three flexible mechanisms, ie the Joint Implementation (JI), CDM and International Emissions Trading (IET), which enable developed countries to acquire Greenhouse Gas (GHG)-reducing credits. It will also be recalled that one CER is equal to one metric ton of CO_2e. For trading purposes, CERs can be sold privately or in the international market at the prevailing carbon market price. Climate exchanges – similar to traditional stock exchanges – have been established to provide a platform through which CERs can

[5] Id at 6.

[6] Ibid.

[7] Ibid. The report mentions the Carbon Initiative for Development and the Pilot Auction Facility for Methane and Climate Change Mitigation.

be traded.[8] The price volatility of CERs is an inevitable concomitant of such an exchange, and is understandably off-putting for risk-averse investors and CDM project developers. The following viewpoint summarises the inherent risk associated with a derivative instrument[9] (such as the CER):[10]

> 'Ultimately, unlike soft and hard tangible commodities such as corn or gold, the carbon credits exist purely on the basis of 'authorisation' on the part of national governments. If 'deauthorised', the entire credit market – and the justification of hundreds of billions of dollars' worth of carbon trades – becomes pure fiction.'

Figure 7.1 below illustrates the fluctuating price of CERs, ranging from €20/tCO_2 at its peak in 2007/2008, before plummeting to €10/tCO_2 in 2008/2009 and subsequently bottoming out to less than €5/tCO_2 in mid-2013.[11] The sharp and persistent price decline has sparked intense debates, both in academia and among policymakers, about the decisive CER price drivers.[12] Two extreme events, namely the 2008 global financial crisis and the 2011 European debt crisis, have caused structural breakpoints in the carbon price.[13]

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[8] According to GM Zatzman *Sustainable Energy Pricing: Nature, Sustainable Engineering, and the Science of Energy Pricing* (2012) at 360, examples include the Chicago Climate Exchange, European Climate Exchange and the NASDAQ OMX Commodities Europe.

[9] A derivative is a financial instrument with a price that is dependent upon (or derived from) one or more underlying assets. According to Investopedia, available at http://www.investopedia.com/terms/d/derivative.asp, accessed on 12 June 2017, the derivative itself is a contract between two or more parties, with its value determined by fluctuations in the underlying asset. The most common underlying assets include commodities, shares, bonds and market indexes. Derivatives can be used for hedging against a particular risk (for example exchange rate fluctuations) or for speculation in betting on the future price of an asset.

[10] P Bond, K Sharife, F Allen, B Amisi, K Brunner, R Castel-Branco, D Dorsey, G Gambirazzio, T Hathaway & A Nel *The CDM cannot deliver the money to Africa* (2012) at 13, available at http://www.ejolt.org/wordpress/wp-content/uploads/2013/01/121221_EJOLT_2_Low.pdf, accessed 12 May 2017.

[11] N Koch, S Fuss, G Grosjean & O Edenhofer 'Causes of the EU ETS price drop: Recession, CDM, renewable policies or a bit of everything?—New evidence' (2014) 73 *Energy Policy* 676-685 at 677.

[12] Ibid.

[13] B Zhu, J Chevallier, S Ma & Y Wei 'Examining the structural changes of European carbon futures price 2005–2012' (2015) 22(5) *Applied Economics Letters* 335-342 at 336. O Rumble, A Gilder & M Parker 'Chapter 20: Carbon Pricing in South Africa' in T Humby, L Kotzé, O Rumble & A Gilder (eds) *Climate Change Law & Governance in South Africa* (Original Service 2016) at 20-18 describe yet another possible factor, namely the dwindling of political will among developed countries to comply with their emissions reduction obligations. This, coupled with the burgeoning success of the CDM, inverted the supply and demand of carbon credits, thus causing the collapse in prices.

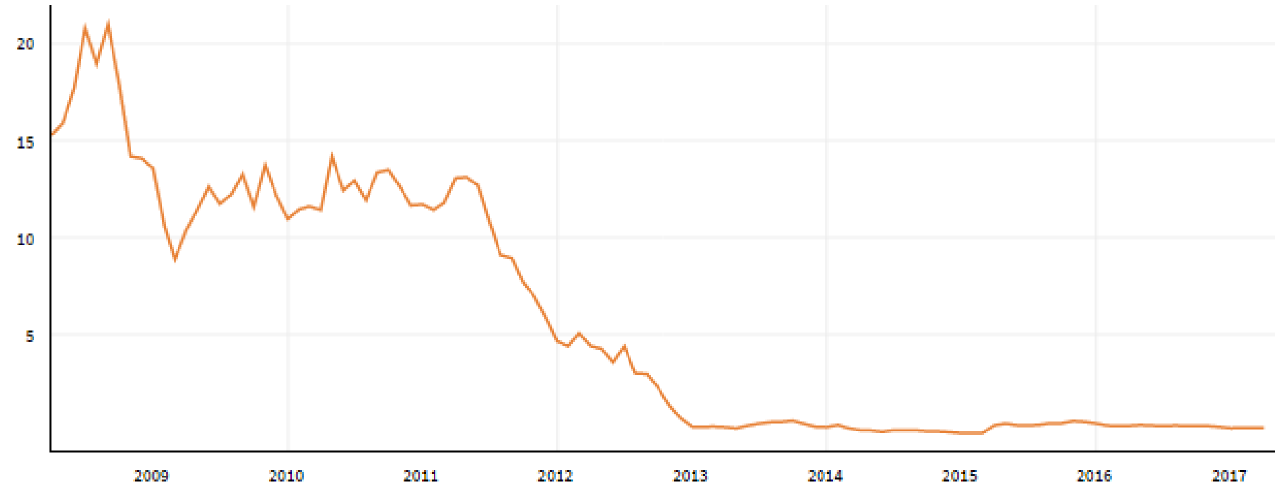

Figure 7.1 Price volatility of CERs from 2008 - 2017[14]

The economic value of CDM projects is dependent upon a stream of future benefits which are, in turn, subject to a variety of risks.[15] As a consequence, CDM investors are motivated by opportunities to meet emission reduction goals at a lower cost.[16] Similarly, host countries often promote policies that attract Foreign Direct Investment (FDI), as these investments will inject capital and promote the transfer of knowledge and technology transfer.[17]

The latest report by the World Bank Group on the State and Trends of Carbon Pricing states that international demand for CERs is 'almost exhausted'.[18] This may be attributable to the EU (which has historically been the biggest source of demand) having likely already fulfilled its demand for international credits.[19] Furthermore, there is no other significant source of demand for CERs at present.[20]

To this end, the CDM Executive Board (EB) is investigating ways to broaden demand for CERs and participation in the CDM.[21] In addition, the first COP21 Decision encourages parties to promote the

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[14] See https://www.quandl.com/data/CHRIS/ICE_CER1-ECX-CER-Emission-Futures-Continuous-Contract-1-CER1-Front-Month?utm_medium=graph&utm_source=quandl, accessed on 10 May 2017.

[15] A Dinar, DF Larson & SM Rahman *The Clean Development Mechanism (CDM): An Early History of Unanticipated Outcomes*, vol. 1 (2013) at 223.

[16] Ibid.

[17] Ibid.

[18] World Bank Group *State and Trends of Carbon Pricing 2016* (2016) at 36.

[19] Ibid.

[20] Ibid.

[21] United Nations Framework Convention on Climate Change (UNFCCC) *Concept note - Options for using the clean development mechanism as a tool for other uses* (2016), available at https://cdm.unfccc.int/filestorage/2/M/1/2M1EZ9RTQCY58NX6AIO73SWBKFUVPJ/eb88_propan01.pdf?t=RzF8b3Bic2thfDAhMNXoIX8khHpkDRikQlcz, accessed on 2 May 2017.

voluntary cancellation of Kyoto credits.[22] An online platform for voluntary CER cancellations[23] was subsequently launched in September 2015 in an effort to increase demand for credits.[24] The platform allows direct sales from project owners of smaller quantities of certificates.[25]

The World Bank Group report mentions a number of initiatives[26] to help stimulate the demand for emission units, but cautions that 'it is unlikely that these initiatives will trigger significant demand pre-2020'.[27] Added to this are the credits yet to be issued, which will add to this surplus.[28] The outlook beyond 2020 is uncertain, as the role of the CDM alongside the SDM has not yet been defined.[29]

Similar to the sluggish world economy, the international carbon market is constrained by various factors, including barriers related to capacity and investment finance in many developing countries. In addition, the limited market-based cooperation to date can be ascribed to several other hurdles:[30]

- *Market uncertainty*: this barrier is intensified if there is uncertainty on the alignment of domestic

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[22] COP Decision 1/CP.21 'Decisions adopted by the Conference of the Parties', available at http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf#page=2, accessed on 2 May 2017. Para 106 states - 'Encourages Parties to promote the voluntary cancellation by Party and non-Party stakeholders, without double counting, of units issued under the Kyoto Protocol, including certified emission reductions that are valid for the second commitment period'.

[23] Per the online platform, 'voluntary cancellation' is the process by which CERs are taken out of circulation, preventing any further use. It is similar to destroying them or marking them so they can no longer be used. The website is available at https://offset.climateneutralnow.org/, accessed on 2 May 2017.

[24] United Nations Framework Convention on Climate Change (UNFCCC) *Annual report of the Executive Board of the clean development mechanism to the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol* (2015) at para 25, available at http://unfccc.int/resource/docs/2015/cmp11/eng/05.pdf, accessed on 29 April 2017. The platform will be promoted by the secretariat in the context of its Carbon Neutral Now initiative, whereby companies, organisations, events and individuals are encouraged to measure their emissions, reduce what they can and offset the rest using CERs.

[25] World Bank Group (n18) at 36 notes that, as at 31 August 2016, the platform has resulted in voluntary cancellations of over 40 000 CERs, which represents less than one per cent of the total 13.5 million CERs cancelled since voluntary cancellation of CERs was made possible.

[26] Id at 36-37. An example includes the International Civil Aviation Organisations' net Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Airlines might be allowed to buy emission units before the start of the CORSIA and bank them for later compliance.

[27] Id at 37.

[28] Ibid.

[29] Ibid.

[30] World Bank Group (n18) at 88-96.

Measurement and Evaluation (MRV) arrangements with international standards. It will also be compounded if there is uncertainty at the international level over the standards or norms governing international carbon market access.

- *Loss of environmental integrity*: the environmental integrity of a coordinated system can be compromised by weak integrity in one jurisdiction, stemming from poor standards in MRV and oversight. Related to this are the issues of additionality and double counting, which are examined in subsequent paragraphs.
- *Potential loss of co-benefits*: Co-benefits include health benefits (due to reduced local air pollutants), low-carbon innovation and energy security. An international market drives cost savings because the emission reductions take place where abatement is cheaper. However, this can also lead to the loss of domestic co-benefits.
- *Loss of regulatory control*: In addition to the potential loss of control over domestic market design and regulation, policymakers are often concerned about the reduced ability to affect the domestic carbon price, given the wider economic implications.
- *Undesirable distributional implications*: the workings of the international market will cause the carbon price to rise in jurisdictions with a lower price.

The current low prices for CERs impact CDM project activities via various mechanisms. On the one hand, projects already implemented may no longer be able to cover their operational costs.[31] Furthermore, project owners may find themselves unable to pay transaction costs for registration, verification and issuance, as well for the financing of CDM-specific monitoring activities.[32] In the absence of any prospect for a price increase in the short term, chances are good that many projects may go unimplemented, be shut down, or modified in such a way that they no longer comply with CDM standards.[33]

At any rate, the transition to a low-carbon future requires 'predictable, sufficiently high, and politically credible carbon prices', failing which private entities will defer low-carbon investments.[34]

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[31] C Warnecke, T Day & N Klein *Analyzing the status quo of CDM projects: Status and Prospects. report prepared by Ecofys/NewClimate Institute by order of German Federal Ministry for the Environment* (2015) at 2, available at https://newclimateinstitute.files.wordpress.com/2015/05/cdm_evaluation_mainreport_2015.pdf, accessed on 15 April 2017.

[32] Ibid.

[33] Ibid.

[34] FG Tiche, SE Weishaar & O Couwenberg 'Carbon Market Stabilisation Measures: Implications for Linking' (2016) at 4 *MIT Center for Energy and Environmental Policy Research CEEPR WP 2016-011*. The authors explain that without these prerequisites, a lock-in of emissions-intensive investments could occur, thereby exacerbating the costs of transitioning to a low-carbon future.

Some analysts estimate that, in order to reach the Paris Agreement's goal of keeping global warming well below 2°C, the carbon price should be above €40/tCO_2.[35] There are also calls on governments at a global level to make businesses pay a higher price for the pollution they generate, in an attempt to force companies to reduce their carbon emissions.[36]

7.2.2 Additionality and accounting

Currently, the Kyoto Protocol determines that emission reductions from CDM projects shall be 'additional to any that would occur in the absence of the certified projects' activities'.[37] The Marrakesh Accords elaborates on this requirement by explaining that[38] -

> 'A CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity'.

In order to estimate additionality, a baseline must be established which represents business-as-usual (BAU) emissions trends. In other words, the counter-factual situation has to be projected, ie as if the project did not occur.[39] The additional emissions reduction is calculated by comparing the CDM project emissions with that of a constructed baseline scenario. Phrased differently, the baseline becomes the point of reference from which to judge whether an activity is additional.

The additionality requirement is subject to different interpretations and is one of the 'most difficult and subjective issues' facing the CDM.[40] The demonstration of additionality has been debated in international climate negotiations and in the literature since the establishment of the CDM.[41] This is due to the fundamental problem that the question of whether a project would also have been implemented without the CDM is hypothetical, ie it can never be proved with absolute certainty.[42]

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[35] A Mooney 'BlackRock calls for higher carbon price to tackle climate change' (2016), available at https://www.ft.com/content/bde6859a-9ac2-11e6-8f9b-70e3cabccfae, accessed on 2 May 2017.

[36] Ibid. The author mentions that BlackRock (the world's largest fund house) is struggling to understand the climate change risks it faces when making investment decisions as the prices that companies have to pay for emitting carbon are inconsistent.

[37] Kyoto Protocol, Art 12(5)(*c*).

[38] Para 43 of the Marrakesh Accords, available at http://unfccc.int/cop7/documents/accords_draft.pdf, accessed on 10 August 2016.

[39] Paras 44 to 48 of the Marrakesh Accords expand on this requirement.

[40] RM Shrestha & GR Timilsina 'The additionality criterion for identifying clean development mechanism projects under the Kyoto Protocol' (2002) 30(1) *Energy Policy* 73-79 at 73.

[41] L Schneider 'Assessing the additionality of CDM projects: practical experiences and lessons learned' (2009) 9(3) *Climate Policy* 242-254 at 243.

[42] Ibid.

From a purely economic perspective, GHG mitigation projects may be classified into two categories. The first is referred to as 'economically no-regret' projects, as they are economically feasible, without even considering climate change benefits.[43] The second category is referred to as 'economically regret' projects, as these would only be feasible if the total benefit of the project, inclusive of climate change benefits, exceeds the total project cost.[44]

Failure to follow the additionality requirement could result in a project with GHG mitigation potential that would have been implemented regardless, being allowed to register as an eligible CDM project. This, in turn, would result in 'free-riding and leakage'.[45] If CERs are created that represent emission reductions that would have happened regardless, the emission targets will be undermined by ‘fake’ reductions.[46]

Economically no-regret projects run the risk of encouraging 'moral hazards', as there is an incentive for both host and investing parties to include such projects under the CDM. This is due to the fact that both parties would obtain extra benefits under the CDM in comparison with what they could get from the project activities in the absence of the CDM.[47] On the other hand, the exclusion of economically no-regret projects could raise a question as to the validity of the additionality criterion in countries where economic attractiveness of a project alone would not ensure a project's implementation.[48]

One of the opposing arguments put forward by developing countries is that introducing an additionality check would further lower the competitiveness of the CDM with regard to JI and

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[43] Id at 74. Examples include energy sector demand-side efficiency improvement projects that are cost-effective, even without considering the GHG mitigation benefits.

[44] Ibid. Examples include most clean coal and renewable energy technologies.

[45] Ibid. The authors explain that free-riding can occur in several ways: A host country party which was considering implementing projects with GHG mitigation potential for purposes other than GHG mitigation would now have an incentive to strategically delay their implementation in order to get their projects included into the CDM. Private investors might have a tendency to include already profitable GHG mitigation projects into the CDM for CER benefits.

[46] S Greiner & A Michaelowa 'Defining investment additionality for CDM projects—practical approaches' (2003) 31(10) *Energy Policy* 1007-1015 at 1007. The authors illustrate this by way of the following example (at 1008): Increased energy efficiency is achieved by foreign direct investment in a heavy industry company in a developing country that reduces emissions and enhances profits. The investor would have done so anyway. If the investor obtains CERs due to the approval of the project as a CDM project, the CERs are 'fake'. This will lead to an inflation of the Kyoto emission budget.

[47] Ibid.

[48] Ibid. The authors also comment that projects are often not implemented due to lack of funding, despite their economic viability.

