University of Alberta

Achieving Cost-Effectiveness and Equity: Analysis of the International Emissions Trading System

by

Annet Nakamatte 

A Thesis submitted to the Faculty of Graduate Studies and Research in Partial Fulfillment of the Requirements for the Degree of Master of Laws

Faculty of Law

Edmonton, Alberta

Spring, 2007

Your file Votre référence
ISBN: 978-0-494-29869-5
Our file Notre référence
ISBN: 978-0-494-29869-5

Dedicated to my mum and dad, and to my siblings

Abstract

Climate change is one of the greatest environmental challenges facing today's world. The *United Nations Framework Convention on Climate Change* and the *Kyoto Protocol* aim at enabling the Parties to mitigate and adapt to climate change, although they recognize that this will be very costly. Therefore, the *Kyoto Protocol* contains flexibility mechanisms such as international emissions trading, with the goal of enabling the Parties to achieve their targets at the least possible cost. This paper argues that although the international emissions trading system is likely to succeed in creating cost-effectiveness, it does not address issues of equity that arise with climate change and consequently the distribution of its costs and benefits will not be fair to all the Parties. The paper proposes ways through which equity can be incorporated into the climate change regime and more specifically, into the international emissions trading system.

Acknowledgements

I wish to acknowledge the significant contribution of my thesis supervisor, Prof. Elaine L. Hughes, the oral exam committee members, Dean David R. Percy, Q.C. and Dr. Ian Urquhart, for their suggestions and guidance. I would also like to thank all the staff of the Faculty of Law, University of Alberta for their help during the course of my studies.

I am solely responsible for any errors that may have been included, inadvertently, in this paper.

Table of Contents

List of Acronyms, Abbreviations and Units

Section One: Climate Change

Section Two: A Comparative Analysis of the International Emissions Trading System under the *Protocol* and the U. S Acid Rain Program.

List of Acronyms, Abbreviations and Units

Annex B Countries	OECD & EIT Countries listed in Annex B to the *Protocol*
Annex I Countries	OECD countries listed in Annex I to the *Convention*
Annex II Countries	OECD & EIT countries listed in Annex II to the Convention
CDM	Clean Development Mechanism
Convention	United Nations Framework Convention on Climate Change
COP	Conference of the Parties
COP/MOP	Conference of the Parties / Meeting of the Parties
EU	European Union
GEF	Global Environment Facility
IPCC	Inter-Governmental Panel on Climate Change
JI	Joint Implementation
LULUCF	Land-use, Land-Use Change and Forestry
NGO	Non-Governmental Organization
OECD	Organization for Economic Co-operation and Development
Protocol	Kyoto Protocol
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice

SCCF	Special Climate Change Fund
U.S.	United States of America

Section One: Climate Change

1.1 Introduction

Climate change is a modern problem, complicated, involving the entire world, and tangled up with difficult issues such as poverty, economic development and population

growth.[1] Although dealing with it will not be easy, it is recognized that ignoring it will be worse.[2] It is this recognition that led many nations to join the *United Nations Framework Convention on Climate Change*[3] with the aim of considering ways to mitigate and to adapt to climate change. The *Convention* was followed up with the *Kyoto Protocol,*[4] which contains legally binding measures to control climate change. However, predictions indicate that implementing the measures in the *Protocol* will be extremely costly to the economies of the State Parties.[5] Consequently, the *Protocol* contains flexibility mechanisms such as emissions trading, the main goal of which is to help in the reduction of the costs of its implementation. This paper argues that although the international emissions trading system is well designed and, therefore, it has the potential to reduce the costs of implementing the obligations under the *Protocol*, it ignores equitable concerns and so the distribution of its costs and benefits will not be fair to all Parties. The problem is that if the international emissions trading

---

[1] UNFCCC Secretariat, "Feeling the Heat," online: United Nations Framework Convention on Climate Change< http://unfccc.int/essential_background/feeling_the_heat/items/2917.php> [UNFCCC, "Heat"].
[2] *Ibid.*
[3] *United Nations Framework Convention on Climate Change,* 9 May 1992, 31 I.L.M. 849 (entered into force 21 March 1994) [The *Convention*].
[4] *Kyoto Protocol to the United Nations Framework Convention on Climate Change,* 11 December 1997, 37 I.L.M. 22 (entered into force 16 February 2005) [*The Protocol*].
[5] National Centre for Policy Analysis, "Economic Effects of Kyoto on Europe," online: National Centre for Policy Analysis< http://www.ncpa.org/iss/env/2002/pd042502g.html >[National Centre, "Economic Effects"].

system does not uphold equity, this will not only constitute a breach of the principles on which the *Convention* and the *Protocol* are founded, but it will also be a setback in the struggle to enable all countries to mitigate and adapt to climate change.

The objectives of this paper are: to assess the likelihood of success of the *Convention* and the *Protocol* in controlling greenhouse gas emissions which are believed to be the cause of climate change; to examine the model of emissions trading under the *Protocol* and its likelihood of success as a cost-effective solution to climate change; to examine and propose solutions to problems that could affect the creation and existence of a vibrant market under the international emissions trading system; to analyze the effects of the international emissions trading system on the equitable principles on which the *Convention* and the *Protocol* are based; and to propose ways in which equity concerns could be incorporated into the climate change legal regime and the international emissions trading system.

These objectives will be accomplished in four sections. Section one is an analysis of aspects relating to climate change such as the evidence of its occurrence, its causes and effects. The section also describes the international legal documents that aim at controlling climate change such as the *Convention*, the *Protocol* and the subsequent elaboration of the *Protocol* terms in the *Marrakesh Accords*.[6] Section two is a comparative analysis of the international emissions trading system and the U.S acid rain program. The latter is a cap and trade program that has achieved immense success in controlling sulphur dioxide emissions in the U.S.[7] The systems are

---

[6] Conference of the Parties, *Report on Its Seventh Session,* FCCC/CP/2001/13/Add.1 [The Accords].
[7] Jennifer Yelin-Kefer, "Warming up to an International Greenhouse Gas Market: Lessons from the U.S Acid Rain Experience" (2001) 20 Stan. Envtl. L. J. 221[Yelin-Kefer, "Warming"]; The White

evaluated based on their potential for achieving environmental and cost-effectiveness, the ease of implementation of their features and their distributional effects.[8] Section three analyzes the effects of climate change and international emissions trading on equity. Section four provides recommendations for integrating concerns of equity into the climate change legal regime and the international emissions trading system.

This paper addresses the scientific information and the international legal developments relating to climate change, as they were in existence on 31 December 2006.

1.2 Evidence of Climate Change

Climate change is indicated by the increase in regional and global temperatures and changes in the sea level, precipitation, and weather patterns.[9] Statistics indicate that the global mean temperature has risen by 0.45° C since the middle of the 19th century.[10] Furthermore, long-term statistics show that if all countries continue with a 'business as usual' growth in greenhouse gas emissions, an increase in the global mean temperature of 2.7° C will occur by 2100.[11] Further evidence of climate change has been given by the IPCC which revealed that over the last 100 years, the global sea level has risen by about 4 to 14cm.[12] It is also forecast that an additional sea level rise

---

House, "Executive Summary – The Clear Skies Initiative," online: The White House < http://www.whitehouse.gov/news/releases/2002/02/clearskies.html>.

[8] U.S Congressional Budget Office, "An Evaluation of Cap-and-Trade Programs for Reducing U.S Carbon Emissions," online: The Congress of the United States Congressional Budget Office <http://www.cbo.gov/ftpdocs/28xxdoc2876/Cap&Trade.pdf> [U.S Congressional Office, "Study"].

[9] Mark Maslin, *Global Warming: A Very Short Introduction* (Oxford: Oxford University Press, 2004) at 15.

[10] Neil Adger & Katrina Brown, *Land Use and the Causes of Global Warming* (Chichester: John Wiley & Sons Publishers, 1994) at 16.

[11] *Ibid.* at 21; See Maslin, *supra* note 9.

[12] *Ibid.* at 53; UNFCCC, "Heat", *supra* note 1.

of between 20 and 88cm will occur in the next 100 years.[13] In addition to the above observations, changes in precipitation levels over the earth's surface have occurred.[14] It has been recorded that precipitation increased from the start of the century up to about 1960, but has decreased since about 1980.[15] The decreases in precipitation have especially been recorded over the subtropics and the tropics from Africa to Indonesia.[16] Further evidence of climate change is the variance in weather patterns, for example the increase in both the magnitude and frequency of storms and droughts.[17]

1.3 Causes of Climate Change

Climate change is attributed to the increase in concentrations of greenhouse gases such as carbon dioxide, methane, and nitrous oxide in the atmosphere.[18] Estimates indicate that the concentration of carbon dioxide in the atmosphere has increased steadily since 1957 and that the present rate of increase is at 0.5% per annum.[19]

Although greenhouse gases exist naturally in the atmosphere, human activities are primarily blamed for the increase in the level of these gases. It is believed that about three-fourths of carbon dioxide added to the air comes from the burning of fossil fuels such as oil and coal.[20] Human activities relating to land-use have also highly

---

[13] Maslin, *supra* note 9 at 84.
[14] *Ibid.*
[15] *Ibid.* at 53.
[16] *Ibid.*
[17] *Ibid.*
[18] UNFCCC Secretariat, "Climate Change Science," online United Nations Framework Convention on Climate Change <http://unfccc.int/essential_background/feeling_the_heat/items/2902.php>; The *Protocol, supra* note 4, lists the other greenhouse gases, that is, hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and sulphur hexafluoride (SF6).
[19] Adger, *supra* note 10 at 5; See Daniel Botkin, "Global Warming: What it is, What is Controversial About it, And What We Might Do in Response to it" (1991) 9 UCLA J. Envtl. L. & Pol'y 119 at 121[Botkin, "Global Warming"].
[20] Kathiann M. Kowalski, *Global Warming (*New York: Marshall Cavendish, 2004) at 16.

increased the levels of greenhouse gases in the atmosphere.[21] Forests are storage areas of carbon, and their clearance leads to a release of the carbon in the atmosphere.[22] Estimates indicate that the world's forests and woodlands are now at 81% of their 1700 total and that from the pre-industrial era to the present, tropical forests have declined in area by approximately 3.9 %.[23] As a result, deforestation is responsible for 25% of all carbon emissions entering the atmosphere.[24]

1.4 Effects of Climate Change

Climate change is predicted to occasion both adverse and positive effects, although the former greatly outweigh the latter.[25] Due to the changes in precipitation, arid and semi - arid areas will become hotter and drier, in particular parts of Southern and Northern Africa, Southern Europe, the Middle East, parts of Latin America, and Australia.[26] The populations in these areas, therefore, may suffer limited access to fresh drinking water and decreases in food production, which in turn may lead to high costs of food importation, starvation, and even death.[27] The IPCC reports that with the projected global population increase and expected climate change, assuming present consumption patterns, 5 billion people will experience water stress by 2025.[28]

Sea level rise has the potential to wreak havoc for people who live in low-lying areas and island nations as they may lose their homes and livelihoods due to flooding.

---

[21] Botkin, "Global Warming", *supra* note 19.
[22] *Ibid.*
[23] Adger, *supra* note 10 at 21; E. Matthews, "Global Vegetation and Land Use: New High Resolution Databases for Climate Studies" (1983) 22 Journal of Climate and Applied Meteorology 474.
[24] EcoBridge, "Causes of Global Warming," online: EcoBridge, <http://www.ecobridge.org/content/g_cse.htm>.
[25] See Maslin, *supra* note 9, chapter 6.
[26] John Carlisle, "Natural Factors Cause Global Warming" in James Haley, ed., *Global Warming: Opposing Viewpoints* (San Diego: Greenhaven Press, Inc, 2002) 72 [Carlisle, "Natural Factors"].
[27] Maslin, *supra* note 9 at 100.
[28] *Ibid.*

Between 100 and 200 million people are estimated to be subject to increased flooding frequency with slight mean sea level changes.[29] Furthermore, research indicates that climate change will have negative impacts on human health as warm weather is conducive to the survival of disease vectors such as mosquitoes, ticks and sand flies.[30] The increased breeding and survival of these vectors will increase prevalence of diseases such as malaria, dengue fever and yellow fever.[31]

Climate change is an enormous threat to biological diversity due to the projected negative impacts on the flora and the fauna.[32] As temperatures and precipitation change, large areas of forests may die, leading to probable deaths of about half of the world's species that live in these forests.[33] Species such as polar bears, penguins, and mountain gorillas that are unable to migrate in response to climate change face the threat of extinction.[34]

On a positive note, climate change may lead to longer growing seasons for crops in places such as Siberia and Northern Canada.[35]

1.5 The Legal Efforts to Control Climate Change

International cooperation and use of legal mechanisms to control environmental harm is not new. For example, in 1985 when a survey of the Antarctic revealed a serious depletion of the ozone layer, there was the signing and ratification of international

---

[29] Adger, *supra* note 10; Kowalski, *supra* note 20 (notes that in Bangladesh, about 6 million people presently live in low-lying areas that are less than 3 feet (almost 1 m) above sea level; and if sea level were to rise just a foot (30cm), many would lose their homes and their livelihoods).
[30] Maslin, *supra* note 9 at 94.
[31] *Ibid.*
[32] Meinhard Doelle, *From Hot Air to Action? Climate Change, Compliance and the Future of International Environmental Law* (Toronto: Thomson Carswell, 2005) at 257.
[33] Kowalski, *supra* note 20 at 53.
[34] Maslin, *supra* note 9 at 98.
[35] Botkin, "Global Warming" *supra* note 19.

treaties such as *The Vienna Convention for the Protection of the Ozone layer*[36] and *The Montreal Protocol on Substances that Deplete the Ozone Layer*[37] in an effort to control the depletion problem.

In 1990, due to the realization that climate change could best be tackled from an international perspective, negotiations to create a legally binding instrument were commenced.[38] The *Convention* was adopted in 1992 at the United Nations Conference on Environment and Development, a conference which had the goal of promoting the integration of environmental protection in economic and social development.[39]

1.5.1 The *United Nations Framework Convention on Climate Change*

The objective of this *Convention* is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.[40] It further provides that the desired level of greenhouse gas concentrations in the atmosphere should be achieved within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic

---

[36] This *Convention*, also known as The *Convention for the Protection of the Ozone Layer*, establishes a framework to address the problem of depletion of the ozone layer, 22 March 1985, 1513 U.N.T.S 323, 26 I.L.M. 1529, (entered into force 22 September 1988).

[37] This is a *Protocol* to the *Vienna Convention* and it lays out a timeline during which the State Parties are to phase out the production and consumption of Ozone Depleting Substances, 16 September 1987, 26 I.L.M. 1550 (entered into force 01 January 1989).

[38] Farhana Yamin, ed., *Climate Change and Carbon Markets: A Handbook of Emissions Reduction Mechanisms* (London: Earthscan, 2005) at xxxvii.

[39] This conference also resulted in the adoption of other instruments to advance its goal of protecting the environment and promoting sustainable development. These are *Agenda 21* U.N GAOR, 46th Sess., Agenda Item 21, UN Doc A/Conf.151/26(1992); The *Rio Declaration* (1992), I.L.M. 874; The *Forest Principles* A/CONF.151/26(Vol. III); and the *Convention on Biological Diversity* 1760 U.N.T.S. 79; 31 I.L.M 818 (1992).

[40] The *Convention*, *supra* note 4, Article 2.

development to proceed in a sustainable manner.[41] The goal of the *Convention* has been interpreted to emphasize mitigation while recognizing that some degree of adaptation will be necessary.[42] The standard of 'stabilization' reflects the intention behind the adoption of the *Convention*, which is to provide a basis or framework on which more effective measures for controlling climate change can be based. Although the standard of 'stabilization' is not as good as a standard of 'prevention', it is a more realistic standard that can be attained with fewer constraints on economic development.[43]

The *Convention* has its roots in equitable principles such as "common but differentiated responsibilities", the precautionary principle, and sustainable development.[44] First, article 3(1) obliges the Parties to protect the climate system in accordance with their common but differentiated responsibilities and respective capabilities. This principle evolved from the notion of the common heritage of mankind and it is a manifestation of the general principles of equity in international law.[45] It recognizes the historical differences in the contribution of the developed and developing countries to global environmental problems, and differences in their respective economic and technical capacity to tackle these problems.[46] The two fundamental elements of the principle are the common responsibility to protect the environment and the need to take into account the different circumstances, particularly each State's contribution to a particular problem and its ability to respond

---

[41] *Ibid.* Article 2.
[42] Yamin, *supra* note 38.
[43] *Ibid.*
[44] The *Convention*, *supra* note 3, Article 3(1), 3(3), 3(4) & 3(5).
[45] Centre for International Sustainable Development Law, "The Principle of Common but Differentiated Responsibilities: Origins and Scope," online: CISDL <http://www.cisdl.org/pdf/brief-common.pdf>[CISDL, "The Principle"].
[46] *Ibid.*

to the threat.[47]

In the present context, common responsibility arises from the fact that climate change is a global problem and every nation has a duty to control its greenhouse gas emissions so as to manage the problem. Following the notion of common responsibilities, the *Convention* creates commitments for all its Parties. For example, they are required to develop and periodically update national inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases that are not controlled by the *Montreal Protocol*.[48] The Parties also have the obligation to implement programs containing measures to mitigate and adapt to climate change.[49] It is also the duty of the Parties to promote the development and transfer of technologies and practices that reduce greenhouse gas emissions especially in the high emitting sectors such as energy, transport, industry, agriculture, forestry and waste management.[50] Although the development of such technologies and practices will require a lot of resources, it is a necessary step towards finding long-term solutions to climate change. The *Convention* also obliges the Parties to promote the sustainable management of sinks and reservoirs of greenhouse gases such as forests and oceans as they are important in controlling climate change.[51] The Parties have a commitment to prepare plans for adapting to the adverse impacts of climate change, covering areas such as coastal zone management, water resources and agriculture.[52]

---

[47] *Ibid.*
[48] The *Convention, supra* note 3, Article 4 (1) (a); The *Montreal Protocol* controls the production and use of ozone-depleting greenhouse gases such as chlorofluorocarbons (CFCS) and hydrochlorofluorocarbons (HCFCs), The *Montreal Protocol, supra* note 37.
[49] The *Convention, supra* note 3, Article 4(1) (b).
[50] *Ibid.* Article 4 (1) (c).
[51] *Ibid.* Article 4 (1) (d); A sink is defined as any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere, *Ibid.* Article 1 (8).
[52] *Ibid.* Article 4(1) (e).

The Parties are also required to take climate change considerations into account in their relevant social, economic and environmental policies and actions, for example by carrying out environmental impact assessments.[53] The aim of this provision is to ensure that in addition to achieving their primary purposes, the policies implemented by the Parties also enable them to mitigate and adapt to climate change. The *Convention* also obliges the Parties to cooperate in carrying out research intended to further the understanding and to reduce the uncertainties surrounding the causes, effects, magnitude,

and timing of climate change and the economic and social consequences of various response strategies.[54] Obviously, this provision is aimed at filling the information gap that exists regarding the above-mentioned aspects of climate change as a better understanding of these issues is necessary in the creation of effective measures to mitigate and adapt to climate change. Additionally, the Parties have an obligation to cooperate in the exchange of information, education, training, and public awareness in matters relating to climate change and to encourage wide participation in the process including that of NGO's.[55] Although the involvement of the private sector and NGO's in climate change issues is positive, so far it has had limited results since these stakeholders are not directly involved in the making of policy.[56]

It is worth noting that the fulfillment of the common commitments by developing country Parties may depend on the extent to which developed country Parties fulfill

---

[53] *Ibid.* Article 4 (1) (f).
[54] *Ibid.* Article 4 (1) (g).
[55] *Ibid.* Article 4 (1) (h) & (i).
[56] For example, the private sector and NGO's were admitted as observers at the negotiations of the *Convention* and the *Protocol,* and are still observers during the meetings of the COP, UNFCCC Secretariat, "Parties & Observers," online: United Nations Framework Convention on Climate Change < http://unfccc.int/parties_and_observers/items/2704.php>.

their obligations, especially in regard to financial and technological transfer.[57] The *Convention* takes note of the fact that the priorities of developing countries are economic and social development and poverty eradication.[58]

The idea of differentiated responsibilities has been applied consistently in international law. For example, the *Rio Declaration*[59] notes that environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply. In the climate change context, the objective of the concept of differentiated responsibilities is to enable developing countries to come into compliance with particular legal rules over time.[60] In practice the element of differentiated responsibilities translates into different legal obligations for the different Parties.[61] This is due to the fact that the largest share of historical and present greenhouse gas emissions has originated in developed countries, and per capita emissions in developing countries are still relatively low and the share of global emissions originating in developing countries will grow to meet their social and developmental needs.[62] Miguez[63] notes that some countries need to take greater responsibility for climate change than others due to differences in size, population, and the level of development, resulting in varying levels of anthropogenic interference with the climate system.

---

[57] The *Convention*, *supra* note 3, Article 4 (7).
[58] *Ibid.*
[59] The *Rio Declaration*, *supra* note 39; See also *Convention on the Prevention of Marine Dumping of Wastes and other Matter,* 1046 U.N.T.S 120, 11 I.L.M 1294 (1972); The *United Nations Convention on the Law of the Sea* 1833 U.N.T.S 3; 21 I.L.M 1261 (1981); and the *Montreal Protocol, supra* note 37.
[60] CISDL, "The Principle", *supra* note 45.
[61] *Ibid.*
[62] The *Convention*, *supra* note 3.
[63] Josè D. G. Miguez, "Equity, Responsibility and Climate Change" in Luiz Pinguelli-Rosa & Mohan Munasinghe, *Ethics, Equity, and International Negotiations on Climate Change* (Cheltenham, UK; Northampton, MA: Edward Elgar, 2002) 7.

Following the element of differentiated responsibilities, the *Convention* creates additional commitments for the developed country Parties.[64] These Parties have a commitment to limit their greenhouse gas emissions and enhance their sinks and reservoirs with a view to returning to their levels of emissions in 1990.[65] However, countries whose economies are in transition are to be accorded some flexibility in accomplishing this task.[66]

Developed country Parties are also obliged to provide the financial resources needed for developing countries to create national inventories of greenhouse gas emissions by sources and removals by sinks and to enable them adapt to climate change.[67] Further, these Parties have the commitment to promote the development and transfer of environmentally sound technologies and know-how to developing country Parties.[68] The *Convention* stresses the need for adequacy and predictability of these resources so that the recipients derive maximum benefit.[69] Developed country Parties are further obliged to particularly assist the developing country Parties that are vulnerable to the adverse effects of climate change in meeting the costs of adaptation to these effects.[70]

The *Convention* also applies a second equitable notion - the precautionary principle- when it calls on its Parties to take precautionary measures to anticipate, prevent, or

---

[64] Annex 1 Parties are the 41 developed countries that are listed in Annex 1 of the *Convention* while the non-Annex 1 Parties are the developing countries that negotiate together as a bloc called the G-77;Annex II Parties are members of the Organization for Economic Cooperation and Development (OECD), minus Turkey and Korea, The *Convention, supra* note 3; See Yamin, *supra* note 41.
[65] The *Convention, supra* note 4, Article 4 (2)(a) & (b).
[66] *Ibid.* Article 4 (6).
[67] *Ibid.* Article 4 (3).
[68] *Ibid.* Article 4 (3) & (5).
[69] *Ibid.* Article 4 (3).
[70] Vulnerable countries are the small island states, countries with low-lying coastal areas, countries with arid and semi-arid areas, countries that are prone to natural disasters, drought and desertification, countries that are highly dependent on fossil fuels, and landlocked and transit countries, *Ibid.* Article 4 (4) & Article 4 (8).

minimize the causes of climate change and to mitigate its adverse effects.[71] This principle requires that if a substance or activity poses a threat to the environment, measures should be taken to prevent that activity or substance from adversely affecting the environment even in the absence of conclusive scientific proof linking that particular substance or activity to environmental damage.[72] Although uncertainties still exist relating to the timing and magnitude of climate change, the *Convention* does create commitments for its Parties to mitigate climate change, which is an exercise of precaution.[73] Although these commitments are insufficient to control climate change, they form a framework on which the measures in the subsequent *Protocol* are based.

