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International Environmental Governance: A Case for Increased Regulation in the Carbon Markets

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List of Acronyms

CDM- Clean Development Mechanism

COP- Conference of the Parties

EU-ETS- European Union Emissions Trading Scheme

ENGO- Environmental Non-Government Organization

GCF- Global Climate Fund

GHG- Greenhouse Gas

IPE- International Political Economy

LDC- Least Developed Countries

MEF- Major Economies Forum on Energy and Climate Change

NGO- Non-Government Organization

UNFCCC- United Nations First Convention on Climate Change

University of Cape Town

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Introduction

Climate change has emerged as one of the leading public policy issues of recent times, both on domestic and international agendas. Scientific evidence has led to a general acceptance that the burning of fossil fuels, as well as other human activities that release greenhouse gases (GHGs), have attributed to higher concentrations of carbon dioxide (CO₂) in the atmosphere and, as a result, rising global surface temperatures.¹ Increased atmospheric concentrations of CO₂ have caused erratic temperatures, rising sea levels, precipitation changes, and reversal of ocean currents that are expected to have drastic effects on the overall ecosystems of our planet. As a result, negatively effecting our well-being as inhabitants, a situation that is only to magnify for future generations (Goulder and Pizer; 2006, 1). The question for public policy-makers is how can these threats be ameliorated under the context of the current international system?

Although the 2011 Durban Climate Change Conference has been labeled a relatively unproductive affair, consensus on the direction of future global environmental governance has been established. Climate change mitigation will be organized around global production with value tied up in emissions reductions (Bernstein et al.; 2010, 163). Regrettably, the international community as a whole has failed to effectively execute any climate mitigation treaty, as there remains a great deal of disagreement on which policies should be pursued. However, middle ground has been found between nations in that climate change policy will rely on a market system as the primary mechanism towards the long-term goal of reducing global GHG emissions. Included in this approach are the options of carbon taxes, emissions trading and programs that promote technological advances, as well as performance standards. All respecting the fact that any approach must be flexible and accommodating to each nation because any other climate change initiative that severely infringes on a state's economic sovereignty will not gain political prowess at international negotiating

¹ There is much debate on the degree to which these changes are human-induced, however that debate is beyond the scope of this paper. This paper recognizes that most climate change scientists support the belief that climate change is in fact human-induced (see "Understanding and Responding to Climate Change", United States National Academy of Sciences, 2008). This paper digresses from this debate and instead provides an analysis on the incidence of climate change from a public policy lens rather than a scientific one and explores the circumstances surrounding climate change mitigation from strictly economic and political perspectives.

tables (Haas; 2008, 1-2).

This research accepts that the current market-led approach to climate control, specifically carbon cap and trade, is the most practical mechanism to reduce greenhouse gas emissions, but takes a critical stance towards the amount of responsibility the free-market is allocated. Though a market-led approach will give global production the incentive to reduce carbon emissions, there still needs to be an appropriate amount of public governance incorporated into the system for incentives to be properly monitored in order to avoid goal-displacement. Therefore, international institutions need to take a more active role in the governance of climate change, not allowing market forces to overtake the initial objective of emissions reductions.

Problem/Research Question

Climate change mitigation is an extremely complex issue considering the number of variables involved. International consensus exists in that any route towards re-writing past wrongs in environmental governance must include a mechanism for internalizing the social costs of emissions by the major polluters - mainly energy intensive industries and utilities companies, providing heightened financial motivation to adopt cleaner modes of production. It is widely agreed upon that to do so value must be attached to emissions reductions, and with the Kyoto Protocol one such mechanism has been established. At the forefront of Kyoto is an economic quantity instrument known in the carbon markets as 'cap and trade'. Cap and trade allocates a certain amount of emissions per annum to be released into the atmosphere from individual states and specific industries within those states. The system allows for emissions to be traded between private actors as well as accumulated by offsetting emissions elsewhere. The most recognized functions of emissions offsetting are the Clean Development Mechanism (CDM) and the European Union Emissions Trading Scheme (EU ETS). Within the realm of carbon trading and offsetting there are also the voluntary emissions reduction markets and tentative markets emerging in California and China.

Despite the institutional growth of the Kyoto regime there are many claiming that carbon trading, for a number of reasons, is not a practical environmental governance policy, and that the system should be replaced with other means for climate change mitigation such as carbon taxes or unilateral state-led initiatives. The central question in this research paper asks whether these claims are accurate. Are carbon trading and emissions offsetting feasible in the context of international environmental governance? What are the obstacles posed by the carbon cap and trade system in a free-market?

Analysis

In my qualitative analysis of carbon trading I will examine its original design and make note of the key economic and political flaws. It should be stressed that this paper focuses on the political dynamics of climate change, and not the science of climate change, identifying reforms that may elicit a possible consensus for cooperation in climate change governance. My analysis is based on the contention that the brand of carbon trading that emerged with the ratification of the Kyoto Protocol is intrinsically flawed, whereby the major hindrance for success in the new found climate regime is in overestimating the abilities of the free-market. This is due to the scope of manipulation that can occur when trading factitious commodities, such as carbon emissions. Additionally, I will illustrate that cap and trade can be a successful venture if the marriage between politics and economics is respected to a larger extent than the framers of Kyoto had deemed necessary. Political considerations, mostly involving the participation of the developing world in exercises of climate change mitigation, must be carefully observed if cap and trade is to achieve international compliance. Here I look at the linkages between resource security, climate change, and development as benchmarks for designing climate change policy at an international level.

Furthermore, I will look at the current system of cap and trade and describe its many weaknesses, illustrating that the problem is not in the overall system, but in how it has been implemented, providing the necessary results-driven 'fine tuning' that is currently absent. Such modifications, among others, include the expansion of

international governance structures dedicated to its success, something that was widely left out of the initial Kyoto framework and can, to a large extent, be attributed to the lack of success in the system. As a result of this void in public governance structures, the system was left to the free-market for self-regulation.