IET.[49] This could consequently divert possible transfers from the developing world. However, it could also be argued that the additionality requirement is justifiable, as the CDM in itself does not reduce global emissions – it is an offset mechanism allowing industrialised countries with a GHG reduction obligation to invest in projects that reduce emissions in developing countries.[50]

Of course, the additionality requirement could have the unintended and undesirable result that host countries do not to implement ambitious policies for the deployment of renewable energy.[51]

To address this dilemma, the CDM EB stipulated that the CDM would not take national policies into account in the baseline calculation that was implemented after November 2001.[52] This was done so as not to punish governments of CDM host countries that have passed progressive renewable energy policies.[53]

Several approaches for assessing additionality have been employed in new methodologies submitted to the CDM EB over the years. These are depicted in Figure 7.2.

[49] Greiner & Michaelowa (n46) at 1008. This would also raise transaction costs and could exclude potentially beneficial projects.

[50] Q Wang & Y Chen 'Barriers and opportunities of using the clean development mechanism to advance renewable energy development in China' (2010) 14(7) *Renewable and Sustainable Energy Reviews* 1989-1998 at 1994 explain that, if a company decides not to reduce its own emissions, but instead purchases credits from a CDM project to offset them, and if this project is not additional, then global emissions increase.

[51] Ibid. The authors describe the situation whereby a host country already has progressive policies for renewable energy development. In this case, it would be hard to testify that the project would not have occurred without the CDM. This situation is also sometimes referred to as a 'perverse incentive'.

[52] Ibid.

[53] Ibid.

Positive lists

- An entire project category is assumed to be additional.

Barrier analysis

- Demonstrate that barriers exist that would prevent the proposed project from being carried out if the project acitvity is not registered as a CDM activity.

Investment analysis

- Demonstrate that the proposed project activity is economically or financially less attractive than at least one other credible alternative.

Common practice analysis

- Assess the extent to which the proposed project type (eg technology or practice) has already been deployed in the relevant sector and region.

Figure 7.2 Approaches for assessing additionality (author's own)[54]

The CDM EB has combined the barrier, investment and common practice analyses into two tools which are used in most approved methodologies for large-scale CDM projects.[55] These are known as the *Tool for the demonstration and assessment of additionality*[56] and the *Combined tool to identify the baseline scenario and demonstrate additionality*.[57] The barrier and investment analyses either offer alternative approaches to demonstrating additionality or they can be combined, while the common practice analysis complements these as a credibility check.[58] The CDM EB has approved a simple barrier test for small-scale CDM projects.[59]

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[54] Based on text from the United Nations (UN) *CDM Methodology Booklet* (2016) at 41-45, available at http://cdm.unfccc.int/methodologies/documentation/index.html, accessed on 20 April 2017.

[55] Schneider (n41) at 244.

[56] United Nations Framework Convention on Climate Change (UNFCCC) *Tool 01 Methodological Tool: tool for the demonstration and assessment of additionality* (2012), available at https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf, accessed on 22 April 2017.

[57] United Nations Framework Convention on Climate Change (UNFCCC) *Tool 02 Methodological tool: combined tool to identify the baseline scenario and demonstrate additionality* (2015), available at https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v6.0.pdf, accessed on 22 April 2017.

[58] Schneider (n41) at 244.

[59] Ibid.

The calculation of a baseline requires complex accounting rules. Moreover, there are many different types of baselines. These include project-specific,[60] multi-project[61] and hybrid[62] baselines, as well as top-down baselines, which can be used on aggregated country-specific data.[63] In addition, a baseline could be static or dynamic.[64] A number of principles can be used to guide the construction of baselines for GHG mitigation projects:[65]

i) Accuracy

A baseline should provide an accurate description of the path of net emissions in the absence of a purposeful intervention. Accuracy will be less of a problem for small projects where it is possible to define a control group. Likewise, accuracy will be more challenging for projects where the technological progress and socio-economic development are likely to determine the length of time for which a project provides savings.

ii) Comprehensiveness

An ideal baseline should be comprehensive in the sense that it captures all important consequences of alternative 'without project' activities. It should therefore also consider secondary effects outside of the immediate project, by taking into account spatial and temporal boundaries.

iii) Conservativeness

It should be demonstrated with sufficient confidence that the credits for emission reductions do not exceed the improvements for the global system. In other words, the choice of baseline should tend to result in conservative GHG credits. Conservative accounting should make involved parties responsible for demonstrating that they chose baseline results in claimed credits that are less than or equal to the mitigation benefits that actually occur.

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[60] L Gustavsson, T Karjalainen, G Marland, I Savolainen, B Schlamadinger & M Apps 'Project-based greenhouse-gas accounting: guiding principles with a focus on baselines and additionality' (2000) 28(13) *Energy policy* 935-946 at 936 describe this baseline, as determined on a case-by-case basis with project-specific measurements or assumptions for all key parameters.

[61] Ibid. The authors explain that a multi-project baseline is equivalent to an 'activity standard' or policy target that is aggregated at a certain level.

[62] Ibid. The authors clarify that hybrid baselines are determined in a hybrid fashion, with some key parameters being project-specific and others standardised.

[63] Ibid.

[64] Ibid. In contrast to a dynamic baseline, a static one is at a constant level throughout the credit time of the project.

[65] As articulated by Gustavsson et al (n60) at 936-942.

iv) Practicality

From the UNFCCC perspective, the rules for the definition of baselines should favour projects that yield real, measurable and verifiable long-term reduction in net emissions, but discourage projects that do not. Project baselines should be verifiable so that they can be accepted, not only by the project host and project investor, but also by an impartial third party or overseeing body. Yet, these rules need to be broadly practical and simple enough to be applicable in a variety of places and circumstances, while not being so simple that the principles of accuracy, comprehensiveness and conservativeness are violated.

Carbon accounting methods have a strong impact on project viability and on the scale at which projects are benefiting from the CDM.[66] Emissions quantification is a fundamental element of the Paris Agreement, as it is necessary for the purpose of measurement and reporting.[67] The Paris Agreement aims to ensure robust accounting through the text included in para 6.2:

> '... internationally transferred mitigation outcomes towards nationally determined contributions ... shall apply robust accounting to ensure, inter alia, the avoidance of double counting,'

as well as in para 6.5:

> 'Emission reductions resulting from the mechanism referred to in paragraph 4 of this Article shall not be used to demonstrate achievement of the host Party's nationally determined contribution if used by another Party to demonstrate achievement of its nationally determined contribution'.

These provisions imply that comprehensive national accounting for offset crediting must take place for both the recipient and the source of the units.[68] There will be no change for the recipient in their procedures,[69] but the source country will be required to make an equivalent reduction from their stated Nationally Determined Contribution (NDC).[70] This 'corresponding adjustment' was a feature of the JI, but was not a required practice of the CDM.[71]

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[66] B Locatelli & L Pedroni 'Accounting methods for carbon credits: impacts on the minimum area of forestry projects under the Clean Development Mechanism' (2004) 4(2) *Climate Policy* 193-204 at 194 explain that the number and price of credits that can be awarded to the projects are dependent on the accounting method used.

[67] D Hone 'Revisiting global emissions accounting' (2016), available at https://blogs.shell.com/2016/09/13/ghgaccounting/comment-page-1/, accessed on 28 April 2017.

[68] Ibid.

[69] Hone (n67) explains that the introduction and counting of 'outside' units is already built in to the inventory processes underpinning the trading systems.

[70] Ibid.

[71] Ibid.

The example in Box 7.1 below illustrates the hypothetical case for a nature-based transfer from Kenya to Canada, utilising the SDM as a means to acquire the necessary funding.[72]

Box 7.1: Example - Accounting for international transfers under the Paris Agreement

Hypothetical facts

Canadian NDC: Canada intends to achieve an economy-wide target to reduce its GHG emissions by 30 per cent below 2005 levels by 2030. This equates to an effective cumulative emissions cap of 5 650 $MtCO_2e$ over the period 2020 to 2030 for all GHGs.

Kenyian NDC: Kenya seeks to abate its GHG emissions by 30 per cent by 2030 relative to the BAU scenario of 143 $MtCO_2$. This equates to a notional emissions cap of 1 000 $MtCO_2$ over the period 2020 to 2030 for all GHGs.

In terms of its commitments as set out in its NDC, Kenya plans to expand tree cover to ten per cent of its land area. If it does so through Canadian-sourced funding, in exchange for a nature-based transfer using the SDM's Internationally Transferred Mitigation Outcome (ITMO) of 50 $MtCO_2$ over the ten-year period, the following occurs:

Results

- The Canada cap rises to 5 700 $MtCO_2e$;
- The Kenya NDC shifts to 37 per cent by 2030 to account for the 50 $MtCO_2$ transfer; and
- An ITMO to the effect of 50 $MtCO_2$ shifts from Kenya to Canada.

Discussion

The impact on the Kenyian NDC implies a shift from a stated reduction of 30 per cent from BAU in 2030, to 37 per cent below BAU. This ensures there is no double counting of the transferred amount, thereby maintaining the integrity of the overall NDC approach. This, in turn, should ensure that the implied global cumulative emissions goal of the NDCs is maintained. However, Kenya will have to unearth further reductions in its economy as a result.

It is expected that, over time, Art 6(4) will introduce much-needed accounting rigour. This may well change the supply/demand balance, leading to a more robust and enduring carbon market.[73]

[72] Derived from Hone (n67).

[73] Ibid.

7.2.3 Technology transfer

7.2.3.1 Background

As mentioned in earlier chapters, in addition to reduce GHG emissions, a complementary objective of the CDM is to assist developing countries in achieving their sustainable development goals. One benefit of investing in climate change mitigation projects that are channelled through the CDM towards developing countries, is the transfer of technology and know-how that are not already available in the host country.[74]

The Intergovernmental Panel on Climate Change (IPCC) defines technology transfer as 'a broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to climate change amongst different stakeholders such as governments, private sector entities, financial institutions, non-governmental organisations (NGOs) and research/education institutions'.[75] The term ‘transfer’ is broad and inclusive and encompasses the diffusion of technologies and technology cooperation across and within countries.[76] Technology transfer therefore covers 'every relevant flow of hardware, software, information and knowledge between and within countries'.[77] It can be on purely commercial terms or on a preferential basis.[78]

Technology development and transfer are included as priorities in both the UNFCCC and its Kyoto Protocol. Article 4.1 of the Convention requires all parties to promote and cooperate in the development, application and diffusion, including transfer, of GHG mitigation technologies.[79] In addition, the Kyoto Protocol requires all parties to cooperate in the development, application, diffusion and transfer of environmentally sound technologies that are in the public domain.[80]

Although the CDM does not have an explicit technology transfer mandate, it does have a more general objective of contributing to the sustainable development of developing countries. The

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[74] United Nations Framework Convention on Climate Change (UNFCCC) *The contribution of the Clean Development Mechanism under the Kyoto Protocol to technology transfer* (2010) at 10, available at https://cdm.unfccc.int/Reference/Reports/TTreport/TTrep10.pdf, accessed on 19 March 2017.

[75] B Metz, OR Davidson, J-W Martens, SNM van Rooijen & L Van Wie McGrory (eds) *Methodological and technological issues in technology transfer: a special report of the Intergovernmental Panel on Climate Change* (2000) at 3.

[76] Ibid. The authors explain that 'transfer' comprises the process of learning to understand, utilise and replicate the technology, including the capacity to choose it, adapt it to local conditions and integrate it with indigenous technologies.

[77] UNFCCC *Contribution* (n74) at 13.

[78] Ibid.

[79] UNFCCC (1992) Art 4.1(*c*).

[80] Kyoto Protocol, Art 10(*c*).

contribution that the CDM makes to technology transfer – by financing emission reduction projects that use technologies currently not available in the host countries – may be viewed in this light.[81] CDM project participants are not specifically required to report technology transfer, but are required to provide details on the technology used for their projects in the Project Design Documents (PDDs), from which information on technology transfer can be derived.[82] The statements in the PDDs therefore reflect the implicit definitions of technology transfer made by the project participants.[83]

There are certain key factors which influence technology transfer. The first refers to the host country itself, as each CDM project must be approved by the host country government. As part of the approval process, the host country government may choose to impose technology transfer requirements.

The next paragraph briefly describes some aspects of the policies put in place by the Brazil, Russia, India, China, South Africa (BRICS) countries (excluding Russia, as it does not participate in CDM projects).

7.2.3.2 Technology transfer in BRICS countries

(i) Brazil

The Brazilian *Manual for Submitting CDM Project Activities* requires the project developer to include in the description of the project its contribution to sustainable development, including its contribution to 'training and technological development'.[84] Technology transfer is not mentioned directly; instead the project's contribution to technology development is assessed as part of its contribution to sustainable development.[85] In an earlier global study undertaken by the UN, it was found that technology transfer for Brazilian projects is below the average for all CDM projects globally, measured in terms of the share of projects (25 per cent versus the global average of 40 per cent).

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[81] UNFCCC *Contribution* (n74) at 12.

[82] Ibid.

[83] Id at 13.

[84] Government of Brazil *Manual for Submitting CDM Project Activities to the Interministerial Commission on Global Climate Change, aimed at obtaining a Letter of Approval from the Brazilian Government* (2008) at 18, available at http://www.mct.gov.br/upd_blob/0025/25269.pdf, accessed on 22 April 2017. The project's contributions to sustainable development must be described in a separate document, commonly referred to as 'Annex III'.

[85] UNFCCC *Contribution* (n74) at 24.

(ii) India

The Indian Government has a list of eligibility criteria for CDM project approval. One of the sustainable development indicators refers to 'technological wellbeing':[86]

> 'The CDM project activity should lead to transfer of environmentally safe and sound technologies that are comparable to best practices in order to assist in upgradation of the technological base. The transfer of technology can be within the country as well from other developing countries also.'

India has adopted a broad concept of technology transfer, which is similar to that of the IPCC Special Report (ie it includes technology transfer within the country).[87] Despite this, India has the lowest rate of international technology transfer of all host countries (13 per cent versus 40 per cent).[88]

(iii) China

According to the *Measures for Operation and Management of Clean Development Mechanism Projects in China*, the Government of China expects that 'CDM project activities should promote the transfer of environmentally sound technology to China'.[89] This is a general provision for the country's use of the CDM, rather than a mandatory requirement for each project.[90] The rate of technology transfer for projects in China is about half the average for all global CDM projects (19 per cent versus 40 per cent).[91]

(iv) South Africa

The Department of Environmental Affairs has a guide containing the *Sustainable development criteria for approval of Clean Development Mechanism projects by the Designated National Authority of the CDM*.[92] The country's Designated National Authority (DNA) will evaluate CDM projects submitted to it by considering economic, social and environmental criteria. In assessing each PDD, the DNA is informed by also considering the project indicators, one of which alludes to

[86] See Government of India *Approvals Process* (n.d.), available at http://www.cdmindia.gov.in/approval_process.php, accessed on 22 April 2017.

[87] See Metz et al (n75) at 3.

[88] UNFCCC *Contribution* (n74) at 24.

[89] Government of China *Measures for Operation and Management of Clean Development Mechanism Projects in China* (2005) at Article 10, available at http://extwprlegs1.fao.org/docs/pdf/chn152593.pdf, accessed on 22 April 2017.

[90] UNFCCC *Contribution* (n74) at 24.

[91] Ibid.

[92] Department of Environmental Affairs *Sustainable development criteria for approval of Clean Development Mechanism projects by the Designated National Authority of the CDM* (2004), available at http://www.energy.gov.za/files/esources/kyoto/Web%20info/Annex%203%20SA%20Sustainable%20Development%20Criteria.pdf, accessed on 22 April 2017.

'appropriate technology transfer'.[93] This comprises positive or negative implications for the transfer of technology to South Africa arising from the project; impacts of the project on local skills development; and demonstration and replication potential of the project.[94]

South Africa performs comparatively well with regard to the rate of technology transfer, coming in at 34 per cent (versus the global rate of 40 per cent). Figure 7.3 below illustrates the distribution of technology transfer over the various projects types deployed in South African CDM projects. The graph shows that the share of projects involving technology transfer ranges from nil to 37 per cent. The dominant project types are 'Energy efficiency own generation'[95] and N_2O reduction.[96]

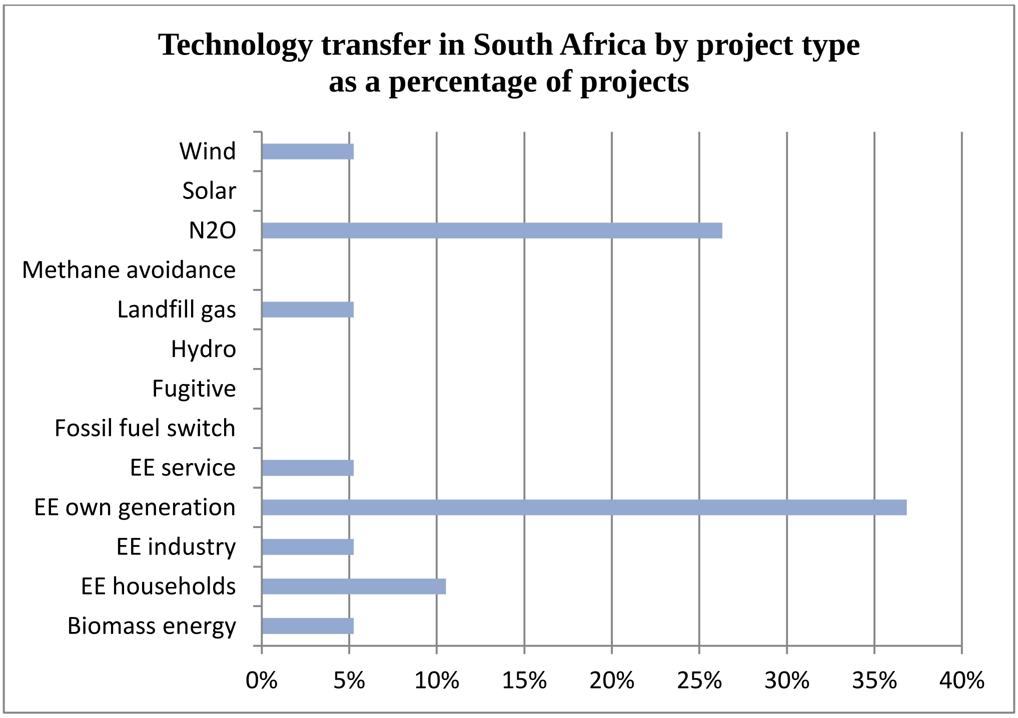

Figure 7.3 Technology transfer by project type as a percentage of projects (author's own)

It is evident that the host country is a key factor in determining the extent to which technology transfer is involved in its CDM projects. The host country influences this explicitly through the criteria it establishes for approval of CDM projects.[97]

In general, technology providers have limited interest in the transmission of their technology into the local economy as they hope to avoid imitation.[98] On the other hand, the recipient's primary

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[93] Id at 3.