A third equitable principle on which the *Convention* is based is the principle of sustainable development. The *Convention* calls on the Parties to promote an open international economic system that would lead to sustainable economic development in all Parties, particularly the developing country Parties.[74] Sustainable development is development that meets the needs of the present generations without compromising the ability of future generations to meet their own needs.[75] It is also a process of change in which exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony

---

[71] *Ibid.* Article 3(3).
[72] James Cameron & Juli Abouchar, "The Precautionary Principle: A Fundamental Principle of Law and Policy for the Protection of the Global Environment" (1991) 14 B.C. Int'l & Comp. L. Rev. 1.
[73] Joyeeta Gupta, "Glocalization: The Precautionary Principle and Public Participation" in David Freestone & Ellen Heys, eds., *The Precautionary Principle and International Law* (The Hague: Kluwer Law International, 1996) 231 at 233 [Gupta, "Glocalization"].
[74] The *Convention, supra* note 4, Article 3 (5).
[75] See Susan Baker, *Sustainable Development* (London; New York: Routledge, 2006); Jennifer Elliott, *An Introduction to Sustainable Development,* 3 ed. (London; New York: Routledge, 2006).

and enhance both current and future potential to meet human needs and aspirations.[76] The objective of this principle is to secure economic development, social equity and justice, and environmental protection.[77] However, it should be noted that although these factors can work well in harmony, they are often found to conflict with one another.[78]

Sustainable development encompasses intra-generational equity, that is, equity among members of the present generation, and intergenerational equity which is equity between the present and future generations.[79] The concept of intergenerational equity has been applied in various international legal documents. For example, the *Convention* calls on the Parties to protect the climate for the benefit of both present and future generations.[80] The *Stockholm Declaration*[81] calls on its signatories to safeguard the natural resources of the earth for the benefit of present and future generations. Similarly, in the *Rio Declaration*, it is noted that the right to development must be fulfilled so as to meet the developmental and environmental needs of the present and future generations.[82]

Brown-Weiss[83] identifies three elements of the concept of intergenerational equity. One element is the conservation of the diversity of the natural and cultural resources so that the options available to the future generations in solving their problems and

---

[76] *Ibid.*
[77] Manchester Metropolitan University, "Encyclopedia of Sustainable Development," online: Manchester Metropolitan University <http://wwww.ace.mmu.ac.uk/esd/Principles/principles.html>[MMU, "Encyclopedia"].
[78] *Ibid.*
[79] *Ibid.*
[80] The *Convention, supra* note 3, Article 3(1); See also the *Convention on Biological Diversity, supra* note 38.
[81] U.N Doc A/Conf.48/14/Rev.1 (1970); 11 I.L.M 1416 (1972).
[82] *Rio Declaration, supra* note 39, Principle 3.
[83] Edith Brown-Weiss, *In Fairness to Future Generations and International Law, Common Patrimony, and Intergenerational Equity* (New York: Transnational Publishers, 1989); Brown Weiss, "Our Rights and Obligations to Future Generations for the Environment" (1990) 94 A.J.I.L 198.

satisfying their own values are not restricted. Conservation of diversity is also based on the fact that the future generations are entitled to the diversity enjoyed by previous generations.[84]

The second element of intergenerational equity is the conservation of the quality of the earth so that it is passed on in no worse condition to the future generations than it was received from the previous generations.[85] This element is premised on the idea that each generation is entitled to overall environmental quality comparable to that enjoyed by previous generations.[86] Conservation of quality, therefore, requires emissions of greenhouse gases to reduce steadily. The third element of intergenerational equity is the conservation of access, which requires each generation to provide its members with equitable rights of access to what was inherited from the past generations and to conserve this access for the future generations.[87]

The intergenerational problem not only relates to the causes of climate change but also to the policies and measures that should be undertaken to combat its adverse impacts.[88] This is due to the fact that those responsible for causing climate change may not suffer the consequences of their actions, because greenhouse gases remain in the atmosphere for long periods of time. For example, it is estimated that approximately 16% of the carbon dioxide emissions remain airborne for over 8 centuries.[89] Consequently, the current concentration of greenhouse gases in the

---

[84] *Ibid.*
[85] *Ibid.*
[86] *Ibid.*
[87] *Ibid.*
[88] Miguez, "Equity", *supra* note 63.
[89] *Ibid.*

atmosphere is due to the accumulation of emissions released into the atmosphere since the industrial revolution.[90]

Therefore, a solution to climate change that takes into account future generations should produce results that are sustainable over the long-term. However, policies and measures to deal with climate change have been criticized as having short-term goals, due to the fact that the governments are overwhelmed by short-term problems.[91]

This concept of intergenerational equity, however, is subject to immense criticism. It is argued that it is a vague concept because it is incapable of ascertaining what the future generations will want or need, so as to ascertain what is fair to them.[92] Furthermore, the concept does not indicate how far into the future we should look.[93] Additionally, the principle does not identify the party that is responsible for enforcing the obligations as the future generations are not yet in existence.

The *Convention* also creates institutions that are to foster its implementation. These are the Conference of the Parties, the Secretariat, the Subsidiary Body for Scientific and Technological Advice, the Subsidiary Body for Implementation, and a financial mechanism operated by the Global Environment Facility. Article 7 establishes the COP as the supreme body whose role is to conduct regular review of the Parties' progress in the implementation of the *Convention* and to make decisions and recommendations necessary to promote its effective implementation.[94] The COP,

---

[90] *Ibid.*
[91] *Ibid.*
[92] Lynda Warren, "Intergenerational Equity," online: Committee on Radioactive Waste Management <http://www.corwm.org.uk/PDF/673%20-%20Intergenerational%Equity.pdf>.
[93] *Ibid.*
[94] The COP is required to facilitate the exchange of information on measures adopted by the Parties to address climate change and its effects, to mobilize financial resources that are needed to achieve the *Convention*'s objectives and to establish bodies as deemed necessary for the implementation of the *Convention*, See The *Convention*, *supra* note 3, Article 12 (4).

however, is a highly political body, a factor that may influence its decisions. The United Nations, its specialized agencies and member states, national and international governmental or NGO's can be admitted as observers at sessions of the COP.[95] The role of observers is limited to presentation of their views at the sessions because they do not have any voting rights.[96]

The *Convention* also creates a Secretariat which is its administrative body.[97] Some of its duties are to make arrangements for sessions of the COP and its subsidiary bodies and to assist Parties in the compilation of information required in accordance with the provisions of the *Convention.*[98]

The SBSTA is also established under the *Convention.*[99] Its main duty is to advise the COP on scientific and technical matters relating to the implementation of the *Convention.*[100] More specifically, the SBSTA provides assessments of the state of scientific knowledge relating to climate change and its effects, it prepares scientific assessments on the effects of measures taken in the implementation of the *Convention*, and it advises on ways and means of promoting the development and transfer of environmentally friendly technologies and processes.[101]

The *Convention* also creates the SBI, which has the duty of carrying out assessments regarding the adequacy of the measures adopted by the Parties in mitigating climate change, and assisting the COP in the preparation and implementation of its

---

[95] *Ibid.* Article 7 (6).
[96] UNFCCC Secretariat, "Non-Governmental Organizations and the Climate Change Process," online: United Nations Framework Convention on Climate Change <http:www.unfccc.int/parties_and_observers/ngos/items/2370.php>.
[97] The *Convention*, *supra* note 3, Article 8.
[98] *Ibid.*
[99] *Ibid.* Article 9 (1).
[100] *Ibid.*
[101] *Ibid.* Article 9 (2).

decisions.[102]

The *Convention* also designates a financial mechanism (the GEF) to provide funds on a grant or concessional basis to Parties[103] It is to operate under the guidance of the COP and it is required to have an equitable and balanced representation of all the Parties in its system of governance.[104]

1.5.2 The *Kyoto Protocol*

The first session of the COP held at Berlin agreed that the mitigation commitments laid out in the *Convention* were inadequate to control climate change.[105] This sparked off negotiations with the intention of creating stronger commitments for the Parties, which resulted in the adoption of the *Protocol* at the third session of the COP held in Kyoto, Japan.[106] Reflecting the stronger commitments, the *Protocol* obliges the Annex 1 Parties to collectively reduce their emissions by at least 5 % below 1990 levels in the commitment period 2008 to 2012.[107] Following the principle of common but differentiated responsibilities, the *Protocol* creates different targets for each of the Annex 1 Parties, although it does not create any targets for developing country Parties. [108]

---

[102] *Ibid.* Article 10 (1) & (2); Article 4 (2) (d).
[103] *Ibid.* Article 11 (1).
[104] *Ibid.* Article 11 (2).
[105] Conference of the Parties, *Report on First Session,* UNFCCC, 1995, FCCC/CP/1995/7/Add.1; See Yamin, *supra* note 41 at xxxxix.
[106] Conference of the Parties, *Report on its Third Session,* UNFCCC, 1997 FCCC/CP/1997/7/Add; See Yamin, *Ibid.*
[107] The *Protocol, supra* note 4, Article 3 (1); Parties listed under Annex 1 are the developed country Parties (members of the OECD) and Parties with economies in transition, The *Convention, supra* note 3, Annex 1.
[108] The targets cover greenhouse gases such as carbon dioxide, methane and nitrous oxide, The *Protocol, supra* note 4, Annex A; The *Protocol* creates targets for each of the Parties, for example, the target for Austria, Belgium, Bulgaria, and the European Community is 8% below 1990 levels, for Canada and Japan it is 6%, New Zealand, Russia and Ukraine have to keep their emissions at 1990 levels while Australia, Iceland, and Norway may increase their emissions by 8%, 10%, and 1% respectively, *Ibid*.Annex B.

In meeting its targets, a Party is required to take into account the reduction in emissions by sources and the removals by sinks resulting from direct human-induced land-use change and forestry activities.[109] Parties may opt to meet their targets jointly, for example under a regional economic integration organization, although each Party remains responsible for meeting its individual target in the event of failure to meet the group target.[110]

It has also been noted that the creation of binding targets necessitated detailed, consistent and transparent reporting of data relating to compliance with these targets.[111] Therefore, the *Protocol* contains stringent reporting, review and compliance provisions. These include the requirement to establish national systems for estimating emissions by sources and removals by sinks, and the creation of expert review teams whose main duty is to assess the implementation of the commitments by the Parties and identify any potential problems in the implementation.[112]

Among the key creations of the *Protocol* are three flexibility mechanisms that are intended to enable the parties to meet their targets at the least possible cost: joint implementation, the clean development mechanism, and emissions trading.

Under the JI mechanism, an Annex 1 party may implement projects that reduce emissions or remove carbon from the atmosphere in another Annex 1 party, in return for credits (emission reduction units).[113]

A Party that claims emission reduction units has to prove that the project has approval

---

[109] *Ibid.* Article 3 (3).
[110] *Ibid.* Article 4 (1)-(5).
[111] See Yamin, *supra* note 38 at xl.
[112] For detailed procedures of the working of the Expert Review Teams, see The *Accords, supra* note 6; See The *Protocol, supra* note 4, Articles 5, 7 & 8 and the *Convention, supra* note 3 Article 12.
[113] The *Protocol, supra* note 4, Article 6(1).

of all the Parties involved, that it produced a reduction in emissions by sources or enhanced removals by sinks that is additional to what would have occurred in absence of the project, and that the Party has complied with the *Protocol*'s reporting requirements (to establish a national system and an annual inventory for estimating and recording emissions by sources and removals by sinks).[114] These requirements are in place to ensure that credits are not awarded where reductions or removals of emissions did not occur.

Additionally, the acquisition of emission reduction units has to be supplemental to domestic action taken by a Party in order to meet its targets.[115] The intention of this provision is to encourage Parties to invest in technology and processes that will reduce greenhouse gas emissions domestically and, therefore, improve the chances of the mechanism's success in the fight against climate change.

The *Protocol* allows a Party to authorize its domestic entities (for example, corporations) to participate in joint implementation projects.[116] This provision aims at creating a high number of participants in this mechanism in a bid to ensure its success. The Party, however, remains responsible for supervising its entities that are participating in the mechanism.

Under another mechanism, the CDM, an Annex 1 party may implement a project that results in a reduction of greenhouse gas emissions in a non-Annex 1 party in return for credits (certified emission reduction credits).[117] Not only will the CDM enable the Annex 1 party to gain reduction units from projects implemented outside its

---

[114] *Ibid.* Articles 5, 6 & 7.
[115] *Ibid.* Article 6(1) & Annex B.
[116] *Ibid.* Article 6 (3).
[117] *Ibid.* Article 12.

jurisdiction but it will also ensure that developing countries are involved in attaining the reduction of greenhouse gas emissions. The CDM is also intended to facilitate the transfer of environmentally safe technology and processes to non-Annex 1 Parties.[118] In order for Annex 1 Parties to successfully claim emission reduction credits, it has to be shown that there was voluntary participation of each of the Parties involved in a particular project, that the project has produced real, measurable and long-term benefits related to the mitigation of climate change, and that the reductions in emissions are additional to any that would occur in the absence of the project.[119]

In addition to the above mechanisms, article 17 of the *Protocol* entitles the Parties included in Annex B (that is, the Parties with binding targets) to participate in emissions trading in order to meet these targets. This mechanism allows the Parties to buy and sell units for compliance amongst each other. The trading, however, is to be supplemental to domestic action taken for the purpose of meeting quantified emission limitation and reduction commitments.[120] This provision suggests that domestic action should account for the bulk of the credits used by a Party to meet its targets. However, it is ambiguous as it does impose a specific limit on the trade. A Party is allowed to authorize its legal entities to participate in international emissions trading although such a Party remains responsible for the overseeing the operations of its entities.[121]

1.5.3 The *Marrakesh Accords*

These *Accords* are a package of decisions containing detailed rules and procedures for

---

[118] The *Accords*, *supra* note 6.
[119] The *Protocol*, *supra* note 4, Article 12 (5).
[120] *Ibid.* Article 17.
[121] The *Accords*, *supra* note 6.

the practical and effective implementation of the *Convention* and the *Protocol.*[122] They were concluded and provisionally adopted at the seventh meeting of the *Convention*'s COP held at Marrakesh in 2001, and were finally adopted at the first COP/MOP held at Montreal in 2005.[123]

In addition to the requirements stipulated under the *Protocol,* the *Accords* provide that an Annex 1 Party that wishes to participate in any of the mechanisms must have ratified the *Protocol*, have calculations of the assigned amounts in terms of tonnes of carbon dioxide equivalent emissions and annually report information on emissions and removals to the Secretariat.[124] The *Accords* also clarify the fact that the *Protocol* and its mechanisms do not create property rights for any Party.[125] This addresses concerns that allocating emission allowances to the Parties is tantamount to the privatization of the atmosphere.

The *Accords* also provide that all the units resulting from the mechanisms and assigned amounts are fungible within the emissions trading system. This is intended to increase the flexibility that the mechanisms offer and hence enable the Parties to find the least costly means of achieving their targets.

1.6 Criticism of the *Protocol*

The first major flaw in the *Protocol*, according to many, is that it does not go far enough as its collective target of achieving a 5% reduction in emissions is insufficient

---

[122] *Ibid;* Yamin, *supra* note 38; See Anita Halvorssenn & Jon Hovi, "The Nature, Origin, and Impact of Legally Binding Consequences: The Case of the Climate Regime" (2006) 6 International Environmental Agreements 157.

[123] Conference of the Parties/Meeting of the Parties, *Report on its First Session,* UNFCCC, 2005 FCCC/KP/CMP/2005/8/Add.1.[Montreal Report].

[124] The *Accords, supra* note 6.

[125] *Ibid.*

to control climate change.[126] Scientific estimates indicate that a reduction of about 50-70% in greenhouse gas emissions is necessary in order to mitigate climate change.[127] Based on the above percentages, however, it is obvious that even if the *Protocol* achieves its target, climate change will still not be under control. The Secretariat[128] has argued that the *Protocol* was never expected to solve the climate change problem in the first commitment period and that it is only a first step on which stronger measures will be built. Pardy, [129] however, argues that as a first step, the *Protocol* is politically appealing but still inadequate in its substance. Needless to say, after the first commitment period, the Parties need to adopt stronger targets so as to effectively fight climate change.

It is also argued that the individual country targets kill the incentive to do better - yet they are not adequate to halt climate change. However, the mere existence of a target is an incentive for a Party to take action on climate change. For example, Doelle[130] has observed that in Canada, there were no signs of serious government action on climate change until after the signing and ratification of the *Protocol* in 1997, and that more importantly, until after the signing and subsequent debate over its ratification, there was no public pressure to take action on climate change. Furthermore, the *Protocol*'s flexibility mechanisms do provide an incentive for the Parties to cut emissions beyond their targets as the extra credits can always be traded.

---

[126] See Maslin, *supra* note 9 at 125.
[127] Brian Cook, "Defeated from the Start," online: In These Times <http://www.inthesetimes.com/site/main/article/1991/>.
[128] UNFCCC Secretariat, "Caring for the Climate," online: United Nations Framework Convention on Climate Change < http://unfccc.int/resource/cfc_guide.pdf>.
[129] Bruce Pardy, "The Kyoto Protocol: Bad News for the Global Environment" (2004)14 J.E.L.P 27.
[130] Doelle, *supra* note 32 at 559.

The second major flaw in the *Protocol* is the lack of binding commitments for developing country Parties due to the application of the principle of common but differentiated responsibilities. With no reduction or even limitation commitments, however, the amount of greenhouse gases that developing countries emit are likely to jeopardize overall global reductions in greenhouse gas emissions. Scholars have noted that if the large developing countries such as India, China, and Brazil emulate America's inefficient technologies in their processes of economic growth, with time they will produce more greenhouse gases than the developed countries.[131] Research indicates that in the next 20 to 30 years, emissions from developing countries will account for nearly 50% of global industrial carbon dioxide emissions and that emissions from China may surpass those of the United States by the year 2015.[132]

Another factor that is likely to affect the performance of the *Protocol* is the non-participation of the U.S.[133] As of 1990, the U.S. ranked first in carbon dioxide emissions, producing nearly 5.5 million tons (over 36%) of the industrialized world's total emissions.[134] In the absence of ratification of the *Protocol* by the U.S., its objective of reducing overall greenhouse gas emissions will suffer a setback. However, the U.S. is a signatory to the *Protocol*, a factor that mandates that it refrains from actions that are contrary to the purpose of the *Protocol*.[135] Furthermore, the U.S. is in the process of implementing an independent climate change program, which has the aim of reducing the greenhouse gas intensity (emissions per unit of

---

[131] Brian Evans, "Principles of Kyoto and Emissions Trading Systems: A Primer for Energy Lawyers" (2004) 42 Alberta Law Review 167.
[132] *Ibid.* at 176; See also American Geological Institute, "The Road to Kyoto," online: AGI < http://www.agiweb.org/gap/legis105/kyotogeo.html>.
[133] Maslin, *supra* note 9 at 126.
[134] Kowalski, *supra* note 20 at 14.
[135] University of Minnesota, "UN Conventions and Treaties," online: University of Minnesota <http://www1.umn.edu/humanrts/edumat/presentations/United%20Nations%20Conventions.PPT>.

economic output) of its economy by 18% over the 10 year period from 2002 to 2012.[136] This approach has the potential to promote a shift towards less greenhouse gas intensive industries and encourage the pursuit of proactive measures to control emissions, such as switching from coal to natural gas in electricity production.[137] It is also advantageous because it resolves the uncertainty over economic growth - as emissions are conditional on the level of economic activity.[138] However, the absence of a cap on emissions implies that total emissions could continue to grow, a factor that makes this approach environmentally undesirable. It has also been observed[139] that the greenhouse gas intensity of the U.S. economy declined by 17% over the 1990's, not because of government action but rather due to structural and technological changes. Therefore, the current target of 18% over a 10 year period is perceived as a weak and easy target.[140]

1.7 Summary

The *Convention* and the *Protocol* contain commitments that are vital in the fight against climate change. Although these commitments are insufficient by themselves to control climate change, they are important as initial steps and it is hoped that the Parties will take on more effective commitments after the first commitment period.[141] The *Protocol* requires that discussions on the post-2012 period should begin at least

---

[136] Office of the Press Secretary, White House, "Climate Change Fact Sheet," online: U.S Department of State <http://www.state.gov/g/oes/rls/fs/46741.htm> [White House, "Climate Change].
[137] Charles D. Kolstad, "The Simple Analytics of Greenhouse Gas Emission Intensity Reduction Targets" (2005) 33 Energy Policy 2231.
[138] *Ibid.*
[139] *Ibid.*
[140] *Ibid.*
[141] The first commitment period under the *Protocol* is from 2008 through 2012, The *Protocol, supra* note 4.

seven years before the end of the first compliance period.[142] Therefore, the first meeting of the COP/MOP established an *ad hoc* working group of Parties to the *Protocol* to consider the post-2012 commitments, and the Parties were invited to submit their views regarding these future commitments.[143] Consequently, the E.U. has suggested long-term emissions targets such as a 15% to a 30% reduction in emissions from industrialized countries from 1990 levels by 2020.[144] South Africa and Mexico have also suggested that more countries should acquire binding targets after 2012.[145] However, the lack of a formal Kyoto framework beyond 2012 is already hurting the ability of government policy makers and private business to make appropriate plans and investments.[146]

In any case, the flexibility mechanisms – in particular international emissions trading - will play a key role in enabling the *Protocol* to achieve its target. Therefore, the next section examines the international emissions trading system in additional detail.

---

[142] *Ibid.* Article 3(9).
[143] *Montreal Report, supra* note 123.
[144] *Ibid.*
[145] *Ibid.*
[146] International Environment Reporter, "Kyoto Protocol 'Experts Meeting' Begins Discussion of Post-2012 Period," online: United Nations Framework Convention on Climate Change <http://unfccc.int/files/press/news_room/unfccc_in_the_press/application/pdf/051805_interview_with_bna.
pdf>.

Section Two: A Comparative Analysis of the International Emissions Trading System under the *Protocol* and the U. S Acid Rain Program.

2.1 Introduction

Climate change is as much an economic problem as it is an environmental one.[147] This is due to the fact that the reduction of greenhouse gases is predicted to be very costly to economies.[148] The high costs arise because achieving greenhouse gas emission reductions necessitates reducing the level of various economic activities, especially transportation and industrial processes.[149] It is predicted that governments of State Parties and industrial emitters will suffer costs associated with developing and implementing more energy efficient technologies and reduced production levels.[150] These costs may be transferred to consumers in form of higher prices for products. Generally, implementing obligations under the *Protocol* is expected to affect economies negatively.[151] For example, it is estimated that meeting the Kyoto targets will cost the Canadian economy a third of its output or force the government to spend $20 billion by 2012 to buy international credits.[152] It is further predicted that European nations will see rising heating fuel, gasoline, diesel and electricity prices, and by 2010 these prices will have risen by 10 to 20 percent.[153] Unemployment may

---

[147] Andrew Bachelder, "Using Credit Trading To Reduce Greenhouse Gas Emissions" (1999) 9 J.E.L.P 281 [Bachelder, "Credit Trading"].
[148] See UNEP/GRID-Arendal, "Kyoto Protocol: Cost of Implementation," online: GRID Arendal <http://maps.grida.no/go/graphic/kyoto_protocol_cost_of_implementation>.
[149] *Ibid.*
[150] *Ibid.*
[151] The *Protocol, supra* note 4.
[152] Paul Vieira, "$20B Warning on Kyoto," *National Post* (23 November 2006), online: National Post <http://www.canada.com/nationalpost/financialpost/story.html?id=27462bf9-ff78-4c05-b2ae-3b6df2a79e2c>; See Leslie Mackinnon, "The Cost of Kyoto," *CBC News* (12 March 2002), online: CBC News <http://www.cbc.ca/national/news/Kyoto>.
[153] National Centre, "Economic Effects", *supra* note 5.

increase by 1.8 million and 1 million in Germany and Britain respectively, while The Netherlands and Spain are set to lose 240,000 and 1 million jobs respectively.[154] Generally, command and control mechanisms have been used to achieve environmental goals.[155] However, economic incentive programs such as emissions trading are increasingly gaining popularity over command and control instruments. Theoretically, emissions trading programs achieve environmental goals at the least possible economic cost.[156] The issue discussed in this section is whether the international emissions trading system is capable of enabling the Parties to achieve their targets at the least possible cost. The system is evaluated against the criteria of cost-effectiveness, environmental effectiveness, distributional effects, and ease of implementation.[157] A comparative analysis of the international emissions trading system vis-à-vis the U.S. acid rain program is also made. The latter is an example of an emissions trading program that is widely seen to have achieved both environmental and cost-effectiveness.[158]

2.2 Command and Control Programs versus Economic Incentive Programs

Traditionally, command and control instruments have been used to achieve environmental goals.[159] These instruments contain specific requirements prescribing how to comply with specific standards defining acceptable levels of pollution.[160]

---

[154] *Ibid.*
[155] See David Driesen, "Is Emissions Trading An Economic Incentive Program? Replacing The Command and Control / Economic Incentive Dichotomy" (1998) 55 Wash. & Lee Law Review 289 at 292 [Driesen, "Emissions Trading"].
[156] Denny Ellerman, "Are Cap and Trade Programs more Environmentally Effective than Command and Control Regulations?", online: Massachusetts Institute of Technology < http://web.mit.edu/ceepr/www/2003-015.pdf> [Ellerman, "Cap and Trade Programs"].
[157] U.S Congressional Budget Office, "The Study", *supra* note 8.
[158] Yelin-Kefer, "Warming", *supra* note 7.
[159] Driesen, "Emissions Trading", *supra* note 155.
[160] *Ibid.*

They specify a precise compliance method rather than simply an emissions level.[161] Command and control regulations may be in the form of performance standards or technology standards. Under performance standards, a regulatory authority creates and mandates an identical reduction target for a pollutant but allows firms to select the appropriate technology to reach this target.[162] With technology-based standards, the regulatory authority requires firms to reduce emissions of a given pollutant using a specified technology.[163] Although performance standards create a little flexibility by allowing an entity to choose the appropriate technology, technology-based standards remain totally inflexible.