As a point of departure for my analysis of the politics of climate change, I include the different theoretical standpoints that have been traditionally applied to environmental governance. Here, I point out a major discrepancy in the scholarship that has previously relied on regime theory as an explanatory tool, but appears to fall short in fully grasping non-cooperation in international environmental governance. Regime theory, accompanied by International Political Economy (IPE) scholarship, can be used to explain fault-lines in international environmental governance, as well as to provide policy-makers with the knowledge on how to avoid this non-cooperation. This is pertinent to the design of a workable carbon trading scheme that must reflect concerns of the North-South divide in the responsibility of climate change mitigation, as well as the conflicting interests of resource producers and non-producers. In my argument that the cap and trade system is broken but fixable, with particular attention to the Clean Development Mechanism CDM, I will use the theoretical work of Karl Polanyi (1944). Polanyi's 'double movement' illustrates the tendency for large institutions to pursue accumulation when there is not a coordinating body (or reliable market forces) that institutes legitimacy into the system. The accumulation vs. legitimacy problem, prevalent in the carbon markets, has occurred due to a lack of regulation in the system. Here, based on Polanyi's work, I will explain the situation of the inability of fictitious commodities to produce a favorable outcome when thrown into the free-market, which had been overlooked by the framers of the Kyoto Protocol.

Methodology

The research paper will include an in-depth analysis of the literature on the subject. The literature in question derives from the fields of international relations and economics, and the sub-fields of environmental economics and environmental policy. Considering that this is an extremely 'hot topic' in international policy, with the

Kyoto Protocol commitment periods having been renewed for 5 years in South Africa this past December, special attention is being paid to update academic publications which reflect the evolving opinions from international organizations, as well as individual state announcements and non-state actors on the future of climate governance.

Literature review

In the discourse of climate change politics regime theory, or neo-liberal institutionalism, has prevailed as the primary theoretical standpoint. David Newell (2000) argues that although regime theory is a workable starting point to study climate change, it fails to recognize some of the most important actors in climate change negotiations. Newell makes use of work by Susan Strange (1983) to point out the state-centric nature of regime theory as incomplete in explaining the power structures that are involved in climate change negotiations, because regime theory lacks ‘vision of a wider reality’.² Newell’s ‘regime breakdown approach’, in addition to the central tenets of neo-liberal institutionalism, incorporates agenda setting, negotiation bargaining, and implementation influences of non-state actors; media, scientific communities, industrial lobbyists and non-governmental organizations (NGO). Newell opts for a more suitable approach than regime theory termed ‘*political economy of transnationalism*’, which he commends on its ability to recognize the influence of non-state actors because of the ‘sensitivity to a state’s location in the circuits of power and networks of interdependency that bind it to a multitude of actors and institutions that significantly shape its field of operation’ (Newell; 2000, 166).

Drawing from a similar approach to Newell, David Helm (2008) identifies the current environmental policy architecture as no more than a building block for the future; a meaningful forum for negotiations between states, NGOs, industry and climate change scientists in the pursuit of progressive policies. Progressive environmental policies include policy a framework direction that continually increases the degree of positive environmental impacts (or reduced negative impacts) by inflicting the least

² Similar arguments will be found in Betsill and Bulkeley; 2004, 2006, Okereke et al.; 2009, and Gulbrandsen and Andresen; 2004.

amounts of economic harm, as a long term goal. However, Held holds a great deal of contention that Kyoto will not produce beneficial results in the near future, insisting that the future for environmental governance is 'grim' due to our increasing thirst for oil, as well as the projected population growth over the next 50 years. Helm holds a central argument that significant increases in emissions will persist if the responsibility for emissions reductions is not properly adjusted to target consumers rather than producers, as is intended under the current pathway. The longer environmental policy fails to acknowledge this fundamental accounting flaw, the more difficult future corrections will be. However, despite Helm's convincing rhetoric, he fails to provide any such guidance for this paradigm shift in environmental policy.

With a more optimistic outlook Anthony Giddens, in his book *the Politics of Climate Change* (2009), advocates for tighter government presence in environmental policy as an opportunity to influence all aspects of environmental governance, including the carbon markets, and that states must force restraints on carbon market actors that would otherwise not be in place under a free-market system. On the issue of regulating environmental governance, Giddens notes the importance of the 'ensuring state'. The ensuring state outlines emissions reduction goals and subsequently works with industry and business to make sure that goals are met. However, this should be done with carrots and not sticks by outlining environmental policy that can be beneficial to all actors. Giddens' foundational argument is that industrialized democratic nations must lead the charge and work together to achieve climate change mitigation. Here he refutes the belief, held by Sherman and Smith (2007) that democratic societies are not capable of making serious adjustments in environmental policy because democratic states, of which most are primarily capitalistic, have vested too highly in materialism in their economies and are dominated by sectoral interests. Giddens writes that Smith and Sherman's authoritarian stance towards environmental governance does not trump a liberal democratic institution because of the positive history that liberal democracies have with the development of science and information exchanges to address socio-economic problems; two aspects in which authoritarianism has been lagging, both extremely important for the end goal of climate change mitigation.

With a more skeptical perspective on current international climate change governance, David Victor (2001) and Victor et. al (2005) criticize the top-down approach, led by international organizations, as a workable solution to climate change. Victor prefers a 'Madisonian' approach that builds a global regime from the bottom up, first enabling state policy to grow then followed by an international framework that links matured policies together. This is based on his analysis of past international treaties where compliance is difficult to attain when there are numerous unresolved bargaining issues between and among nation states. Victor recognizes the market based approach of the Kyoto Protocol to be important, and that it is not to be dismantled, salvaging the parts that have been working, but that states must first prove that they can implement national policies before an international treaty is feasible. Owing to a lack of a clear hierarchy in environmental governance where international schemes have any sort of authority, national schemes that overcome the lack of functional, strategic and organization components must be designed (Keohane and Victor; 2010, 14-15). Also, that the best way to build national schemes is through the involvement of Environmental Non-Governmental Organizations (ENGOS) and green business specialists. Obviously then, it can be said that Victor envisions the sort of international treaty that will not be achieved for a number of years, but one with solid foundations that is intrinsically linked to the economies of each individual state.