[94] Ibid.

[95] As per Table 6.2 in the previous chapter, this project type refers to waste heat or waste gas used for electricity production in industry. Most of these projects are based in the North-West and Mpumalanga provinces.

[96] As per Table 6.2, this refers to the reduction of N_2O from the production of nitric acid, adipic acid and caprolactam, with most of the projects situated in the Free State.

[97] UNFCCC *Contribution* (n74) at 24.

motivation to adopt new technology is driven by considerations about their competitive position in the local market.[99] In other words, recipients do not necessarily search for the most efficient technology in the global market, but rather search for technology best suited to the company's local needs and their capacity to absorb new technology.[100]

The remainder of this section will explore other barriers to technology transfer which impede the growth of the CDM.

7.2.3.3 Barriers to technology transfer

(a) Lack of commercial viability

Technology imported from industrialised countries is generally more efficient, but also more expensive than technology manufactured locally.[101] The result is therefore higher initial investment costs.[102]

(b) Lack of information

Even assuming that a technology transfer deal is considered commercially viable, it might not be executed due to a lack of information about the investment opportunity.[103] Concomitant concerns include a lack of confidence in the information, as well as high transaction costs for obtaining reliable information and negotiating the deal.[104] Moreover, technology available on the world market is often not appropriate, due to insufficient knowledge about recipients' local needs and technological capabilities.[105]

(c) Lack of access to capital

Firms might be unable to attract an investor due to high interest rates or the insufficient infrastructure of financial markets in many developing countries.[106] Investors also sometimes

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[98] M Schneider, A Holzer & VH Hoffmann 'Understanding the CDM's contribution to technology transfer' (2008) 36(8) *Energy policy* 2930-2938 at 2931.

[99] Ibid.

[100] Ibid.

[101] Ibid.

[102] Ibid.

[103] Ibid.

[104] Ibid.

[105] Ibid.

[106] Ibid.

overestimate the investment risks, resulting in theoretically profitable investment projects without the necessary funding.[107]

(e) Intellectual property

The perceived and effective protection of intellectual property rights can affect whether technology transfer via CDM projects is achieved.[108] Indeed, the issue of intellectual property rights (IPRs) has 'provoked particularly thorny debate between developed and developing countries'.[109] IPRs are legal rights over ideas, creative processes and products, with patents likely to be the most important type of IRP with the context of low carbon technology transfer.[110]

Two viewpoints inform this debate. One argument goes that low carbon technologies are public goods, due to their contribution to the avoidance of future carbon emissions.[111] Therefore, these technologies should be made freely available to developing countries.[112] Proponents underscore how IPRs can prohibit access to new technologies by, for example, enabling firms that own patented technologies to keep prices prohibitively high.[113]

On the other hand, opponents argue that low carbon technology transfer will be better facilitated if developing countries ensured that their legal frameworks (for IPR protection) are ratcheted up and properly enforced.[114] After all, multinational companies are unlikely to deploy cutting-edge technologies - which they have spent significant time and money on developing – in countries where they cannot ensure adequate patent protection.[115] In this regard, Ncube cautions that IPR systems 'should not be made inappropriately robust', as this could be detrimental to local technology

[107] Ibid.

[108] K Murphy, GA Kirkman, S Seres & E Haites 'Technology transfer in the CDM: an updated analysis' (2015) 15(1) *Climate Policy* 127-145 at 133.

[109] DG Ockwell, R Haum, A Mallett & J Watson 'Intellectual property rights and low carbon technology transfer: Conflicting discourses of diffusion and development' (2010) 20(4) *Global Environmental Change* 729-738 at 729.

[110] Id at 730. The authors explain that IPRs also include copyrights and trademarks.

[111] Id at 731.

[112] Ibid. The authors provide an analogy: this is similar to agreements made over certain anti-retroviral drugs for treating HIV/AIDS.

[113] Ibid. They also observe how IPRs can reduce the scope for imitation which, in countries such as South Korea and Japan, has been a key source of learning and technological change.

[114] Id at 731.

[115] Ibid.

creators and users.[116] The challenge is to 'appropriately calibrate' IPR regimes for local benefit, whilst not losing sight of attracting foreign direct investment.[117]

Implicit in these disparate views is the so-called patent dilemma in global climate change, which can be stated as follows:[118]

1) Responding ethically to global climate change requires technological innovation that is accessible to everyone.
2) Strong patent protection is necessary for technological innovation.
3) At the same time, strong patent protection makes it unlikely that patent-protected technologies will be accessible to everyone, particularly those in developing countries.
4) Thus, it appears that responding ethically to global climate change is unlikely.

Biddle posits[119] that any strategy for resolving this dilemma has to satisfy the criteria of 'near-term feasibility'[120] and 'non-paternalism'.[121] However, Article 10 of the Paris Agreement merely calls for establishing a Technology Framework[122] to provide advice and guidance to the already existing Technology Executive Committee (TEC) and Climate Technology Centre and Network (CTCN).[123]

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[116] CB Ncube *Intellectual property policy, law and administration in Africa: Exploring continental and sub-regional co-operation* (2015) at 88.

[117] Ibid.

[118] JB Biddle 'Intellectual Property Rights and Global Climate Change: Toward Resolving an Apparent Dilemma' (2016) 19(3) *Ethics, Policy & Environment* 301-319 at 302.

[119] To that end, Biddle (n118) at 312-316 has formulated a multi-pronged, multi-tiered strategy to satisfy these conditions.

[120] Id at 303 explains that it should be politically and economically realistic to at least begin to implement a strategy in the near term, because the problem of global climate change is time sensitive.

[121] Ibid. Biddle states that non-paternalistic strategies should not involve coercion. In addition, they should 'not treat people as if they were passive objects rather than agents capable of formulating their own plans'.

[122] Art 10(4) of the Paris Agreement states:

> 'A technology framework is hereby established to provide overarching guidance to the work of the Technology Mechanism in promoting and facilitating enhanced action on technology development and transfer in order to support the implementation of this Agreement, in pursuit of the long-term vision referred to in paragraph 1 of this Article.'

[123] Created in 2010, the TEC is the policy arm of the Technology Mechanism. It focuses on identifying policies that can accelerate the development and transfer of low-emission and climate resilient technologies. The TEC and the CTCN together form the Technology Mechanism. With the Technology Mechanism serving the Paris Agreement, the TEC will play a key role in supporting countries to identify climate technology policies that support them to achieve the Agreement's objectives. See http://unfccc.int/ttclear/tec, accessed on 30 July 2017.

It is important to point out that these bodies are not mandated to discuss IPRs.[124] It would therefore seem that the Paris Agreement does not add much to the obligations on technology transfer that already exist in the UNFCCC.[125] Consequently, it remains to be seen if and how the Technology Mechanism established in the Paris Agreement will address the two discourses of development and diffusion as described above. It is clear to see how these competing discourses can imply very different policy options.

(d) Repellent institutional framework

Other factors, such as tariffs or barriers to imports of relevant technologies, perceived and effective protection of intellectual property rights, and restrictions on foreign investments can also affect the extent of technology transfer.[126] For example, access to capital is more restricted if investors are worried about political risks and regard enforcement of the regulatory framework as weak.[127] Furthermore, high levels of corruption complicate the retrieval of correct information and thus raise transaction costs. In short, the stability of the political system, sound economic policy and regulatory frameworks, legal security, trade openness and a low level of corruption are important elements of an enabling environment.[128]

(e) Stakeholder perceptions

A range of other – more subjective – factors influence the success of technology transfer. First, there is a lack of awareness of the range of potentially useful technologies.[129] Secondly, an innate assumption exists that technologies which had not been used in a particular developing country's context before were more expensive and thus presented more risk.[130] Thirdly, historical experience could hamper the acceptance of a particular technology: if a new technology was badly

[124] M Wewerinke-Singh & C Doebbler 'The Paris agreement: Some critical reflections on process and substance' (2016) 39(4) *UNSW Law Journal* 1486-1517 at 1510.

[125] Ibid.

[126] UNFCCC *Contribution* (n74) at 24.

[127] Schneider et al (n98) at 2931.

[128] Ibid.

[129] W van der Gaast, K Begg & A Flamos 'Promoting sustainable energy technology transfers to developing countries through the CDM' (2009) 86(2) *Applied Energy* 230-236 at 234. The authors describe two main aspects to this issue: first, stakeholders may never have heard of some technologies and were therefore locked in to established technologies. Secondly, a short-term perspective prevents some stakeholders from realising the long-term potential of 'new' technologies.

[130] Ibid.

implemented (for whatever reason), then this could create an automatic bias against it.[131] Finally, cultural aspects must also be taken into account so that technology is compatible with the residents' lifestyles.[132]

Although technology transfer is not an explicit objective of the CDM, the CDM has contributed to the transfer of mitigation technologies to developing countries.[133] Some CDM projects have used technologies not currently available in the host country, and have thus induced technology transfer.[134] Some scholars are of the opinion that the CDM is 'currently the strongest mechanism for technology transfer under the UNFCCC'.[135]

A developing country government wishing to develop technological capacity related to a specific technology should consider whether there is potential for successful domestic application from a commercial perspective.[136] It should then develop a strategy for building this capacity, which might include transfer via one or more channels, including CDM projects, and complementary policies, together with financial incentives for deployment of the technology.[137]

7.2.4 Policy and legislative barriers in host countries

According to the Organisation for Economic Cooperation and Development (OECD), there are three different types of host country barriers that can impede the development of CDM projects.[138] The following paragraphs will examine each in turn.

(i) National barriers

Many CDM project activities are being developed unilaterally, without the involvement of foreign investment.[139] The policy and legislative framework within a country may therefore enable

[131] Ibid. The authors add that people also have to overcome a resistance to change in their decision-making process and go beyond technologies with which they are familiar.

[132] Id at 235. The authors provide a curious example of a solar cooking pilot programme in Kenya which failed, because the local people did not like to cook outside (due to dust and dogs, etc) and also did not want the prying eyes of neighbours.

[133] Murphy et al (n108) at 141.

[134] Ibid.

[135] Schneider et al (n98) at 2936.

[136] Murphy et al (n108) at 142.

[137] Ibid.

[138] J Ellis & S Kamel 'Overcoming barriers to clean development mechanism projects' (2007) 7(1) *OECD Papers* at 17.

domestic and foreign investments to varying extents. Actions which reduce bureaucratic processes and simplify the overall complexity of the CDM process include the following:[140]

- *Ensuring that laws are stable and enforced*: investors require reasonable certainty that key legislative provisions will remain stable, unambiguous and enforced throughout the lifetime of the CDM project. This can only be achieved through good governance and responsible leadership.
- *Providing an appropriate tax/incentive framework for investments*: high or discriminatory taxes can be a barrier to investments, as they reduce the effective rate of return. Tax breaks, subsidies and import duties also impact investment decisions.
- *Reducing participation/ownership restrictions of foreigners*: some countries prevent non-citizens from owning land; others may restrict the level of foreign investment in particular sectors; some stipulate local procurement requirements for some project types. Restrictions may also be placed on the level of foreign ownership in potential CDM projects.
- *Developing a clear policy on CDM-relevant issues*: investors need clarity on the impact of national legislation on the eligibility of proposed CDM projects and the ownership of CERs.

In short, CDM investors require a stable political regime and enabling macro-economic climate.

(ii) Institutional barriers

The CDM-specific framework within host countries is an important factor that can assist or obstruct the development of projects under the CDM.[141] Some of these barriers are sector- or project-related, while others are more national barriers.[142] For example, if a host country has no DNA, it will not be able to participate in the CDM, even it has an enabling general policy framework and a first-rate investment climate.[143] There are three institutional barriers which come into play:[144]

- *An enabling CDM-specific policy framework*: good communication between the different role players and the various levels of government is necessary to ensure a consistent policy. Some

[139] Ibid. The authors note that even CDM project activities that are developed on a bilateral basis may often involve Annex I parties purchasing credits generated by the project, rather than funding the underlying project.

[140] Id at 18-25.

[141] Id at 25.

[142] Ibid.

[143] Ibid.

[144] Id at 25-30.

countries devote significant resources to promoting CDM activities in their countries. A clear policy on the legal status and ownership of CERs is also desirable.

- *CDM institutional capacity and framework*: institutions relevant to the CDM should possess adequate information on CDM modalities and procedures. In addition, these institutions should have the mandate and ability to take actions that would facilitate the completion of CDM transactions in a timely and transparent manner.[145]
- *Awareness of CDM issues*: the key stakeholder groups must possess adequate and correct knowledge. These include the policymakers responsible for enacting laws and decisions; individuals working in technical fields and economic activities; and bankers, loan officers and individuals working in local financial intermediaries.

(iii) Project-related barriers

As the development of a CDM project requires resources upfront, it is important to have CDM 'champions' to assist with CDM project development.[146] Table 7.1 summarises common pitfalls in CDM project development, which result due to a lack of adequate information about CDM modalities and procedures.[147]

[145] Id at 28-30. The authors describe a 'successful' DNA as having the following operational characteristics: responsiveness, flexibility, sustainability, efficiency and transparency.

[146] Id at 29.

[147] Id at 30, citing UNEP Risoe-DNV (2005) *CDM PDD Guidebook: Navigating the Pitfalls*.

Table 7.1 Examples of common pitfalls in CDM project development	
1. Lack of logic and consistency in the PDD.	9. Insufficient explanation of baseline scenarios.
2. Deviations from selected calculation methodology not justified sufficiently or incorrect formulas applied.	10. Insufficient explanation of project additionality.
3. Compliance with local legal requirements not covered sufficiently.	11. Baseline information not sufficiently supported by evidence and/or not referenced sufficiently.
4. Insufficient information on the stakeholder consultation process.	12. Major risks to the baseline not identified/described.
5. Evidence of Environmental Impact Assessment and/or required construction or operating permits or approvals not provided.	13. Project boundaries not defined clearly.
6. Letter of Approval insufficient or delayed.	14. Project and/or crediting start date unclear.
7. Project participants not identified clearly.	15. Deviations from monitoring methodology not justified sufficiently.
8. Insufficient description of the technology.	

Lack of financing is among the most common barriers inhibiting CDM project development.[148] The fact that many sub-Saharan African countries (including South Africa) suffer from poor credit ratings and high sovereignty risk, further limits the possibility for securing financing.[149] CDM projects often face a long project lead time and are viewed as high risk compared to conventional technologies with low capital cost requirements.[150] Other project-related barriers include exchange rate fluctuations, time over-run and capital cost over-run.[151]

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[148] Ibid.

[149] As regards finance in the run up to the climate talks, the African Development Bank said it would triple climate financing to reach $5 billion a year by 2020. See African Development Bank Group 'African Development Bank to triple Annual Climate Financing to nearly $5 billion by 2020' (2015), available at http://www.afdb.org/en/news-and-events/article/african-development-bank-to-triple-annual-climate-financing-to-nearly-5-billion-by-2020-14798/, accessed on 30 July 2017.

Another programme aimed at mobilising additional support for adaptation and for addressing loss and damage is the Africa Adaptation Initiative (AAI). The AAI was formally launched at the COP21 in December of 2015. See http://www.africaadaptationinitiative.org/, accessed on 30 July 2017.

[150] Ellis & S Kamel (n138) at 30.

[151] Ibid.

Half of this will be used to reduce Africa's GHG emissions via the implementation of renewable energy, particularly solar; while the rest will be used to help African economies adapt to climate change through climate-resilient crops, for example, and improving access to water. Both national and international actions can help countries to tap into a larger proportion of their CDM potential.[152] This work can be effected by national governments and the international UNFCCC negotiating process, as well as by organisations such as development agencies, financial institutions and carbon funds.[153]

7.2.5 High transaction costs

The size of a CDM project will depend, among other factors, on the transaction costs related to the implementation of the project. The transaction costs[154] incurred by investors and hosts comprise a number of components and vary in relation to the project size – these relationships are depicted in Table 7.2.[155]

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[152] Id at 42.