On the other hand, economic incentive programs are pollution control programs that provide an economic benefit or incentive for pollution reductions or an economic penalty or disincentive for pollution.[164] These include emissions trading, tax credits, and emissions fees.[165] Presently, economic incentive programs are gaining popularity over command and control programs as a means of achieving pollution control. Harrington and Morgenstein[166] attribute this popularity to the growth in awareness of economic incentive approaches among policy makers and policy analysts over the years between 1970 and 1990 and the emergence of tradable emission permits in the late 1970s. They argue that in the 1970s, economic incentive approaches were

---

[161] *Ibid.*
[162] Yelin-Kefer, "Warming", *supra* note 7.
[163] *Ibid.*
[164] Isabel Rauch, "Developing a German and an International Emissions Trading System – Lessons from U.S Experiences with the Acid Rain Program" (2000) 11 Fordham Envtl. L.J 307 at 309 [Rauch, "Developing an International System"].
[165] Environmental Protection Agency, "Allowance Trading Basics," online: Environmental Protection Agency< http://www.epa.gov/airmarkets/trading/basics/>.
[166] Winston Harrington & Richard D. Morgenstein, "Economic Incentives Versus Command and Control: What's the Best Approach for Solving Environmental Problems?" online: Resources for the Future <http://www.rff.org/Documents/RFF_Resources_152_ecoincentives.pdf> [Harrington, "Economic Incentives"].

generally unfamiliar to those outside the economics profession, hence the low level of usage.[167]

Additionally, the popularity of economic incentive programs is attributed to the various advantages that these programs have over command and control instruments. Economic incentive programs are more efficient than command and control instruments as they result in a lower unit cost of pollution abatement.[168] Entities can save expenses because they are free to select among a variety of control options to meet their requirements.[169] On the other hand, command and control programs are highly criticized as being inefficient and expensive.[170] Inefficiency arises from the fact that command and control instruments impose uniform requirements for pollution control and, therefore, they ignore the difference in pollution abatement costs of the different firms.[171] They are also expensive for the regulatory body as it has to make informed decisions on how to achieve pollution control over the activity of diverse entities and it has to continuously enforce these regulations.[172] Administrative costs are determined by the amount of interaction between the regulator and the regulated source, a factor that explains the high costs encountered where the regulator has to set and enforce specific requirements.[173]

In support of command and control instruments, however, Driesen[174] observes that environmental statutes usually specify a level of environmental performance rather than requiring the use of a particular technology hence facilitating flexibility and

---

[167] *Ibid.*
[168] *Ibid.*
[169] Yelin-Kefer, "Warming", *supra* note 7 at 231.
[170] Rauch, "Developing an International System", *supra* note 164 at 310.
[171] *Ibid.*
[172] *Ibid.*
[173] Harrington, "Economic Incentives", *supra* note 166.
[174] Driesen, "Emissions Trading", *supra* note 155 at 293.

efficiency. Although performance-based standards create some flexibility, it is limited to the choice of technology and, therefore, they still do not create the freedom for an entity to pursue its most efficient form of compliance.

Economic incentive programs have also successfully achieved environmental goals more effectively and faster that command and control instruments, hence their popularity.[175] For example, Swift[176] points out the fact that the U.S. acid rain emissions trading program was in part a response to the failure of traditional health-based rate standards set under Title I of the *Clean Air Act* to achieve significant pollutant reductions from the utility sector. Furthermore, economic incentive programs provide a continual incentive to reduce emissions, hence promoting the development of new technology.[177] On the other hand, although performance standards created under command and control regulations have the stated objective of promoting technology, their effect is to postpone retirements of older, dirtier plants and discourage entry by outside firms.[178] By promoting the prolonged use of the existing technology, performance standards provide no incentive for technological innovation. Driesen,[179] however, argues that under command and control regulations, polluters have substantial economic incentives to use the flexibility offered by performance standards to employ innovative means of reducing emissions. He not only disagrees with the notion that command and control instruments discourage innovation but also advances the view that very rigid regulations promote

---

[175] Ellerman, "Cap and Trade Programs", *supra* note 156.
[176] Byron Swift, "U.S Emissions Trading Myths, Realities, and Opportunities" (2005) 20- SUM Nat. Resources & Env't 3 at 5 [Swift, "U.S Emissions Trading"].
[177] Harrington, "Economic Incentives", *supra* note 166.
[178] *Ibid.*
[179] Driesen, "Emissions Trading", *supra* note 155 at 293.

innovation.[180] He cites examples of the outright bans of ozone depleting chemicals that have stimulated the development of substitutes, and the zero emission standards for automobiles that have forced the development of electric vehicles.[181] However, incentive for innovation under command and control regulations remains low and is mainly in instances where the regulations are in the form of performance standards. Where technology based standards are in place, there is hardly any incentive for innovation.[182]

Economic incentive programs are popular because they also lessen the need for litigation.[183] There is limited discontent with the regulatory authority because the entities have the freedom to choose their means of compliance. This is in contrast to command and control systems where the regulations imposed may be unpopular as they lead to increased costs among the entities, a situation that may result in increased litigation in a bid to challenge the regulations.[184]

In favor of command and control instruments, it is argued[185] that their uniform standards have equitable advantages that outweigh the monetary efficiencies from non-uniform standards of economic incentive instruments. Since command and control regulations apply equally to all entities, issues of equity and fairness hardly arise.

---

[180] *Ibid.* at 294
[181] *Ibid.* 294-295
[182] Technology based standards may foster innovation if the regulation requires the entities to comply with the Best Available Technology – Economically Achievable (BATEA) standard, as this would force the entities to upgrade as new technology develops, See Ontario Ministry of Environment, "Guideline for Identification of Best Available Control Technology – Economically Achievable," online: Ministry of the Environment <http://www.ene.gov.on.ca/envision/env_reg/er/documents/2005/ra05e0002a.pdf>.
[183] Rauch, "Developing an International System", *supra* note 164 at 311.
[184] *Ibid.*
[185] Driesen, "Emissions Trading", *supra* note 155 at 296

2.3 The Concept of Emissions Trading

Under economic incentive programs, emissions trading is increasingly used to achieve environmental goals.[186] It may take the form of a cap and trade program, a project-based/credit/offset program, or a rate-based/averaging program. Under a cap and trade program, the controlling authority creates a ceiling on total emissions (the cap), which represents the desired level of emissions.[187] Since sources rarely emit at maximum levels, it is important that the regulatory authority does not create a tremendous amount of emission allowances that do not reflect true emission reductions.[188] Entities that are covered under the program are issued allowances that authorize them to emit a specified quantity of pollutant.[189] Entities are at liberty to buy or sell allowances amongst each other, depending on their desired emission levels.[190]

In project-based/credit/offset programs, entities are awarded credits for reducing emissions beyond what is required by a pre-existing regulation.[191] The credits can be traded to other entities which can use them for compliance with the regulation.[192]

---

[186] Examples of cap and trade programs in the United States include, the Lead trading program which was used to facilitate the phase-down of the lead content in gasoline during the mid 1980's; the Regional Clean Air Incentives Market (RECLAIM) that is being used to control sulphur dioxide and nitrogen oxide emissions in the Los Angeles area; Most notably, however, is the acid rain program which serves as an example of great success in controlling pollution and achieving cost-effectiveness through a cap and trade program, Ellerman, " Cap and Trade Programs", *supra* note 153; Regional Clean Air Incentives Market (RECLAIM)," online: South Coast AQMD< http://www.aqmd.gov/reclaim/reclaim.html>.

[187] The entities can be firms and business organizations, Non-Governmental Organizations and even individuals .Under the *Protocol*, entities are countries listed in Annex B. The countries can authorize firms and organizations under their jurisdiction to engage in emissions trading although such countries retain the responsibility of meeting their emission reduction commitments under the *Protocol*, See Clean Air Market Programs, "Types of Trading," online: Environmental Protection Agency <http://www.epa.gov/airmarkets/capandtrade/tradingtypes.pdf> [CAMA, "Trading"].

[188] Rauch, "Developing an International Market", *supra* note 164 at 312.

[189] CAMA, "Trading", *supra* note 187.

[190] *Ibid.*

[191] *Ibid.*

[192] *Ibid.*

In rate-based or averaging programs, the controlling authority sets an emission rate performance standard, and entities with average emission rates below the standard earn credits that they can sell to entities that have average emission rates above the standard.[193] Although averaging programs can reduce emissions, they also pose a risk of increasing emissions as new entities enter the program, as there is no overall cap on emissions.[194]

All forms of emissions trading operate on the assumption that the entities have different operating costs.[195] Consequently, one entity may find it more economical to cut down on its emissions and sell its excess allowances while another entity may find it more economical or profitable to emit beyond its authorized quantity and then purchase units from other entities. In this way, each entity attains compliance with the overall emission limitations at the least possible cost.

Emissions trading is especially suitable for greenhouse gas emissions control because the cost of reducing emissions differs for the different greenhouse gases, sectors, and countries.[196] This argument is supported by research which indicates that global trading yields very large gains, reducing the costs by about 85 per cent relative to no trading.[197] Studies conducted by the European Commission[198] further revealed that

---

[193] An example of a successful averaging program is U.S Lead credit trading program that was used to phase-out lead in gasoline in the 1980's, *Ibid.*

[194] *Ibid.*

[195] CAMA, "Trading", *supra* note 187.

[196] Denny Ellerman, Paul Joskow & David Harrison, "Emissions Trading in the U.S. Experience, Lessons, and Considerations for Greenhouse Gases," online: Pew Center on Global Climate Change < http://www.pewclimate.org/docUploads/emissions%5Ftrading%2Epdf > vii [Ellerman, "Emissions Trading"].

[197] William D. Nordhaus, "From Porcopolis to Carbopolis: The Evolution From Pork Bellies to Emissions Trading" in Richard Kosobud, ed., *Emissions Trading: Environmental Policy's New Approach* (New York: John Wiley & Sons, 2000) 69 [Nordhaus, "From Porcopolis"].

[198] European Commission, "Questions and Answers on Emissions Trading and National Action Plans," online: EUROPA

the *Protocol* targets can be achieved at an annual cost of €2.9 to €3.7 billion, but that without the emissions trading scheme costs could reach € 6.8 billion. In the case of Canada, estimates show that the costs of importing emissions credits will be only one third of the cost of domestic abatement policies such as carbon taxes.[199]

Generally, all trading programs have ancillary benefits that lead to improved environmental quality.[200] One such benefit is the significant improvement in the quality of environmental data that results from the monitoring requirements of emissions trading programs.[201] Such data contributes to a better understanding of the nature of environmental problems and, therefore, helps in the search for effective solutions to these problems.[202] However, among the forms of emissions trading, cap and trade programs are very popular because ideally, emissions do not exceed the cap and therefore a permanent reduction in emissions is achieved. Swift[203] observes that the permanence of reductions when caps are used is in line with the needs of the environment, which requires that ambient pollution levels not increase over time. This is in contrast to averaging programs which allow emissions to grow over time as more plants are built or as output increases.[204]

2.4 The International Emissions Trading System.

The international emissions trading system is a cap and trade model. Each party's

---

<http://europa.eu.int/rapid/pressReleasesAction.do?reference=MEMO/04/44&format=HTML&aged=1&language=EN&guiLanguage=en>.

[199] J. Timmons Roberts, "Accounting for Climate Injustice: Approaches, Unforeseen Consequences and Political Resistance," online: <http://eji.snre.umich.edu/EJCC/PRESENTATIONS/workshop%20climate%20policies.pdf>.

[200] Ellerman, "Cap and Trade Programs", *supra* note 196 at 34.

[201] *Ibid.* at 35.

[202] *Ibid.*

[203] Swift, "U.S Emissions Trading", *supra* note 176 at 6.

[204] *Ibid.*

emissions are capped at a specified percentage of its emission levels in 1990.[205] The participants are the Parties listed in Annex B of the *Protocol*, and each Party may authorize its legal entities to engage in emissions trading.[206] This provision will help in the creation of a vibrant market as it ensures that there will be a huge number of participants. However, there is need to exercise strict control over all these entities to ensure that they do not sell in excess of the quantity of units that they possess, a situation that would defeat the environmental goal of the *Protocol*. Each Party has primary control over its entities and will be held accountable for breaches by the entities. If, for example, a company sells emission units in excess of what it holds, the Party in whose jurisdiction it operates will be held liable.

The *Accords,* which are rules adopted by the COP for the practical and effective implementation of the *Convention* and the *Protocol,* lay out eligibility requirements that a Party has to meet in order to participate in the trade. They require that a Party should calculate its assigned amount and establish national systems and registries to record emissions, removals and transactions.[207]

The units that may be transferred include assigned amount units which are derived from a Party's assigned amount, and they represent the total quantity of emissions that a Party is allowed to produce.[208] They are allocated free of charge on the basis of a Party's historical emissions; a situation known as grandfathering.[209] Parties may

---

[205] For example, The European community has to reduce its emissions by 8% while Canada, Hungary, Japan, and Poland have to reduce their emissions by 6%. New Zealand, Russia and Ukraine have their emissions capped at 1990 levels. Australia and Iceland may increase their emissions by 8% and 10% respectively, Annex B of the *Protocol, supra* note 4

[206] Annex B creates targets for members of the OECD and Economies in Transition, The *Protocol*, supra note 4, Article 6(3).

[207] The *Accords, supra* note 6.

[208] The *Protocol, supra* note 4, Article 3 (7).

[209] See Ellerman, "Cap and Trade", *supra* note 156.

also transfer removal units that are acquired when the Party creates sinks that remove greenhouse gases from the atmosphere.[210] The other units are emission reduction units and certified emission reduction units that are acquired from JI and CDM projects respectively.[211] The fact that all the different kinds of units are tradable adds to the flexibility that the mechanisms provide. However, Choi[212] has observed that the use of project based credits raises problems associated with establishing a baseline inventory, monitoring and verification of claimed reductions, especially with regard to afforestation projects due to the uncertainty over how to gauge greenhouse gas removal of carbon sinks. Therefore, strict monitoring and verification rules are necessary to ensure that real reductions in emissions by sources and removals by sinks are achieved before credits are awarded and transferred. However, such strict verification procedures will increase project costs, a factor that may deter the Parties from implementing carbon sequestration projects.[213]

The *Accords* also provide for 'banking' of unused units. This feature allows a party that reduces emissions beyond its obligations to 'store' the excess units for use or sale in future periods. Although banking increases the flexibility already created by emissions trading, it is a disadvantage in as far as it will lead to high emissions levels in the future and consequently high levels of pollutants that accompany industrial processes.[214] Banking, however, will enhance the competitiveness of the market as a

---

[210] Removal units are measured as a change in greenhouse gas emissions by sources and removals by the sinks, The *Protocol, supra* note 4, Article 3(3).
[211] *Ibid.* Articles 3(3), 3(4), 6 & 12.
[212] Inch Choi, "Global Climate Change and the use of Economic Approaches: The Ideal Design Features of Domestic Greenhouse Gas Emissions Trading with an Analysis of the European Union's Carbon dioxide Emissions Trading Directive and the Climate Stewardship Act (2005) 4 Natural Resources Journal 45 [Choi, "Global Climate"].
[213] *Ibid.*
[214] Evans, "Principles of Kyoto", *supra* note 131 at 197.

Party can always 'keep' its excess units if the current price is not good enough. A thriving emissions trading market will ensure that overall costs of complying with the *Protocol*'s commitments are reduced.

In order to prevent the occurrence of a situation where a Party oversells its units and then fails to meet its own reduction obligations (a situation known as emissions bankruptcy), the *Accords* require each Party to keep a percentage of its units in its registry for compliance (commitment period reserve).[215] Overselling would definitely lead to more emissions than authorized, and this would be detrimental to achieving the *Protocol*'s environmental objective. Therefore, the provision for a commitment period reserve is instrumental in preventing overselling. In spite of such a provision, there are unforeseen circumstances that could occur to cause a Party to inadvertently breach its commitment period reserve. Such circumstances may include accidental loss of sinks and unexpected increases in human induced emissions.[216] Also, instances of a party deliberately selling in excess of the units it holds cannot be ruled out.

In the event that a Party sells units in excess of the quantity that it holds, it will be barred from carrying out any more sales until it is in compliance.[217] Legal entities that have been authorized by such a party will also be barred from trading until the Party is in compliance.[218]

---

[215] The *Accords*, *supra* note 6.
[216] Sinks may be lost through accidental or unforeseen circumstances such as forest fires and plant diseases; See Anup Shah, "Carbon Sinks, Forests and Climate Change," online: Global Issues <http://www.globalissues.org/EnvIssues/GlobalWarming/Forests.asp>.
[217] The *Accords*, *supra* note 6.
[218] *Ibid.*

2.5 The Acid Rain Cap and Trade Program

Acid rain is the deposition of atmospheric pollutants, primarily suphur dioxide and nitrogen oxide, that ultimately cause damage due to their acidity.[219] The former pollutant is primarily produced by electrical generating plants, industrial boilers, smelters, and refineries while automobiles are the main source of the latter.[220] The adverse effects of acid rain include: the acidification of lakes and rivers which in turn has a negative effect on aquatic life; forest damage occasioned when acid rain strips the leaves of essential nutrients and alters the soil composition; contamination of drinking water supplies; deterioration in air quality; and accumulation of chemicals in the food chain.[221] Acid rain also has adverse economic effects as it is corrosive to materials and damages surfaces of outdoor structures, hence reducing property value.[222]

The U.S. acid rain cap and trade program was created under Title IV of the *Clean Air Act* Amendments of 1990.[223] The goal of this amendment is to reduce acid rain and improve public health by reducing emissions of sulphur dioxide and nitrogen oxide by 10 million tons and two million tons respectively from the levels in 1980.[224] Title IV mainly deals with electric power plants since they account for almost three fourths of sulphur dioxide emissions.[225] It established a cap on sulphur dioxide emissions which was implemented by issuing tradable allowances equal to the total annual

---

[219] Timothy Stein, "Acid Rain: The Clean Air Act Cannot Handle the Problem" (1987) 56 UMKC. L. Rev. 139 [Stein, "Acid Rain"].
[220] *Ibid.*
[221] *Ibid.*
[222] *Ibid.*
[223] *Clean Air Act of 1970,* Pub. L. 101 – 549, 104 Stat. 2399 (Codified as amended at 42 U.S.C. 7401-7671 (1990))[Clean Air Act].
[224] *Ibid.* See Rauch, "Developing an International Market", *supra* note 164.
[225] *Ibid.*

allowed emissions and by requiring that the owners of the electric utility plants surrender an allowance for every ton of sulphur dioxide emissions.[226]

The reductions in emissions under the program were to be achieved in two phases. Phase 1 covered the 263 highest emitting electric utility plants while phase II expanded the program to cover all electric utility plants, with the aim of reducing annual sulphur dioxide emissions by an additional five million tons.[227] Plants that were established after 2000 were not issued any allowances by the U.S. Environmental Protection Agency.[228] This was advantageous for both the environment and the market. The environmental benefit occurred because overall pollution levels were not increased, while the existence of a vibrant market arose from the fact that new plants had to purchase allowances from existing plants. Generally, the acid rain program has succeeded in achieving both its environmental and economic goals and it has been hailed as one of the most successful environmental programs of the past several decades.[229]

2.6 Evaluation of the International Emissions Trading System vis-à-vis the Acid Rain Program

This section consists of an evaluation of the acid rain cap and trade program and the international emissions trading system created under the *Protocol,* applying the criteria for evaluation of cap and trade programs that was developed in a study by the

---

[226] Ellerman, "Cap and Trade Programs", *supra* note 156.
[227] Yelin-Kefer, "Warming", *supra* note 7.
[228] Rauch, "Developing an International Market", *supra* note 164 at 316.
[229] Yelin-Kefer, "Warming", *supra* note 7; See The White House, "Executive Summary – The Clear Skies Initiative," online: The White House
< http://www.whitehouse.gov/news/releases/2002/02/clearskies.html>.
[229] *Ibid.*

U.S. Congressional Budget Office.[230] The study evaluates a cap and trade program on: its cost-effectiveness (whether the program can reduce emissions at the lowest possible cost to society), its environmental effectiveness (whether the program can achieve the target level of emissions), the ease of implementation (whether the program is easy to carry out and enforce), and the distributional effects of the program (how the costs and benefits of the policy would be distributed amongst the affected entities). Although these criteria were applied in evaluating domestic emissions trading systems, they are relevant in the assessment of an international system because the systems have similar features.

2.6.1 Environmental effectiveness

The study provides that a cap and trade program should be able to achieve the target level of emissions.[231] Although emissions trading is sometimes portrayed as a means of evading environmental obligations, experience with the acid rain program has proved otherwise.[232] In the first five years of its existence, firms emitted 40% fewer sulphur dioxide emissions than the *Clean Air Act* allowed in 1995 and 25% below permitted levels in 1996.[233] As a result, a 10-25% decline in rainfall acidity was evidenced in 1995.[234] The environmental success of the program has continued, as reports indicate that in 2002 sulphur dioxide emissions from utility plants were 9%

---

[230] U.S Congressional Office, "Study", *supra* note 8.
[231] *Ibid.*
[232] Ellerman, "Cap and Trade Programs", *supra* note 156 at 34.
[233] Yelin-Kefer, "Warming", *supra* note 7 at 231.
[234] *Ibid.*

lower than the emissions in 1980 and 41% lower than 1990, and nitrogen oxide emissions decreased by 33% from 1990 levels.[235]

The environmental success of the acid rain program is attributed to a number of factors. Ellerman and Joskow[236] have observed that any trading program must have an accurate method for measuring emissions so that the requirement that all emissions be matched by surrendering an equal number of allowances can be enforced. In the absence of accurate monitoring, emissions could easily exceed the cap and this would definitely jeopardize the environmental effectiveness of the trading program. Therefore, it has been noted[237] that the integrity of the emissions trading program rests on its monitoring system.

Critics of emissions trading as a means of achieving environmental goals charge that current technologies and systems of government administration have not been able to adequately deal with the monitoring problem.[238] However, the acid rain program has strict monitoring standards that have ensured that the regulated utilities do not emit in excess of their allowances. Under the continuous emissions monitoring system, each utility is required to install a monitoring system so as to analyze, measure, and provide an accurate and permanent record of emissions.[239] Additionally, the U.S.

---

[235] Clean Air Market Programs, "Cap and Trade: Acid Rain Program Results," online: Environmental Protection Agency <http://www.epa.gov/airmarkets/capandtrade/ctresults_pdf> [Clean Air Market Programs, "Cap and Trade"].
[236] Ellerman, "Cap and Trade Programs", *supra* note 156 at 16.
[237] Evans, "Principles of Kyoto", *supra* note 131.
[238] Rauch, "Developing an International Market", *supra* note 164 at 312.
[239] *Ibid.* at 316.

Environmental Protection Agency conducts quality assurance checks, a factor that ensures that transparent and accurate emissions data is obtained.[240]

The international emissions trading system has strict monitoring and reporting requirements that will be instrumental in ensuring that the system achieves its environmental target. Each Annex B Party is required to have in place a national system for estimating anthropogenic emissions by sources and anthropogenic removals by sinks.[241] The advantage that a greenhouse gas emissions trading system has is that these emissions can be estimated accurately.[242] In addition to the above requirement, the *Accords* require the Party to establish a national registry to account for, record, and monitor transactions in allowances.[243] Expert Review Teams will assess this information in order to ensure that it is complete, accurate and that it conforms to the guidelines.[244] These Teams have the power to recommend adjustment to the data so as to reflect the facts on the ground.[245] As an added monitoring tool, the Secretariat has the mandate to manage an independent transaction log that will be used to check the validity of transactions under the mechanisms.[246] Generally, this system has the capacity to ensure that while engaging in transactions, the Parties do not exceed their assigned amounts.