On the topic of climate change economics, *The Stern Review on the Economics of Climate Change* (Stern; 2007), commissioned by the UK government with lead author economist David Stern, is the most influential and most often cited publication. In over 700 pages, the Stern Report provides an analysis of the economics of climate change, with a particular focus on applying his findings to format policy suggestions. Stern finds that we can stabilize the greenhouse gas concentrations in the atmosphere by committing 1 percent of global GDP³ to the cause. From an international policy perspective Stern insists that carbon trading is the preferred market mechanism because it allows for flexibility between nations and can be designed without extinguishing global economic growth. With such high acclaim being received from the report, the United Nations First Convention on Climate Change (UNFCCC) has

³ In a later article Stern (2008) admits that he overestimated some of his calculations, and that in fact a more accurate figure is 2 percent of global GDP.

adopted his opinions and reinstated carbon trading as the preferential method for international climate change policy. However, the Stern Review has certainly not been without its critics (Giddens; 2009, Toll; 2009).

The most persistent arguments against Stern's main findings are that extensive cap and trade should be implemented immediately as the most cost effective way to reduce the risks of climate change. Bjørn Lomborg, a prominent climate change skeptic, is most vocal about these findings, insisting that humankind would benefit more by resisting serious actions towards climate change until more consistent scientific evidence is accumulated. Lomborg contends that it is more beneficial to hesitate before implementing strong action to prevent climate change, and rather pursue policies of adaption than mitigation at a lower cost to society (Lomborg; 2001, 318). Wietzman (2007) argues that, while the Stern Review should gain merit for its in-depth descriptive analysis, Stern ignores conventional methods of economic analysis of climate change in favor of picking and choosing methods out of convenience that will support his prepositions. Weitzman rejects Stern's use of cost benefit analysis of climate change that relies on a particularly low discount rate, to which his findings are highly sensitive. Furthermore, Wietzman criticizes Stern's work on the premise that it is neither politically nor economically sufficient, attempting to bridge the two without fully achieving his ambitions in either discourse.

Bumpus and Liverman (2008) suggest that the political economy of carbon emissions offsetting through the CDM produces inequalities due to its hierarchical nature. They insist that the CDM has been designed to be most successfully applied in more developed non-Annex 1 countries, considering implementation barriers that are more difficult to overcome in the least developed nations. The two authors criticize the CDM for its fundamental flaws in providing actual 'additionality' or verifiable emissions reduction, as opposed to a 'business as usual' scenario. They also note that the carbon offset markets have received further criticism because of their resemblance to neo-colonial practices that lack southern participation and northern transparency, resulting in a system in which industrialized countries accumulate wealth by dictating the rules. Bumpus and Liverman suggest increased regulation and a high inclusion of non-state actors to legitimize and stabilize the carbon markets (Liverman and Bumpus; 2008, 148).

In a similar argument concerning the shortcomings of global environmental governance in the carbon markets, Paterson (2010), looks at the current marketised global environmental governance structure by utilizing political economic theory to explain the tensions of capitalism between legitimation and accumulation. Paterson finds that within the carbon markets these tensions are most prevalent in the offset markets. Where Paterson finds a lack of legitimacy in the carbon markets is notably the ‘counterfactual methodologies’ that create and allocate credits to be placed on the markets, which result in windfall profits and speculative practices. As Bernstein and many others suggest, ‘the new legitimacy concerns need to be placed in the context of the ongoing debate over the reconfiguration of global authority’ (Bernstein; 2005, 142).

Larry Lohman, a renowned critic of carbon trading, refuses to accept that a quantity instrument is the mainstream climate change mitigation policy (Lohman; 2006). Instead, he believes that carbon trading, as a relatively new instrument, is prone to failure, applied only to save money for the rich in the short term. Lohman’s answer to the climate change problem is a more direct policy that targets the use of fossil fuels. He includes more conventional methods in his climate change mitigation formula that be implemented to immediately reduce atmospheric GHGs, including; large scale public works programs, subsidy shifting, conventional regulation, green taxes, and other non-trading market mechanisms and legal action (Lohman; 2006, 330). The criticism towards such a ‘complicated blueprint’ is that it involved too much public investment without specific private rewards for compliance, which Lohman refutes can be overcome with strong green movements and green alliances that will operate to implement these methods of environmental reform. Also, they will be more far-reaching than market mechanisms, targeting full-scale makeovers or transport systems, and overhauling inefficient heating systems, as well as other technology sectors that are unnecessarily energy intensive. Though Lohman’s arguments can be quite convincing, he appears idealistic, failing to appropriately address international political concerns that would accompany a completely public-led economic overhaul; something that must surely be respected in climate change negotiations and policy formation.

The literature review presented outlines the many diverging opinions on how international governing structures, NGOs, and the business community can best respond to the climate change issue. The major themes of this debate include what policies (ie economic instruments) should be put in place and how time sensitive the issue is. The main findings are that different economic and political theories can be applied to provide a plethora of answers. Due to the unique situation of climate change which involves great minds in the areas of science, economics and politics working to present a solution, it is found in the literature that there are so many variables involved in the international environmental governance process that formatting a unanimous response will be nearly impossible. The following chapters argue that a flexible environmental governance strategy, that takes into account various paradigms, must be installed to gain the degree of large scale acceptance necessary for effective implementation. Additionally, environmental policy must include regulated state led institutions that can ensure legitimacy in the system. This argument is made in the following chapters by analyzing the interdependence of politics, including the various climate change actors outlined in the stake-holder model of democracy, and economics. The argument for flexible, yet well regulated environmental governance will come full circle by first analyzing the politics of climate change and the tensions that have become clear between certain actors. Secondly, pages on the economics of climate change will further illustrate that the issue is quite complex, further demonstrating the need for a flexible system where adaptations can be made. Reflecting my argument, this section identifies the inconsistencies in climate change economics, owing to the proposition that no clear cut policy can be implemented to solve what could possibly be the largest international governance issue of the next era. The final chapters provide theoretical explanations to the present difficulties of developing a universally excepted environmental governance policy, with specific attention to the CDM concluding with general policy suggestions reflecting my thesis.