[153] Ibid.

[154] Per the Oxford Online Dictionary (2017), available at https://en.oxforddictionaries.com/, accessed on 29 April 2017, 'degressive' means to reduce by gradual amounts. This should not be confused with the term 'regressive'. The latter is used in the context of taxation, and refers to taking a proportionally greater amount from those on lower incomes.

[155] Based on A Michaelowa & F Jotzo 'Transaction costs, institutional rigidities and the size of the clean development mechanism' (2005) 33(4) *Energy policy* 511-523 at 513. The authors point out that transaction costs will be higher in countries with an inefficient regulatory framework and will thus lead to a competitive disadvantage vis-à-vis other countries.

Table 7.2 Definition of transaction cost components		
Transaction cost components	**Description of component**	**Relation to project size**
Search costs	Including costs incurred in the preparation of the PDD that also document assignment and scheduling of benefits over the project time period. It also includes public consultation with key stakeholders	Fixed
Negotiation costs		Degressive
Project documentation costs	Development of a baseline and monitoring plan	Fixed
Approval costs	Costs of authorisation from host country	Proportional
Validation costs	Review and revision of PDD by operational entity	Fixed
Registration costs	Registration by CDM EB	Slightly degressive
Monitoring costs	Costs to collect data	Fixed
Verification costs	Costs to hire an operational entity and to report to the CDM EB	Degressive
Certification costs	Issuances of CERs by UNFCCC EB	Degressive
Enforcement costs	Including costs of administrative and legal measures incurred in the event of departure from the agreed transaction	Proportional
Transfer costs	Brokerage costs	Proportional
Registry costs	Costs to hold an account in national registry	Proportional

No official definition for CDM transaction costs exists, although many scholars have attempted to formulate a definition. One such definition[156] is that transaction costs are components in the price of a CER that cannot be attributed to either -

- the physical process of removing GHGs from the atmosphere; or
- The level (or changes in the level) of demand for CERs.

A simple test was consequently suggested for determining whether an item should be considered as a CDM transaction cost – see Box 7.2.[157]

156 See BP Chadwick 'Transaction costs and the clean development mechanism' (2006) 30(4) *Natural Resources Forum* 256-271 at 260.

157 Ibid.

Box 7.2 Test for determining CDM transaction cost

If the project were undertaken as is, but without this expense, would it release additional GHG?

YES: The expense is an *operation* cost contributing to the reduction of GHGs.

NO: The expense is a *transaction* cost required to obtain title to CERs.

CDM transaction costs will never be eliminated entirely, as the key commodity, namely CERs, is 'unusual and requires careful monitoring, verification, and evaluation before anyone would pay for it'.[158] Each step in the CDM project process adds costs that do not remove additional GHGs, but that are essential to ensure that CERs on the market are scientifically credible to host countries.[159]

Figure 7.4 on the next page depicts the decision flowchart for determining whether a CDM project is viable, taking into account the various levels of transaction costs.

[158] Id at 263. The author further explains that not only does a CER represent the absence of GHGs, but most of these gases are invisible, even when they are present. It therefore creates additional challenges to proving that they have been reduced.

[159] Id at 265. The author mentions that the expectation is for this process to become more standardised and streamlined over time, thereby lowering the costs of each individual step and, ultimately, the total transaction costs.

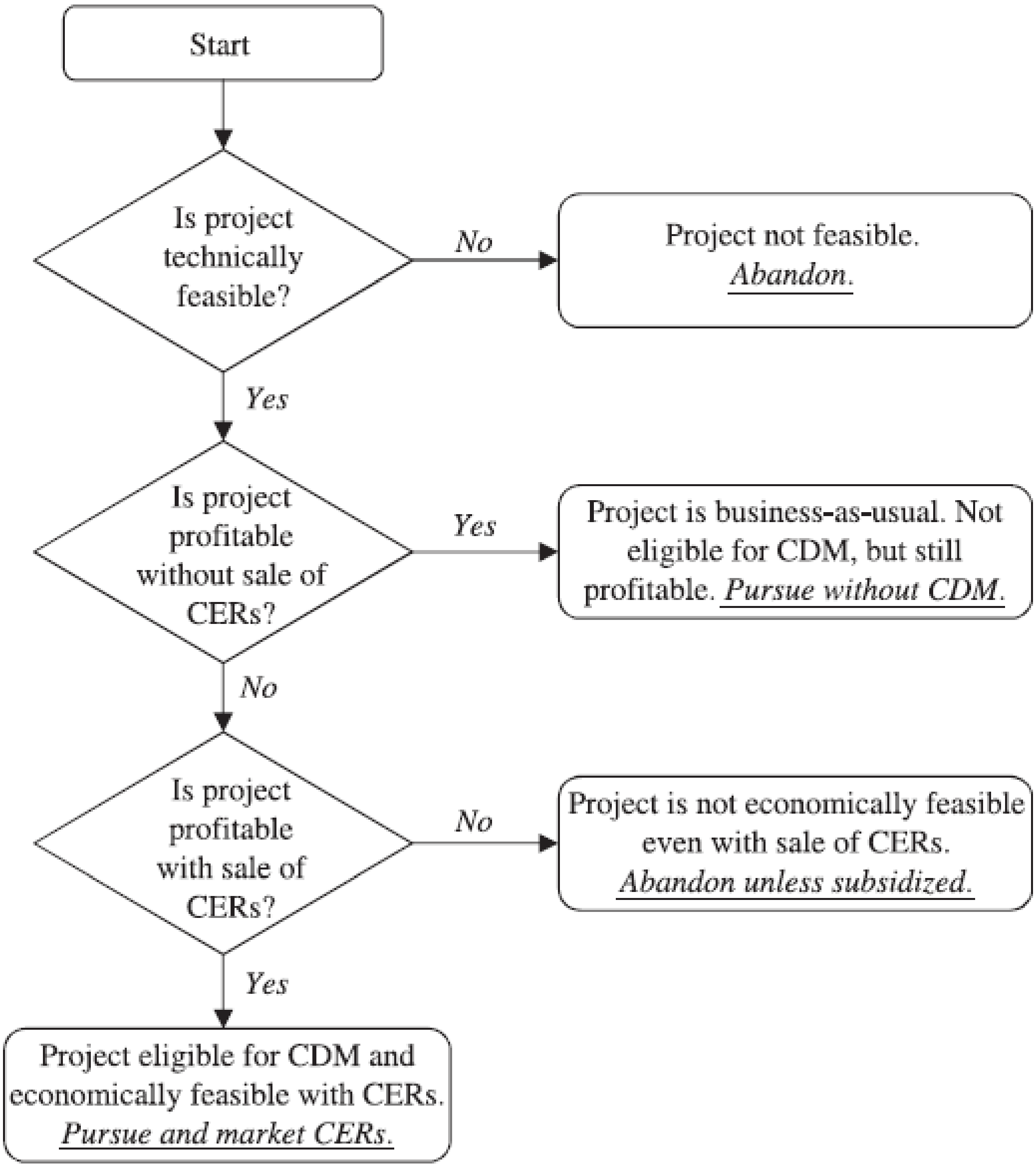

Figure 7.4 Decision flowchart for pursuing a CDM project[160]

Having considered the obstacles impeding the growth of the CDM (as well as suggestions to overcome these), the next section regards the South African experience.

[160] Id at 264.

7.3 THE SOUTH AFRICAN EXPERIENCE

In a local study conducted in 2007, interviews with 30 experts involved in the South African CDM identified a number of factors perceived to be facilitative and inhibitive of the use of the CDM.[161] Although the study was conducted a decade ago, it is among the most comprehensive of its kind in South Africa and the findings provide a useful starting point. The list of factors and associated issues is presented in Table 7.3, together with this author's comments as to the relevance of these issues in the current political and economic climate.[162]

Table 7.3 Clustered factors and associated issues			
	Clustered factor	**Stakeholder issue**	**Classification**
1	Kyoto Protocol requirements and processes	• Additionality • Post-2012 uncertainty[163] • Expensive to keep up to date with CDM developments • Complexity of CDM process • Methodologies applicable to SA • Bureaucratic process • Transaction costs • USA & Australia outside Kyoto[164]	Inhibiting
2	Carbon markets	• Volatility of CER price • Growth of CER market / money • Price of CERs[165] • Time to return CERs	Facilitating
3	South African infrastructure	• SA economic growth[166]	Facilitating

[161] GS Little, T Maxwell & M Sutherland 'Accelerating the implementation of the clean development mechanism in South Africa' (2007) 10(4) *SAJEMS* 395-411. The five groupings of stakeholders comprise industry, government, policy makers, project developers and supporting catalysts. Through their analysis, the authors have identified 56 issues and grouped these into 11 clusters.

[162] Id at 402-403.

[163] This has now likely shifted to post-2020 uncertainty regarding the probable replacement of the CDM with the SDM.

[164] The anxiety surrounding President Trump's views on climate change could also be cause for concern for CDM stakeholders.

[165] As discussed in para 7.2.1. above, the volatility of the carbon market and plummeting of the carbon price are likely to now be regarded as an inhibiting factor.

[166] With zero per cent growth and numerous credit ratings downgrades, economic growth is unfortunately no longer a supporting factor.

		• Political stability[167] • Development of SA infrastructure • Africa not a significant international investment destination • SA best investment destination in Africa[168] • No SA experience in Activities Implemented Jointly (AIJ) or emissions trading • Role of civil society / NGOs • Attractiveness of FDI • Energy crisis	
4	SA Government infrastructure	• No direct legislation covering CDM • No formal incentives to industry to implement CDM • Environmental Impact Assessments • Potential taxation of CERs[169] • Government leadership	Inhibiting
5	SA Energy infrastructure	• Cheap coal power • Eskom policies	Inhibiting
6	SA CDM capacity	• CDM capacity in South Africa • Silos in capacity • SA banks lack understanding of CDM finance	Facilitating
7	Government CDM processes	• SA ratified Kyoto Protocol[170] • DNA in DEA • SA slow to form a DNA • DNA effectiveness in promoting CDM • Government guidance • Government capacity • Sustainable development and Black Economic Empowerment (BEE) requirements	Facilitating

[167] Likewise, corruption and discord within the ruling party have seriously hampered the political stability of the country.

[168] This is a debatable point, as some economists no longer rank South Africa as the top destination in Africa. See, for example, Quantum Global 'Botswana Most Attractive Investment Destination in Africa' (2017), available at https://quantumglobalgroup.com/article/botswana-most-attractive-investment-destination-in-africa/, accessed on 24 April 2017, where neighbouring country Botswana was awarded top status.

[169] This is no longer an issue, since receipts from the sale of CERs are exempt from Income Tax (refer to Chapter 4).

[170] As mentioned in the introduction to this thesis, South Africa has also ratified the Paris Agreement. This factor therefore remains facilitating.

8	SA Industry infrastructure	• Corporate governance • Conservative industry / inertia • Potential for renewable energy / energy efficiency • Old technology ready for replacement • Large emitters • Industry economic focus	Facilitating
9	SA Industry CDM response	• Industry leadership • Industry understanding of CDM process • Technology transfer • Identification of correct projects • Business priorities elsewhere (not CDM) • Lack of success stories / CDM critical mass	Inhibiting
10	Industry / government interface	• Government and industry cooperation	Inhibiting
11	Public & media perceptions	• Climate change is a real issue • Increased media coverage of global warming issues • Lack of awareness of CDM process • Mixed messages on CDM and climate change • South Africa does not perceive climate change as a real issue[171]	Inhibiting

Of particular interest are the interventions identified by the study to accelerate the implementation of CDM in the South African industry:[172]

- A clear understanding of the Kyoto Protocol (and now Paris Agreement) mechanisms and of the opportunities for South Africa must be developed by all stakeholder groups.
- The national processes supporting CDM have to be streamlined by government to facilitate project implementation.
- The South African energy market needs to be opened to reduce the dominance of Eskom and fossil-based power. To that end, the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) (as discussed in Chapter 4), as well as the privatisation of the state-owned entity Eskom, will go far in addressing this issue.

[171] This point is likely no longer an inhibiting factor, as the government (under the auspices of the Department of Environmental Affairs has devoted much time and effort towards formulating and implementing climate change mitigation policies – see Chapter 4.

[172] Little et al (n161) at 409-410.

- Business should take the lead and drive CDM in South Africa.
- Formal structures are required to facilitate communication between stakeholders to prevent a 'silo' mindset.
- The CDM should be promoted to change perceptions in the media and public.
- South Africa can learn from successful non-Annex I countries.

When viewed in the context of the African continent, it is evident that the compliance-driven demand for credits from African CDM projects 'has come to an almost complete halt'.[173] However, there is a range of bilateral or multilateral procurement initiatives that focus on African countries and which could provide a lifeline to CDM projects. Table 7.4 on the next page provides a summary of these:[174]

[173] S Hoch, S Greiner, A Michaelowa, F Le Saché, A Korthuis & E-HM Diagne *Progress and potential of CDM reform and post-Paris market mechanisms for Africa: policy briefing* (n.d.) at 5, available at http://www.perspectives.cc/fileadmin/user_upload/CDM_Africa_policybrief_final.pdf, accessed on 24 April 2017.

[174] Ibid.

Table 7.4 Summary of bilateral and multilateral procurement initiatives for African CDM projects	
Programme	**Details**
Norwegian Carbon Credit Programme	Ministry of Finance can procure up to 60 million CERs generated until 2020, particularly from vulnerable projects.
The Swedish Programme for International Climate Change Mitigation	Manages nine multilateral funds and facilities and approximately 140 projects, of which 37% are located in sub-Saharan Africa.
The Carbon Initiative for Development of the World Bank	A budget of US$100million for technical assistance and procurement of CDM credits from energy access projects in low-income countries.
The Pilot Auction Facility	A competitive auctioning mechanism piloted by the World Bank that targets stranded CDM projects in the methane sector.
BMUB/KfW foundation future of the Carbon Market	Supports credit-based programmatic mitigation projects via start-up finance.
Go Climate Neutral Now	Recently launched initiative of the UNFCCC Secretariat allows users to calculate their carbon footprint, advises on reduction strategies and offers to offset remaining emission via the purchase of CERs.
UN Office for Project Services	Seeks to procure 350 000 carbon credits from CDM projects to offset emissions of the UN system.
European Parliament	The existing carbon offsetting scheme is being expanded with an additional €250 000 budget for Gold Standard and UNFCCC credits, targeting African countries.

As is the case elsewhere in the developing world, South Africa faces numerous challenges in attracting foreign CDM investors. At the same time, the country has the potential to traverse these hurdles if it is able to create an enabling policy framework to address the issues highlighted in this section.

From a global perspective, interesting proposals have been advanced to navigate the CDM obstacle course. The next section addresses the first proposal, which is to link the CDM to the Green Climate Fund. Thereafter, the development of the Sustainable Development tool is discussed. Lastly, a proposal for a sector-based mechanism is considered.

7.4 A PROPOSAL TO LINK THE CDM TO THE GREEN CLIMATE FUND

Notwithstanding the uncertainty of the continuance of the CDM alongside the SDM, until such time as the CDM is replaced (if at all), an opportunity exists to link the CDM to the Green Climate Fund (GCF). The GCF was discussed as part of the historical development of the CDM in Chapter 3.

At the Climate Change Conference held in Paris in December 2015, the idea to link the CDM to the GCF was formally placed on the agenda. The GCF is primed to become the key vehicle for large-scale international climate finance under the UNFCCC.[175] However, it is still at an early stage of its institutional development and an opportunity exists for collaboration between the CDM and GCF. On the one hand, the GCF can make use of the CDM's MRV framework to enhance its results-oriented approach to financing mitigation action.[176] Moreover, the CDM can support the GCF in leveraging private capital from investors seeking investment opportunities in green asset classes.[177] On the other hand, the CDM stands to gain an important source of demand for CERs.[178]

The UNFCCC Secretariat has identified four new areas where the CDM can contribute to global efforts to reduce GHG emissions:[179]

(i) Support the implementation of NDCs, whereby the CDM can provide a means for realising domestic targets or support the achievement of higher conditional targets proposed by parties.

(ii) Encourage voluntary offsetting by corporations, governments or sectors that are likely to face compliance targets in a post-2020 environment.

(iii) Increase the number of market-based carbon pricing policies intended to utilise CERs by linking to emerging ETS worldwide.

(iv) Serve as an effective MRV tool to enable credible and transparent results-based payments, using both public and private climate finance.

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[175] S Mikolajczyk, D Brescia, H Galt, F Le Saché, T Hunzai, S Greiner & S Hoch *Linking the Clean Development Mechanism with the Green Climate Fund* (2016) at 9, available at http://www.perspectives.cc/fileadmin/user_upload/Linking_the_Clean_Development_Mechanism_with_the_Green_Climate_Fund_v3_0_5_.pdf, accessed on 23 April 2017.

[176] Ibid.