---

[240] Clean Air Market Programs, "Cap and Trade", *supra* note 235; See The White House, "Detailed Information on the EPA Acid Rain Program Assessment," online: The White House <https://www.whitehouse.gov/omb/expectmore/detail.10001131.2005.html>.
[241] The *Protocol, supra* note 4, Article 5(1).
[242] See Environment Canada, "Metal Mining – Guidance Manual for Estimating Greenhouse Gas Emissions," online: Environment Canada < http://www.ec.gc.ca/pdb/ghg/guidance/calcu_pro_e.cfm>.
[243] The *Accords, supra* note 6.
[244] *Ibid.*
[245] *Ibid.*
[246] *Ibid.*

Although monitoring increases the cost incurred in an emissions trading program, its role in attaining the environmental objective of the program is of greater value. In the acid rain program, although the continuous emissions monitoring system accounted for 7% of the total phase I compliance costs, it was of critical value in ensuring that the overall objective of reducing sulphur dioxide emissions was achieved.[247] Similarly, Parties to the *Protocol* may incur high costs in establishing national systems and registries, but this will play a vital role in ensuring that they meet their targets.

It has also been pointed out[248] that the continuous emissions monitoring system was successful because the first phase of the acid rain program involved fewer than 200 electric utilities, and therefore monitoring emissions of these entities was not complicated. On the other hand, the international emissions trading program will involve various countries and the entities that they may choose to authorize to participate in the trade.[249] Therefore, it is feared that the projected size and diversity of the program will complicate monitoring and enforcement.[250] However, this fear is minimal since each Party is primarily responsible for monitoring the emissions of its domestic entities.

In order to be environmentally effective, an emissions trading program should also have stringent penalties. Such penalties will serve as a disincentive for not complying with the targets by the Parties and entities. Under the acid rain program, there is a penalty of $2000 per ton of emissions that a utility emits in excess of its

---

[247] Ellerman, "Cap and Trade Programs", *supra* note 156 at 16.
[248] Ellerman, "Emissions Trading", *supra* note 196.
[249] Yelin-Kefer, "Warming", *supra* note 7 at 234.
[250] *Ibid.* at 235

allowances.[251] Additionally, the U.S. Environmental Protection Agency is entitled to reduce a defaulting utility's allowance allocation for the following year.[252] By deducting a defaulting entity's allowance in addition to the fine, this penalty has ensured that not only is the defaulter punished but also that the environmental objective of the program is kept in sight.

The international emissions trading program also has penalties that are intended to foster compliance and, therefore, aid in the achievement of the environmental objective of the *Protocol.* A Party that exceeds its allowances is required to make up any shortfall in compliance (by purchasing allowances from other Parties) within 100 days of the notification.[253] Further, if the Party fails to make up the shortfall by purchasing allowances from other Parties, it is required to make up the difference in the next commitment period, in addition to a penalty of 30%.[254] This provision, therefore, ensures that the environmental effectiveness of the *Protocol* and the trading system is not compromised by a Party's breach. A Party that has failed to meet its targets will also be barred from selling allowances under emissions trading until it is able to meet its targets.[255] Additionally, domestic legal entities of the Party that is in default are barred from participating in international emissions trading during any period of time in which this Party has not met its targets.[256] Therefore, there exist sufficient disincentives for non-compliance under the international emissions trading

---

[251] Rauch, "Developing an International Market", *supra* note 164 at 316.
[252] *Ibid.*
[253] The *Accords, supra* note 6.
[254] *Ibid.*
[255] *Ibid.*
[256] *Ibid.*

system, a factor that will promote the achievement of the environmental objective of the *Protocol*.

In addition to the strict monitoring requirements and penalties, the international emissions trading system has various features that are intended to foster its environmental effectiveness. One such feature is the requirement for a commitment period reserve, which is a quantity of allowances that a Party must hold in its national registry at any given period of time. The *Accords* stipulate that each Party is to maintain a commitment period reserve, which should not drop below 90% of its assigned amount.[257] The purpose of this provision is to ensure that a Party does not oversell and that it will always have sufficient allowances for compliance with its emission targets. Haites and Missfeldt[258] have observed that among all proposed liability rules, with the exception of a financial penalty, the reserve would be most effective to reduce overselling and would not significantly add to the overall cost of compliance. The commitment period reserve was set at 90% in a bid to ensure that it is not so restrictive as to limit the liquidity of the market.[259] However, the *Accords* provide that the provisions relating to the commitment period reserve or other limitations to transfer allowances shall not apply to transfers of certified emission reduction units.[260] The result of the provision is that a Party can transfer certified emission reduction units regardless of whether its registry holds enough units to

---

[257] *Ibid.*

[258] Erik Haites & Fanny Missfeldt, "Liability Rules for International Trading of Greenhouse Gas Emissions Quotas" (2001) 1 Climate Policy 85.

[259] OECD Environment Directory & International Energy Agency, "The Commitment Period Reserve," online: Organization for Economic Cooperation and Development <http://www.oecd.org/dataoecd/50/20/2468753.pdf>.

[260] Certified emission reduction units are obtained from projects of the clean development mechanism, The *Accords, supra* note 6; Yamin *supra* note 7 at 29; and OECD, *Ibid.*

comply with the reserve requirement.[261] The exemption is due to the fact that these units have already been accompanied by a reduction in emissions by sources or an increase in removals by sinks under a CDM project.

In spite of the provision for a commitment period reserve, overselling could occur if a Party's emissions are higher than 90% of its assigned amount, yet it decides to sell the tradable amount (that is, the 10%).[262] Additionally, there are unforeseen circumstances that can occur to cause a Party to inadvertently breach its commitment period reserve and also fail to meet its targets. Such circumstances may include accidental loss of sinks through instances such as forest fires and plant diseases, and unexpected increases in human induced emissions. In absence of any unforeseen circumstances, however, the commitment period reserve will be useful in preventing overselling and hence promoting the achievement of the environmental goal of the *Protocol*.

Another feature that has the potential to increase the environmental effectiveness of the international emissions trading system is the recognition of early reduction credits. This involves parties being awarded credits for reductions in emissions or removals from sources that occurred before that start of the *Protocol*'s compliance period. Parties to the *Protocol* can gain early reduction credits from projects of the CDM.[263]

These credits are an incentive for the Parties or regulated entities to engage in emission reductions as soon as possible, a factor that benefits the environment. However, recognition of early reduction credits has to be accompanied by strict

---

[261] *Ibid.*
[262] *Ibid.*
[263] The *Protocol, supra* note 4, Articles 6 & 12.

verification rules in order to ensure that credits are not awarded for reductions that would have taken place even in the absence of the reduction commitments.

In the international emissions system, the fact that the Parties can also use removal units that are gained from land use, land-use change and forestry activities may enhance the achievement of the environmental goal of the *Protocol*.[264] The use of removal units in the trade is an incentive for Parties to engage in sustainable land management practices, a factor that will enhance the environmental goal of the *Protocol*. However, Choi[265] has observed that in order for LULUCF activities to be effective in enhancing the nation's greenhouse gas removal capacity, comprehensive long term sustainable land use management plans need to be established simultaneously at the national level or else greenhouse gas removal activities induced by sink-creating activities will be partially or wholly nullified by destructive forest management and farming practices that increase greenhouse gas emissions, which take place outside of the carbon sequestration projects.

However, there exist factors that may limit the effectiveness of the international emissions trading system in contributing to the reduction in global greenhouse gases. Of primary concern is the fact that the program is limited to only Annex 1 Parties. Due to this limited coverage, reductions that could have been achieved from non-Annex 1 Parties are forfeited. Therefore, Rauch advises that even if the program starts with only developed countries, it is a matter of urgency to include developing countries, especially those with large growth such as India and China, as they will

---

[264] *Ibid.* Article 3(3) & 3(4).
[265] Choi, "Global Climate", *supra* note 212 at 71.

prospectively become large emitters of greenhouse gases.[266] However, Rauch acknowledges the fact that it is not expected that a trading system would commence with universal participation.[267] Even with the participation of only Annex 1 Parties, the program still has the ability to substantially reduce global greenhouse gas emissions especially because it covers countries that account for at least 55% of the total carbon dioxide emissions.[268] Additionally, some emissions reductions and removals in developing countries will be achieved through the application of the CDM. In comparison, the acid rain program used a phase-in approach, where phase I (1995-99) included 263 of the large electric generating plants, and later phase II covered all power generating plants.[269]

Another big threat to the environmental effectiveness of the international emissions trading program is the presence of 'hot air' in the system. This refers to the emission allowances held by Eastern European nations such as Russia and Ukraine, in excess of their emission capacities.[270] Although the *Protocol* allows these countries to emit at their 1990 levels in the compliance period 2008-2012, their present emissions are way below these levels due to the economic decline that these nations have suffered.[271] For example, currently carbon dioxide emissions in Russia are only 74%

---

[266] *Ibid.*
[267] *Ibid.*
[268] The *Protocol*, *supra* note 4, Article 25.
[269] Ellerman, "Cap and Trade Programs" *supra* note 156 at 12; Notre Europe, "Overview and Analysis of the Acid Rain Program," online: Notre Europe <http://www.notre-europe.eu/uploads/tx_publication/EU_ETS_Appendix_E_01.pdf>.
[270] Chris Rolfe, "An Environmental Perspective on International Greenhouse Gas Emission Trading," online: West Coast Environmental Law Association < www.wcel.org/wcelpub/1998/12249.html> [Rolfe, "Environmental"].
[271] *Ibid.*

of 1990 emission levels and are projected to increase to about 80 to 90 % of 1990 levels by 2010.[272]

The consequence of allowing hot air on the emissions trading market is that nations that buy these allowances will increase their emissions while nations that sell the allowances will not take any action to reduce emissions.[273] For example, Rolfe[274] has observed that under trading rules supported by Canada, Eastern European nations would be able to sell their excess allowances without any actions being taken to reduce emissions. Further, predictions indicate that Russian hot air alone has the affect of allowing other Annex 1 nations to increase their collective emissions by 4% above the commitment levels.[275] The above fears formed the basis of the EU's suggestion to impose a limit on the trade in such emissions.[276] However, since this proposal was defeated, the threat of hot air remains. On the other hand, Russia and Ukraine have advanced the view that the allowances are legitimate because they are real reductions gained through economic hardship.[277] However, this view lacks credibility, as it is not in line with the intention of the *Protocol,* which is to achieve voluntary emissions reductions.

However, the threat posed by hot air can be reduced through the application of JI provisions as the basis for international emissions trading.[278] JI ensures that emissions

---

[272] *Ibid.*
[273] *Ibid;* See Michael Grubb, "International Emissions Trading Under the Kyoto Protocol: Core Issues in Implementation (1998) 7 Review of European Community & International Environmental Law 1.
[274] Rolfe, "Environmental", *supra* note 270.
[275] *Ibid.*
[276] Evans, "Emissions Trading", *supra* note 131.
[277] *Ibid.*
[278] *Ibid.*

trading with countries such as Russia is coupled with investments in projects that will lead to reduced emission levels.[279]

2.6.2 Cost-effectiveness

The Study provides that a cap and trade program should be able to reduce carbon emissions at the lowest possible cost to society.[280] The greatest stated advantage of economic incentive programs over the traditional command and control mechanisms is the potential to reduce the costs of achieving emission reductions. Cost-effectiveness is created by the flexibility that firms have to reduce emissions or to purchase credits to cover up for the emissions beyond their permits. This advantage has materialized under the acid rain program. It is reported that emission reductions under phase I were achieved at about one half of the cost of a more conventional approach and that emissions trading under the acid rain program has resulted in annual savings of $1 billion.[281] A cost-benefit analysis of the acid rain program further revealed that it has provided greater benefits for its cost than any program in history.[282] Although the acid rain emissions trading program has been effective in minimizing the costs of reducing pollutant emissions, it has faced criticism for failing to realize the full potential cost savings of an ideal "textbook" program design.[283] Additionally, critics charge that utilities still incurred high transaction costs in the process of identifying suitable trading partners, a factor that partly accounted for resulting intra-utility as opposed to inter-utility trading.[284] On the whole however, the

---

[279] Rolfe, "Environmental", *supra* note 270.
[280] *Ibid.*
[281] Yelin-Kefer, "Warming", *supra* note 7 at 231.
[282] Swift, "U.S Emissions Trading", supra note 176.
[283] *Ibid.*
[284] Rauch, "Developing an International Market", *supra* note 164 at 320.

U.S. Environmental Protection Agency and the regulated utilities achieved tremendous cost savings from the program.[285]

Among the features that enabled the acid rain program to achieve cost-effectiveness is banking.[286] Banking allows entities participating in a cap and trade program to keep allowances that are not used in one compliance period for future use.[287] Although banking has helped utilities to save costs by using or selling allowances that were saved from the previous periods, its greatest advantage is the flexibility it has provided for dealing with uncertainties.[288] It has enabled the entities to increase their emissions in response to short-term demand in the market and to sell the allowances when the market prices are high.[289] The international emissions trading system also allows the Parties to bank their unused units. Therefore, one can predict that this feature will promote flexibility and cost-effectiveness in the international market.

Another factor that has contributed to the market success of the acid rain program is the fact that it covers a large number of entities, which are the actual emitters. Evans[290] has observed that it is essential that the participants in the system should include the actual emitters, as opposed to governments of the Parties. Such a system is more sustainable over the long term because it creates strong incentives to continuously reduce emissions.[291]

---

[285] Ellerman, "Cap and Trade Programs", *supra* note 156.
[286] One major emissions trading program without a substantial banking provision, the Los Angeles RECLAIM program, appears to have suffered because of its absence, Ellerman, "Emissions Trading", *supra* note 196.
[287] Business and Sustainable Development, "The Case for Early Action," online: Business and Sustainable Development <http://www.iisd.org/business/incentivesummary.htm>.
[288] Ellerman, "Cap and Trade Programs", *supra* note 156 at 37.
[289] Choi, "Global Climate Change", *supra* note 212 at 67.
[290] Evans, "Principles of Kyoto", *supra* note 131.
[291] *Ibid.*

Similarly, the international emissions trading system has a sufficient number of participants, a factor that will facilitate the creation of a functioning market. Many entities will be involved in the system as the Parties authorize various domestic entities to participate in the trade. These private sector entities will better exploit abatement opportunities and thereby enlarge the economic gains achieved under emissions trading.[292] However, involvement of the private sector requires a robust monitoring and reporting system so as to ensure that emissions reductions are not overstated.[293] Private sector entities may easily overstate emissions reductions because they are not directly responsible for achieving the target emissions under the *Protocol,* coupled with the fact that they can make profit from selling excess allowances.[294] Thus, monitoring and enforcement are once again important roles of the Parties. Regardless of the fact that the participants are limited to Annex B Parties, the inclusion of private sector entities will help in the creation of a robust market.

Another factor that has resulted in the reduction of costs in the acid rain program is the innovation that has occurred. The U.S. Environmental Protection Agency has observed that this program has been accompanied by immense innovation and improved performance of pollution technologies, which has led to lower-than-expected program compliance costs.[295] Generally, an active emissions trading market serves as an incentive for innovation. It is also a goal of the international emissions trading system to foster the innovation and transfer of energy efficient

---

[292] Rauch, "Developing an International System", *supra* note 164.
[293] Evans, "Principles of Kyoto", *supra* note 131 at 7.
[294] *Ibid.*
[295] Clean Air Market Programs, "Cap and Trade", *supra* note 235.

technologies.[296] An assumption is made that the possibility of selling excess units will motivate Parties to engage in the innovation of new technologies that will cut their emissions.[297]

In addition to the above factors, cost-effectiveness in the international emissions trading market is likely to be enhanced by the recognition of early reduction credits.[298] This gives the Parties and regulated entities time to pursue low-cost opportunities and make adjustments to production processes through experimentation and innovation, hence resulting in lower compliance costs.[299]

An additional factor that will affect the economic performance of the international emissions trading system is the determination of liability. Liability rules allocate responsibility in case a Party which has transferred parts of its assigned amounts is found in non-compliance, and they have a tremendous effect on the market and its ability to achieve cost-effectiveness.[300] Under a buyer liability system, the buyer must decide whether the seller is likely to comply with its obligations before purchasing the allowances.[301] If the seller later needs these allowances for compliance, the sale will be invalidated and the buyer may have to resort to the contract provisions in order to recover any payments that were made.[302] Additionally, the buyer may have to

---

[296] See The *Convention, supra* note 3, The *Protocol, supra* note 4, and the *Accords, supra* note 6.
[297] See Bruce A. Ackerman & Richard Stewart, "Reforming Environmental Law: The Democratic Case for Market Incentives" 13 Colum. J. Envtl. L. 171.
[298] Choi, "Global Climate", *supra* note 212
[299] *Ibid.* at 66.
[300] OECD Environment Directory & International Energy Agency, "An Assessment of Liability Rules for International Greenhouse Gas Emissions Trading," online: Organization for Economic Co-operation and Development < http://www.oecd.org/dataoecd/31/49/2402827.pdf>.
[301] Erik Haites, "Emissions Trading for Greenhouse Gases in Canada," online: Institute for Research on Public Policy <http://www.irpp.org/po/archive/may98/haites.pdf> [Haites, "Emissions Trading"].
[302] *Ibid.*

purchase replacement allowances to ensure its compliance.[303] Although this means less work for the regulatory authority, buyers are reluctant to purchase allowances. The result is that the international trade in allowances will be hampered if buyers have to bear the risk.[304]

Under a seller liability system, the seller has to have the credits certified as valid by the regulatory authority before they can be sold.[305] Although the certification increases the time and cost involved in creating and selling allowances, it may lead to more purchases as buyers are assured of the validity of the allowances. [306] A trading system may also rely on shared liability. In such instances, the seller and the buyer decide who will bear the liability in their contract.[307] The presumption is that the international emissions trading system applies a seller liability system because it places the burden on a Party to ensure that it has sufficient units for compliance and it has no penalties for the buyer. Therefore, this will promote a vibrant market, which in turn will enhance cost-effectiveness.

2.6.3 Ease of Implementation

The Study provides that the cap and trade program should be easy to carry out and enforce.[308] The major requirement for the regulated entities under the acid rain program was to install a continuous emissions monitoring system that would record

---

[303] *Ibid.*
[304] Brett Frischmann, "Using the Multi-Layered Nature of International Emissions Trading and of International-Domestic Legal Systems to Escape a Multi-State Compliance Dilemma" (2001) Georgetown International Environmental Law Review 463 at 482.
[305] Haites, "Emissions Trading", *supra* note 301
[306] *Ibid.*
[307] *Ibid.*
[308] U.S Congressional Office, "Study", *supra* note 8.

their emissions.[309] The costs incurred by the entities in installing this system were negated by the fact that the entities achieved overall cost-savings under the program. The role of the U.S. Environmental Protection Agency is to review the reports submitted by the entities and ensure that they do not emit in excess of their allowances, and to apply penalties to defaulting entities.[310] Reports indicate that the U.S. Environmental Protection Agency has achieved tremendous cost savings in the administration of this program.[311]

Under the international emissions trading system, the Parties bear the primary responsibility of ensuring that the requirements for monitoring of emissions are in place. These include establishing national systems for estimating anthropogenic emissions by sources and removals by sinks, and national registries that will ensure accurate accounting of transactions.[312] Consequently the role of the Secretariat is mainly limited to assisting the Parties in implementing their commitments and providing support for the compliance regime of the *Protocol*.[313] The compliance regime under the *Protocol* is comprised of a Compliance Committee that is made up of a Facilitative Branch and an Enforcement Branch.[314] The Facilitative Branch is responsible for providing early warning of cases where a Party is in danger of not complying with its emissions targets, and ensuring that the Parties' use of the

---

[309] Denny Ellerman & Richard Schmalensee, "Emissions Trading Under the Acid Rain Program: Evaluation of Compliance Costs and Allowance Market Performance," online: Massachusetts Institute of Technology < http://web.mit.edu/ceepr/www/napap.pdf>.
[310] Environmental Protection Agency, "Acid Rain Program SO2 Allowances Fact Sheet," online: Environmental Protection Agency < http://www.epa.gov/airmarkets/arp/allfact.html>.
[311] Environmental Protection Agency, "The EPA Acid Rain Program 2004 Report," online: Environmental Protection Agency < http://www.epa.gov/airmarkets/cmprpt/arp04/index.html>; See also<http://www.epa.gov/airmarkets/trading/basics/index.html>.
[312] The *Accords, supra* note 18.
[313] The *Convention, supra* note 3, Article 8.
[314] The *Accords, supra* note 18.

flexibility mechanisms is only supplemental to domestic action. On the other hand, the Enforcement Branch is responsible for determining whether an Annex B Party is not complying with its emission target or reporting requirements, or has lost its eligibility to participate in the mechanisms.[315] Although this non-confrontational approach may not be as effective as traditional dispute settlement mechanisms, it does have various advantages. It allows compliance issues to be addressed in a multi-lateral context, rather than bi-lateral disputes resolved through third party arbitration or adjudication.[316] It also promotes resolution of compliance problems in a cooperative rather than an adversarial manner, and it allows for procedures to be designed to facilitate rather than enforce compliance.[317] The Secretariat has reported that the *Protocol*'s compliance mechanism is among the most comprehensive and rigorous systems of compliance for a multilateral environmental agreement. [318]

2.6.4 Distributional Effects

Under the Study, a cap and trade program should be able to equitably distribute its costs and benefits amongst the affected entities.[319] The issue of distribution of costs and benefits usually arises during the initial allocation of allowances. The two main methods used under cap and trade programs are auctioning and grandfathering. Under auctioning, the revenue from the sale of allowances could be used to finance energy conservation projects or it could be used to compensate the affected entities, which in

---

[315] *Ibid.*
[316] Geir Ulfstein & Jacob Werksman, "The Kyoto Compliance System: Towards Hard Enforcement," online: University of Oslo <http://folk.uio.no/geiru/TheKyotoComplianceSystem.pdf>.
[317] *Ibid.*
[318] UNFCCC Secretariat, "An Introduction to the Kyoto Protocol Compliance Mechanism," online: United Nations Framework Convention on Climate Change <http://unfccc.int/kyoto_protocol/compliance/introduction/items/3024.php>.
[319] U.S Congressional Office, "Study", *supra* note 8.

turn could lower prices for the consumers.[320] In this way, the costs and benefits would be shared by a large number of the affected persons. However, Burtrow[321] has observed that despite its theoretical superiority, auctioning of allowances has never been used in a revenue-raising manner anywhere in the world.

On the other hand, allowances are issued free of charge to the participating entities under the grandfathering mode of allocation. Under the acid rain program, allowances were distributed to the electric utility plants free of charge, based on each plant's generating capacity and its historical level of emissions between 1985 and 1987.[322] Similarly, under the *Protocol*, each Party acquires assigned amounts free of charge, on the basis of its emissions levels in 1990.[323]

Ethical concerns arise from the fact that valuable rights are created in the atmosphere and given to a few States and entities.[324] The majority of the populations do not have a direct share in the financial benefits accruing from the trade. Consequently, as long as a grandfathering mode of allowance allocation is followed, the distribution between nations of costs and benefits from the trade can hardly be equitable.