Chapter 2- The Politics of Climate Change

Environmental Governance

The concept of governance took on a paradigm shift between the late 90s and early 21st century (Arts; 2006, 178). In previous years the term governance was generally directed towards traditional governing bodies - states and international organizations. Now the concept has expanded to include the above, as well as various non-governmental organizations and commercial sectors that present themselves in many different forms and functions. These organizations provide a necessary role as intermediaries between the global population and the governing bodies that make decisions over them. As a result, reflecting on the interconnected world we inhabit, non-state actors have grown to become powerful players in international negotiations. The nature of climate change and international environmental awareness is of a particular essence where non-state actors feel the necessity to get involved in global affairs, working at levels of governance that have, in the past, only been accessible to traditional actors. This paints a conceptual mapping of governance that disregards the old top-down paradigm when embracing that governance of today has undertaken the 'diffusion of political power' to private organizations (Arts; 2006, 178).

Consequently, environmental governance includes private actors outside of state and international organizations, identified as the wide range of political, economic, and social structures and processes that 'shape and constrain' the various actors involved in the realm of environmental policy. Furthermore, environmental governance refers to the 'multiple channels through which human impacts on the natural environment are ordered and regulated' (Levy and Newell; 2003, 3). Although environmental governance can take the form of many issues facing humanity's relationship with our environment, such as the management of rivers, wildlife, or particular ecosystems, this paper explores environmental governance with regard to actions intended to mitigate climate change.

Actors in Environmental Governance

The Role of Civil Society/NGOs

To outline the involvement of civil society in environmental governance a general definition of civil society must be provided. A basic interpretation of civil society is an area of communal life that is publicly operated and exclusive of government enterprise, and whereby common goals are advanced through ideas, actions and demands on governments (Cohen and Arato; 1994, 1-4). Within environmental governance civil society most often takes the form of NGOs acting as a platform to voice a need for change in environmental policies. Within the global network of environmental NGOs (ENGOS) there are a multitude of goal-oriented ventures that fall under the heading of environmentalism. Among others, included are groups that advocate for animal rights, ocean awareness, forest and biodiversity preservation, and the focus of this paper, groups that promote a greener more sustainable economy in pursuit of the reduction of atmospheric GHGs. The role of ENGOS in environmental governance can be partitioned into three groupings: 1) campaigners utilizing their networks and high public profiles to transfer ideas and information to society, think-tanks and research based groups; 2) academic institutions that focus on particular issues in a problem-solving manner; 3) groups that represent certain business communities pursuing adjustments to environmental policy, (or the status quo) that will have significant effects towards the success of a particular industry (Gough and Shackley; 2001, 333).

Important to note is the duality of climate governance. Climate governance is the sum of the governing of resource usage and the leveling off of atmospheric GHG concentrations, as the two targets for endeavors in climate change mitigation. ENGOS are deemed to be important in an operational capacity concerning the management of natural resources because they are able to utilize on the ground information with quick adjustments in resource usage, 'making the impossible possible by doing what governments cannot or will not do' (Simmons; 1998, 87). This is true regarding natural resources when community-based organizations have a serious stake in the outcome of local environmental policy (Gemmill and Bamidele-izu; 2002,16), and

especially true in the developing world where there is a lack of governmental capacity to achieve meaningful adjustments in environmental governance targeted at specific communities. The wide variety of influence accomplished by ENGOs, where impartiality most often persists, aside from their commitment to the environment of course, results in the ability to issue varying degrees of legitimacy towards governing bodies and the decisions that they make (Gemmill and Bamidele-izu; 2002,1). A neo-Gramscian perspective stresses the utility of NGOs in environmental governance as not only bodies that can issue legitimacy to environmental decisions, but also as entities that can challenge decisions that are believed to be against the ‘global interest’ (Ford; 2003, 129).

This interpretation of an environmentally focused civil society accompanies the idea that civil society, in its relations within the state system, is furthering the democratization of environmental awareness when influential groupings within society are allocated a discursive space to function. In more democratic countries (countries that have also taken climate change mitigation more seriously), ENGOs have become persuasive political players, successfully advancing awareness onto the general population and, in turn, forcing such agendas onto political platforms.

Although climate change ENGOs are, for the most part, of the same epistemic community whereby the incidence of climate change is accepted as the focal point of their activities, there are a number of ENGOs that are outside this community. Groups such as Global Climate Coalition (GCC), and the Climate Change Lobby (CCL) aggressively pursue a resistance against the curtailment of fossil fuel use. These organizations are most often vocal skeptics about the scientific findings of mainstream ENGOs pertaining to rising atmospheric temperatures. Such ‘climate contrarians’ are successful in identifying the uncertainties that lie in international documentation regarding climate change, with a major focus on the findings of the UNFCCC, which, to their dismay, should be not be accepted as completely factual, but somewhat precarious (Gough and Shackley; 2001, 334). Most often these groupings receive their financial support from industries that do not interpret mechanisms that mitigate climate change to be in their best interests.

Business Actors

Termed 'street level bureaucrats', employees of large firms are able to shape environmental policy through their actions on the ground. It can be stressed that the significance of these individuals is in the process of developing regulatory policy aimed at ameliorating environmental problems (Newell and Levy; 2003, 1). Major players in industry, where energy use is most highly concentrated and therefore climate change policy is proportionately targeted, are the primary actors in this segment of global civil society. They hold the power to influence environmental policy, but often tread the balance between mutual gains in the global commons and representing their own specific interests. Though industry receives the lion's share of blame for countering progressive global climate change policies, they have the means to become the largest participant in climate change mitigation outside of nation states. The International Chamber of Commerce (ICC) highlights the responsibility of industry in global efforts to mitigate climate change;

'Industry's involvement is a critical factor in the policy deliberations relating to climate change. It is industry that will meet the growing demands of consumers for goods and services. It is industry that develops and disseminates most of the world's technology. It is industry and the private financial community that marshal most of the financial resources that fund the world's economic growth. It is industry that develops, finances and manages most of the investments that enhance and protect the environment. It is industry, therefore, that will be called upon to implement and finance a substantial part of governments' climate change policies.' (International Chamber of Commerce, 1995)

However, industry is not a unified actor in environmental governance. For effective environmental governance in the wake of globalization, cooperation between the various industrial and business regimes must be accomplished at sustainable levels. It is important to note that no single group can gain substantial influence in this exercise or the others will refrain from participating in an effective manner. An example of such an outcome would be the hypothetical situation of solar power firms gaining unreasonable subsidies that would make oil and gas considerably less competitive, a

move that would force the oil and gas industry away from the bargaining table. This cooperation must accommodate private actors' needs to overcome the current short-lived ad hoc nature that environmental governance has been subjected to, dependent on calculated interests of individual groupings (Falkner; 2003, 73), where, instead, institutional norms outline a process to mitigate the differences between interest groups, which in turn will add legitimacy to any policy arrangement.