[177] Ibid. This is due to the use of the internationally recognised standard quantifying and tracking GHG mitigation results.

[178] Ibid. This is because the CDM offers a large pipeline of high-quality, investment-ready mitigation activities that can be mobilised rapidly.

[179] United Nations Framework Convention on Climate Change (UNFCCC) *Annex I - Concept Note: Options for using the clean development mechanism as a tool for other uses* (2016), available at https://cdm.unfccc.int/Meetings/MeetingInfo/DB/FIMUC4QJ0NXEAHW/view, accessed on 23 April 2017.

Similarities between the objectives of both institutions serve as the starting point for collaborative engagement. As regards the mission of each, the following broad similarities emerge:[180]

- Both the GCF and the CDM are governed by the UNFCCC;
- Both institutions share the objective of stimulating GHG mitigation action in developing countries, while contributing to sustainable development; and
- The GCF is a funding vehicle through which international climate finance pledges are disbursed and accounted for, whereas the CDM represents a baseline and crediting scheme.

With reference to the scope and modalities of the GCF and the CDM, Table 7.5 offers a comparative view.[181]

Table 7.5 Comparison between the operating modalities of the GCF and the CDM

	GCF	**CDM**
Mission	To expand collective human action to respond to climate change by mobilising funding at scale to support a paradigm shift towards low-emission and climate-resilient development.	To allow those countries that have an emission reduction commitment under the Kyoto Protocol to meet these commitments by supporting cost-effective mitigation activities in non-Annex I countries, whilst contributing to sustainable development.
Institutional Framework	Governed by a Board, administrated through a Secretariat, supported through Committees and implemented through Accredited Entities and Executing Entities.	Governed by an Executive Board, administrated through a Secretariat, supported through panels and working groups, with independent auditing conducted by DOEs, implemented by Project Participants.
Approval cycle	Proposal submission through Accredited Entities, endorsed by National Designated Authorities. First review by the Secretariat, final funding decision by the Board.	PDD validation through DOEs, endorsement by DNAs. First review by the Secretariat, registration by the Board. Successful monitoring by Project Participant, and verification by DOEs is prerequisite for issuance of CERs by the Board.
Funding instruments	Direct through grants, concessional loans, equity and price guarantees.	CERs serve as assets that can receive financing by carbon market or non-market climate finance sources.

By incentivising entities accredited to the GCF and project implementers to use the CDM's established framework – or by having the GCF directly support high-quality CDM activities – the

[180] Mikolajczyk et al (n175) at 20.

[181] Id at 19.

linkage can achieve a number of synergistic effects.[182] However, there are opposing views to such a connection.

First, due to the previously mentioned problem of additionality, there is a risk that purchasing 'stranded' offset credits (that is, credits that do not represent real emission reductions) would result in wasteful expenditure of scarce climate finance.[183] Another reason is the lack of safeguards or an established grievance mechanism under the CDM.[184] The GCF accreditation process has adopted safeguards which foresee extensive stakeholder participation, as well as a grievance mechanism.[185] The disparate view is therefore that, in its current design, the CDM does not comply with the safeguard policies of the GCF and should therefore not be accredited as an eligible entity to access funds.[186]

A positive development is that the CDM EB is considering defining additional guidelines for stakeholder consultations, as well as incorporating a grievance mechanism to allow for post-registration stakeholder feedback.[187] Such a grievance mechanism should exist both at the national level, but more importantly, at the international level, especially considering the international nature

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[182] Id at 10-11.

[183] U Trunk 'Why CDM projects do not qualify for GCF finance' (2014), available at http://carbonmarketwatch.org/why-cdm-projects-do-not-qualify-for-gcf-finance/, accessed on 23 April 2017.

[184] Ibid.

[185] Per Green Climate Fund *Further development of the initial investment framework: sub-criteria and methodology*, GCF/B.09/07 (2015), available at https://www.greenclimate.fund/documents/20182/24949/GCF_B.09_07_-_Further_Development_of_the_Initial_Investment_Framework__Sub-Criteria_and_Methodology.pdf/18db33f8-a55b-488f-8a6b-5df68f39a137, accessed on 23 April 2017, there are six key investment criteria which the GCF considers:

- *Impact potential*: potential of the activity to contribute to the shift to low-emission, sustainable development pathways or increased climate resilience;
- *Paradigm shift*: degree to which the activity can catalyse a wider impact and contribute to global low-carbon sustainable development in line with a temperature increase of less than 2°C above pre-industrial levels;
- *Sustainable development*: degree of environmental, social, economic, and gender-related benefits resulting from the activity;
- *Needs of recipient*: technical, institutional and financing needs of the beneficiary country or project implementer;
- *Country ownership*: of the activity, as well as alignment with national development or climate policies;
- *Efficiency and effectiveness*: economic and financial soundness of the activity, including the cost of the tCO_2e reduced.

[186] Trunk (n183).

[187] Mikolajczyk et al (n175) at 39.

of the UNFCCC.[188] The mechanism should give individuals, communities or indigenous peoples the opportunity to submit complaints and relevant information.[189] The assessment of such grievances should be carried out by independent experts who should recommend measures for preventing or minimising harmful effects.[190]

In addition to alignment with the GCF, the CDM would do well to also consider best practices from programmes of comparable status, such as Reducing Emissions from Deforestation and Forest Degradation (REDD+)[191] and the Adaptation Fund (AF), which are making steady progress in mainstreaming human rights into their operations.[192] In some of the programmes and initiatives, non-judicial grievance mechanisms are emerging and being used effectively to address disputes between individuals, companies, or groups in societies, and to strengthen stakeholders' participation. For example, at the Cancun COP, the normative basis for implementing REDD+ was established in the form of safeguards.[193] Subsequent decisions of the COP further require that

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[188] J Voigt *Human rights implications of climate mitigation actions – second edition* (2016) at 25, available at http://carbonmarketwatch.org/wp-content/uploads/2016/05/NC-HUMAN-RIGHTS-IMPLICATIONS-OF-CLIMATE-CHANGE-MITIGATION-ACTIONS-VERSION-02-MAY-2016-OK-WEB-spread-page-.pdf, accessed on 23 April 2017.

[189] Id at 26.

[190] Ibid. The author advocates the following principles to guide the design of a grievance mechanism:

- Effectiveness, in providing timely and meaningful recourse;
- Legitimacy, which requires independence from political influence;
- Accessibility, particularly for complainants;
- Predictability, by way of clear and known procedures and monitoring of implementation;
- Equitability, by ensuring aggrieved parties can engage in a process on fair and equitable terms;
- Transparency of process and outcome;
- Rights compatibility to ensure consistency with internationally recognised human rights standards; and
- Participation, at all relevant stages of the decision-making process.

[191] NA Munuo *Towards the design of a reflexive regulatory framework to "Reduce and control emissions from land deforestation and degradation and enhancing carbon stocks"(REDD+): a perspective from select developing countries* (Doctoral dissertation, University of Cape Town, 2016) argues that REDD+ has emerged as a governance approach which calls for developing countries to participate in a second commitment period for a post-2020 climate change regime under the auspices of the UNFCCC, yet outside of the UNFCCC. The goal of REDD+ is that host countries will receive, inter alia, financial compensation if they choose to conserve their forests, rather than convert them to non-forest land use.

[192] E Filzmoser, J Voigt, U Trunk, KH Olsen & AO Jegede *The need for a Rights-based approach to the Clean Development Mechanism* (2015) Centre for International Sustainable Development Law (Public Participation and Climate Governance Working Paper Series) at 14.

[193] COP Decision 1/CP.16 'The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention', available at

parties indicate their level of compliance with these safeguards through national communications and other channels.[194] In particular, countries are required to develop a Safeguards Information System (SIS).[195] The SIS is dependent on a scale, risk-based approach to provide information on how safeguards are addressed and respected.[196]

Developed countries are more likely to provide financial assistance for transition towards low-carbon economies in developing countries where economic interests converge.[197] This could be achieved through the implementation and linking of market-based instruments.[198] Thus, linking the CDM with the GCF presents an opportunity to capitalise on collaborative efforts and improve the working of both institutions.[199] Ultimately, it is hoped that this linkage will enhance climate change mitigation action as a whole.

7.5 THE CDM SUSTAINABLE DEVELOPMENT TOOL

The second proposal refers to a tool that has emerged as part of the CDM experience, and which could be carried forward to the SDM. As discussed in Chapters 5 and 6, criticism of the CDM has been raised over the years that the DNA's assessment of sustainable development was weak due to the lack of clear and transparent criteria. This was exacerbated by the lack of requirements and procedures to monitor, report and verify that the intended sustainable development benefits were actually being received. This led to the 2011 COP/MOP mandating the CDM EB to develop voluntary measures to highlight the co-benefits of CDM projects.[200]

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http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2, accessed on 23 April 2017. Para 2 of Appendix I describes these safeguards.

[194] COP Decision 12/CP.19 'The timing and the frequency of presentations of the summary of information on how all the safeguards referred to in decision 1/CP.16, appendix I, are being addressed and respected', available at http://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf#page=33, accessed on 23 April 2017.

[195] Filzmoser et al (n192) at 14.

[196] Ibid.

[197] E de Lemos Pinto Aydos 'Paris: the dilemmas of international climate change negotiations and the role of linked Emissions Trading Schemes in the post-2020 regime' in NP Stoianoff, L Kreiser, B Butcher, JE Milne & H Ashiabor (eds) *Market Instruments and the Protection of Natural Resources* (2016) at 216.

[198] Ibid.

[199] Mikolajczyk et al (n175) at 63.

[200] KH Olsen, C Arens & F Mersman 'Learning from CDM SD tool experience for Article 6.4 of the Paris Agreement' (2017) *Climate Policy* 1-13 at 3.

Following a call for input by stakeholders, the UNFCCC Secretariat cooperated with the UNEP DTU Partnership in 2012 to develop a draft CDM Sustainable Development tool (SD tool).[201] The tool consists of three elements: a sustainable development taxonomy of indicators to identify and describe the co-benefits of CDM projects, safeguards to mitigate the risks of negative impacts, and enhanced requirements for stakeholder consultation.[202] The final SD tool was approved by the CDM EB in Doha in 2012.[203] However, it was reduced to only one element, namely voluntary declaration of sustainable development co-benefits, as members of the Board argued that there was only a COP/MOP mandate to highlight the co-benefits, and not any negative impacts.[204]

The SD tool can be used at any time in the lifetime of a CDM project or Project of Activities and may include an update in the event of a change in the co-benefits.[205] There are no requirements to monitor or verify declared co-benefits, but voluntary options exist.[206] The declaration of co-benefits uses the three basic dimensions of sustainable development (as seen in the previous chapter) and comprises environmental, social and economic dimensions. Based on the above, the sustainable development tool uses a taxonomy of 12 sustainable development criteria and 70 indicators.[207] From the data input to the tool, a Sustainable Development Co-benefit (SBC) report is generated and made public on the CDM website.[208] Primary users of the tool are project participants and coordinating or managing entities.[209]

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[201] Ibid.

[202] Ibid.

[203] KH Olsen *Sustainable Development Impacts of NAMAs: An integrated approach to assessment of co-benefits based on experience with the CDM* (2013) at 14, available at http://orbit.dtu.dk/files/88057192/Low_Carbon_Development.pdf, accessed on 13 May 2017.

[204] Olsen et al (n200) at 3.

[205] Ibid.

[206] Ibid.

[207] United Nations Framework Convention on Climate Change (UNFCCC) *EB 68 - Annex 22 Draft voluntary tool for highlighting sustainable development co-benefits of CDM project activities and Programmes of Activities* (2012) at para 13, available at https://cdm.unfccc.int/filestorage/v/w/AZNU6L350HMOJIVGS1FWCBEXRQ27TP.pdf/eb68_propan22.pdf?t=TTB8b3B3MThzfDBcYPDiV656fkXnULuXmLif, accessed on 13 May 2017.

[208] See http://cdmcobenefits.unfccc.int/Pages/SD-Tool.aspx, accessed on 13 May 2017. As of May 2017, there are 50 reports on the UNFCCC website.

[209] Per C Arens, F Mersmann, C Beuermann, F Rudolph, KH Olsen & JV Fenhann *Mapping the Indicators. An Analysis of Sustainable Development Requirements of Selected Market Mechanisms and Multilateral Institution* (2015) at 16, available at http://orbit.dtu.dk/files/115264357/Mapping_the_Indicators.pdf, accessed on 13 May 2017, they may request access to the tool from the CDM's tool webpage or download a Word version as an alternative from the same page.

Despite its usefulness in highlighting the co-benefits of CDM projects, there are a number of observed shortcomings and demands for sustainable development assessment in practice. These include:[210]

- *Quantification*: The tool does not provide a method for quantifying the co-benefits. The extra data collection is considered as adding considerable effort for both project participants and DNAs. Quantification is required in order to determine the scope and significance of sustainable development impacts and the necessity of monetising the value of co-benefits, so as to leverage additional climate and development finance.
- *Assessment of negative impacts*: The tool does not contain safeguards against negative impacts.[211] From a buyer's perspective, the avoidance of negative impacts is a key priority in mitigating financial and reputational risks.
- *Monitoring and reporting*: The tool does not require the monitoring of co-benefits. Consequently, the SDC report may be submitted at any time without any requirements for the monitoring of sustainable development claims.[212]
- *Independent third-party validation and verification*: In its current form, the sustainable development tool does not contain any requirements for verification. Validation and verification are seen as prerequisites for pricing co-benefits in the carbon market and as a means to attract results-based climate or development finance.
- *Certification*: At the moment, certification is not envisaged by the sustainable development tool. It could be considered of interest if the tool is informed by international guidance regarding best practice.
- *Guidelines for stakeholder consultation*: The tool does not mention local stakeholder consultations, although provisions exist elsewhere in the CDM modalities and procedures.[213]

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[210] Olsen et al (n200) at 4-5.

[211] In its draft form, the tool did contain safeguard provisions, but the CDM EB omitted it from the final tool. Olsen et al (n200) at 11 explains that the Secretariat was requested to simplify the tool by leaving out two of the three elements in an integrated approach to SD assessment, namely safeguards to avoid negative impacts and enhanced procedures for stakeholder involvement.

[212] At its 82nd meeting in February 2015, the CDM EB discussed a concept note on the 'Voluntary monitoring of Sustainable Development co-benefits'. See United Nations Framework Convention on Climate Change (UNFCCC) *Concept note - Voluntary monitoring of sustainable development co-benefits* (2015), available at https://cdm.unfccc.int/filestorage/F/7/S/F7SC8OIAU2RMXJ6E5PNVWGTQ90LDZB/eb82_propan14.pdf?t=VEV8b3VrbXRofDDUJqMqUfx0zvbopSotBkUj, accessed on 2 May 2017. However, no decision was made to formally adopt this.

[213] In addition, enhanced requirements for local stakeholder consultations were included in the draft SD tool.

Guidance for local stakeholder consultations is a core element to ensure that a project activity is beneficial to sustainable development priorities and does not result in negative impacts.

Table 7.6 presents possible ways to improve and enhance the tool, and to improve the consideration of sustainable development in the CDM in general.[214]

Table 7.6 Recommendations to improve the SD Tool	
Improving the tool	Introduce no-harm safeguards • Establish no-harm safeguards as mandatory benchmarks; • These could comprise human rights, good labour practice, anti-corruption issues, etc.
	Develop monitoring and reporting guidelines • Global guidelines can be made available and tailored for voluntary use with the SD tool; • Keep this monitoring separate from GHG reduction monitoring, to ensure the SD tool remains voluntary and flexible to use.
	Introduce 3rd party validation and verification of sustainable development claims • Independent validation and verification of sustainable development co-benefits; • Keep this separate from validation and verification of GHG reductions.
	Link enhanced stakeholder requirements to the CDM SD tool • SDC reports could be used as the basis for stakeholder consultations; • Introduce a grievance mechanism.
Enhancing the tool	Introduce UNFCCC certification of sustainable development co-benefits • A UNFCCC sustainable development certification framework could be made available to countries that do not have the capacity to develop their own standards.
	Create a global standard for quantification of sustainable development co-benefits • Willingness to pay for extra benefits can be identified and additional sources of finance for mitigation can be leveraged.

The CDM SD tool offers an international and flexible definition of sustainable development criteria and indicators.[215] It can help guide national authorities, such as DNAs, to develop their own

[214] Derived from C Arens, F Mersmann, C Beuermann, F Rudolph, KH Olsen, F Bakhtiari, ML Hinostroza & JV Fenhann *Reforming the CDM SD Tool - Recommendations for Improvement* (2015) at 18, available at http://orbit.dtu.dk/files/115264238/Reforming_the_CDM_SD_Tool.pdf, accessed on 13 May 2017.

sustainable development assessments or to adopt a global sustainable development goal tool in entirety or in part.[216] Furthermore, the harmonisation of sustainable development assessment methods across cooperative approaches is advisable.[217] An enhanced sustainable development tool in the SDM that builds on the existing CDM SD tool could lay down common international best practice, upon which guidance for cooperative approaches can be built.[218]

7.6 A SECTORAL APPROACH

The third proposal has its point of departure in the CDM, but may be viewed as a stepping stone to the SDM. The sectoral approach was proposed as a means to broaden the global scope of GHG mitigation to developing countries.[219] This approach entails a combined industry and government initiative, which may apply to one sector or to several sectors at once. They may also apply to one or to several countries and, in the latter case, may differ from one country to another.[220]

A sectoral CDM (S-CDM) approach would maintain some basic elements of the current CDM, but would also allow for the development of CDM projects without pre-established limitations in terms of territorial coverage or enabling instruments.[221] Different entities have defined the sectoral concept in different ways, including the following:

- a government-driven mechanism that would enable non-Annex I parties to develop local policy initiatives to discernibly lower GHG emissions in a particular sector;[222]
- a policy-based mechanism driven by private role players to combine similar projects within a country or local region along the lines of a sector;[223]

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[215] Olsen et al (n200) at 11.