Furthermore, the international emissions trading system may not distribute its costs and benefits evenly among the participants because countries such as Russia and Ukraine stand to make huge gains from the sale of the excess allowances that they hold. On the contrary, other Parties may experience economic decline due to the decreased level of economic activity that will come as a direct result of restricting the

---

[320] Dallas Burtraw, *et al,* "The Effect of Allowance Allocation on the Cost of Carbon Emissions Trading," online: Resources for the Future <http://www.rff.org/rff/Documents/RFF-DP-10-30.pdf>.
[321] *Ibid.*
[322] Ellerman, "Cap and Trade Programs", *supra* note 156
[323] The *Protocol, supra* note 4, Article 3(7) & (8) and Annex B.
[324] Ellerman, "Cap and Trade Programs", *supra* note 156

emissions of domestic entities. Additionally, there exists a fear that there will be an exodus of industries from Annex 1 Parties to unregulated developing countries due to the absence of restrictions on emissions in the latter.[325] Yet, since the adverse effects of climate change are predicted to impact some countries on a much greater scale than others, the international emissions trading system should be structured to even out the resulting inequalities.[326]

Emissions trading programs can also lead to an increase in pollution in some areas. For example, the acid rain program led to an increase in pollution in the New England States.[327] The problem was a result of the absence of limits on where owners of utilities could sell their excess allowances. Consequently, utilities in the Midwest purchased lots of allowances from Northwestern utilities, causing the Midwest utilities to fill the wind with more pollutants than they were allowed to emit under the former regulatory program.[328]

However, the increase in pollution in the areas with high sources of greenhouse gas emissions is not a concern under the international emissions trading program because the effect of greenhouse gases is spread evenly over the globe regardless of the geographical location of their source.[329]

2.7 Problems Affecting Emissions Trading Programs

Although the acid rain program has been hailed as a great success, it experienced various market problems that slowed the achievement of its goals. For example,

---

[325] Maurizio D'Orlando, "Kyoto and its Paradoxes" *Pime News* (16 February 2005), online: Pime News <http://www.asianews.it/view.php?/=en&art=2589>.
[326] See also Simon Caney, "Cosmopolitan Justice, Rights and Global Climate Change" (2006) 19 Can. J. L. & Juris. 255 [Caney, "Cosmopolitan"].
[327] "Market-based Regulatory Tools Toward Better Bubbles," online: Centre for Progressive Regulation <http://www.progressiveregulation.org/perspectives/emissions.html>
[328] Rauch, "Developing an International Market", *supra* note 164 t 321.
[329] See Maslin, *supra* note 9, chapter 1.

during phase I, there were low levels of inter-utility trades due to existence of uncertainties regarding the price of allowances, and the hoarding of allowances.[330] The low number of transactions was also due to the fact that the program covered only a limited number of utilities. In an attempt to create a functioning market, the U.S. Environmental Protection Agency allowed non-utilities to participate in the allowance market by buying allowances directly from the utilities and at the Environmental Protection Agency's annual auction.[331] The participation of non-utilities was instrumental in creating a balance between demand and supply and therefore stabilizing the price of allowances.[332] There was an environmental benefit from this provision as NGO's and corporations bought allowances and retired them.[333] This, however, had the potential to be a disadvantage if the NGO's had purchased and retired too large a number of allowances.

Although the above problems may not occur in the international emissions trading system, there are other market problems that have the potential to undermine the success of this system. These include hoarding and market entry problems for new entities, and the existence of a monopoly or a monopsony. Hoarding may arise if entities that hold a significant share of the total tradable permits decide to keep these permits to themselves in order to exclude other entities from the product market, resulting in a distortion in competition for that product.[334] It has been observed, however, that hoarding may not be a significant problem in the international

---

[330] Rauch, "Developing an International Market," *supra* note 164.
[331] *Ibid.*
[332] *Ibid.* at 318.
[333] *Ibid.*
[334] OECD Environment Directorate & International Energy Agency, "Market Power and Market Access in International Greenhouse Gas Emissions Trading," online: Organization for Economic Co-operation and Development http://www.oecd.org/dataoecd/16/61/2391156.pdf.>[OECD, "Market Power"].

emissions trading market especially if Parties authorize domestic private entities to participate in the market.[335] These private entities will be involved in a broad range of economic activities, and therefore, a new entrant that needs allowances can purchase them from entities outside its own sector.[336] It is assumed that entities from different sectors will have limited interest in hoarding their allowances because they are not competing with each other for a particular product market.[337]

On the other hand, the existence of a monopoly and monopsony poses a big threat to the effectiveness of the international emissions trading market.[338] It is argued that any participant, given an opportunity to do so, may exert market power to lower its own economic cost at the expense of overall economic efficiency.[339] In the international emissions trading system, Russia and Ukraine have the capacity to create a monopoly since they hold allowances in excess of their present emission capacities. Burniaux[340] provides an estimate of the effect that the monopoly power of Russia and Ukraine can occasion on the international emissions trading market: that by 2010, the price of assigned amount units would be about 20% higher than under a competitive scenario (US $91 per tonne of carbon versus US $75), gains from emissions trading would reduce by about 20% for OECD countries in 2010, and these two countries would reduce their emissions by less than they would have under a competitive scenario

---

[335] *Ibid.*
[336] *Ibid.*
[337] *Ibid.*
[338] A Monopoly arises where the market comprises of a single seller that can price its output at a higher level than its marginal cost. In the case of international emissions trading, therefore, allowances would be overpriced, causing a reduction in the volume of trading and leading potential buyers to resort to reducing emissions domestically, which may be at a high cost, a monopsony arises where there is a single buyer that could lower the market price of allowances, *Ibid.*
[339] *Ibid.*
[340] Jean-Marc Burniaux, "How Important is Market Power in Achieving Kyoto? An Assessment Based on the Green Model," online: Organization for Economic Co-operation and Development <http://www. http://www.oecd.org/dataoecd/39/9/1923127.pdf>.

while other Annex 1 Parties would achieve more reductions domestically but at a higher cost.[341]

However, the risk of monopolistic power over the international emissions trading market by Russia and Ukraine is decreased by a number of factors. Most importantly is the fact that these are two separate Parties that may compete against each other in the supply of allowances, instead of forming a cartel.[342] Also the fact that Parties can use certified emission reduction units obtained from the CDM implies that there will be other suppliers of allowances other than Russia and Ukraine. However, the quantity of allowances that the CDM will produce is uncertain and there is also a fear of shifting the monopoly power to large developing countries such as China.[343] In addition to the above, excessive pricing due to monopoly power could drive buyers out of the market leading to lower revenues for the sellers, a factor that will provide an incentive for the sellers to keep the prices at a reasonable level.[344] Although monopoly power is a threat to the effectiveness of the international emissions trading system, it may also be countered by monopsony power (presence of a large buyer). As monopoly power pushes the prices up, monopsony power will push the prices down, causing the prices in the market to be closer to the competitive level.[345]

---

[341] *Ibid.*
[342] OECD, "Market Power", *supra* note 334.
[343] *Ibid.*
[344] *Ibid.*
[345] Also, as a dominant buyer lowers market prices in its interest, then other Parties will turn into buyers and hence the market power of the dominant buyer would be neutralized, *Ibid*; See Peter Bohm, "Determinants of the Benefits of International Carbon Emissions Trading: Theory and Experimental Evidence" in *Emissions Trading – Proceedings of the Conference on Greenhouse Gas Emissions Trading* (Sydney: May 21-22, 1998).

However, it has been observed that in the international emissions trading system, market power is more likely to come from sellers than buyers.[346]

An effective solution to the creation of monopolies and monopsonies under the international emissions trading system is the involvement of private entities in the trade, as opposed to governments of the Parties carrying out centralized trading.[347] Some Parties, however, may prefer to engage in the trade directly or may lack the institutional structure needed to organize and monitor the trade activities of the entities.[348]

Some Parties, in particular those with economies in transition may lack the foreign exchange needed in order to purchase allowances, a factor that may limit the volume of activity on the international emissions trading market.[349] However, this is not expected to be a huge problem because most of the countries with economies in transition are expected to be sellers rather than buyers as they already hold excess allowances and their level of economic activity is relatively low.[350]

2.8 Summary

The international emissions trading system is likely to contribute to the environmental success of the *Protocol* by providing an economic incentive for Parties to reduce emissions and by fostering innovation of energy efficient technology. It is also likely

---

[346] OECD, "Market Power", *supra* note 334.

[347] R.W Hahn , "Market Power and Transferable Property Rights" (1984) 99 Quarterly Journal of Economics 753; Also, where governments engage in the trade, transactions could be the result of bilateral bargaining where allowances may not be the only element of the transaction, a factor that may lead to the exclusion of other participants that are unable to fulfill the other conditions that the seller may require, OECD, "Market Power", *supra* note 334.

[348] *Ibid.*

[349] See Perry L. Patterson, "Capital Markets and Financial Issues in Economies in Transition" (1992) 74 American Journal of Agricultural Economics 1170.

[350] See OECD, "Joint Implementation and International Emissions Trading Under the Kyoto Protocol," online: International Energy Agency <http://www.iea.org/textbase/papers/1999/ji.pdf>.

to help the Parties in reducing the costs of meeting their targets because of the flexibility that it creates. However, the benefits and costs of the system may not be distributed among the participants in an equitable manner. It is to this question of equity that we now turn.

Section Three: International Emissions Trading and Equity

3.1 Introduction

Equity is the state, quality, or ideal of being just, impartial, and fair.[351] Equity in the environmental sense has received a lot of attention recently because of the disproportionately greater environmental damages suffered by disadvantaged groups.[352] It is relevant in the climate change context due to the fact that the latter's adverse effects are likely to impact the low-lying and small island countries and developing countries more than the developed countries.[353] Historically, greenhouse gas emissions from developing countries have been low, so these countries are only responsible for human-induced climate change to a very small extent.[354] Additionally, the developing countries do not have adequate resources to address the adverse effects of climate change and so their populations are likely to suffer heavily from effects such as floods and droughts.[355] On the other hand, it is the developed countries that are primarily responsible for human induced climate change and they also have the financial and technological capacity to respond to any adverse effects that may be caused by it.[356]

In a bid to address the existing inequities, the *Convention* and the *Protocol* set out to achieve a reduction of greenhouse gas emissions in a manner that is conducive to narrowing the per capita differences between the developed and developing

---

[351] *The American Heritage Dictionary of the English Language*, 4th ed., *s.v.* "equity".
[352] Mohan Munasinghe, "Analysing Ethics, Equity and Climate Change in the Sustainomics Trans-disciplinary Framework" in Pinguelli –Rosa, *supra* note 63 at 62 [Munasinghe, "Analyzing Ethics"].
[353] The *Convention, supra* note 3.
[354] *Ibid.* Preamble.
[355] Munasinghe, "Analyzing Ethics", *supra* note 352.
[356] The *Convention, supra* note 3.

countries.[357] Hence, these instruments apply equitable principles such as common but differentiated responsibilities and sustainable development.[358] The existence of equity in an international agreement is necessary in order to ensure that the Parties readily comply with the agreement's obligations.[359] In absence of an equitable agreement, compliance with the obligations may not be sustainable in the long run.[360]

Because equity is a founding principle of the *Convention* and the *Protocol*, it is recognized as an essential element of any legitimate climate change solution.[361] Yet it is worthwhile to observe that the *Protocol* has found its conceptual driver in the concern with economic efficiency and cost-effective global mitigation.[362] It is further argued that over time, climate change concerns have shifted from equity towards cost-effectiveness, with the result the equity concerns have increasingly become subordinate to efficiency concerns.[363] This explains why the flexibility mechanisms such as emissions trading occupy a central place in the *Protocol*.

The manner in which the international emissions trading system distributes its costs and benefits will either advance or hinder the achievement of equity within each Party's domestic setting and amongst the Parties.

---

[357] The *Protocol, supra* note 4; The *Accords, supra* note 6.
[358] The *Convention, supra* note 4, Article 3.
[359] Raùl A. Estrada-Oyuela, "Equity and Climate Change" in Pinguelli –Rosa, *supra* note 63 at 36. [Estrada, "Equity"].
[360] *Ibid.*
[361] Tariq Banuri & Erika Spanger-Siegfried, "Equity and the Clean Development Mechanism: Equity, Additionality, Supplementarity" in Pinguelli –Rosa, *supra* note 63 at 102 [Banuri, "Equity and CDM"].
[362] *Ibid.* at 108.
[363] *Ibid.* at 102.

3.2 Climate Change and Equity

Tol, Downing, Kuik and Smith[364] argue that climate change has always been seen as a problem of equity. They observe that by the 1980's when climate change was beginning to be recognized as a policy problem, it was clear where the problem originated (the carbon dioxide emissions of the rich) and where the effects would be felt hardest (the poor countries).[365] Therefore, some poor countries are vulnerable because they expect high climate change impacts and yet they have low adaptive capacity; for example, Bangladesh is exposed to sea level rise, cyclones and droughts.[366] Consequently, many inhabitants of vulnerable countries may no longer be able to sustain themselves from agriculture, their risks of suffering from diseases such as malaria and cholera will significantly increase and eventually they will be forced migrate and become environmental refugees.[367]

Other countries might anticipate relatively low climate change impacts but because they have a low adaptive capacity, the risks could end up being significant, for example Namibia has low exposure to sea level rise and storms but also low adaptive capacity.[368] On the other hand, countries such as the U.S. may expect to face significant impacts from climate change but they are not vulnerable to these impacts due to their great wealth and adaptive capacity.[369] Furthermore, countries such as Canada and Norway have a high adaptive capacity coupled with low expected

---

[364] Richard S.J. Tol et al., "Distributional Aspects of Climate Change Impacts" (2004) 14 Global Environmental Change 259 [Tol, "Distributional Aspects"].
[365] Research has not altered this notion, *Ibid*; *See* also The *Convention*, *supra* note 3, preamble.
[366] The poor may lack adequate food and water due to the drought and they will be more at risk from diseases such as malaria and cholera, Tol, "Distributional Aspects" *supra* note 364; Caney, "Cosmopolitan Justice", *supra* note 326.
[367] *Ibid.*
[368] Tol, "Distributional Aspects" *supra* note 364.
[369] *Ibid.*

impacts and, therefore, they will hardly suffer from the adverse impacts of climate change.[370]

Also climate change raises questions of equity in as far as the ill effects of the high emission levels of greenhouse gases of current generations will often be borne by future generations, and part of the problem facing current and future generations arises because of the policies of past generations.[371] Issues of equity also arise from the fact that principles and policies suggested to address climate change will impact adversely on some countries' economic entitlements, for example, economies that are highly dependent on the production and use of fossil fuels could suffer from a decline in the demand of these fuels.[372] Also, the fact that carbon absorption projects (removals by sinks) contribute to a Party's emission targets is an approach that does not offer the same benefits to all Parties.[373] It will be primarily beneficial to countries that have large areas where afforestation can be practiced, for example, New Zealand.[374]

3.3. The Concept of Emissions Trading and Equity

Many critics view the concept of emissions trading as unethical and inequitable. Ott and Sachs, [375] for example, relate emissions trading to the enclosure of communal forests that put in place property rights and denied access for the common people in 18th century Europe. Generally, the market is perceived as an instrument to achieve

---

[370] *Ibid.*
[371] Caney, "Cosmopolitan Justice", *supra* note 326.
[372] *Ibid*; *See* The *Convention, supra* note 3, preamble.
[373] Rachel Parr, "Equity and the New Zealand Government's Climate Change Domestic Policy Options Statement" (2000) 4 New Zealand Journal of Environmental Law 49 [Parr, "Equity"].
[374] *Ibid.* at 58.
[375] Herman E. Ott & Wolfgang Sachs, "Ethical Aspects of Emissions Trading," online: Wuppertal Institute for Climate, Environment and Energy < http://www.wupperinst.org/publikationen/wp/wp110.pdf>[(Ott, "Ethical Aspects"].

economic efficiency, and traditionally, efficiency and equity are regarded as separate objectives.[376] This raises concern as to whether an emissions trading system can be used to achieve equitable ends for disadvantaged groups. In any case, although policies to address climate change are not expected to address all the prevailing inequities, they should not be allowed to worsen these inequities.[377] A market mechanism, however, has the potential to worsen existing inequities between the wealthy and poor classes in society, as those that cannot afford a commodity are totally excluded from its consumption.[378]

Contrary to the above discussion, Roson and Bosello[379] argue that efficiency and distributive justice can both be obtained through market mechanisms, if there is perfect competition accompanied by the absence of market distortions of any kind. However, perfect competition does not exist outside of theoretical discussions, due to factors such as government regulation, lack of perfect knowledge, and market entry barriers.[380]

Additionally, Parr[381] argues that an emissions trading regime that allows trade in sink credits must also be seen as creating significant winners and losers. This is because it creates an opportunity for large emitters such as New Zealand, to increase their GDP through sale of sink credits.

---

[376] Roberto Roson & Francesco Bosello, "Carbon Emissions Trading and Equity in International Agreements," online: University of Crete< http://www.soc.uoc.gr/calendar/2000EAERE/papers/PDF/G3-Roson.pdf> [Roson, "Carbon Emissions"].
[377] Munasinghe, "Analyzing Ethics", *supra* note 352 at 84.
[378] Miguel Angel Centeno, "Isomorphic Neoliberalism and the Creation of Inevitability," online: Princeton University <http://www.princeton.edu/~cenmiga/wprks/SASE%20centeno.doc>.
[379] Roson, "Carbon Emissions", *supra* note 376.
[380] See Bruce Bartlett, "The Flawed Idea of Perfect Competition," online: National Center for Policy Analysis < http://www.ncpa.org/oped/bartlett/jun1699.html>; See Frank Hyneman Knight, *Risk, Uncertainty and Profit* (Chicago: Chicago University Press, 1971).
[381] Parr, "Equity", *supra* note 373 at 370.

In the next two sub-sections, key aspects of the *Protocol*'s regime (that is, allowance distribution and trade in CDM credits) are examined with equitable concerns in mind.

3.4 Allowance Distribution

The fact that Annex 1 Parties have acquired allowances that are marketable may increase the economic gap between these countries and the non-Annex 1 Parties. As discussed previously, countries with economies in transition stand to benefit highly from international emissions trading. Evans[382] reports that under the socialist economic systems of the past, energy users had few incentives to limit energy consumption because the State subsidized energy prices and most large energy users had no budget constraints, leading to high energy intensity. In addition, many of the low-cost opportunities for energy efficiency and other carbon mitigation strategies have yet to be tapped, a factor only limited by financing.[383] Since international emissions trading is a potential source of finance, it will greatly boost these economies.

On the other hand, non-Annex 1 Parties are not eligible to participate in the international emissions trading system because they do not have binding emission reduction commitments and, therefore, they do not have calculated assigned amounts. It has been observed, [384] however, that developing countries could benefit considerably from joining an international emissions trading system, as they could become potential collaborators in the post-Kyoto climate policy agreements. Because

---

[382] Meredydd Evans, "Emission Trading in Transition Economies: The Link Between International and Domestic Policy," online Pacific Northwest National Laboratory <http://www.pnl.gov/aisu/pubs/Emissiontrade.pdf >[Evans, " Transition Economies"].

[383] *Ibid.*

[384] Marian Leimbach, "Equity and Carbon Emissions Trading: A Model Analysis," online: Institute for Climate Impact Research< http://www.pik-potsdam.de/~leimbach/templates/equity_rev.pdf>.

developing countries do not have any allowances to sell, they are deprived of the capital that they would have obtained from the market.

The mode of emission allowance distribution under the *Protocol* may also increase the economic and social gap amongst Annex 1 Parties.[385] The allowances were distributed according to a country's historic emission levels, using 1990 as the base year.[386] The more emissions a Party had in the base year, the higher its assigned amount is, and clearly this is inequitable.[387] As a consequence, countries such as Iceland, Ukraine and Russia are in position to increase their emissions or to sell huge amounts of excess allowances.[388] On the other hand, some Annex 1 Parties may suffer economic decline because of low levels of economic activity that may result from restricting emissions, or the need to purchase allowances from other Parties. The fact that the international emissions trading system has the potential to increase the economic and social gap between the Annex 1 Parties does not serve the interests of equity.

Generally, distribution of allowances based on per capita emission levels is seen to be more equitable because it translates into equal emission allowances for each individual.[389] A 2001 IPCC report recommended a system that would ensure equal greenhouse gas emissions for each inhabitant of the planet.[390] Leimbach[391] observes, however, that allocation based on per capita is not the only method that can be

---

[385] The *Protocol, supra* note 4, Article 3.
[386] *Ibid.*
[387] UNEP, "Emissions Distribution," online: United Nations Environment Programme < http://climatechange.unep.net/jcm/doc/emit/distrib.html>[UNEP,"Emissions Distribution"]. See also The *Protocol,* supra note 4, Annex B.
[389] *Ibid.*
[390] Inter-Governmental Panel on Climate Change, "IPCC Third Assessment: Climate Change 2001" (Geneva, World Meteorological Organization, 2001).
[391] *Ibid.*

justified by equity concerns as it fails where different individual needs arise due to existing natural and cultural conditions. Furthermore, per capita emission allowances could result in the perpetuation of the current level of greenhouse gas emissions and consequently the continuity of present extravagant lifestyles.[392] Although a per capita mode of distribution does have disadvantages, it has the potential to be a more equitably justified mode of allowance distribution.

The mode of allocation that each Party follows in distributing allowances to its entities will also bridge or increase the economic gap amongst domestic populations.[393] If a Party chooses to issue allowances free of charge to existing entities, these entities may increase their wealth by utilizing the allowances in the production of commodities or by transforming them into finance on the emissions trading market. Additionally, the "grandfathered" entities may have a competitive advantage over firms abroad that produce similar goods. Woerdman[394] has argued that grandfathered firms or sectors do not have a cost advantage over identical auctioned firms or sectors abroad, as long as markets are perfectly competitive, because the auctioned firm can include the costs of using permits in the product price. However, since markets are not perfectly competitive, grandfathered entities will always have an advantage as they incur lower production costs than other entities that may have to purchase allowances.

---

[392] Maria Silvia Muylaert & Luiz Pinguelli Rosa, "Ethics, Equity and the Convention on Climate Change" in Luiz Pinguelli-Rosa, *supra* note 63 at 137.
[393] See UNEP,"Emissions Distribution", *supra* note 387.
[394] Edwin Woerdman, "Competitive Distortions in an International Emissions Trading Market" (2000) 5 Mitigation and Adaptation Strategies for Global Change 337; See Edwin Woerdman, *The Institutional Economics of Market-Based Climate Policy* (Amsterdam; Boston: Elsevier, 2004).

3.5 Equity and the Trade in CDM Credits

Article 12 of the *Protocol* establishes the CDM with the aim of facilitating the transfer of energy efficient technology to non-Annex 1 countries, while rewarding the Annex 1 countries involved with emission credits.[395] It is presumed that this will lead to distributional equity, efficiency and sustainability.[396] From CDM projects, Parties will acquire certified emission reduction units that can be used in the trading system. Loosely translated, the CDM is a form of emissions trading and, therefore, its equity implications are relevant to the present discussion.

The CDM places responsibility on the historic emitters of greenhouse gases and has been described as the only element of the *Protocol* that pertains directly to equity.[397] The mechanism does appear to be equitable in as far as it creates a form of burden sharing between Annex 1 and non-Annex 1 countries.[398]

However, questions are still raised as to how it will influence the rights to commons and its impacts on the poor and the vulnerable.[399] Concern is raised that non-Annex 1 Parties may find themselves burdened in the medium term with an inequitable proportion of the emission reductions.[400] This may arise from the fact that CDM projects will naturally concentrate on the relatively inexpensive abatement options commonly termed as the 'low hanging fruit', and hence force the non-Annex 1 Parties to undertake more expensive abatement efforts on their own.[401] More inequities may also be created by the fact that not all non-Annex 1 countries will reap the financial

---

[395] The *Protocol, supra* note 4, Article 12.
[396] Banuri, "Equity and CDM", *supra* note 361 at 115.
[397] *Ibid.* at 106
[398] *Ibid.* at 117.
[399] *Ibid.*
[400] *Ibid.* at 118.
[401] *Ibid.*

and technological benefits of CDM projects. Generally, preferential treatment may be accorded to a handful of large developing countries.[402] Ott and Sachs[403] observe that not too many Southern countries will be considered worthy of CDM investments because credits from such investments can be more easily reaped in newly industrializing countries that have already embarked upon a fossil – based energy path.

The present challenge is to design CDM projects that will enable all developing countries to attain significant cuts in emissions without endangering the prospects for equitable and sustainable development.[404] In absence of a fair distribution of projects amongst all developing countries, the CDM may backfire in terms of equity.[405]

From the above discussion, it is obvious that the costs and benefits arising from the international emissions trading system may not be equitably distributed. Furthermore, the international emissions trading system may not uphold the equitable principles on which the *Convention* and the *Protocol* are based.

3.6 Implications of International Emissions Trading on the Equitable Principles of the *Convention* and the *Protocol*

3.6.1 Common but Differentiated Responsibilities

An issue that arises from the existence of an international emissions trading system is whether such a system upholds the common responsibility to protect the environment. Mickelson and Rees[406] argue that from an ecological perspective, our confidence in

---

[402] *Ibid.* at 119.
[403] Ott , "Ethical Aspects", *supra* note 375 at 20.
[404] Banuri, "Equity and CDM", *supra* note 361 at 103.
[405] Ott , "Ethical Aspects", *supra* note 375.
[406] Karin Mickelson & William Rees, "The Environment: Ecological and Ethical Dimensions" in Elaine Hughes, A.R Lucas & W.A. Tilleman eds., *Environmental Law and Policy,* 2ed. (Toronto: Emond Montgomery Publications, 1998) 1.

markets and technological innovation to solve the ecological crisis is misplaced. In the short run, the international emissions trading system has the potential to lead to an overall increase in global greenhouse gas emissions. This fear will materialize if countries that hold emission allowances in excess of their present emission capacity (such as Ukraine and Russia) sell these allowances to countries that will actually emit on the basis of these allowances. For example, because there are no restrictions on trading, carbon dioxide emissions in Canada may increase above 1990 levels although this will not cause it to be in breach of the *Protocol*.[407] Therefore, in the short-term, international emissions trading could lead to a breach of the common responsibility to protect the environment.