Scientific Community

It is believed that the greater the consensus towards environmental realities, the greater will be the cooperation on environmental issues that present themselves (Newell; 2000, 40). However, to date, the verdict on climate change is not unanimous, resulting in a position for states to justify inaction. Consensus on the realities of climate change is dependent on the findings of the various scientists and research institutions dedicated to the pursuit of bridging the gap between the known and the unknown concerning global warming. Within this camp the aforementioned organizations, the GCC and GCL, are motivated to question the findings of the Intergovernmental Panel on Climate Change (IPCC). They use their extensive knowledge on the science of climate change as a definite source of power in the fora of environmental politics, consequently aiding in the suspension of climate change policy. Here information, in this case scientific knowledge on climate change, is recognized as one of the main sources of power in the international system.

Prominent climate change scientists have been granted privileged access to state leaders, placing certain individuals in a substantial position to independently impact climate change policy. However, the literature on the subject does not provide evidence that the general scientific community seeks to influence decisions, but is rather neutral, only projecting their findings with purely scientific intensions (apart from lobby-orientated organizations and the politically motivated IPCC, of course). Instead of pressuring decisions the scientific community provides for decision-makers the 'deliberative framework' from which policy-makers can choose one option over another (Hempel; 1993, 23). This guidance is not only prescribed to decision-makers at the state and inter-state levels, but the general public to whom, in democratic states particularity, leaders are responsive. The influence of scientists and their acceptance

into the realm of environmental policy cannot be overemphasized, as noted by Litfin who states that, 'the level of political involvement by scientists in the climate change issue is unprecedented in international relations' (Litfin; 1994, 192).

Challenges in Environmental Governance

A top down approach towards climate change governance looks first to international organizations as the solution builders for climate change mitigation. Traditionally, it has been presumed that individual states will independently attempt to solve their own environmental problems, but the incidence of climate change is beyond the reach of any one state. States are best situated to solve domestic problems like national deforestation or water pollution, but not climate change, a global issue that transcends national boundaries. The occurrence of climate change, accompanied by environmental degradation over multiple geographical areas, logically suggests that an authority above the nation state is best suited to address such a problem (Alcock; 2008, 78,). As a result, the role of the nation state in climate governance becomes blurred because states define their roles in climate governance through their participation in international organizations. There are those that insist that a free-market approach, utilizing economic instruments, can be applied by states to overcome the incidence of climate change, while others insist that advocating for environmental policy outlined by individual states be tightly monitored and implemented by national governments, and others in between. David Giddens outlines this difference in the responsibilities of nation states as actors in environmental governance to be that of the 'enabling state', as opposed to that of the 'ensuring state' (Giddens; 2009, 10). The enabling state will develop policy only to then step back and let others attempt to perform the intended consequence of that policy, assumedly private actors and non-governmental organizations. The ensuring state will take a more hands-on approach, designing environmental policy to the same degree as the enabling state, but also committing itself to the obligation of GHG reduction targets in an active role by working with private actors in a more fluid relationship. The role of the ensuring state is that of a 'catalyzing force', stimulating innovation as well as regulating and monitoring such efforts, and is considered to be more effective, but at a higher demand for institutional resources (Gideon; 2009, 11).

On the international level, the largest climate change regime is spearheaded by the UNFCCC's Conference of the Parties (COP). The COP is a forum that is open to all states that have acted to implement the negotiations of the Kyoto Protocol. The Kyoto Protocol was established to incite deeper involvement by all states. However, only parties to the convention- signatories to the Protocol - can be made part of the decision-making process. For instance, only the COP Executive Board, a limited membership institution governing its carbon markets, can address any decision involving international emissions trading under the UNFCCC. As a major focus of this paper, the Kyoto regime will be expanded on in later pages.

Regime Complex

The top down approach to climate governance is most suitably aligned with regime theory. Regime theorists have aligned themselves with the central realist belief that anarchy in the international system is the cause of power struggles between states, but differ in their interpretation of the international system in that cooperative rule-making and rule-abiding can be a solution to overcoming this anarchy (Auer; 2000, 160). Renowned regime theorist, Stephan Krasner, most often quoted for his work on regime complexes, defines regimes as, 'principles, norms, rules, and decision-making procedures around which actor expectations converge in a given issue-area' (Krasner; 1983, 1). As the principal theoretical framework in the scholarship of environmental governance, regime theory is applied to analyses of climate change governance because it can explain the dynamics of cooperation and interdependence; two key attributes for action, which, at the core of climate governance, must be pioneered by states. Keohane and Victor illustrate this point in their work on environmental governance by stating that environmental regimes will be developed on the international level based on 'conditions of complex interdependence' where partisan politics will consistently remain a major motivating factor on the individual state's actions at the level of international negotiations (Keohane and Victor; 2011, 3).

Although regime theory is used as a point of departure for a theoretical analysis of environmental governance, it does not paint a full picture because of its commitment

to state-centricity. While regime theory succeeds in explaining cooperation, it falls short of including specific actors in environmental governance, such as NGOs, industry associations and firms, scientific communities and a variety of domestic actors which are not recognized under regime theory as holding the leverage in climate change negotiations that they have achieved (Levy and Newell; 2003, 5-6). Theoretical concepts of international political economy sufficiently add to the neo-liberal institutionalist approach for a more clear and precise explanation of climate change governance. Notions of property rights, trade relations, market mechanisms, and privatization that are utilized in IPE theories are important to consider when looking into climate change negotiations, respecting the fact that global environmental governance is so closely intertwined with the global economy.