[216] Ibid.

[217] Ibid.

[218] Ibid.

[219] R Baron, B Buchner & J Ellis *Sectoral approaches and the carbon market* (2009) at 6, available at http://www.oecd-ilibrary.org.ezproxy.uct.ac.za/environment/sectoral-approaches-and-the-carbon-market_5k4559g5snzq-en, accessed on 14 May 2017.

[220] G Meunier & JP Ponssard 'A sectoral approach balancing global efficiency and equity' (2012) *Environmental and Resource Economics* 1-20 at 2.

[221] J Samaniago & C Figueres 'Evolving to a sector-based Clean Development Mechanism' in K Baumert (ed) *Building on the Kyoto Protocol: Options for protecting the climate* (2002) at 89.

[222] Ibid.

[223] A Cosbey, JE Parry, J Browne, YD Babu, P Bhandari, J Drexhage & D Murphy 'Realizing the development dividend: Making the CDM work for developing countries' (2005) at 55-57, available at http://www.iisd.org/pdf/2005/climate_realizing_dividend.pdf, accessed on 14 May 2017.

- a programmatic crediting mechanism that could encompass both public and private actors;[224] or
- a sectoral baseline where any emission mitigation below the baseline would be credited.[225]

As for defining the sector (or the CDM project boundary), developing countries would be encouraged to develop sectoral (eg electricity, transport, forestry), territorial (eg cities or regions) or a combination of these (eg transport and lighting in a particular city) projects.[226] In contrast to the project-based approach of the CDM, a sectoral approach evaluates aggregate emission reductions relative to a single sector-wide baseline.[227]

The S-CDM approach brings with it a number of design and methodological issues. The first relates to the distribution of costs and benefits, as the S-CDM has the potential to turn an instrument that was originally aimed at private investment into a tool for governments to finance climate-friendly policy measures.[228] The question then arises as to how much a government could charge for the preparation of an S-CDM project.[229]

The second issue pertains to the determination of a baseline and additionality. Sectoral projects have two levels, namely the level of the overall project and the level of the individual actions which the project induces.[230] Consequently, a project would have to utilise a two-level approach, setting a baseline and demonstrating additionality for both the whole project and for each of the activities.[231] This evidently results in greater complexity.

The third issue, which stems from the concerns surrounding additionality, refers to double counting. If the local project receives CERs for the climate benefit it has achieved and the sectoral project

[224] D Bodansky, E Diringer, J Pershing & X Wang *Strawman elements: Possible approaches to advancing international climate change effort* (2004) at 8, available at https://www.c2es.org/docUploads/Strawman%20Elements.pdf, accessed on 14 May 2017.

[225] M Bosi & J Ellis *Exploring Options for 'Sectoral Crediting Mechanisms'* (2005), available at https://www.oecd.org/env/cc/34902644.pdf, accessed on 14 May 2017.

[226] Samaniago & Figueres (n221) at 89.

[227] G Chan, H Bloomquist, B Denk & A Hillstrom *Guidelines for a Sectoral Sustainable Development Mechanism in the post-2020 climate regime* (2016), available at https://www.hhh.umn.edu/sites/hhh.umn.edu/files/hhh_sdm_proposal_final.pdf, accessed on 11 April 2017.

[228] W Sterk & B Wittneben 'Enhancing the clean development mechanism through sectoral approaches: definitions, applications and ways forward' (2006) 6(3) *International Environmental Agreements: Politics, Law and Economics* 271-287 at 281.

[229] Ibid.

[230] Id at 282.

[231] Ibid.

also receives CERs for the contribution made by the local project, the same climate benefit is, in effect, counted twice.[232] Moreover, since most economic segments are interlinked, the double counting problem might also arise if there were more than one sectoral project in a particular country.[233]

The last point of concern has to do with the project approval process. Under the CDM rules, it is the prerogative of the host country to check whether a project supports its sustainable development claims.[234] In the case of the S-CDM project, the government would actually be asked to approve its own plans.[235]

Despite the abovementioned problematic points, a sectoral approach to the CDM has several benefits. First, it would allow for greater flexibility in modes of investment, as activities complementary to direct mitigation could be supported.[236] It would also expand the range of mitigation options, which would increase the scale of possible emissions reductions.[237] Next, the S-CDM would be better suited to achieving sector-wide transformations.[238] In addition, sectoral agreements could result in broadening participation in the case where some major emitting countries are not prepared to take on economy-wide targets (as sectoral agreements would offer an alternative path to climate commitments).[239]

The S-CDM also has the potential to simplify negotiations in sectors with relatively few important actors.[240] The sectoral approach allows states to proceed in an incremental fashion, targeting their initial efforts to sectors where action is most urgent.[241] Finally, the S-CDM could address some of the competitiveness concerns raised by a comprehensive approach.[242] This is because an

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[232] Id at 283.

[233] Ibid.

[234] Id at 284.

[235] Ibid.

[236] Chan et al (n227). The authors mention investment in infrastructure and capacity building as examples.

[237] Ibid.

[238] Sterk & Wittneben (n228) at 285 explain that, in particular, the renewable energy, energy efficiency and transport projects would be given a boost, as these are problematic to fit into a single-site approach.

[239] D Bodansky *International sectoral agreements in a post-2012 climate framework* (2007) at 5, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1028187, accessed on 15 May 2017.

[240] Ibid. The author argues that, first, the relevant actors would be easier to identify, and, secondly, the fewer role players involved, the lower the complexity of negotiations.

[241] Id at 6.

[242] Ibid.

international sectoral approach could ensure that all global competitors in a given sector undertake mitigation efforts – whether fully comparable or differentiated – to reflect equity considerations.[243]

With the prospect of the SDM in the Paris Agreement, many developing counties have begun refining their climate policies.[244] Sustainable benefits in the CDM and the proposed SDM have the potential to match developing countries' needs for sustainable development and climate mitigation measures.[245] To that end, Figure 7.5 presents an overall approach as to how such a sectoral methodology could be attained.

Scope

- Host countries for SDM activity should be limited to the Least Developed Countries (LDCs).
- Begin implementation of SDM with a relatively small number of host countries to allow for gradual adoption of governance norms.

Governance

- Participation rules for the EB should be reformed to strengthen conflict of interest protection.
- The new SDM EB should establish an oversight committee to maintain transparency within the Board.
- Established DNAs in host countries should be maintained under the SDM. DNAs should seek to engage domestic central banks to facilitate governance while maintaining national sovereignty.

Sectoral baselines

- The new SDM EB should adopt standardised methodologies for setting sectoral baselines.
- Sectoral baselines should be defined in terms of absolute emissions.
- Baseline and crediting methods should avoid exemptions to provide the highest level of environmental integrity.

Emissions accounting

- Establish multiple baselines that avoid the double counting of the host country's mitigation activities under their NDC as activity under the SDM.

Re-evaluation

- The SDM should initially be established with clearly defined goals over short (approximately five-year) timelines.
- The SDM EB should establish regular evaluation timelines to allow for reflection and adjustment.
- Country-level sector baselines should be re-evaluated regularly on the basis of emissions reductions and sustainable development.

Figure 7.5 Transitioning to a sectoral-based SDM (author's own)[246]

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[243] Ibid.

[244] Arens et al (n214) at 21.

[245] Ibid.

[246] Based on text from Chan et al (n227).

To conclude: a sectoral approach to the CDM has several features which could enhance this mechanism's sustainable development mandate. However, an S-CDM cannot be regarded as a cure-all for the CDM's shortcomings. The concerns raised about host countries' sustainable development criteria, together with the lack of opportunities for local stakeholders to engage meaningfully in the approval process, are independent of the type of projects proposed.[247] The latter issue was brought strikingly to the forefront in a failed CDM project in Panama. Apart from all the financial and economic aspects, the next section demonstrates that socio-economic factors – in particular human rights considerations – are as vital to the success or failure of a CDM project.

7.7 THE FAILED PANAMA PROJECT - A CAUTIONARY TALE

In early November 2016, Panama withdrew the Barro Blanco hydroelectric power plant project from the CDM registry.[248] This marked the first time that a host country had withdrawn a CDM registration, effectively preventing Barro Blanco from issuing offset credits.[249] Specifically, the registration was withdrawn due to human rights concerns.[250] In addition to claims that livelihoods were destroyed by the flooding of the dam's reservoir, the indigenous Ngäbe people were forcibly relocated.[251] This, coupled with the fact that the residents had not consented to the project, were viewed as human rights infringements and resulted in the intervention by the international environmental NGO, the Centre for International Environmental Law (CIEL).[252]

The Barro Blanco project entailed the construction of a large-scale hydroelectric dam in Western Panama. It was registered as a CDM project by the CDM Executive Board under the Kyoto Protocol. In June 2011, Barro Blanco was approved as a CDM project at the CDM EB Meeting 61.[253] The project was run by Panamanian company GENISA and financed largely by German and

[247] Sterk & Wittneben (n228) at 285.

[248] Carbon Market Watch 'Barro Blanco carbon credits withdrawn' (2016), available at http://www.thepanamanews.com/2016/11/carbon-market-watch-barro-blanco-carbon-credits-withdrawn/, accessed on 17 April 2017.17.

[249] Ibid.

[250] A Chatziantoniou & K Alford-Jones 'Panama withdraws problematic Barro Blanco dam project from CDM registry' *Centre for International Environmental Law* (2016), available at http://www.ciel.org/panama-withdraws-problematic-barro-blanco-dam-project-cdm-registry/, accessed on 17 April 2017.

[251] Ibid.

[252] Ibid.

[253] For an historical account of the Barro Blanco project, see BF Pérez, JA Hofbauer, M Mayrhofer & PV Calzadilla 'Rethinking the role of Development Banks in Climate Finance: Panama's Barro Blanco CDM project and human

Dutch development banks.[254] Although envisioned as a way to contribute to sustainable development, the dam's reservoir went on to flood indigenous land, homes and cultural artefacts.[255]

Ten years after the communities began their defence, the project was formally withdrawn from the CDM registry. Criticisms levelled at CDM projects include that these projects usually affect the most vulnerable people, the poorest and those who have little political power.[256] Besides affecting the quality of life of local communities and indigenous peoples, CDM projects – such as Barro Blanco - have also been the direct or indirect cause of displacement, social conflicts and repressions.[257] This, in turn, has resulted in human rights violations affecting, among others, the right to life, health, safety and physical and psychological integrity.[258]

The dual purpose of the CDM should always be borne in mind: to reduce emissions and to promote sustainable development in developing countries. Several CDM projects, however, have 'lacked environmental integrity, failed to contribute to sustainable development, and others have had serious social, environmental and human rights consequences'.[259] The Barro Blanco case is unfortunately not unique. Moreover, it highlights the need for a human rights-based[260] approach in sustainable development initiatives.[261]

Notwithstanding the fact that large-scale renewable energy projects are a means of attaining a country's carbon emission reduction goals under the Paris Agreement, they come with their own 'environmental and social harms'.[262] In fact, a coalition of more than 300 civil society organisations from 53 countries released a global manifesto to pressure governments and financiers at the Paris climate talks to exclude hydropower projects from the list of sustainable initiatives.[263] If excluded,

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rights' (2016) 12(1) *Law, Environment and Development Journal* 12-16. The DOE for the validation report was the Spanish Association for Standardisation and Certification.

[254] Chatziantoniou & Alford-Jones (n250).

[255] Ibid.

[256] Pérez et al (n253) at 9.

[257] Ibid.

[258] RMF Egea 'The Flexible Mechanisms to Combat Climate Change: A Critical View of their Legitimacy' (2012) 2(2) *Revista Catalana de Dret Ambiental* 1-39 at 17.

[259] Carbon Market Watch (n248).

[260] For a discussion of a human rights based approach to climate change, including the benefits and drawbacks of such an approach, see D Bodansky, J Brunnée & L Rajamani *International Climate Change Law* (2017) at 296-313.

[261] Chatziantoniou & Alford-Jones (n250).

[262] Ibid. The authors report that artificial reservoirs created by large-scale dams may emit large amounts of methane gas, contributing significantly to GHG emissions.

[263] International Rivers *A Civil Society Manifesto for the Support of Real Climate Solutions* (2015), available at https://www.internationalrivers.org/node/9204, accessed on 17 April 2017.

such projects would not be eligible to receive financial incentives under programmes like the CDM or GCF.[264]

Overall, the Barro Blanco project embodies a number of problematic issues which are 'common' to the implementation of CDM projects.[265] The first is the failure of the CDM institutions to define clear criteria for sustainable development.[266] It will be recalled from the previous chapter that there is no definition of 'sustainable development' under the CDM. Each host country therefore has the prerogative of determining whether a CDM project contributes to its sustainable development or not. The South African DNA applies a list of sustainable development indicators to assess the potential contribution of a CDM project (refer to Table 6.1 in the previous chapter). The previous chapter also demonstrated (in Figure 6.5) that social criteria scored the least in South African CDM projects. This is not to say that there are impending human rights violations, but merely to highlight the fact that social indicators are often not prioritised.

The second issue relates to stakeholder consultation that is compatible with international human rights standards and the lack of authority to review such compliance.[267] The third concerns the role of the banks involved, as they failed to exercise due diligence at the initial stages of the development of the project.[268]

Barro Blanco serves as a cautionary tale for governments, companies and financiers that renewable energy projects must meet the same social and environmental standards as any other project. This includes environmental impact assessments and proper consultation with affected communities.

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[264] Ecowatch 'What the Paris Climate Agreement means for Indigenous Rights and Hydroelectric Dams' (2015), available at http://www.ecowatch.com/what-the-paris-climate-agreement-means-for-indigenous-rights-and-hydro-1882129916.html, accessed on 17 April 2017.

[265] Pérez et al (n253) at 16.

[266] Ibid. The authors point out (at 7) that there is also a risk that a country could lower its sustainable development criteria in order to attract more projects.

[267] Ibid.

[268] Ibid.

7.8 CONCLUSION

The UNFCCC mandates that lessons learned from existing Kyoto Protocol mechanisms must be applied in developing modalities and procedures for the SDM.[269] Although many concepts that appear in Art 6(4) of the Paris Agreement (ie the SDM) are generally accepted, there will also be many that require negotiations. The challenge will be to do so without going into a renegotiation of the Paris Agreement. This chapter aimed to contribute to an enhanced understanding of the drivers and barriers of the CDM, so as to derive policy recommendations on how to increase the future uptake of the SDM.

Although the CDM is beset by numerous hurdles (including a volatile carbon price, setting a baseline and determining additionality, problematic technology transfer, policy and legislative uncertainty and high transaction costs), these are not insurmountable. Recommendations were made to accelerate the implementation of the CDM - and by analogy future SDM projects - in the South African industry. These included: developing a clear understanding of the workings of the CDM and SDM for all stakeholders involved; streamlining of government processes; breaking the Eskom monopoly and strengthening the REIPPPP; and enhancing communications between stakeholders, the media and the public. In addition to highlighting specific measures targeting the above shortcomings, this chapter also examined three proposals which could assist as stepping stones for transitioning from the CDM to the SDM.

The first pertains to linking the CDM with the GCF in order to enhance climate mitigation as a whole. It was demonstrated that many similarities exist between the scope and modalities of both institutions. This leads to an opportunity for the GCF to make use of the CDM's MRV framework to enhance its results-oriented approach for financing mitigation action.

The second refers to extending the range of the SD tool to beyond the CDM, so as to harmonise sustainable development assessment and reporting requirements in other mitigation mechanisms (most notably the SDM).[270] In addition to recommending improvements to the existing SD tool, the thesis also advocated that the SDM build on the existing SD tool to ordain common international best practice, upon which guidance for cooperative approaches could be built.

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269 UNFCCC Decision 1/CP.21 *Adoption of the Paris Agreement*, available at https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf, accessed on 24 April 2017. Para 37(f) recommends that - 'Experience gained with and lessons learned from existing mechanisms and approaches adopted under the Convention and its related legal instruments'.

270 KH Olsen, JV Fenhann, ML Hinostroza, C Arens, F Mersmann, C Beuermann & F Rudolph *Assessing Usefulness. Do Stakeholders Regard the CDM's SD Tool as Practical?* (2015) at 25, available at http://orbit.dtu.dk/files/115264300/Assessing_Usefulness.pdf, accessed on 13 May 2017.

Finally, a sectoral approach was considered to hold promising opportunities for enhancing the CDM's sustainable development mandate. Although the S-CDM is not a panacea for all the shortcomings of the CDM, the thesis presented an overall approach for transitioning to a sectoral-based SDM by addressing the scope, governance, sectoral baselines, emissions accounting and re-evaluation matters.