Following the equitable notion of differentiated responsibilities, developed countries are obliged to provide leadership in the fight against climate change. It is also acknowledged that the extent to which developing country Parties will implement their commitments under the *Convention* will depend on the effective implementation by developed country Parties of their commitments related to financial resources and transfer of technology.[408] However, the flexibility that arises from emissions trading could relieve the most industrialized Parties from the pressure to initiate structural changes in their economies towards long-term technical and societal innovation, a factor that would undermine the notion of differentiated responsibilities and the leadership principle.[409] For example, Parr[410] notes that northern industrialized countries may tend to focus on the enhancement of sinks, the bulk of which are in the

[407] Ott, "Ethical Aspects", *supra* note 375.
[408] *Ibid.* at 19.
[409] *Ibid.*
[410] Parr, "Equity", *supra* note 373.

developing south, rather than on the reduction of greenhouse gas sources, the bulk of which are in the north. Generally, if the largest greenhouse gas emitting countries do not spearhead innovation into energy efficient technology, progress towards reducing global emissions will be limited.

3.6.2 Sustainable Development

The *Convention* calls on the Parties to promote an open international economic system that would lead to sustainable economic development in all Parties, particularly the developing country Parties.[411] The components of sustainable development include intergenerational equity and intra generational equity, and they require conservation of the quality of the environment and access to it by all members of the present and future generations.[412] International emissions trading promotes sustainable development in as far as it has the potential to occasion a reduction in global greenhouse gas emissions. This is due to the fact that sustainable development requires conservation of the quality of the environment, a factor that will be promoted by a reduction in greenhouse gas emissions.

Ideally, emissions trading does foster innovation and if this materializes, then future generations will have more technological options to enable them solve their problems.[413] However, the existing fear is that the large emitting countries will engage in purchasing of allowances at the expense of investing in the development of new technologies.[414]

---

[411] The *Convention, supra* note 3, Article 3(5).
[412] See Section one for a discussion of the concept of sustainable development.
[413] Harrington, "Economic Incentives", *supra* note 166.
[414] See Sharon Boddy, "Pros and Cons of Carbon Trading," online: The Peace and Environment Resource Centre < http://www.perc.ca/PEN/2004-07-08/s-boddy.html>.

In addition, international emissions trading may not be not compatible with the concept of intergenerational equity in as far as the concept requires equitable rights of access to the legacy of the past generations. This is due to the fact that under emissions trading, rights to emit are held by a selected group. Consequently, emissions trading has been criticized as tantamount to the privatization of the atmosphere.[415]

Another element of sustainable development is the polluter pays principle. This principle requires that a polluter should be made to pay for any environmental damage that is occasioned.[416] Under emissions trading, the polluter does pay, although in financial terms. The intention of the polluter pays principle, however, is to cause the actual polluter to occasion less pollution by attaching a cost to the pollution. Although emissions trading does ensure that the total emissions do not exceed a given cap, it fails to ensure that a given polluter ceases or significantly reduces the polluting activity. Hopefully, this will change in the *Protocol*'s future commitment periods as the targets are increased and the cap reduced.[417]

3.7 Summary

Generally, the priority of emissions trading as a market mechanism is achieving cost-effectiveness and, therefore, equity will always be secondary. It is likely that the costs and benefits will not be equitably distributed amongst the participants. Additionally, international emissions trading may lead to a breach of the principles of common but

---

[415] Anne Petermann & Orin Langelle, "UN Global Warming Convention Meets U.S Resistance While Activists Criticize Carbon Trading As Privatization of the Atmosphere," online: Global Justice Ecology Project < http://www.globaljusticeecology.org/index.php?name=getrees&ID=311>.

[416] See Organization for Economic Co-operation and Development, *The Polluter Pays Principle: Definition, Analysis, Implementation* (Paris: OECD, 1975).

[417] Negotiations are underway for targets for the *Protocol*'s second commitment period (2013-2017) and the EU has suggested a 15-30% reduction in emissions from 1990 levels, *Montreal Report, supra* note 123.

differentiated responsibilities and sustainable development. If equity concerns are ignored, many people (especially in developing countries) will suffer from the adverse effects of climate change, while a few entities (mainly in developed countries) will benefit from the measures aimed at addressing climate change.[418] The next section, therefore, contains proposals for integrating equity concerns into the climate change legal regime and the domestic and international emissions trading systems.

[418] See Caney, "Cosmopolitan Justice", *supra* note 326.

Section Four: The Way Forward: Integrating Equity Concerns into International Emissions Trading

4.1 Introduction

In order for the ambitious goals enumerated by the Parties to be achieved, equity concerns must be confronted and surmounted, and if this challenge is met, there is no telling how far the riches of market based environmental regulation could extend.[419] This section, therefore, contains proposals that will better ensure that equity is upheld within the climate change regime and more specifically, within the domestic and international emissions trading systems. The section proposes that the *Convention* and the *Protocol* should oblige the Parties to give national courts jurisdiction, and individuals and organizations access and standing in national courts to pursue the rights and duties that these instruments create. This will prompt the developed countries to fulfill their obligations (for example, transfer of financial and technological resources), a factor that will lessen inequities between these countries and the developing countries.[420]

This section argues that addressing the inequities that may arise from the operation of the CDM will require a fair distribution of projects amongst all developing country Parties and, therefore, the funding mechanisms of the *Convention* and the *Protocol* need to be reformed so as cater for the Parties that may be left out. It also advocates for the creation of an emissions trading fund that will help the Parties with economies in transition and later on the developing country Parties to establish sound domestic

---

[419] Tanya L. Forsheit, "International Emissions Trading: Equity Issues in the Search for Market-Based Solutions to Global Environmental Degradation" (1997) 18 U. Pa. J. Int'l Econ. L. 689 at 693.
[420] The *Convention, supra* note 3, Article 4 (3) & 4 (5) lay out the financial and technological obligations of the developed country Parties; See also Lakshman Guruswamy, *International Environmental Law in a Nutshell* (St. Paul, MN: Thomson/West, 2003).

emissions trading systems so that they can compete favorably on the international market. It proposes the introduction of a tax on emissions trading transactions to be a source of finance for the emissions trading fund.

The section also advocates for use of auctioning as the primary method of allocation of allowances by Parties to their local entities so as to ensure that there is equity within the domestic emissions trading systems. It also recommends the introduction of quantitative limits on the extent to which a Party can rely on international emissions trading to meet its targets and the amount of CDM credits that are allowed to enter the system, as this will be necessary to ensure that the developed country Parties spearhead the search for long-term solutions to climate change as envisaged under the *Convention* and the *Protocol.*[421]

4.2 Enforcing Compliance with Treaty Obligations as a Means of Promoting Equity

In order to promote equity in the climate change regime, it is essential that the developed country Parties fulfill their obligations under the *Convention* and the *Protocol.*[422] If these Parties meet their obligations, they will be moving a step closer to eliminating the inequities that may be caused by climate change.[423] Generally, treaties depend on the goodwill of the Parties to comply with their obligations, as the implementation of these obligations is hampered by the fact that the vertical command and control power structure governing domestic politics is absent within

---

[421] The *Convention, supra note 3 and* the *Protocol, supra* note 4.

[422] These obligations include collectively reducing emissions by at least 5% below 1990 levels in the commitment period 2008 to 2012 and providing financial and technological resources to enable developing country Parties to mitigate and adapt to climate change, The *Protocol, supra* note 4, Article 3 (1) and The *Convention, supra* note 3, Articles 4 (2) (a) & (b), 4 (3) & (4).

[423] Guruswamy, *supra* note 420 at 550, however is of the view that most countries that have ratified the *Protocol* will not be able to meet their obligations.

the international legal order.[424] Therefore, it is necessary that rules of international law should possess an internal force or dynamic that makes sense to the Parties and invokes an attitude of compliance rather than non-compliance.[425] Under the *Convention* and the *Protocol*, the recognition of the fact that the developed countries are largely responsible for the problem of climate change and that it is the developing countries that will be most adversely affected, may promote an attitude of compliance.[426]

Also, treaties create institutions and techniques that induce compliance and confer power on appropriate authorities to deal with non-compliance.[427] The *Protocol*'s compliance mechanism is designed to strengthen its environmental integrity, support the carbon markets' integrity and ensure transparency of accounting by the Parties.[428] As discussed previously, it is comprised of a Compliance Committee, which has a Facilitative and an Enforcement Branch.[429] The role of the Facilitative Branch is to provide advice and facilitation (which may be financial or technical assistance) to the Parties in implementing the *Protocol*.[430] This Branch is responsible for addressing questions relating to the implementation of mitigation measures and the extent to which the flexibility mechanisms are supplemental to domestic action.[431] It is also responsible for providing "early warning" to potential non-compliance with the

---

[424] Lakshman Guruswamy & Brent Hendricks, *International Environmental Law in a Nutshell* (St. Paul, MN: West Publishing Co, 1997) at 39.
[425] *Ibid.* at 48.
[426] The *Convention, supra* note 3, preamble.
[427] Guruswamy, *supra* note 420 at 49.
[428] UNFCCC Secretariat, "Compliance Under the Kyoto Protocol", online: United Nations Framework Convention on Climate Change http://unfccc.int/Kyoto_protocol/compliance/items/2875.php[UNFCCC, "Compliance"].
[429] The Accords, *supra* note 6.
[430] *Ibid;* UNFCCC, "Compliance", *supra* note 428.
[431] *Ibid.*

targets and reporting requirements.[432] The Enforcement Branch is the judicial forum of the *Protocol* charged with determining whether the Parties have met their targets, complied with monitoring and reporting requirements, and met the eligibility tests for participating in the mechanisms.[433] It also determines the consequences of non-compliance.[434]

Each of the Branches is composed of 10 members who represent each of the five UN regional groups, with two additional members from Annex 1 and two from non-Annex 1 Parties.[435] The diversity of members of these Branches is intended to ensure that the Parties from all regions are accorded impartial treatment. Voting is by consensus or if consensus cannot be obtained then a three-fourths majority vote is required.[436] Additionally, decisions of the Enforcement Branch require a majority vote of both Annex 1 and non-Annex 1 Parties.[437]

A Party that wishes to submit a matter to the Enforcement Branch is required to do so by delivering to the Branch a written submission requesting a public hearing.[438] After evaluating the submission, the Branch will make a decision as to whether to proceed with the matter.[439] In case the Branch decides to proceed with the matter, the Party will be given ten weeks in which to make a further submission and the Branch will

---

[432] *Ibid.*
[433] The *Accords, supra* note 6; See Donald Goldberg & Katherine Silverthorne, "The Marrakesh Accords" Sustainable Development, Ecosystems, and Climate Change Committee Newsletter (2002) vol.5, No.2.
[434] See UNFCCC, "Compliance", *supra* note 428; The *Accords, supra* note 6.
[435] The 5 UN regional groups are the African Group, The Asian Group, The Latin American and Caribbean Group, The Eastern Europe Group, and the Western Europe Group and Others (for example Canada and the U.S.), See UNFCCC Secretariat, "Party Groupings," online United Nations Framework Convention on Climate Change <http://unfccc.int/parties_and_observers/parties/negotiating_groups/items/2714.php>.
[436] The *Accords, supra* note 6.
[437] *Ibid.*
[438] *Ibid.*
[439] *Ibid.*

make a final decision based on the submission.[440] The Enforcement Branch may penalize a Party found to be in breach by ordering it to prepare a detailed plan explaining how it will meet its target for the subsequent period, deducting from its assigned amount for the subsequent period and barring the Party from participating in the trading system until the breach is rectified.[441]

As a general rule, decisions of the two Branches cannot be appealed. The exception is the ability to appeal a decision of the Enforcement Branch relating to emissions targets if a Party believes that it was denied due process.[442] Such an appeal is made to the COP, where the decision can be overturned by a three-fourths majority vote.[443] It has been observed, however, that there will be no predictability of outcome of the decision of the COP as this will be highly influenced by politics.[444]

In addition to the above, judicial remedies are an important aspect of a treaty's compliance regime, as Guruswamy and Hendricks[445] observe that judicial remedies can be used to obtain specific acts of compliance and can act as deterrents by bringing embarrassment and public contempt to bear on wrongdoing states. They further note that in a community where good standing and reputation are important, judicial remedies have some use even though they lack mechanisms for enforcement.[446] Judicial remedies, however, may be limited due to the fact that international courts may not have jurisdiction over all matters, for example the *Convention* makes it

---

[440] *Ibid.*
[441] *Ibid.*
[442] UNFCCC, "Compliance", *supra* note 485.
[443] *Ibid; The Accords, supra* note 6.
[444] Dane Ratliff, "Dispute Resolution in Flexible Mechanism Contracts," online: International Emissions Trading Association <http://www.ieta.org/ieta/www/pages/getfile.php?docID=283>.
[445] Guruswamy & Hendricks, *supra* note 424 at 54.
[446] *Ibid.* at 55.

optional for Parties to submit disputes to the International Court of Justice.[447] Additionally, States do not usually sue other States for breaches of treaty obligations except where strained political relationships exist.[448] Therefore, in order to increase the effectiveness of judicial mechanisms in fostering compliance, it is necessary that the *Convention* and the *Protocol* oblige the Parties to give national courts jurisdiction and individuals and public interest groups access and standing in national courts to pursue the rights and duties that they create.[449] In support of the above recommendation, Guruswamy[450] argues that environmental litigation in national courts is proliferating and it makes sense to use national courts to advance international remedies.

Environmental litigation has played a key role in compelling governments to comply with their environmental obligations under domestic laws.[451] It has also served as a forum for public education and the expression of opinion on controversial matters.[452] For example, in *Canadian Wildlife Federation Inc v Minister of the Environment*,[453] the court ordered the Minister to conduct an environment impact assessment before granting a license for construction of dams on the Souris River as was required under

---

[447] The *Convention, supra* note 3, Article 14 (2).
[448] Guruswamy, *supra* note 420 at 546.
[449] For example, *Agenda 21* recommends that non-governmental organizations should be given the opportunity of vindicating treaty rights in national forums, *Agenda 21, supra* note 38, chapter 27.
[450] Treaties that allow private individuals to prosecute claims for breaches in national courts include the *Convention on Third Party Liability in the Field of Nuclear Energy* 29 July 1960, 956 U.N.T.S 251 (entered into force 1 April 1968) and The *International Convention on Civil Liability for Oil Pollution Damage* (29 November 1969), 9 I.L.M 45 (entered into force 19 June 1975).
[451] See Plater J.B Zugmunt, "Dealing With the Dumb and Dumber: The Continuing Mission of Citizen Environmentalism" (2005) J. Envtl. L. & Litig. 9; See Elizabeth J. Swanson & Elaine L. Hughes, *The Price of Pollution: Environmental Litigation in Canada* (Edmonton: Environmental Law Centre, 1990).
[452] *Ibid.* at 104.
[453] (1989) 3 C.E.L.R. (N.S) 287 (F.C.T.D).

the *Environmental Assessment Review Process Guidelines.*[454] Similarly, in *Friends of the Oldman River Society v Minister of Transport,* the Federal Court of Appeal[455] ordered the Minister to comply with the *Environment Review Process Guidelines.* Ormond[456] has noted that countries such as Iceland, Spain and Greece have liberal standing rules that permit virtually any citizen to bring an action intended to promote environmental protection. In the UK, the courts are moving away from the narrow and technical rules towards a more flexible rule that recognizes a right to initiate proceedings if a party is directly affected and discretion to do so when the individual is a member of the public.[457] Other countries such as France, Netherlands, Denmark, Italy, Portugal, Luxembourg, and Belgium have introduced specific legislation on the right of environmental NGO's to avail themselves of administrative and judicial remedies.[458]

However, the effectiveness of environmental litigation is still limited by a number of factors. Firstly, restrictive standing laws may prevent individuals and public interest groups from commencing or succeeding in lawsuits.[459] For example, in *Lujan v Defenders of Wildlife*[460], the plaintiffs brought a suit to prevent the U.S. federal government from engaging in actions that would cause damage to endangered species

---

[454] *Federal Environment Assessment Review Process Guidelines Order*, SOR/84-467.
[455] (1989), 4 C.E.L.R. (N.S). 137, rev'g [1990] A-395-89(F.C.A.D), leave to appeal to S.C.C granted, [1990] A21890 (S.C.C.).
[456] Thomas Ormond, ""Access to Justice" for Environmental NGOs in the European Union" in Sven Deimann & Bernard Dyssli eds., *Environmental Rights: Law, Litigation & Access to Justice* (London: Cameron May, 1995) 71 at 73 [Ormond, "Access"].
[457] Jona Razzaque, *Public Interest Environmental Litigation in India, Pakistan and Bangladesh* (The Hague: Kluwer Law International, 2004) at 273.
[458] Ormond, "Access", supra note 456.
[459] Elizabeth Swanson & Elaine L. Hughes, *The Price of Pollution: Environmental Litigation in Canada* (Edmonton: Environmental Law Centre, 1990) at 116;Paul Stein, "Citizen Rights and Litigation in Environmental Law: An Antipodean Perspective on Environmental Rights" in Sven Deimann & Bernard Dyssli eds., *Environmental Rights: Law, Litigation & Access to Justice* (London: Cameron May, 1995) 271 [Stein, "citizen Rights"]
[460] 504 US 555; 112 S. Ct. 2130; 119 L.Ed 2d 351(1992).

in Egypt and Sri Lanka. However, the court held that "it would be pure speculation to say that anyone who observes or works with an endangered species anywhere in the world, is appreciably harmed by a single project affecting some portion of species with which he has not had more specific connection."[461]

Hence, Stein[462] has observed that the reluctance of legislators to recognize the contribution of environmental groups to the protection of the environment by giving them standing is difficult to justify and that it seems to be a pretext used by governments to paralyze legal action by NGO's rather than a measure intended to repress abuse of the judicial forum. Also, the high costs and length of litigation hinder potential litigants from commencing suits against government or any other party that is in breach of environmental laws.[463]

In addition to the above constraints, individuals and public interest litigation groups may lack sufficient information to put them on the same ground as government officials, a factor that makes it hard for them to prove their case.[464] It is also worth noting that even where litigation is successful, there is no guarantee that the relief obtained will have the desired effect.[465] However, it has been observed[466] that the willingness of public interest groups to pursue legal action in spite of all the obstacles is indicative of the level of concern and commitment to the protection and conservation of the environment. Therefore, the climate change legal regime stands to benefit by ensuring that national courts are given jurisdiction, and individuals and

---

[461] *Ibid.*
[462] Stein, "Citizen Rights", supra note 459 at 154.
[463] Swanson *supra* note 459 at 104; See Ormond, "Access" *supra* note 456 at 73.
[464] Sara Pirk, "Expanding Public Participation in Environmental Justice: Methods, Legislation, Litigation and Beyond" (2002) 17 J. Envtl. L. & Litig. 207 at 210.
[465] Swanson *supra* note 459 at 117.
[466] *Ibid.* at 105.

public interest groups given standing to enforce the duties that the *Convention* and the *Protocol* create. Such a drastic measure is justified by the magnitude of harm that climate change poses. The effects of climate change are predicted not only to be primarily adverse but are also irreversible.[467] Furthermore, the countries that are largely responsible for this problem are not vulnerable to these effects, yet the reverse is true. Developed country Parties are in position to mitigate climate change and help the developing countries to adapt to it if they fulfill their obligations under the *Convention* and the *Protocol,* although the issue of costs is still a major concern.[468] The *Protocol* has attempted to alleviate this concern through its flexibility mechanisms, which many Parties are making use of.[469] For example, the David Suzuki Foundation[470] has reported that EU nations such as Denmark, Spain, Portugal, Italy, and Ireland have allocated funds for the purchase of international credits and that Japan has set up a $141.5 million fund to engage in the international carbon market. Therefore, Parties that are willfully neglecting to implement policies and programs to enable them fulfill their commitments lack ample justification for doing so. For example, Canada is not on course to meet its commitments, and it has indicated that its *Protocol* target is unrealistic and unattainable.[471] In such cases, granting national courts jurisdiction and giving individuals standing to enforce the treaty obligations would be effective in enforcing compliance. However, this proposal

---

[467] See Jim Lobe, "Damage from Warming Becoming Irreversible," online: University of California, Berkeley< http://www.learning.berkeley.edu/cipolat/PDF/ISF60/Articles/IrreversibleDamage.pdf>; See also UNFCCC, "Heat" *supra* note 1.
[468] See sub-section 2.1.
[469] David Suzuki Foundation, "Who's Meeting their Kyoto Targets?" online: Climate Action Network Canada <http://www.climateactionnetwork.ca/e/cop-12/kyoto-targets-dsf-2006.pdf>.
[470] *Ibid.*
[471] See Environment News Service, "Canada's Government Cold Shoulders Climate Change Action," online: Environment News Service <http://www.ens-newswire.com/ens/apr2006/2006-04-04-01.asp>.

may not be attractive to the Parties because they may not be comfortable with the fact that national courts have the capacity to force them to comply with their treaty obligations. Therefore, although the proposal would greatly facilitate compliance with the treaty obligations, it is unlikely that the Parties will adopt it.

4.3 Reforming the Funding Mechanisms Under the *Convention* and the *Protocol*.

The *Convention* and the *Protocol* have various Funds that generally aim at facilitating developing country Parties to deal with the effects of climate change.[472] These are the Special Climate Change Fund, the Adaptation Fund and the Least Developed Countries Fund. It is hoped that the provision of funds to developing countries will help to bridge the economic and social gap that exists between these countries and the developed countries. However, as we shall see, none of these financial mechanisms is specifically tailored to address the imbalances and inequities that may arise directly from international emissions trading and the operation of the CDM. There is a need, therefore, to broaden the objectives of these funding mechanisms so as to effectively encompass all equity concerns.

The Adaptation Fund and the Least Developed Countries Fund have very narrow and specialized objectives. The Adaptation Fund's mandate is to finance concrete adaptation projects and programs in developing country Parties.[473] Such projects aim at increasing resilience of vulnerable countries, sectors and communities to the adverse impacts of climate change.[474] The Least Developed Countries Fund was created to support its beneficiaries in the implementation of national adaptation

---

[472] The *Accords*, *supra* note 6.
[473] *Ibid.*
[474] Global Environment Facility, "Climate Change," online: Global Environment Facility <http://www.gefweb.org/projects/Focal_Areas/climate/climate.html> [GEF, "Climate Change"].

programs.[475] It will also support projects that aim at reducing or avoiding greenhouse gas emissions in the areas of renewable energy, energy efficiency, and sustainable transport.[476]

The SCCF has broader and more flexible objectives than the above-mentioned Funds. Its major objective is to provide finance for activities, programs and measures relating to climate change in the areas of adaptation, technological transfer, energy, the transport industry, agriculture, forestry, and waste management; as well as activities to assist developing countries whose economies are highly dependant on income generated from fossil fuels in diversifying their economies.[477] The adaptation activities to be supported cover the areas of water resources management, agriculture, health, infrastructure development, fragile ecosystems, and integrated coastal zone management.[478] Additionally, the Fund is to be used to improve disease control and prevention through improved monitoring of diseases and vectors affected by climate change and related forecasting and early warning systems.[479] It is also to be utilized to support capacity building for preventive measures, planning, preparedness and management of disasters relating to climate change, including contingency planning, in particular for droughts and floods in areas prone to extreme weather events.[480]

---

[475] UNFCCC Secretariat, "Issues in the Negotiating Process: Funding Under the Convention and the Kyoto Protocol," online: United Nations Framework Convention on Climate Change <http://unfccc.int/coopertaion_and_support/financial_mechanism/special_climate_change_fund/items/3657.php> [UNFCCC, "Issues"]; The Least Developed Countries are the 49 poorest countries in the world and are mainly located in Sub-Saharan Africa, Asia and the Islands, See the *Convention*, *supra* note 4, Article 4 (9).

[476] GEF, "Climate Change", *supra* note 474.

[477] *Conference of the Parties, Report on the Second Part of its Sixth Session*, UNFCCC, 2001, FCCC/CP/2001/5; See also *The Accords*, *supra* note 6.

[478] Suraje Dessai, "The Special Climate Change Fund: Origins and Prioritization Assessment," online: Tyndall Centre for Climate Change Research and School of Environmental Sciences <http:www.tyndall.ac.uk/publications/briefing_notes/note05.shtml>[Dessai, " Special Climate Fund"].

[479] Conference of the Parties, *Report on its ninth session,* UNFCCC, 2003, FCCC/CP/2003.