Environmental regimes will cross over state boundaries in what would appear to be the fracturing of national environmental policy; an interpretation that alludes to the difficulty in studying environmental governance with a state-centrist approach. Simply, that each state will have various interests - often competing, that the government must account for when pursuing climate change policies. Owing to varying modes of production of and within states, and relying on different energy sources, a variety of interest-orientated environmental regimes have been formed. As a result, the alignment of power, interests, information and beliefs is played out both at the international and domestic levels, and climate 'clubs' are formed that seek to influence climate change policy reflecting their own interests, limiting free riding, and blocking the influence of groups that have opposing interests (Keohane and Nye; 2001,52). Environmental regimes specifically designed for climate change mitigation are noticed at international levels, (UNFCCC, G-8, MEF (Major Economies Forum on Energy and Climate Change)), bilateral (EU-China Partnership on Climate Change), and national (Regional Greenhouse Gas Initiative in the north eastern US, California Emissions Trading Scheme) making environmental governance a highly fragmented apparatus.

As political realities dictate, we must often work with the system that is available. In the case of climate change mitigation we have a non-concerted network of nation states and industrial sectors with diverse interests. Therefore, to appease each of these separate regimes in climate change policy, policy must be designed that is both

flexible and adaptable (Keohane and Victor; 2011, 17-18). Flexibility allows for different states, or even industrial sectors within those states, to commit to different means in pursuit of the same ends; atmospheric GHG reduction. A flexible mechanism also affords groups the ability to pursue feasible goals for reduction targets that are respective to the specifics of their economies (i.e. energy production, clean tech sector, margin for industrial efficiency improvements) having an advantage over 'blanket' global reduction targets that result in a chain reaction of non-compliance. Adaptability refers to the chronologic appropriateness of mitigation efforts and takes into account the sensitivities of domestic politics on a state's climate change policy, recognizing that between states there will be fluctuating degrees of support from society towards climate change policy. Consequently, it is important that different time-lines for means of GHG reduction implementations exist, specifically for developing countries that do not have the finances or the political willpower to make large adjustments in the near future.

Fragmentation of Global Climate Governance

Since the initial framework for climate change governance at the international level was designed through the UNFCCC in 1992, there has been substantial withdrawal from the intended pathway of the original mandate. This fragmentation, as illustrated by Bierman et al., is both cooperative and conflicting in nature (Bierman et al.; 2009, 22). The mandate laid out in the UNFCCC is to prevent 'dangerous anthropogenic interference with the climate system' (Gupta and Van Asselt; 2006, 83). Although this is the goal of all parties working in the sphere of 'responsible' environmental governance, divergence has occurred on how exactly it is most appropriate to accomplish such a large goal. Cooperative elements of fragmentation occur when certain states band together and form their own climate governance regimes, separate from the Kyoto architecture. An example is the European Union Emissions Trading Scheme (EU-ETS), which has been a successful venture, and is regarded by many as a pioneering commitment by European nations in the reduction of atmospheric greenhouse gases through international emissions trading and emissions offsetting in the developing world. Conflicting fragmentation has occurred with breakaway climate governance regimes, such as the 2005 Asia-Pacific Partnership on Clean

Development and Climate and the Major Economies Process on Energy Security and Climate Change, created by the United States in 2007 which provide an alternative form of governance that may result in states reducing or neglecting their commitments to the original UNFCCC partnership (Bierman et al.; 23, 2009).

It is found through time projections in economic modeling that these fragmentations will severely hinder the cost efficiency of all regimes included in climate governance. Based on environmental effectiveness, cost effectiveness and cost of distribution for environmental policy, it is concluded by Aldy, Barrett and Stavins that to stabilize greenhouse gas concentrations and implement mechanisms that will also slow down resource depletion, a 'broad-but-shallow' framework (less regimes) is preferable to a multitude of independently acting regimes (Aldy, Barrett and Stavins; 2003, 378). Therefore, it is necessary to build a framework that can accommodate all nation-states, working towards progress by improving on the 'shallowness' rather than extending the fragmented architecture that includes the regimes that have been created since 1992.

Fault-lines in Environmental Governance

The fragmentation of the climate change mitigation architecture can be explained from a structural perspective by looking at the difficulties involved in cooperation between environmental regimes. However, a more exhaustive agent-specific explanation for these difficulties is found by looking at the discrepancies between the parties involved within these regimes. There are four major fault lines in climate change negotiations. They can occur at all levels of environmental governance; state, regional entities, NGOs, and industrial sectors. Each of these fault lines have been present since climate change made it onto the international political agenda, and (though wavering in significance over the last 25 years⁴) continue to impede international dialogue geared towards mitigation efforts. In the pages of *International Affairs*, dating back to 1992, Matthew Paterson and Michael Grubb identify the four

⁴ It is recognized that climate change became a major political issue in 1988, establishing the Intergovernmental Panel on Climate Change (IPCC), after a series of scientific conferences taking place in the 1980's which identified the rising levels of GHG concentrations in the atmosphere (Patterson and Grubb, 1992: 293).

major fault-lines as; 1) the North-South divide; 2) Differing policy prerogatives of energy producers and non-energy producers; 3) Geographical location of states and their perceived resilience to the effects of climate change, and finally; 4), the division between polarized opinions towards climate change based on scientific uncertainties (Paterson and Grubb; 1992, 296). The first and far most obstructive fault line, the North-South divide, will now be discussed in this section pertaining to the politics of climate change. The third and fourth, regarding perceived resilience and skepticism, have been addressed in the introduction and are proven to be less of a barrier during the commencement of climate change negotiations. The energy producers vs. non-energy producers' quarrel will be covered at the end of this chapter, and elaborated on in the subsequent chapter which focuses on the economics of climate change and resource depletion.