The failed Panama project demonstrated that in order for the CDM (and the SDM) to achieve long-term success, the business-centric approach followed by CDM project investors would have to shift increasingly to the attainment of the social, economic and environmental benefits for local communities. In so doing, sustainable development will be within reach. This will necessitate greater public participation of local stakeholders to ensure that people affected by a CDM project can provide a timely and meaningful input to a proposed project.

It is evident that many lessons have been learned from the CDM, and that this knowledge will prove indispensable with the design and implementation of the SDM. The next, and final, chapter will draw on these lessons and make further recommendations for policymakers, investors and financiers to help ensure the success of the SDM. The thesis will conclude with a proposal of practical steps to smooth the transition from Kyoto to Paris.

Chapter 8

CONCLUSION

8.1 OVERVIEW

The research underlying this thesis was undertaken during the period from 2015 to 2017, and was inspired by the 'spirit of Paris' in upholding a culture of multilateralism, the rule of law and trust between nations. This thesis came about during a critical juncture in the climate change timeline, when policymakers, academics and other stakeholders were contemplating the end of the Kyoto era and the beginning of the Paris age.

In an endeavour to contribute to the body of knowledge regarding this transition, this study was primarily concerned with learning from past experience with the Clean Development Mechanism (CDM), in order to consider the future of the Sustainable Development Mechanism (SDM) provided for in Art 6(4) of the Paris Agreement. In so doing, a critical assessment of the SDM was undertaken by examining the prospects and challenges of its predecessor, the CDM.

To achieve this overall objective, Chapter 2 contextualised the CDM/SDM study against the backdrop of a theoretical framework relating to the concepts and principles pertaining to market-based instruments (MBIs), with a particular focus on environmental taxes and carbon offsets.

Having laid the theoretical foundation in the previous chapter, Chapter 3 subsequently examined the Kyoto Protocol, particularly Art 12, which contains the CDM. It was indicated that the CDM only applies to developing countries (or non-Annex I parties), such as South Africa. Thereafter, the chapter investigated the theoretical and policy considerations underlying the legal aspects of the CDM with the aim of assessing how they will be expanded upon by the SDM. The architectural components of the Paris Agreement were explored in order to contextualise the origin and proposed implementation of the SDM. Lastly, the chapter reflected on transitional arrangements for existing CDM projects. It was found that the Paris Agreement had moved purposefully beyond the distinct categories between developed and developing countries, as exemplified by the distinction between Annex I and non-Annex I parties. The chapter also revealed the manifold interpretational issues which remain to be resolved in the coming years.

Against this background, Chapter 4 described the law and policy framework governing the CDM – and, by extension, the SDM – in South Africa. The point of departure is the concept of 'sustainable development', which is an environmental right entrenched in the Constitution and elaborated on by the National Environmental Management Act (NEMA). The chapter outlined the use of tax incentives to enhance the uptake of renewable energy. Thereafter, the role of local government in implementing green reform was explored. It was found that the country's many domestic policies (including the National Climate Change Response Strategy) have the potential to create an enabling environment for the SDM. However, a co-ordinated and integrated regulatory approach, together with a concerted effort by the various government spheres, will be needed to move successfully to a sustainable energy future.

Having considered the policies and politics which inform the workings of the CDM, Chapter 5 observed the status of the CDM from an international perspective, elaborating on the CDM network of the BRICS member countries. High-level analytics revealed that South Africa's CDM per capita ranked lowest of the BRICS grouping. Regrettably, the country also had (by a far margin) the highest CO_2 emissions per capita. When applying a different metric, namely that of CDM as a percentage of GDP, South Africa was on par with Brazil. Encouragingly, South Africa ranked first in terms of the estimated CO_2e reductions per CDM project. With the notable exception of Russia (which does not participate in the CDM), it was noted that all BRICS countries had ratified the Paris Agreement. However, as regards the commitment to reduce Greenhouse Gas (GHG) emissions, it was found that all the countries fell short in their targets to limit warming to below 2°C.

It became apparent that a further in-depth study of South Africa's CDM projects was required in order to evaluate its success with greater accuracy. Consequently, Chapter 6 provided a quantitative analysis of all 56 registered CDM projects in South Africa, by assigning sustainable development criteria to the goals stated in each project design document. The empirical analysis demonstrated that CDM projects did have a positive impact on the various facets of sustainable development in South Africa. The indicators mentioned most frequently were job creation and poverty alleviation, the promotion of reliable and renewable energy and the reduction of pollution. The UNFCCC has identified 24 different CDM project types or technologies (refer to para 6.3.2), of which 13 are employed in South Africa. Chapter 6 indicated that most CDM projects in South Africa were energy-related. It could therefore be surmised that existing CDM (and future SDM projects) play a vital role in contributing to South Africa's sustainable energy future.

Notwithstanding that the CDM has achieved some level of success, it became evident that certain impediments hindered a more extensive roll-out of CDM projects. Chapter 7 sought to identify the barriers which prevented the expansion of the CDM. These hurdles include a volatile carbon price, setting a baseline and determining additionality, problematic technology transfer, policy and legislative uncertainty and high transaction costs.

Two case studies were analysed in this thesis. The local Kuyasa CDM project demonstrated that small-scale initiatives require an appropriate, affordable and effective verification mechanism, together with a sustainable financial model, in order to be successful. The Panama project demonstrated that, in order for the CDM (and the SDM) to achieve long-term success, the business-centric approach followed by CDM project investors will have to shift increasingly to the attainment of social, economic and environmental benefits for local communities.

In addition to highlighting specific measures aimed at overcoming the barriers which beset the CDM, this study also examined three proposals which could assist as stepping stones for transitioning from the CDM to the SDM. These, as well as other recommendations, are set out below.

8.2 KEY RECOMMENDATIONS

Although the eventual architecture of the SDM is in the process of development and, as such, is not yet clear, this thesis has demonstrated that many lessons can and should be learned from the CDM, as outlined in the subsequent paragraphs. This knowledge is sure to prove indispensable with the design and implementation of the SDM.

An initial suggestion is that the SDM is a successor to the CDM and should replace the CDM from 2020 onwards. However, this remains a contentious point. Ultimately, two key differences between the existing CDM and the proposed SDM were identified. First, carbon markets will no longer be limited to developed country parties. Instead, all parties will be able to participate in this mechanism. This is in line with the abandonment of the distinct differentiation between Annex I and non-Annex I countries alluded to above. Secondly, under the CDM, every tonne of CO_2 reduced in a non-Annex I country allowed for an additional tonne to be emitted in an Annex I country. This was, at best, a zero-sum game. In contrast, the SDM aims to ensure an *overall* reduction in global emissions.

Moreover, this thesis posits that the South African government remains constitutionally bound to apply domestic law in a manner that is consistent with its international law obligations. As a result (refer to para 4.2.2), the commitments made by South Africa under the Paris Agreement will become binding at a domestic level once enacted into national law.

Whether the CDM will continue to exist alongside the SDM, or will be replaced by it instead, is as yet uncertain. At any rate, some sort of transition will be required. Below are key recommendations to facilitate this transition, while the full discussions on which these are based are contained in previous chapters.

8.2.1 Carbon offsetting for the imminent carbon tax in South Africa

The CDM is a fully-fledged, internationally regulated carbon offset standard which has also been domestically approved as a carbon offset methodology. As discussed in Chapter 2, the use of the current existing standards to issue Certified Emission Reductions (CERs) will enhance the credibility and confidence in the market with regards to the carbon offset mechanisms. This will also ensure that a degree of local familiarity and existing competence in these standards can be capitalised on to implement and expedite the process of issuing CERs in South Africa. It is suggested that the CDM will move increasingly into the spotlight in South Africa, as it will serve as a useful mechanism for reducing (or offsetting) the impending carbon tax liability.

8.2.2 Transitional arrangements for existing CDM projects

On the basis that there is no sunset clause for the Kyoto Protocol or its CDM mechanism, existing CDM projects can formally continue to exist beyond 2020. Whether the CDM can generate new credits after 2020 is a contentious issue.[1] However, even if there was a clear consensus that the CDM could continue to issue credits post-2020, it is uncertain whether parties would be likely to agree politically on the continuation of these mechanisms.[2] Between the two extremes of the discontinuation of existing projects and quasi-automatic continuation under the SDM, are a range of non-mutually exclusive options which would allow some projects to continue generating credits under the SDM. Section 4.5 identified these options as the -

- Continuation of certain project types;
- Continuation only in certain countries;
- Continuation after an adjustment to the baseline, which takes the host country's Nationally Determined Contribution (NDC) into account; or
- Continuation after a re-registration of the project under the rules, modalities and procedures of the SDM.

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[1] M Cames, S Healy, D Tänzler, L Li, J Melnikova, C Warnecke, M Kurdziel *International market mechanisms after Paris – Discussion Paper* (2016) at 17-18, available at https://newclimate.org/2016/11/17/international-market-mechanisms-after-paris/, accessed on 2 January 2017. The authors remark (at 23) that the administration of mechanisms is likely to continue for approximately three years beyond 2020 to ensure that all requirements for the second commitment period of the Kyoto Protocol can be appropriately processed.

[2] Ibid. The authors contend that it seems 'very unlikely' that the CDM will continue to issue credits, as when the SDM comes into force, there is little sense in maintaining other crediting mechanisms which aim to reduce the same emissions and are largely based on the same concepts, but which do not take into account the new context under the Paris Agreement.

It was recommended that an important criterion for judging which option (or combination of options) is most appropriate is their potential contribution to reducing global GHG emissions.

8.2.3 Local governance

Two necessary components for ensuring the success of a CDM project were posited in section 4.4. These are the necessity of a 'champion' for the project at a municipal level, where this individual is supported by an advisory team with the necessary technical, legal and financial skills.[3] Moreover, it was recommended that the municipality where the CDM/SDM project is physically located ensures that all procedural and regulatory approvals are identified and properly addressed.

This study also suggested that local governments should improve their institutional planning processes, increase transparency around local development decision-making processes, and emphasise meaningful public participatory processes. It was further advised that municipalities align their social economic plans (as developed by renewable energy projects) with local government development planning processes.

Finally, it was recommended that the South African national government should increase its capacity and perceived efficiency, while also promoting inter-departmental cooperation, so as to attract private investments.

8.2.4 Contribution of past CDM and future SDM projects to sustainable development

It was recommended (in section 6.5) that one way of achieving a greater contribution to sustainable development in South Africa would be for the CDM policy to expand its focus to the promotion of sustainable development criteria as a whole, and not focus exclusively on GHG reductions. To this end, two policies were suggested.

The first is the implementation of a points system, which allocates points based on development aspects of CDM projects. All projects could be required to attain a minimum level of points in order for sustainable development benefits to be accepted. The second is a CER value adjustment to be

[3] Whether the municipality would have the necessary resources and skills to facilitate this is, of course, highly questionable. Most South African municipalities are chronically underfunded, underskilled and lack the necessary leadership accountability to curb irregular expenditure. See, for example, the latest Auditor-General report wherein only 49 out of 263 municipalities obtained clean audit reports. S Ndlendle 'Auditor-General Report: Municipalities lack accountability' (2017), available at https://www.iol.co.za/business-report/auditor-general-report-municipalities-lack-accountability-9904121, accessed on 12 August 2017.

made in cases where CDM projects favour high CERs, but low sustainable development or distributional benefits.

The failed Panama project (see section 7.7) demonstrated that governments, companies and financiers of renewable energy projects are required to meet the same social and environmental standards as any other project. This includes environmental impact assessments and proper consultation with affected communities. Moreover, it was recommended that greater public participation by local stakeholders is necessary to ensure that people affected by a CDM project are able to provide a timely and meaningful input to a proposed project.

8.2.5 Recommendations to promote the South African CDM industry

Section 7.3 suggested the following interventions to accelerate the implementation of the CDM in the South African industry and, by extension, to future SDM projects:

- A clear understanding of the Kyoto Protocol (and now Paris Agreement) mechanisms and the opportunities for South Africa must be developed by all stakeholder groups.
- The national processes supporting CDM must be streamlined by government to facilitate project implementation.
- The South African energy market must be opened up to reduce the dominance of Eskom and fossil-based power. To this end, the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) (as discussed in Chapter 4), as well as the privatisation of the state-owned entity Eskom, can have a considerable impact.
- Business should take the lead and drive the CDM in South Africa.
- Formal structures are required to facilitate communication between stakeholders to prevent a 'silo' mindset.
- The CDM should be promoted in order to change perceptions in the media and public.
- South Africa can learn from successful non-Annex I countries.

8.2.6 Linking the CDM to the Green Climate Fund (GCF)

As discussed in section 7.4, the GCF is positioned to become the key vehicle for large-scale international climate finance under the UNFCCC. As the GCF is still at an early stage of its institutional development, an opportunity exists for collaboration between the CDM (and future SDM projects) and the GCF. It was demonstrated that many similarities exist between the scope and modalities of both institutions. This leads to an opportunity for the GCF to make use of the CDM's

Measurement and Evaluation (MRV) framework to enhance its results-oriented approach for financing mitigation action. In addition, the CDM can support the GCF in leveraging private capital from investors seeking investment opportunities in green asset classes. On the other hand, the CDM can gain an important source of demand for CERs. It was found that the CDM does not currently comply with the safeguard policies of the GCF, and should therefore adopt a similar grievance mechanism.

8.2.7 The CDM Sustainable Development Tool

Another recommendation (refer to the outline in section 7.5) pertains to a tool that has emerged as part of the CDM experience and which could be carried forward to the SDM. The Sustainable Development (SD) tool offers an international and flexible definition of sustainable development criteria and indicators. It can assist in guiding national authorities, such as Designated National Authorities (DNAs), to develop their own sustainable development assessments or to adopt a global sustainable development goal tool. This thesis identified a number of shortcomings of the SD tool, as well as making recommendations for improvements. It was found that an enhanced sustainable development tool in the SDM, which builds on the existing CDM SD tool, could lay down common international best practice, upon which guidance for cooperative approaches could be built.

8.2.8 A sectoral CDM approach

A sectoral CDM (S-CDM) approach was recommended (in section 7.6) to serve as a stepping stone from the CDM to the SDM. This entails a combined industry and government initiative, which may apply to one sector or to several sectors at once. The S-CDM approach would maintain some basic elements of the current CDM, but would also allow for the development of CDM projects without pre-established limitations in terms of territorial coverage or enabling instruments. This thesis presented an overall approach for transitioning to a sectoral-based SDM by addressing the scope, governance, sectoral baselines, emissions accounting and re-evaluation matters.

8.2.9 Recommendations for policymakers, investors and financiers

The following lessons learned from the CDM experience should provide insight to future SDM participants regarding the transition from the CDM. In particular, recommendations for policymakers include:[4]

- Create an overall enabling environment for businesses to operate in by ensuring the enforceability of contracts, improving the reliability of regulation and reducing administrative burdens.
- Use public finance mechanisms to allocate risk effectively between the public and private sector;
- Establish a well-functioning DNA, which can take decisions quickly and transparently, build capacity and share experiences with other DNAs in the region and broader continent; and
- DNAs must be embedded within a broader national economic development framework.

For investors and finance providers, the following recommendations are suggested:[5]

- Investors should engage with public institutions more systematically on the issue of risk sharing;
- The inability to mobilise local finance could be bridged by the development of a public finance mechanism, for example, by providing guarantees to local financial institutions;
- Investors should increase their collaboration with local financial institutions and project developers in awareness-raising and capacity-building efforts; and
- Investors and lenders must ensure the integration of multiple revenue streams, which increases the viability and resilience of the business model. At the same time, projects should be aligned with local development needs to ensure early buy-in and support from relevant stakeholders.

8.2.10 Implementation of the SDM

In addition to the transitional arrangements proposed in para 8.2.2 above, the following practical steps are recommended during this transition period:[6]

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[4] UNEP 'And yet it moves. Success stories and drivers of CDM project development in sub-Saharan Africa' (2011) at 45, available at http://www.unepfi.org/fileadmin/documents/and_yet_it_moves_01.pdf, accessed on 11 May 2017.

[5] Id at 45-46.

[6] Carbon Market Watch 'Good-bye Kyoto: transitioning away from offsetting after 2010' (2017) at 6-7, available at http://carbonmarketwatch.org/wp-content/uploads/2017/04/Good-bye-Kyoto_Transitioning-away-from-offsetting-after-2020_WEB_1final.pdf, accessed 11 May 2017.