[480] *Ibid.*

In addition to facilitating technological transfer, the SCCF also aims at facilitating technological innovation.[481] The intention of this provision is to foster the transfer of modern energy efficient technology that will not escalate the problem of climate change. However, facilitating technological innovation will be very costly to the Fund, and it may compromise the achievement of its other objectives since only meager resources will be left for implementing these objectives. Additionally, since most of this technological innovation occurs in the developed countries, most of the funds could end up being be channeled to these countries, a factor that may aggravate the existing inequities and imbalances.

The objectives of this Fund could be broadened to include the creation of projects similar to CDM projects in countries that may not benefit from the latter. This is necessary so as to minimize the creation of inequities by virtue of the fact that not all developing country Parties will be beneficiaries of CDM projects.[482]

In order for all the Funds to effectively achieve the equitable objectives, their sources of finance need to be expanded. Presently, the Funds primarily rely on donations from developed country Parties. The *Convention* obliges the developed country Parties to provide financial assistance to developing countries in order to enable them to address climate change and adapt to its adverse effects.[483] The former are further obliged to assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation to these effects.[484] The *Accords* also urge the developed country Parties to provide funding to the developing

[481] UNFCCC, "Issues", *supra* note 475.
[482] Banuri, "Equity and CDM" *supra* note 361 at 123.
[483] The *Convention, supra* note 3, Article 4 (3).
[484] *Ibid.* Article 4 (4).

countries through these Funds.[485] Flowing from the above obligations, developed country Parties are the primary source of finance for these funds. For example, the European Community and its member States, Canada, Iceland, New Zealand, Norway, and Switzerland pledged to collectively contribute US $410 million annually to the Funds by 2005, with this level to be reviewed in 2008.[486] Despite the contributions of the donor countries, there is need for more financing in order to achieve the equitable objectives of the Funds. Dessai[487] has noted that there does not appear to be incentive for donor countries to contribute money to the Funds, which then finance mitigation projects for which the donors cannot get credit (as opposed to CDM projects where donors earn credits). The COP has recognized that there is need for new and additional funding to contributions that have been allocated to the Funding mechanisms.[488] One proposal for raising additional funds is the auctioning of allowances instead of their free distribution.[489]

The Adaptation Fund is also to be financed from a share of the proceeds of the CDM and 'other sources'.[490] However, if countries do not realize any proceeds from the CDM or if such proceeds are meager, then the objectives of this Fund will not be effectively fulfilled. Furthermore, it is not clear what proportion of the proceeds of the CDM are to go into fund as the *Accords* only require a 'share' of these proceeds. Countries may use this ambiguity to contribute meager amounts to the Fund. However, in a bid to avoid these problems, the *Accords* appeal to the State Parties to

---

[485] The *Accords*, *supra* note 6.
[486] *Ibid.*
[487] Dessai, "Special Climate Fund", *supra* note 478.
[488] The *Accords*, *supra* note 6.
[489] See the proposal for auctioning of allowances, section 4.4.
[490] UNFCCC, "Issues", *supra* note 475.

provide funding which will be additional to the share of the proceeds on the CDM project activities.[491] Although the *Accords* list 'other sources' as a means of financing the Adaptation Fund,[492] these 'other sources' are not explained. Therefore, there remains a need for greater and more certain sources of funding.

In order for the Funds to be effective in promoting equity, there is also a need to create reforms in their administration. These Funds are administered by the GEF that operates them under the guidance of the COP.[493] The GEF is mandated to provide financial support that is needed for developing country Parties and Parties with economies in transition to adapt to climate change and to mitigate its adverse effects.[494]

The fact that there is one central administration of the Funds helps to reduce administration costs and limits unnecessary duplication of objectives.[495] However, since the GEF's funds are disbursed through its implementing agencies (the World Bank, the United Nations Development Program and the United Nations Environment Program), competition among these agencies still leads to a waste of resources.[496]

---

[491] The *Accords, supra* note 6.
[492] *Ibid.*
[493] *Ibid.*
[494] More specifically, the mandate of the GEF is to avail funds for the implementation of national adaptation programs in order to reduce the vulnerability of countries to climate-related natural disasters, establish pilot or demonstration projects to show how adaptation planning and assessment can be practically translated into projects that will produce real benefits, establish national, sub-regional or regional databases on climate change with the aim of improving climate change related data collection and the analysis, interpretation and dissemination of the data to national policy makers and other end-users. The Facility is also charged with the duty of undertaking more in-depth public awareness and education activities and community involvement and participation in climate change issues and establishing or strengthening early warning systems for extreme weather events.[494] In the course of discharging its duties, the Facility is required to promote consistency of its activities with national priorities and to integrate them into national planning frameworks such as national sustainable development strategies and poverty reduction strategies; *See* The *Accords, supra* note 6.
[495] GEF, "Climate Change", *supra* note 474.
[496] Saleemul Huq, "Climate Funding for Developing Countries," online: Climate Research Institute University of East Anglia <http://www.cru.uea.ac.uk/tiempo/floor0/archive/issue4445/t4445a2.htm> [Huq, "Climate Funding"].

Furthermore, the GEF's role in disbursing funds to developing countries is subject to a lot of criticism.[497] This is due to the existence of bureaucratic procedures within the organization, which lead to long periods between project approval and disbursement of funds. Huq[498] has suggested that the GEF's operations can be improved by considering individual projects for funding on a case- by-case basis and by allowing countries to set their own priorities.

Another idea is the creation of an emissions trading fund that will have the objective of facilitating countries with economies in transition and later on developing country Parties to establish sound domestic emissions trading systems. Although provision of assistance to these countries would be contrary to the idea of a free market, it is justified by the need to promote equity in the international emissions trading system. Presently, the priorities of these countries lie in areas such as economic growth, poverty and disease eradication and education.[499] Therefore, they do not have ample resources to devote to the development of emissions trading systems. On the other hand, if these countries are offered assistance in establishing sound emissions trading systems, they will be able to compete favorably with the developed country Parties, and this will result in a more equitable distribution of the costs and benefits of international emissions trading. This Fund could offer aid in areas such as the establishment of national registries and monitoring and verification systems. Proceeds of the Fund can also be used to address any imbalances that may arise from the

[497] Dessai, "Special Climate Fund", *supra* note 478.

[498] It has been suggested that the decision of the seventh Conference of the Parties at Marrakesh allowing Least Developed Countries to carry out their national adaptation plans is tacit support to this approach, Huq, "Climate Funding", *supra* note 496.

[499] See Yvette Delph, "Health Priorities in Developing Countries" (1993) 21 Journal of Law and Medicine 16; See also Beatrice Chaytor & Mathias Wolkewitz, "Participation and Priorities; An Assessment of Developing Country Concerns in the Trade/ Environment Interface" (1997) Review of European and International Environmental Law 157.

trading system.

Although presently developing country Parties have no binding targets and, therefore, they are not eligible to participate in the international emissions trading system,[500] having domestic emissions trading systems in existence has a lot of advantages. When these countries get binding commitments, they will easily fit into the international emissions trading system as they will already possess the necessary structures. This may lead to a fairer distribution of the benefits and costs of the trade between the developing and developed countries. Moreover, if the developing country Parties have binding commitments under the *Protocol* and yet they have no features in place to enable them to quickly participate in the trade, they will miss out on the cost-effectiveness benefit that comes with international emissions trading. Although establishing domestic emissions trading systems may not be a priority for developing countries at the moment, it will become a necessity when they get binding commitments under the *Protocol.*

The international emissions trading system could be directly harnessed as a source of finance for the emissions trading fund. One possibility is the introduction of a tax to be paid by all entities that are issued allowances under emissions trading systems. Domestic entities could pay this tax to their governments, which in turn remit the proceeds to the Fund. The introduction of a transaction tax under the emissions trading system will have several advantages. Firstly, it will serve as a predictable and adequate source of finance for the emissions trading fund. Generally, taxes have been used generate revenue to improve environmental quality by cleaning up contaminated ecosystems and investing in the development of environmentally friendly technology

[500] The *Protocol*, *supra* note 4.

and to redistribute income. [501] The transaction tax will also promote equity by ensuring that the entities that are directly benefiting from the allowances and the emissions trade also make a substantial contribution towards eliminating the resulting imbalances and inequities. The tax may also serve as an incentive for polluters to change their behavior and shift production to goods that are less energy intensive. [502] Therefore, the tax will prompt entities to invest in the innovation and development of eco-friendly products and technologies.[503] This will not only promote the domestic reduction in emissions in the Parties, but it will also ensure that there is a long-term solution to the problem of greenhouse gas emissions.[504] Generally, taxation is also advantageous as the costs of imposing and enforcing the tax are low for the regulatory authority because management decisions are in the hands of the polluter.[505]

However, entities will probably pass this tax on to consumers in form of higher prices for products and services.[506] This may be an advantage in as far as it will discourage consumers to use the products and services whose production is not environmentally friendly. However, the tax may be unfair especially to the low-income consumers and households that usually spend proportionately more of their income on affected

---

[501] Nancy Olewiler, "The Case for Pollution Taxes" in Allan Greenbaum, Alex Wellington & Ron Pushchak eds., *Environmental Law in Social Context: A Canadian Perspective* (Concord, Ont: Captus Press Inc, 2002) at 182 [Olewiler, "Pollution Taxes"].

[502] Charles D. Patterson, "Environmental Taxes and Subsidies: What is the Appropriate Fiscal Policy for Dealing with Modern Environmental Problems?" (2000) 24 Wm. & Mary Envtl. L. & Pol'y Rev 121at 134 [Patterson, "Environmental Taxes]; and CBC, "The Carbon Tax: The Pros and Cons of a Tax on Fossil Fuels" *Canadian Broadcasting Corporation* (16 June 2006), online: Canadian Broadcasting Corporation <http://www.cbc.ca/news/background/kyoto/carbon-tax.html> [CBC, "The Carbon Tax"].

[503] Olewiler, "Pollution Taxes", *supra* note 501 at 181.

[504] CBC, "The Carbon Tax", *supra* note 502.

[505] The regulatory authority saves costs as it does not have to dictate to the entities how to reduce emissions, Patterson, "Environmental Taxes, *supra* note 502; and Olewiler, "Pollution Taxes", *supra* note 501.

[506] *Ibid.*

essential commodities such as energy, than do the more affluent.[507] However, such an effect may be minimal as studies on the distributional incidence of environmental taxes have identified weak to mild regressive effects regardless of the models used, the countries reviewed or the specific questions examined.[508] Regardless, part of the revenues obtained can be used to compensate those who are most adversely affected by the imposition of the tax.[509]

It may also be feared that the imposition of the transactions tax will drive jobs and businesses to untaxed jurisdictions.[510] However, the tax can act as a barrier to entry of foreign firms and can prompt entities to open additional plants in untaxed jurisdictions while they do not shut down.[511] Needless to say, the tax would also face opposition from the affected entities because it would reduce their profits.[512]

Thus, alternative ideas such as the auctioning of allowances and the introduction of quantitative limitations on the extent to which a Party can rely on international emissions trading as ways of addressing equity concerns within the domestic and the international emissions trading systems are worth examining.

4.4 Auctioning

It has been suggested that the most critical design element in an emissions trading system is the mechanism by which companies first obtain emission allowances.[513] This section advocates the use of auctioning, as opposed to grandfathering, as the

---

[507] Patterson, "Environmental Taxes, *supra* note 502 at 142.
[508] Christhart Bork, "Distributional Effects of the Ecological Tax Reform in Germany: An Evaluation with a Microsimulation Model" in Yse Serret & Nick Johnstone eds., *The Distributional Effects of Environmental Policy* (Cheltenham, UK: Edward Elgar Publishing, 2006) at 139.
[509] Olewiler, "Pollution Taxes", *supra* note 501 at 183.
[510] *Ibid.* at 185.
[511] *Ibid.* at 185.
[512] *Ibid.* at 180.
[513] Centre for Clean Air Policy, "Allowance Allocation: Who Wins and Loses Under a Carbon Dioxide Control Program?" online: Centre for Clean Air Policy <http://www.ccap.org>.

primary mode of allocation of allowances by the Parties to their domestic entities. Under this mode of distribution, participants in the trading system purchase allowances at the market price - either from the controlling authority in the initial distribution round or from other sellers after the permit trading market has been established - in order to cover their emissions.[514] The fact that auctioning places an obligation on an emitter to pay for emission permits is a legitimate mechanism for collecting compensation from the emitter and, therefore, is consistent with the polluter pays principle.[515] Additionally, the requirement for emitters to pay for emissions permits will create a high adjustment pressure and act as an incentive for them to purchase energy efficient equipment, switch to cleaner fuels or find other ways of lowering emission levels.[516] Auctioning also avoids the difficult negotiation of source-by-source allocations, since each source will purchase the allowances it needs depending on its projected emissions.[517] Additionally, it represents a level playing field for all emitters because they pay a competitively determined price for all their emissions.[518] It is unlikely that any individual business or consortium will significantly influence the permit price because permits will be freely tradable, government backed and widely sought by a diversity of buyers.[519]

---

[514] Cedric Philibert & Julia Reinaud, "Emissions Trading: Taking Stock and Looking Forward," online: Organization for Economic Co-operation and Development <http://www.oecd.org/dataoecd/58/59/32140134.pdf> [Philibert, "Emissions Trading"].
[515] Australian Greenhouse Office, "National Emissions Trading: Issuing the Permits," online: Australian Greenhouse Office< http://www.greenhouse.gov.au/emissionstrading/papers/paper2/pubs/paper_2.pdf>. [Australian Greenhouse Office, "Permits"].
[516] *Ibid.*
[517] Philibert, "Emissions Trading", *supra* note 514.
[518] *Ibid.*
[519] The permit market is likely to be similar to markets for bonds and other financial securities, and generally, these markets have attracted relatively few market power concerns because even the largest buyers tend to represent only a small share of the total trade; *Ibid.*

The revenues received from auctioning of emission permits can be used to create or advance equity in a number of ways. The United States Congressional Budget Office[520] has made the following suggestion;

> The revenue raised from an auction could be used to cut existing taxes that cause distortions in the economy, for example taxes on capital discourage investment and saving, and taxes on labor can discourage people from working more and employers from using more labor. If the revenue raised by auctioning of emission allowances was used to cut taxes on capital and labor, these adverse incentives would be reduced.

It has also been argued[521] that since a limit on carbon emissions would increase energy prices, a trading program would be equitable only if it compensated low-income households for those price increases. Kopp,[522] therefore proposes that 75% of the auction proceeds should fund a direct payment to all households and the remaining 25% would be given to States or local governments on the basis of how much energy their low income households use and how vulnerable their industries are to higher energy costs. Following the same line of argument, the United States Centre for Enterprise Corporation[523] has proposed the creation of a 'sky trust' from the auction revenues, with the bulk of this fund being issued as uniform payments to the citizens. This proposal is based on the idea that everyone owns the rights to the sky and that each person should receive an equal amount of the revenue generated by selling those rights.[524]

---

[520] United States Congressional Budget Office, "Who Gains and Who Pays Under Carbon Allowance Trading?" online: Congressional Budget Office <http://www.cbo.gov/showdoc.cfm?index=2104&sequence=2>[CBO, "Carbon Allowance"].
[521] Raymond Kopp, "A Proposal for Credible Early Auction in the United States Climate Policy," online: Resources for the Future<http://www.weathervane.rff.org/features/feature060.html>.
[522] *Ibid.*
[523] See Peter Barnes, *Who Owns the Sky?: Our Common Assets and the Future of Capitalism* (Washington, DC: Island Press, 2001).
[524] *Ibid.*

However, since auctioning places greater costs on the regulated entities, there are fears that these entities may not achieve the reduction in costs of reducing emissions that makes emissions trading popular.[525] Alternatively, the entities may pass on the cost of emission permits to consumers in form of higher prices for products.[526] This problem, however, can be minimized if the governments use the auction revenues to compensate the affected persons as suggested above. Another concern associated with auctioning is that entities will have to purchase their permits well in advance of the need to use them, a factor that can lead to severe cash flow problems for some entities.[527] In order to eliminate this problem, the Australian Greenhouse Office[528] has suggested that permits could be auctioned in stages so that entities have the opportunity to purchase them at an auction closer to acquittal times. Additionally, the entities can always purchase permits from each other in the secondary trading market.[529]

On other hand, under grandfathering, distribution of allowances is free of charge and is based on past emission levels.[530] The base period or historic emissions principle starts from emissions in a chosen period which may be one reference year or the average over several years.[531] If allowances are freely distributed, their value will go to the recipient entities, which may have higher profits as a result and hence richer shareholders.[532] Grandfathering, therefore, will increase the gap between the "haves"

---

[525] Philibert, "Emissions Trading", *supra* note 514; See T.H Tietenberg, *Emissions Trading: An Exercise in Reforming Pollution Policy* (Washington, D.C: Resources for the Future, Inc, 1985).
[526] Australian Greenhouse Office, "Permits", *supra* note 515.
[527] *Ibid.* at 39.
[528] *Ibid.*
[529] *Ibid.*
[530] *Ibid.*
[531] *Ibid.*
[532] See CBC, "Carbon Tax", *supra* note 502.

and the "have-nots". Although distributing allowances free of charge would make the imposition of a cap on emissions more acceptable to the regulated entities (since it translates into reduced costs of meeting emissions targets), it is not as equitable as auctioning.

4.5 Quantitative Limitations on International Emissions Trading

This sub-section proposes the introduction of quantitative limits in the international emissions trading system as a means of advancing the equitable principles of the *Convention* and the *Protocol* such as common but differentiated responsibilities and sustainable development. During the negotiations of the COP held at Bonn and Marrakesh, the EU favored the imposition of limitations on the use of mechanisms in order to protect the environmental integrity of the reduction commitments, but this proposal was defeated by the Umbrella group of countries of Australia, Canada, Japan, and Russia which argued against these limitations on grounds of advancing economic efficiency.[533]

The *Accords* require that trading should be supplemental to a Party's domestic action taken to reduce emissions.[534] This provision can be interpreted to require that domestic action should account for the greater share of allowances that a Party uses to meet its emission targets. Its purpose is to ensure that Annex 1 Parties spearhead the fight against climate change by implementing projects that will reduce emissions at home. It is assumed that non-Annex 1 Parties will not only be inspired to implement similar projects but that they will also derive the technological and financial means

[533] Davis A. Wirth, "The Sixth Session (Part Two) and Seventh Session of the Conference of the Parties to the Framework Convention on Climate Change" (2002) 96 American Journal of International Law 648 [Wirth, "The Sixth Session"].
[534] The *Accords, supra* note 6.

for controlling their own emissions from the Annex 1 countries.[535] However, the *Accords* do not stipulate the extent to which the trading should supplement domestic action. As a result of this omission, Annex 1 Parties may heavily rely on trading at the expense of spearheading the financial and technological investment that is required in order to find long-term solutions to reducing greenhouse gas emissions. This would constitute a breach of the leadership principle as the Annex 1 Parties would not provide the leadership in the fight against climate change, it would breach the element of differentiated responsibilities which requires Annex 1 Parties to make the greater share of emissions reductions, and it would jeopardize sustainable development in the developing countries by imposing a heavier than necessary burden of reducing emissions on these countries.[536]

Therefore, it is necessary that two kinds of limitations are created in the international trading system. The first kind are quantitative limitations on the extent to which a Party can rely on international emissions trading in order to meet its targets. Such a limitation is needed in order to ensure that Annex 1 Parties do not rely on international emissions trading in order to fulfill their targets at the expense of domestic reductions. The second kind of a necessary limitation is a limitation on the amount of certified emission reduction units that are allowed to enter the emissions trading system.[537] The latter is necessary in order to ensure that the credits that are

---

[535] The parties are obliged to promote and cooperate in the development, application and diffusion of technologies, practices and processes that limit emission of greenhouse gases, The *Convention, supra* note 4, Article 4.

[536] *Ibid.* Article 3.

[537] The Parties can earn certified emission reduction units from projects of the CDM, The *Protocol, supra* note 4, Article 12.

traded are primarily generated within the Annex 1 countries, and not just from projects of the CDM.

It has been argued[538] that imposing quantitative limitations will interfere with the working of a free market. Advocates of an unrestricted emissions trading market also argue that imposing any restrictions on the trade in emissions will further alienate the U.S., which, during the course of the climate change negotiations insisted that any emissions trading regime must be unrestricted and left entirely to free market mechanisms.[539] However, the limitations are justified by the need to ensure that developed countries provide leadership in the fight against climate change.

Any proposal to create limitations in the international emissions trading system may still meet resistance from Parties such as Canada, Japan, and Russia.[540] Therefore, countries that favor limitations need to spearhead the implementation of these limitations in their domestic systems.

4.6 Conclusion

Climate change remains a serious threat to nature and humankind, especially to the countries with low adaptive capacity. Although the *Convention* and the *Protocol* are insufficient to reverse the climate change problem, they are of great value in as far as they have the potential to help the Parties to mitigate and adapt to it. Although the costs of complying with the obligations under these instruments will be immense,

---

[538] See Patrick Matschoss & Heinz Welsch, "International Emissions Trading and Carbon-Saving Technological Change: The Effects of Restricting the Trade in Carbon Rights" (2006) 33 Journal of Environmental Resource and Economics 169.

[539] See Cinnamon Carlene, "The Kyoto Protocol and the World Trade Organization: Reconciling Tensions Between Free Trade and Environmental Objectives" (2006) 17 Colorado Journal of International Environmental Law and Policy 45 at 59; See Wirth, "The Sixth Session", *supra* note 533.

[540] *Ibid.*

flexibility mechanisms such as international emissions trading will help to reduce these costs.

However, the Parties should not lose sight of the equitable notions on which the *Convention* and the *Protocol* are founded. These instruments require that developed country Parties should spearhead the fight against climate change since they are largely responsible for causing it due to their historically high levels of greenhouse gas emissions. The proposal for the *Convention* and the *Protocol* to give national courts jurisdiction and to oblige their members to give individuals and organizations standing in order to enforce the obligations that they create will result in increased compliance and, therefore, will help to bridge the equity gap between the developing and the developed countries. The reform of the funding mechanisms created under these international legal instruments will help the developing country Parties to mitigate and adapt better to climate change. The use of auctioning, as opposed to grandfathering, as the main method of allocation of emissions allowances will ensure that equity is upheld within the emissions trading systems and the creation of limitations on the extent to which a Party relies on international emissions trading to fulfill its obligations will ensure that developed country Parties lead the way in the search for long-term solutions to climate change.

Bibliography

Legislation

Clean Air Act of 1970, Pub. L. 101 – 549, 104 Stat. 2399 (Codified as amended at 42 U.S.C. 7401- 7671 (1990)).

Federal Environment Assessment Review Process Guidelines Order, SOR/84-467.

Treaties and International Documents

Conference of the Parties/Meeting of the Parties, *Report on its First Session,* UNFCCC, 2005 FCCC/KP/CMP/2005/8/Add.1.

Conference of the Parties, *Report on its First Session,* UNFCCC, 1995, FCCC/CP/1995/7/Add.1.

Conference of the Parties, *Report on its Ninth Session,* UNFCCC, 2003, FCCC/CP/2003.

Conference of the Parties, *Report on its Seventh Session*, UNFCCC, 2001, FCCC/CP/2001/13.

Conference of the Parties, *Report on its Third Session,* UNFCCC, 1997 FCCC/CP/1997/7/Add.

Conference of the Parties, *Report on the Second Part of its Sixth Session*, UNFCCC, 2001, FCCC/CP/2001/5.

Convention on Biological Diversity 1760 U.N.T.S. 79; 31 I.L.M 818 (1992).

Convention on the Prevention of Marine Dumping of Wastes and other Matter, 1046 U.N.T.S 120, 11 I.L.M 1294 (1972).

Kyoto Protocol to the United Nations Framework Convention on Climate Change, 11 December 1997, 37 I.L.M. 22 (entered into force 16 February 2005).

Montreal Protocol on Substances that Deplete the Ozone Layer, 16 September 1987, 26 I.L.M. 1541 (entered into force 1 January 1989).

Rio Declaration on Environment and Development (1992), I.L.M. 874.

Stockholm Declaration on the Human Environment U.N Doc A/Conf.48/14/Rev.1 (1970); 11 I.L.M 1416 (1972).

United Nations Convention on the Law of the Sea 1833 U.N.T.S 3; 21 I.L.M 1261 (1981).

United Nations Declaration on the Human Environment, (1972), 11 I.L.M. 1416.

United Nations Framework Convention on Climate Change, 9 May 1992, 31 I.L.M. 849 (entered into force 21 March 1994).

Vienna Convention for the Protection of the Ozone Layer, 22 March 1985, 26 I.L.M. 1516 (entered into force 22 September 1988).

Juirsprudence

Canadian Wildlife Federation Inc v Minister of the Environment, (1989) 3 C.E.L.R. (N.S) 287 (F.C.T.D).