The North-South Divide

The largest political test towards establishing international cooperation in climate change governance is in developed and developing countries reaching an agreement (Depledge and Yamin; 2009, 443, Whaley and Walsh; 2009, 1). The argument from the South is that the environmental problems that we are now faced with exist solely because of the North's particular pathways to development, and their ignorance of the repercussions of utilizing cheap fossil fuels. Rather than being restricted from doing the same, developing countries proclaim that they too should be able to develop using the cheapest materials available. They insist that they should be able to get rich first, only having to correct their behaviour once they reach an advanced stage of development. Most within the G77, a UN classification of the world's developing countries termed the 'trade union of the poor' by ex-Tanzania president Julius Nyerere (1980; 7), point to socio-economic priorities of the present, such as poverty and unemployment, which they treat as problems of highest importance that can be best alleviated with the cheapest means of development possible, fossil fuels. In addition, developing countries reiterate that the North are pursuing an agenda which will restrain their developmental capacity by imposing a degree of 'environmental sensitivity' that is beyond their economic means and will only stall their progress (Alcock; 2008, 74).

From the perspective of the North, the general consensus is that sustainable development for the South, which implies the least possible reliance on fossil fuels, is in the best interest of the entire globe. The counter-argument from the North advocates that their inclusion of the South is not only in the global interest, but proportionally more so in the interest of the South. This is based on their insistence that developing countries pose the greatest risk from climate change, where large populations are susceptible to drought and crop failure in regions that produce, at current rates, barely enough to feed growing populations. In addition to this, developing countries with large populations living close to the sea do not have the means to quickly implement rescue efforts in the event of catastrophe, nor do they have the financial means to rebuild. For these reasons, northern countries have persistently pushed the agenda of sustainable development, with increased measures of resource efficiency, on the global south.

As the largest emitter of greenhouse gases, China has been at the focal point of this debate. Many other developing countries can be 'bought' to adapt to the North's climate change policy vision. China cannot. The leadership in Beijing insists that China should be allowed to continue to grow their economy on coal because they have large reserves and it is cheap and readily available, and that only national actors will have influence over their domestic environmental policy, consistent with China's overall stance of non-interference. This approach is achieved by China because the West holds very little economic sway over China in forcing changes in their methods of production, as the West relies more on cheap goods from China than China relies on the West for consumption of those goods (Haas; 2008, 6).

The second fracture in the North-South Divide in global environmental policy concerns responsibility for financing the implementation of any policy that steers countries away from inefficient fossil fuel usage. The first aspect of responsibility is linked to how countries will pay for past damages to reach the intended emissions levels of 5% below 1990, the goal set by the initial Kyoto agreement. The South demands that a framework allocating a cost for emissions released should be cumulative and based on history rather than on an annual basis, as is advocated by the North. The disagreement here reflects, once again, the injustice that the South feels

for being pressured away from the same methods of production that the North has used to gain economic prominence. The second aspect of this responsibility fracture concerns how reductions are measured. CO2 emissions generated in the South can be directly linked to economic growth, especially in developing countries that have little knowledge sector or clean tech industrial growth. If the annual amount of emissions that are to be accounted for track industrial output, and in turn development, the South will pay higher costs as a percentage of GDP. Although a significantly less nominal figure, a much higher percentage proportionate to their populations' income due to the fact that they have higher growth rates than northern countries.⁵ The argument of the South is once again merited on the reality that they did not cause the current climate problem so they should not be held as equals to the North in terms of responsibility for its amendment. This debate is advanced with one particular angle from China and India, both of which have large export economies. They argue about the design of emissions reduction policies that target producers of these manufactured goods. Instead, they advocate that consumers of goods should be targeted, most of which reach the markets of developed countries. This argument was most succinctly raised at the Bali Conference of the Parties in 2007 by senior Chinese officials claiming that they should not be punished for being the 'factory of the world'; that if China did not produce goods for the West then their emissions would be at least 30% less (Pan, Phillips and Chan; 2009,143).

From the South, the solution to these discrepancies is simple. The Southern countries are eager to participate in progressive environmental policy, but in doing so have identified a position from which to negotiate privilege for participation. Privilege for the South is the transfer of Western capital for the implementation of environmental policies, industrial processes and agricultural and forestries management. Therefore, it is clear that the global agenda for environmentalism includes a global agenda for sustainable development in the South, whereby the effectiveness of environmental policy will be judged by the south, not only in terms of environmental successes, but also in terms of development achievements that address issues of global inequality (Najam; 2005, 317).

⁵ As reported by the International Monetary Fund the average GDP of the OECD countries is just under 3 percent, in comparison to the non-OECD countries, which are much higher. China and India are around 11 percent and Brazil at 7.5 percent for 2010.

The 2009 Copenhagen summit appeared to have been a platform for industrialized nations to make a great deal of progress in bridging this divide by presenting a deal to create a \$100 billion Global Climate Fund (GCF) to expedite this wealth transfer. Although the commitment to create the GCF was fully agreed upon at last year's Cancun summit, developing countries have grown weary that rhetoric towards wealth transfer for climate change-orientated development is too far distanced from action. In the 2011 UN climate change negotiations in Panama a group of the least developed countries (LDCs) issued a statement that industrialized nations were renegeing on commitments for the global climate fund, which includes \$30 billion from the years 2011-2013 as part of the overall \$100 billion due by 2020 (Business Green; 2011).

With the absence of an emissions reduction commitment from developing nations, particularly China and India, the United States did not ratify the Kyoto Protocol. Opposition to Kyoto was based on projections that developing nations will become some of the largest global emitters in the near future and they too should be accounted for in emissions reduction schemes. Under the Byrd-Hagel resolution, which passed through the US Senate by 95-0, the US became the only industrialized nation to opt out of Kyoto just prior to the third Conference of the Parties summit. Lack of support from the United States has been interpreted as the largest weakness in Kyoto, failing to include both the largest emitter at the time, as well as the most important global player in international affairs. The explanation for non-ratification of Kyoto from the USA is mainly because of the impending rise of China, which was not given an emissions reduction target even when it was clear that they would become the largest emitter shortly after the turn of the millennium. Instead, China was grouped in with least developed nations and given identical privilege under the Protocol, which the US identified as a major economic advantage in trade competitions.

This points to the issue of equity in climate change mitigation. Climate change is a global public good, where all parties can benefit from the reduced emissions from a group of states, and are exposed to climate risks if any one large emitter does not contribute to reduction efforts. Owing to the fact that there is no body that can strictly enforce climate change commitments, the state of environmental governance is highly self-enforcing. Therefore, the incentive to contribute is limited by the belief that other

states will either agree to climate treaties and not comply, or not agree at all and become free riders on climate change policy: A disincentive that is surely heightened by the national interests of states and the perceived costs of joining reduction schemes. This is the greatest paradox of international agreements, whereby the greater the global net benefits of free riding exist, the greater there is an incentive to free ride (Cazorla and Toman; 2000, 4).