1. *Design the SDM as a tool for results-based climate finance*: the CDM's methodologies to reduce emissions and criteria to evaluate additionality should be retained, but adapted for the SDM.
2. *Transition period registration from the CDM to the SDM*: consensus seems to exist that there will be no new commitment period after the Kyoto Protocol's second commitment period expires in 2020. The demand for carbon offsets to fulfil pre-2020 pledges is very limited and, as such, CDM project registrations should be stopped in 2018.[7] From 2018, new projects should seek registration under the Paris Agreement rulebook.
3. *Set a cut-off date for the use of CDM credits*: the use of CDM credits should be restricted to the Kyoto time horizon, with a decision to stop credit issuance and usage by the end of the true-up period in 2023.[8]
4. *Inform a new, reformed SDM supervisory body*: the CDM Executive Board (EB) should be dissolved and a new body designated to oversee the SDM. The CDM EB has accumulated revenues generated by the CDM which could be used to establish the new SDM supervisory body. Equally importantly, the wealth of knowledge and experience of the CDM EB should inform the formation of the new body.
5. *Adapt CDM infrastructure*: the CDM has built valuable capacity in developing countries and its various structures and procedures could be adapted and reformed for use under the SDM.[9] Civil society should play an integral role on panels and in working groups.
6. *Establish a COP/MOP process to guide the transition process*: Notwithstanding that the reform process for the CDM was originally scheduled for finalisation by December 2013, it has yet to be concluded. The considerations and discussions in the CDM reform process should feed into the design of the new SDM.

8.3 CONCLUDING REMARKS

The CDM – one of the flexible mechanisms introduced under the Kyoto Protocol – has evolved significantly over time, broadening its applicability to a large number of sectors, while introducing programmatic and standardised approaches. Despite the crash in carbon prices, the CDM

[7] COP24 will take place in Poland in 2018.

[8] This is when parties have to report on how they have met their emission reduction commitments up to 2020.

[9] Such structures could include the Designated National Authorities (DNAs), Designated Operational Entities (DoEs), panels and working groups.

successfully attracted private sector investment in projects hosted in developing countries and created an internationally recognised framework for realising mitigation action.

The different legal frameworks of the Kyoto Protocol and the Paris Agreement give rise to a number of challenges in implementing the SDM. The Kyoto Protocol's commitment periods will end in 2020. It is therefore incumbent upon the parties to decide actively how to transition the Kyoto Protocol's mechanisms, including the CDM, into the Paris Agreement. This transition should take advantage of the valuable CDM lessons enumerated above in order to shape the SDM. Indeed, Christiana Figueres (former Executive Secretary of the UNFCCC), stated that we are 'in a very privileged situation of being able to live up to the expectations of the Paris Agreement, because we have more than a decade of experience with the CDM'.[10]

Although the Paris Agreement established the new SDM, this mechanism has not yet been implemented. Until such time as the SDM comes into effect, 'value remains in using the CDM for prompt climate action with international recognition'.[11] This thesis found (particularly in para 4.3.3.) that many of the principles listed for the SDM mirror those of the CDM. Notwithstanding that many concepts which appear in the SDM are generally accepted, there will also be many that will require negotiations. The challenge will be to do so without straying into a renegotiation of the Paris Agreement. A lot has been learned from the Kyoto mechanisms, and that knowledge is sure to prove valuable.

New instruments (such as the SDM) under the Paris Agreement may come, over time, and eventually replace the CDM. However, it is fair to say that the CDM is a working tool for use by parties at present and that the experience gained with the CDM will also prove useful for the future. While this thesis calls for a bridge between the CDM and the SDM, it remains a vital issue for consideration by the parties concerned.[12]

[10] United Nations (UN) 'Lessons from Clean Development Mechanism Critical to Implementation of Paris Agreement' (2016), available at http://newsroom.unfccc.int/climate-action/lessons-clean-development-mechanism-implementation-paris-agreement/, accessed on 20 July 2017.

[11] V Silva, L Brusa & N Muller 'Contribution the details: The link between the Clean Development Mechanism and Nationally Determined Contributions to climate action' (2017) at 20, available at http://www.carbon-mechanisms.de/fileadmin/media/dokumente/Publikationen/CMR/CMR_2016_02_Towards_Implementation_eng_bf.pdf, accessed on 8 March 2017.

[12] Indeed, as D Bodansky, J Brunnée & L Rajamani *International Climate Change Law* (2017) at 248 succinctly remark, 'the post-Paris negotiations have crucial gap-filling work to do'.

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ANNEXURE A - Extracts from the Kyoto Protocol and Paris Agreement

Kyoto Protocol, Art 12 – The CDM

1. A clean development mechanism is hereby defined.

2. The purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist Parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments under Article 3.

3. Under the clean development mechanism:

(a) Parties not included in Annex I will benefit from project activities resulting in certified emission reductions; and

(b) Parties included in Annex I may use the certified emission reductions accruing from such project activities to contribute to compliance with part of their quantified emission limitation and reduction commitments under Article 3, as determined by the Conference of the Parties serving as the meeting of the Parties to this Protocol.

4. The clean development mechanism shall be subject to the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to this Protocol and be supervised by an executive board of the clean development mechanism.

5. Emission reductions resulting from each project activity shall be certified by operational entities to be designated by the Conference of the Parties serving as the meeting of the Parties to this Protocol, on the basis of:

(a) Voluntary participation approved by each Party involved;

(b) Real, measurable, and long-term benefits related to the mitigation of climate change; and

(c) Reductions in emissions that are additional to any that would occur in the absence of the certified project activity.

6. The clean development mechanism shall assist in arranging funding of certified project activities as necessary.

7. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session, elaborate modalities and procedures with the objective of ensuring transparency, efficiency and accountability through independent auditing and verification of project activities.

8. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall ensure that a share of the proceeds from certified project activities is used to cover administrative expenses as well as to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation.

9. Participation under the clean development mechanism, including in activities mentioned in paragraph 3 (a) above and in the acquisition of certified emission reductions, may involve private and/or public entities, and is to be subject to whatever guidance may be provided by the executive board of the clean development mechanism.

10. Certified emission reductions obtained during the period from the year 2000 up to the beginning of the first commitment period can be used to assist in achieving compliance in the first commitment period.

Paris Agreement, Art 6(4) – The SDM

4. A mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development is hereby established under the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to this Agreement for use by Parties on a voluntary basis. It shall be supervised by a body designated by the Conference of the Parties serving as the meeting of the Parties to this Agreement, and shall aim:

(a) To promote the mitigation of greenhouse gas emissions while fostering sustainable development;

(b) To incentivize and facilitate participation in the mitigation of greenhouse gas emissions by public and private entities authorized by a Party;

(c) To contribute to the reduction of emission levels in the host Party, which will benefit from mitigation activities resulting in emission reductions that can also be used by another Party to fulfil its nationally determined contribution; and

(d) To deliver an overall mitigation in global emissions.

ANNEXURE B - Funding available for CDM projects

This annexure provides an overview of the development finance institutions, and local financiers and investors in both the public and private sectors that provide opportunities for start-up CDM projects. Table B-1[1] below is not exhaustive, but intends to be indicative of the more green-focused funds and incentives available.[2]

Table B-1 Funding available for CDM projects		
Funding solution	**Funding instrument**	**Details**
Development finance		
International Finance Corporation	Loan, Equity	www.ifc.org
European Investment Bank	Loan	Greater than R0.25 million www.eib.org
SouthSouthNorth / DBSA: Sustainable Settlements Facility	Grant, Subsidy, Rebate	http://southsouthnorth.org/sustainable-settlements-facility-ssf/
African Development Bank: Sustainable Energy Fund for Africa	Grant, Technical assistance, Equity	• Grant: projects with total capital investments in the range of US$ 30-200 million • Equity: For IPPs with an ideal size of 5-50MW and a commitment of US$10-30 million per project https://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/sustainable-energy-fund-for-africa/
United Nations Development Programme: Global Environment	Grant	Up to US$ 50 000 https://sgp.undp.org/

[1] Adapted from Greencape *Utility-scale renewable energy sectors 2016 – Market Intelligence Report* (2016) at 28-31, available at http://greencape.co.za/assets/GreenCape-Renewable-Energy-MIR-2016.pdf, accessed on 12 January 2017.

[2] In addition to these, the full range of government investment incentives can be found at http://www.investmentincentives.co.za/, accessed on 1 February 2017. Also, all website references in this table were available and accessed on 1 February 2017.

Facility		
Renewable Energy and Energy Efficiency Partnership	Grant	http://www.reeep.org/
UK Prosperity Fund Programme	Grant	https://www.gov.uk/guidance/prosperity-fund-programme
German Federal Ministry of Environment: International Climate Initiative	Grant	http://www.bmub.bund.de/en/topics/climate-energy/climate-initiative/general-information/
German International Cooperation Agency	Feasibility studies	Bio-energy https://www.giz.de/en/html/about_giz.html
Public sector funding		
Western Cape Government: Cape Capital Fund	Grant	50% of approved intervention https://www.westerncape.gov.za/general-publication/cape-capital-fund
Eskom: Integrated Demand Management	Rebate	www.eskom.co.za/sites/idm/Pages/Home.aspx
Industrial Development Corporation: Green Energy Efficiency Fund	Loan, Technical support	R1-50 million http://www.idc.co.za/
Development Bank of South Africa: Green Fund	Grant, Loan	Green cities and towns; low carbon economy; environmental and natural resource management http://www.sagreenfund.org.za/wordpress/about-the-green-fund/
DTI: Critical Infrastructure Programme	Grant	10%-30% of the total qualifying infrastructural development costs, up to a maximum of R50 million http://www.thedti.gov.za/financial_assistance/financial_incentive.jsp?id=3
DTI: Manufacturing Competitiveness Enhancement Programme Industrial Financing	Loan	Up to R50 million at a fixed rate of 4% p.a. https://www.thedti.gov.za/financial_assistance/MCEP.jsp Note: Despite being temporarily suspended in October 2015, the MCEP has since been re-opened for applications
DTI:	Grant	Up to 25% of the manufacturing value added.

Manufacturing Competitiveness Enhancement Programme Production Incentive		https://www.thedti.gov.za/financial_assistance/MCEP.jsp Note: Despite being temporarily suspended in October 2015, the MCEP has since been re-opened for applications
DTI: Manufacturing Investment Programme	Grant	• New or expansion projects < R5 million: investment grant of 30% of the cost of qualifying assets • New or expansion projects > R5 million: investment grant of 15% to 30% of the cost of qualifying assets Note: the MIP is fully subscribed and has since been suspended.
Department of Small Business Development Co-operative Incentive Scheme	Grant	R0.35 million http://www.dsbd.gov.za/about-dsbd.html
Municipal Infrastructure Grant	Grant	https://www.westerncape.gov.za/general-publication/municipal-infrastructure-grant
Recycling and Economic Development Initiative of South Africa	Grant	Infrastructure and set-up costs for tyre recycling http://www.redisa.org.za/Satellite/Redisa%20Home%20Page.html
South African National Biodiversity Institute: Global Adaptation Fund	Grant	http://www.sanbi.org/biodiversity-science/state-biodiversity/climate-change-and-bioadaptation-division
	Private Sector Funding	
ABSA (with the French Development Agency)	Loan, Rebate	Rebate of up to 7% of the loan amount, for clients who qualify for a loan of up to R100 million used in energy efficiency or renewable energy projects http://cib.absa.co.za/MediaReleases/Pages/CleanEnergyfinancingopportunityprovidedbyAbsa.aspx
Nedbank	Loan	https://www.nedbank.co.za/content/nedbank/desktop/gt/en/news/nedbankstories/affinity-projects/2015/the-wwf-nedbank-green-trust-funds-climate-change-projects.html
FNB	Loan	Eco-energy business loans with flexible terms https://www.fnb.co.za/business-banking/business-loan/ecoEnergyLoan.html
Standard Bank	Loan	http://community.standardbank.co.za/t5/Community-blog/Making-a-difference-by-financing-renewable-energy/ba-p/4931

Old Mutual Infrastructural, Developmental and Environmental Assets Managed fund	Loan, Equity	http://ww2.oldmutual.co.za/old-mutual-investment-group/boutiques/alternative-investments/our-capabilities1/infrastructure/our-products/ideas-managed-fund
Business Partners Green Fund	Equity, Loan	R0.5 – R30 million http://www.businesspartners.co.za/general-finance-solutions/green-fund/
Edge Growth	Equity, Loan	R1 – R20 million https://www.edgegrowth.com/
Inspired Evolution: Evolution One fund	Loan	> R10 million http://inspiredevolution.co.za/funds/evolution-one-fund/
Atlantic Asset Management	Loan	> R15 million http://www.atlanticam.com/sites/default/files/documents/fund-factsheets/atlantic-environmental-impact-fund-institutional-only/atlantic-environmental-impact-fund-institutional-only-factsheet-2014-01.pdf
POLYCO	Loan, Grant	Financial assistance may take the form of a capital interest-free loan or a capital grant http://www.polyco.co.za/
PETCO	Subsidy, Awareness and training, Equipment	http://petco.co.za/

ANNEXURE C - Summary of statistical analysis on Project Design Documents for South African CDM projects

Chapter 6 assessed the contribution of CDM projects to sustainable development in South Africa. The project design documents (PDDs) of all 56 registered CDM projects in South Africa were scrutinised in order to measure their contribution to sustainable development. The sustainable development claims in the PDDs of these projects were tabulated using the indicators in Table 7.1. The spreadsheet on the next page reflects the working paper of the author, with the digit '1' indicating whether a particular indicator was found in the respective PDD.

Nr	Registered	Ref	Province	Project type	Dimension									
					Economic			Environmental			Social			
	Year		Province	Project type	Ind1	Ind2	Ind3	Ind4	Ind5	Ind6	Ind7	Ind8	Ind9	Ind10
1	20/12/2014	10005	NW	Fossil fuel switch	1			1			1			
2	22/05/2014	8369	EC	Biomass	1			1	1	1	1			
3	15/07/2013	8956	NW	EE own generation	1	1			1			1		
4	24/06/2013	6669	NW	EE own generation	1	1			1					
5	31/12/2012	8951	EC	Wind	1	1			1			1		
6	31/12/2012	7576	EC	Wind	1			1						
7	31/12/2012	8928	KZN	EE own generation	1	1		1	1		1	1		
8	29/12/2012	9412	Gau	EE Service	1	1			1			1		
9	28/12/2012	9238	Gau	EE industry				1	1	1	1			
10	28/12/2012	9187	KZN	EE industry	1	1		1	1	1		1		
11	27/12/2012	8372	EC	Biomass	1			1	1	1		1		
12	27/12/2012	8967	NW	EE own generation	1	1			1					
13	24/12/2012	8954	EC	Wind										
14	24/12/2012	8289	EC	Wind	1				1			1		
15	20/12/2012	7476	Mpu	Biomass	1		1		1		1		1	
16	18/12/2012	5884	WC	EE own generation	1	1		1		1				
17	13/12/2012	8346	WC	Wind	1			1	1	1				
18	13/12/2012	8404	WC	Wind	1				1					
19	13/12/2012	7531	NC	Solar	1			1	1					
20	12/12/2012	8566	Mpu	EE own generation	1	1			1			1		
21	12/12/2012	8525	Mpu	EE own generation	1	1			1			1		
22	11/12/2012	7356	EC, KZN, NW	EE household	1	1			1	1	1			
23	05/12/2012	7492	NC	Solar	1			1	1					
24	23/11/2012	8107	WC	Wind	1				1	1		1		
25	15/11/2012	8047	KZN	Methane Avoidance	1			1	1	1				
26	14/11/2012	8087	NC, WC	Wind	1			1	1					
27	14/11/2012	7816	WC	Wind	1				1	1				
28	14/11/2012	8148	NC, WC	Solar	1			1	1					
29	12/11/2012	6797	Gau	Landfill	1			1	1	1	1			
30	05/11/2012	7536	NC	Hydro	1			1	1					
31	26/10/2012	7841	NC	Solar	1							1		1
32	22/10/2012	7607	NC	Solar	1			1	1					
33	10/10/2012	7478	Gau, Free State, Lim, Mpu, NC	EE household	1	1		1	1		1	1		
34	10/10/2012	7638	EC	Wind	1			1	1					
35	24/05/2012	5692	EC	Landfill	1		1	1	1					
36	30/04/2012	6083	Free State	N2O	1	1		1				1		
37	10/06/2011	4728	Free State	Fugitive	1				1	1	1			1
38	25/12/2010	3398	Gau	Fossil fuel switch	1			1			1			
39	26/10/2010	3677	Gau	Landfill	1	1		1			1			
40	08/10/2009	2692	Free State	Hydro	1				1					
41	24/08/2009	2549	KZN	Landfill	1			1	1		1			
42	26/03/2009	1921	KZN	Landfill	1			1			1			
43	18/07/2008	1665	Mpu	EE own generation	1			1	1		1	1	1	1
44	08/02/2008	1364	Gau	N2O	1	1			1			1		
45	05/11/2007	1171	Gau	N2O	1	1			1			1		
46	19/10/2007	1027	Gau	EE industry	1			1	1					
47	25/05/2007	961	Free State, Mpu	N2O		1								
48	20/05/2007	966	KZN	Biomass	1	1		1	1					
49	03/05/2007	752	Free State	N2O	1	1								
50	27/04/2007	925	Gau	Landfill	1			1				1		
51	12/02/2007	795	KZN	Biomass				1	1					
52	15/12/2006	545	KZN	Landfill	1			1	1		1			
53	29/09/2006	358	Gau	Fossil fuel switch				1	1		1			
54	29/09/2006	446	WC	Methane avoidance	1				1		1			
55	06/03/2006	177	Gau	Fossil fuel switch	1				1		1			
56	27/08/2005	79	WC	EE household	1				1		1			