Friends of the Oldman River Society v Minister of Transport, the Federal Court of Appeal 1989), 4 C.E.L.R. (N.S). 137, rev'g [1990] A-395-89(F.C.A.D), leave to appeal to S.C.C granted, [1990] A21890 (S.C.C.).

Lujan v Defenders of Wildlife ,504 US 555; 112 S. Ct. 2130; 119 L.Ed 2d 351(1992).

Secondary Material: Monographs

Adger, Neil & Brown, Katrina. *Land Use and the Causes of Global Warming* (Chichester: John Wiley & Sons Publishers, 1994).

Baker, Susan. *Sustainable Development* (London; New York: Routledge, 2006).

Barnes, Peter. *Who Owns the Sky?: Our Common Assets and the Future of Capitalism* (Washington, DC: Island Press, 2001).

Bartsch, Ulrich & Muller, Benito. *Fossil Fuels in a Changing Climate* (Oxford: Oxford University Press, 2000).

Baumert, Kevin, et al, eds., *Building on the Kyoto Protocol: Options for Protecting the Climate*, (Washington D.C: World Resources Institute, 2002).

Birnie, Patricia & Boyle, Alan. *International Law and the Environment*, (Oxford: Oxford University Press, 2002).

Boustie, Sylvie, Raynolds, Marlo & Bramley, Mathew. *How Ratifying the Kyoto Protocol will Benefit Canada's Competitiveness* (Pembina Institute, 2002).

Brown-Weiss, Edith. *In Fairness to Future Generations and International Law, Common Patrimony, and Intergenerational Equity* (New York: Transnational Publishers, 1989).

Dales JH. *Pollution, Property & Prices: An Essay in Policy Making and Economics* (Cheltenham: Edward Elgar Publishing Limited, 2002).

Depledge, Joanna. *The Organization of Global Negotiations: Constructing the Climate Change Regime* (London: Earthscan, 2005).

DiMento, Joseph. *The Global Environment and International Law*, (Austin: University of Texas Press, 2003).

Doelle, Meinhard. *From Hot Air To Action? Climate Change, Compliance and the Future of International Environmental Law* (Toronto: Thomson Carswell, (2005).

Dunsmuir, Mollie.*The Kyoto Protocol: Overview of Federal Legal Mechanisms for Implementation,* (Ottawa: Parliamentary Research Branch, 2002).

Elliott, Jennifer. *An Introduction to Sustainable Development,* 3 ed. (London; New York: Routledge, 2006).

Faure, Michael, Gupta Joyeeta & Nentjes Andries. *Climate Change and the Kyoto Protocol; The Role of Institutions and Instruments to Control Global Change* (Northampton: Edward Elgar, 2003).

Freestone, David and Streck, Charlotte, eds., *Legal Aspects of Implementing the Kyoto Protocol Mechanisms: Making Kyoto Work* (Oxford: Oxford University Press, 2005).

Haley, James, ed., *Global Warming: Opposing Viewpoints* (San Diego: Greenhaven Press, Inc, 2002).

Greenbaum, Allan, Wellington, Alex & Pushchak, Ron eds., *Environmental Law in Social Context: A Canadian Perspective* (Concord, Ont: Captus Press Inc, 2002).

Guruswamy, Lakshman. *International Environmental Law in a Nutshell* (St.Paul, MN: West Publishing Co, 2003).

Guruswamy, Lakshman & Hendricks, Brent. *International Environmental Law in a Nutshell* (St. Paul, MN: West Publishing Co, 1997).

Harm de Blij. *Why Geography Matters: Three Challenges Facing America: Climate Change, the rise of China, and Global Terrorism* (Oxford: Oxford University Press, 2005).

Johnson, Rebecca. *Global Warming* (Washington: National Geographic Society, 2002).

Kimio, Uno, ed., *Economy – Energy - Environment Simulation* (Dordrecht: Kluwer Academic Publishers, 2002).

Kister, Chad. *Arctic Melting: How Global Warming is Destroying One of the World's Largest Wilderness Areas* (Monroe: Common Courage Press, 2005).

Knight, Hyneman Frank. *Risk, Uncertainty and Profit* (Chicago: Chicago University Press, 1971).

Kosobud, Richard, ed., *Emissions Trading: Environmental Policy's New Approach* (New York: John Wiley & Sons, Inc, 2000).

Kowalski, Kathiann. *Global Warming* (New York: Marshall Cavendish, 2004).

Maslin, Mark. *Global Warming: A Very Short Introduction* (Oxford: Oxford University Press, 2004).

Muldoon, R. Paul. *Cross-Border Litigation: Environmental Rights in the Great Lakes System* (Toronto: Carswell, 1986).

O' Hare, Greg, Sweeny, John & Wilby, Rob. *Weather, Climate and Change; Human Perspectives* (Essex: Pearson Education Limited, 2005).

Organization for Economic Co-operation and Development. *The Polluter Pays Principle: Definition, Analysis, Implementation* (Paris: OECD, 1975).

Rehbinder, Eckard. *Emissions Trading Policy in the United States of America* (Berlin: E. Schmidt, 1985).

Serret, Ysé & Johnstone, Nick. The Distributional Effects of Environmental Policy (Cheltenham, UK: Edward Elgar Publishing, 2006).

Stillborn, Jack. *The Kyoto Protocol: Intergovernmental Issues* (Ottawa: Parliamentary Research Branch, 2002).

Swanson, Elizabeth & Hughes, L. Elaine. *The Price of Pollution: Environmental Litigation in Canada* (Edmonton: Environmental Law Centre, 1990)

Tietenberg, T.H. *Emissions Trading: An Exercise in Reforming Pollution Policy* (Washington, D.C: Resources for the Future, Inc, 1985).

Volokh, Eugene. *Academic Legal Writing*, 2nd Ed. (New York: Foundation Press, 2005).

Wilkinson, David. *Environment and Law* (London: Routledge, 2002).

Williams, Tim. *The Kyoto Protocol: The Basics of Climate Change* (Ottawa: Parliamentary Research Branch, 2002).

Woerdman, Edwin. *The Institutional Economics of Market-Based Climate Policy* (Amsterdam; Boston: Elsevier, 2004).

Yamin, Farhana ed., Climate Change and Carbon Markets: A Handbook of Emissions Reduction Mechanisms (London: Earthscan, 2005).

Secondary Material: Articles

Ackerman, Bruce & Richard Stewart. "Reforming Environmental Law: The Democratic Case for Market Incentives" (1987-88) 13 Colum. J. Envtl. L. 171.

Bachelder, Andrew. "Using Credit Trading To Reduce Greenhouse Gas Emissions" (1999) 9 J.E.L.P 281.

Bartlett, Bruce. "The Flawed Idea of Perfect Competition," online: National Center for Policy Analysis < http://www.ncpa.org/oped/bartlett/jun1699.html>.

Bessendorf, Ari. "Games in the Courthouse: The Theoretical Dimensions in Climate Change" (2005) 28 Suffolk Transnat'l L. Rev. 325.

Bohm, Peter. "Determinants of the Benefits of International Carbon Emissions Trading: Theory and Experimental Evidence" in *Emissions Trading – Proceedings of the Conference on Greenhouse Gas Emissions Trading* (Sydney: May 21-22, 1998).

Booncharoen, C and Gase, J. "International Commitment Toward Curbing Global Warming: The Kyoto Protocol" (1998) 4:3 The Environmental Lawyer 9.

Bord, Richard and Fisher, Ann. "Is Accurate Understanding of Global Warming Necessary to Promote Willingness to Sacrifice?" (1997) 8 RISK 339.

Botkin, Daniel."Global Warming: What it is, What is Controversial About it, And What We Might Do in Response to it" (1991) 9 UCLA J. Envtl. L. & Pol'y 119.

Brown Weiss, Edith."Our Rights and Obligations to Future Generations for the Environment" (1990) 94 A. J.I.L 198.

Brunnée, Jutta. "A Fine Balance: Facilitation and Enforcement in the Design of a Compliance Regime for the Kyoto Protocol" (1999-2000)13 Tul. Envtl. L. J. 223.

Burtraw, Dallas, Palmer, Kuren, Bhavirkar Ranjit & Paul, Anthony. "The Effect of Allowance Allocation on the Cost of Carbon Emissions Trading," online: Resources for the Future <http://www.rff.org/rff/Documents/RFF-DP-10-30.pdf>.

Cameron, James & Juli, Abouchar. "The Precautionary Principle: A Fundamental Principle of Law and Policy for the Protection of the Global Environment" (1991) 14 B.C. Int'l & Comp. L. Rev. 1.

Eritja, C et al., "Compliance Mechanisms in the Framework Convention on Climate Change and the Kyoto Protocol (2004) 34 Rev. Gen. 51.

Caney, Simon. "Cosmopolitan Justice, Rights and Global Climate Change" (2006) 19 Can. J. L. & Juris. 255.

Capellen Frede & Statil Asa. "Linking Domestic Emissions Trading schemes: The Norwegian Example," online: International Energy Agency. <http://www.iea.org/textbase/work/2004/ghg/presentations/cappelen_doc.pdf >.

Carlerne, Cinnamon. "The Kyoto Protocol and the World Trade Organization: Reconciling Tensions Between Free Trade and Environmental Objectives" (2006) 17 Colorado Journal of International Environmental Law and Policy 45.

Carlisle, John. "Natural Factors Cause Global Warming" in James Haley, ed., *Global. Warming: Opposing View Points* (San Diego: Greenhaven Press, Inc. 2002).

Centre for Clean Air Policy. "Allowance Allocation: Who Wins and Loses Under a Carbon Dioxide Control Program?" online: Centre for Clean Air Policy <http://www.ccap.org>.

Centre for International Sustainable Development Law. "The Principle of Common but Differentiated Responsibilities: Origins and Scope," online: CISDL <http://www.cisdl.org/pdf/brief-common.pdf>.

Chaytor, Beatrice & Wolkewitz, Mathias. "Participation and Priorities; An Assessment of the Priorities of Developing Countries Concerns in the Trade/Environment Interface" (1997) Review of European and International Environmental Law 157.

Chinn, Lily. "Can the Market be Fair and Efficient? An Environmental Justice Critique of Emissions Trading" (1999) 26 Ecology Law Quarterly 80.

Choi, Inch. "Global Climate Change and the use of Economic Approaches: The Ideal Design Features of Domestic Greenhouse Gas Emissions Trading with an Analysis of the European Union's Carbon dioxide Emissions Trading Directive & the Climate Stewardship Act" (2005) 4 Natural Resources Journal 45.

Clean Air Market Programs, "Types of Trading," online: Environmental Protection Agency <http://www.epa.gov/airmarkets/capandtrade/tradingtypes.pdf>.

Climate Change Secretariat. "Caring for the Climate: A Guide to the Climate Change Convention and the Kyoto Protocol," online: United Nations Framework Convention on Climate Change <http://unfccc.int/resource/cfc-guide.pdf>.

Delph, Yvette. "Health Priorities in Developing Countries" (1993) 21 Journal of Law and Medicine 16.

Dessai, Suraje. "The Special Climate Change Fund: Origins and Prioritization Assessment," online: Tyndall Centre for Climate Change Research and School of Environmental Sciences <http:www.tyndall.ac.uk/publications/briefing_notes/note05.shtml>.

Doelle, Meinhard. "Linking the Kyoto Protocol and Other Multilateral Environmental Agreements: From Fragmentation to Integration? (2004) 14 Journal of Environmental Law and Practice 75.

Doelle,Meinhard. "The Kyoto Protocol" (2004) 2 Dalhousie Law Journal 559.

Driesen, David. "Free Lunch or Cheap Fix? The Emissions Trading Idea and the Climate Change Convention" (1999) 26 B.C Envtl Aff. L. Rev. 18.

Driesen, David. "Is Emissions Trading An Economic Incentive Program? Replacing The Command and Control / Economic Incentive Dichotomy" (1998) 55 Wash. & Lee Law Review 289.

Ellerman, Denny. "Are Cap and Trade Programs more Environmentally Effective than Command and Control Regulations?" online: Massachusetts Institute of Technology <http://web.mit.edu/ceepr/www/2003-015.pdf>.

Estapá, Jaume Saura. "Flexibility Mechanisms in the Kyoto Protocol: Constitutive Elements and Challenges Ahead" (2004) 34 Revue Générale De Droit 107.

Eury, Nicola. "Regulatory Developments: Leveling the Playing Field in Europe" (2004) 18 – SPG Nat. Resources & Env't 45.

Evans, Brian."Principles of Kyoto and Emissions Trading Systems: A Primer for Energy Lawyers" (2004) 42 Alberta Law Review 167.

Evans, Meredydd. "Emissions Trading in Transition Economies: The Link Between International and Domestic Policy," online: Pacific Northwest National Laboratory<http://www.pnl.gov/aisu/pubs/Emissiontrade.pdf>.

Forsheit, L.Tanya "International Emissions Trading: Equity Issues in the Search for Market-Based Solutions to Global Environmental Degradation" (1997) 18 U. Pa. J. Int'l Econ. L. 689.

Frischmann, Brett. "Using the Multi-Layered Nature of International Emissions Trading and of International-Domestic Legal Systems to Escape a Multi-State Compliance Dilemma" (2001) Georgetown International Environmental Law Review 463.

Global Environment Facility. "Climate Change,"online: Global Environment Facility <http://www.gefweb.org/projects/Focal_Areas/climate/climate.html>.

Grubb, Michael. "International Emissions Trading Under the Kyoto Protocol: Core Issues in Implementation" (1998) 7 Review of European Community & International Environmental Law 1.

Gupta, Joyeeta. "Glocalization: The Precautionary Principle and Public Participation" In David Freestone & Ellen Heys, eds., *The Precautionary Principle and International Law* (The Hague: Kluwer Law International, 1996) 231.

Hahn , R.W. "Market Power and Transferable Property Rights" (1984) 99 Quarterly Journal of Economics 753.

Haites Erik. "Emissions Trading for Greenhouse Gases in Canada," online: Institute For Research on Public Policy <http://www.irpp.org/po/archive/may98/haites.pdf>.

Haites Erik & Missfeldt, Fanny. "Liability Rules for International Trading of Greenhouse Gas Emissions Quotas" (2001) 1 Climate Policy 85.

Halvorssenn, Anita & Hovi, Jon. "The Nature, Origin, and Impact of Legally Binding Consequences: The Case of the Climate Regime" (2006) 6 International Environmental Agreements 157.

Hickey, James & Vern, Walker. "Refining the Precautionary Principle in International Environmental Law" (1995) 14 Va. Envtl. L.J. 423.

Holtsmark, Bjart. "Climate Agreements: Optimal Taxation of Fossil Fuels and the Distribution of Costs and Benefits Across Countries," online: Center for International Climate and Environmental Research <http://www.cicero.uio.no/index_e.asp >.

Hovi, Jon. "Enforcing the Climate Change Regime: Game Theory and the Marrakesh Accords," online: Centre for International Climate and Environmental Research <http://www.cicero.uio.no/media/2048.pdf>.

Jutlah, Russel. "Economic Instruments and Environmental Policy in Canada" (1997) 8 J. E. L. P. 323.

Kopp, Raymond. "A Proposal for Credible Early Auction in the United States Climate Policy," online: Resources for the Future <http://www.weathervane.rff.org/features/feature060.html>.

Kopp, Raymond & Toman, Michael. "The Choice of Modeling Platform for Carbon Policy Analysis: A Report to the U.S Environmental Protection Agency," online: Resources for the Future < http://www.rff.org/Documents/RFF-RPT- carbonpol.pdf>.

Mackinnon, Leslie. "The Cost of Kyoto," online: Canadian Broadcasting Corporation <http://www.cbc.ca/national/news/Kyoto/>.

Matschoss, Patrick & Welsch, Heinz. "International Emissions Trading and Carbon-Saving Technological Change: The Effects of Restricting the Trade in Carbon Rights" (2006) 33 Journal of Environmental Resource and Economics 169.

Matthews, E. "Global Vegetation and Land Use: New High Resolution Databases for Climate Studies" (1983) 22 Journal of Climate and Applied Meteorology, 474.

Mickelson, Karin & Rees, William. "The Environment: Ecological and Ethical Dimensions" in Elaine Hughes, A.R Lucas & W.A. Tilleman, *Environmental Law and Policy* 2nd Ed. (Toronto: Emond Montgomery Publications, 1998) 1.

Munasinghe, Mohan "Analyzing Ethics, Equity and Climate Change in the Sustainomics Trans-disciplinary Framework" in Luiz Pinguelli –Rosa, & Mohan Munasinghe, *Ethics, Equity, and International Negotiations on Climate Change* (Cheltenham,UK; Northampton, MA: Edward Elgar Publishing, 2002) 62.

Nakada, Minoru. "Distributional Conflicts and the Timing of Environmental Policy" (2006) 6 International Environmental Agreements: Politics, Law and Economics 29.

Noelle-Neumann, Elisabeth. "A Shift From The Right to the Left as an Indicator of Value Exchange: A Battle for the Climate of Opinion" (1998) 10 Int. Journal of Public Opinion Research 317.

Nordhaus, William."From Porcopolis to Carbopolis: The Evolution From Pork Bellies to Emissions Trading" in Richard Kosobud, ed., *Emissions Trading: Environmental Policy's New Approach* (New York: John Wiley & Sons, Inc, 2000) 69.

OECD Environment Directory & International Energy Agency. "An Assessment of Liability Rules for International Greenhouse Gas Emissions Trading," online: Organization for Economic Co-operation and Development < http://www.oecd.org/dataoecd/31/49/2402827.pdf>.

OECD & International Energy Agency. "Joint Implementation and International Emissions Trading Under the Kyoto Protocol," online: International Energy Agency <http://www.iea.org/textbase/papers/1999/ji.pdf>.

OECD Environment Directorate & International Energy Agency. "Market Power and Market Access in International Greenhouse Gas Emissions Trading," online: Organization for Economic Co-operation and Development <http://www.oecd.org/dataoecd/16/61/2391156.pdf>.

OECD Environment Directory & International Energy Agency. "The Commitment Period Reserve," online: Organization for Economic Co-operation and Development <http://www.oecd.org/dataoecd/50/20/2468753.pdf>.

Office of the Press Secretary, White House. "Climate Change Fact Sheet," online: U.S Department of State <http://www.state.gov/g/oes/rls/fs/46741.htm>.

Olewiler, Nancy. "The Case for Pollution Taxes" in Allan Greenbaum, Alex Wellington & Ron Pushchak eds., *Environmental Law in Social Context: A Canadian Perspective* (Concord, Ont: Captus Press Inc, 2002).

Ontario Ministry of Environment. "Guideline for Identification of Best Available Control Technology - Economically Achievable," online: Ministry of the Environment <http://www.ene.gov.on.ca/envision/env_reg/er/documents/2005/ra05e0002a.pdf>.

Otto, Herman and Wolfgang, Sachs. "The Ethics of International Emissions Trading" in Luiz Pinguelli – Rossa, ed., *Ethics, Equity and International Negotiations on Climate Change* (Cheltenham: Edward Elgar Publishing Limited, 2002).

Pardy, Bruce. "The Kyoto Protocol: Bad News for the Global Environment" (2004) J.E.L.P 27.

Parr, Rachel. "Equity and the New Zealand Government's Climate Change Domestic Policy Options Statement" (2000) 49 New Zealand Journal of Environmental Law 49.

Patterson, D. Charles. "Environmental Taxes and Subsidies: What is the Appropriate Fiscal Policy for Dealing with Modern Environmental Problems?" (2000) 24 Wm. & Mary Envtl. L. & Pol'y Rev 121.

Patterson, L. Perry. "Capital Markets and Financial Issues in Economies in Transition" (1992) 74 American Journal of Agricultural Economics 1170.

Petermann, Anne & Langelle, Orin. "UN Global Warming Convention Meets U.S Resistance While Activists Criticize Carbon Trading As Privatization of the Atmosphere," online: Global Justice Ecology Project <http://www.globaljusticeecology.org/index.php?name=getrees&ID=311>.

Philibert, Cedric & Reinaud, Julia. "Emissions Trading: Taking Stock and Looking Forward," online: Organization for Economic Co-operation and Development <http://www.oecd.org/dataoecd/58/59/32140134.pdf>.

Ratliff, Dane. "Dispute Resolution in Flexible Mechanism Contracts," online: International Emissions Trading Association <http://www.ieta.org/ieta/www/pages/getfile.php?docID=283>.

Rauch, Isabel. "Developing a German and an International Emissions Trading System –Lessons from U.S Experiences with the Acid Rain Program" (2000) 11 Fordham Envtl. L. J. 307.

Rolfe, Chris. "An Environmental Perspective on International Greenhouse Gas Emission Trading," online: West Coast Environmental Law Association <www.wcel.org/wcelpub/1998/12249.html>.

Roson, Roberto & Bosello, Francesco. "Carbon Emissions Trading and Equity in International Agreements," online: University of Crete <http://www.soc.uoc.gr/calendar/2000EAERE/papers/PDF/G3-Roson.pdf>.

Rypdal, Kristin, Stordal ,Frode, Fuglestvedt, Jan and Berntsen, Terje. "Assessing Compliance with the Kyoto Protocol: Expert Reviews, Inverse Modelling or Both?" (2003) 7 CICERO Working Paper.

Stein, Timothy. "Acid Rain: The Clean Air Act Cannot Handle the Problem" (1987) 56 UMKC. L. Rev. 139.

Swift, Byron. "U.S Emissions Trading Myths, Realities, and Opportunities" (2005) 20- SUM Nat. Resources & Env't 3.

Taylor, Prue. "Heads in the Sand as the Tide Rises: Environmental Ethics and the Law on Climate Change" (2000/01) 19 UCLA J. Envtl. L & Pol'y 247.

Thomas, Laura. "A Comparative Analysis of International Regimes on Ozone and Climate Change with Implications for Regime Design" (2003) 41 Colum. J. Transnat'l L. 795.

UNEP. "Emissions Distribution," online: United Nations Environment Programme <http://climatechange.unep.net/jcm/doc/emit/distrib.html>.

UNFCCC Secretariat. "Issues in the Negotiating Process: Funding Under the Convention and the Kyoto Protocol" online: United Nations Framework Convention on climate change <http://unfccc.int/coopertaion_and_support/financial_mechanism/special_climatechange_fund/items/3657.php>.

UNFCCC Secretariat. "Non-Governmental Organizations and the Climate Change Process," online: United Nations Framework Convention on Climate Change <http:www.unfccc.int/parties_and_observers/ngos/items/2370.php>.

United States Congressional Budget Office. "An Evaluation of Cap-and-Trade Programs for Reducing U.S Carbon Emissions," online: The Congress of the United States Congressional Budget Office <http://www.cbo.gov/ftpdocs/28xxdoc2876/Cap&Trade.pdf>.

United States National Research Council. "The United States of America's Third National Communication Under the United Nations Framework Convention on Climate Change," online: US Global Change Research Program <www.usgrp.gov>.

Vespa, Mathew. "Climate Change 2001: Kyoto at Bonn and Marrakech" (2002) *29* Ecology Law Quarterly, 395.

Viguier Laurent. "Fair Trade and Harmonization of Climate Change Policies in Europe" (2001) 29 Energy Policy 749.

Wang, Xueman & Wiser, Glen. "The Implementation and Compliance Regimes Under the Climate Change Convention and its Kyoto Protocol," online: The Centre for International Environmental Law < http://www.ciel.org/Publications/Wang_Wiser.pdf>.

Warioba, Joseph Sinde. "Monitoring Compliance with and Enforcement of Binding Decisions of International Courts," online: Max Plank – Institute <http://www.mpil.de/shared/data/pdf/pdfmpunyb/warioba_5.pdf>.

Warren, Lynda. "Intergenerational Equity," online: Committee on Radioactive Waste Management <http://www.corwm.org.uk/PDF/673%20%20Intergenerational%Euity.pdf>.

Wiener, Jonathan. "Global Environmental Regulation: Instrument Choice in Legal Context" (1999) 108 Yale L. J 677.

Wirth, A Davis. "The Sixth Session (Part Two) and Seventh Session of the Conference of the Parties to the Framework Convention on Climate Change" (2002) 96 American Journal of International Law 648.

Woerdman, Edwin "Competitive Distortions in an International Emissions Trading Market" (2000) 5 Mitigation and Adaptation Strategies for Global Change 337.

Yelin-Kefer, Jennifer. "Warming up to an International Greenhouse Gas Market: Lessons from the U.S Acid Rain Experience" (2001) 20 Stan. Envtl. L. J. 221.

Zugmunt, Plater. "Dealing With the Dumb and Dumber: The Continuing Mission of Citizen Environmentalism" (2005) J. Envtl. L. & Litig. 9.