Deficiencies in Regime Theory: Utilising IPE as an Explanatory Tool in Environmental Governance

A regime theory analysis to explain environmental governance can be assisted by IPE theorists with the realization that regime theory, as the traditional theoretical standpoint in the discourse on environmental politics, is inadequate because of its major assumption; that states and markets can be looked at as independent of one another (Newell and Paterson; 1998, 680). Owing to this assumption, applying regime theory to environmental governance focus too fully on the political players. Here the failed attempts of cooperation are not recognized because the major players, members of the various regimes outside of traditional governing structures are not given their due respect. Instead, to properly explain environmental governance a wider theoretical standpoint must be applied that advocates a larger degree of power in the international system to international non-governmental organizations including multinational corporations who play a major role in designing and implementing environmental policy.

An analysis of failed attempts for cooperation, that regime theory does not fully comprehend, can be properly explained by using an IPE approach. An IPE approach identifies the interconnectivity of a nation's economy, and therefore its major economic actors, with its environmental policy. Using this approach it is quickly realized that the main hindrance for cooperation in adapting environmental policy at both intra and inter-state levels (specifically for more industrialized countries) is the connection between fossil fuel-based energy production with the nation's economy. For Environmental policy to gain success, this relationship must be at the forefront of

negotiations, because the more energy intensive a country is the more important a role it has in new climate policies.

For energy producers, policy that is designed to mitigate climate change is met with indignation that such policies are not a matter of conducting different business, but rather the 'dissipation' of their business (Rowlands; 1995, 137). Therefore, energy producers go to great lengths in lobbying against mitigation policies such as carbon taxes and emissions restrictions. The energy producers' lobby provides rhetoric that any energy restriction will be followed by job loss, increased energy costs, and a severe reduction in the national GDP. The influence that oil companies have over national environmental policy is illustrated in the case of Shell Oil in 1992, when they gave the Dutch government an ultimatum; to either retract their intention to adopt specific environmental policies, or face the event of Dutch Shell's relocation (Newell and Paterson; 1998, 684). The Dutch government immediately caved and Shell Oil was able to prevent the intended policies. This incident illustrates the structural constraints that energy capital can have on capitalist societies which link GDP growth with institutional success (Newell and Paterson; 1998, 691). Here institutional success, which is accompanied by the retention of power, is tied to economic achievements that rely on 'advancing the general interests of capital' (Burnham; 1990, 180), which in energy producing states is largely tied to promoting energy use, both domestically and internationally.

The fault-line in environmental governance that occurs between energy producers and non-energy producers can be explained through Putnam's two level games (Putnam; 1998). Internationally, states may appear to have good intentions to adopt international environmental treaties, but one must look at the intra-national level. Countries that do not have a strong domestic opposition to environmental reforms which could affect energy production, (i.e. Sweden and Finland who are considered to have two of the most progressive environmental policies) are better situated to adopt emissions reduction treaties. In opposition, states where large proportions of the population hold contention on the issue of fossil fuel energy restrictions, such as quotas or taxes, will find it difficult to adopt such policies. Even though it may appear on the surface (regime theory) that a country is prepared to commit itself to environmental reforms, domestic politics will often tell a different story. For instance,

Canada was one of the largest contributors to the design of the Kyoto Protocol, and therefore was predicted to become a leader in its implementation. However, over a decade later, Canada has fallen far short of its Kyoto commitment and has become a large disappointment in the international community in regards to environmental governance. By utilizing Putnam's typology this stagnation to incite progressive environmental reforms is explained by the domestic political prerogatives of the Conservative government during this period. Led by Prime Minister Steven Harper, the Conservative Government of Canada who relies heavily on the support of the Western provinces where a vast majority of Canadian oil production is conducted, and therefore environmental reforms for energy producers would be concentrated. If Harper were to implement Canada's Kyoto commitments (installed by the previous Liberal government) he would be subjected to a loss of support in those provinces, and possibly the loss of office, explaining why, on the domestic level, it has been so difficult for him to consolidate Canada's Kyoto commitments.

This chapter has explained the political tension that climate change mitigation policies have, and will continue in the future, to bring forth; by focusing on different countries at different stages in development and the roles they see themselves playing in climate initiatives. Furthermore, it is established that the traditional regime approach cannot fully analyze these tensions because they are not only rooted at the level of national government but through non-conventional international policy decision makers. By utilizing an IPE approach in attempts to ameliorate these conflicts, a more bodied explanation can be formed, a necessary step to solving this conundrum of cooperation in environmental governance. Although this chapter has focused most heavily on the political aspects of climate change negotiations, the IPE standpoint, as the accepted theoretical discourse in this thesis, has not been fully developed. The next chapter will delve deeper into the economics of climate change, focusing on certain findings, concepts and issue areas that will weigh heavily on future climate negotiations; in my attempts to further argue that flexible environmental policy that will be welcomed by all relevant parties is the only way forward.

Chapter 3- Economics of Climate Change

Natural Capital and the Necessity of Risk Aversion

The world economy relies on the availability of the necessary space and natural inputs for the various production processes, which have provided for mankind the foundations for progress. Natural capital, which we are beginning to appreciate as finite in existence, refers to nature's resources and various ecosystems. The concept of natural capitalism is a building block towards protecting this capital by adding value to the preservation of nature's attributes. The concept identifies the 'interdependency between production and use of human-made capital and the maintenance and supply of natural capital' (Hawkins, Lovins and Lovins; 1999, 3). More specifically, the climate debate seeks to reduce harmful effects to the earth's life supporting system - the recycling of oxygen and carbon dioxide between plants and animals. The system relies on a critical balance whereby dangerous atmospheric gases, mainly carbon dioxide, are currently being over-produced. As these gases build up in the atmosphere the capacity of the system to maintain this balance is overextended. As a result, the earth's climate has increased in average temperature, and the foundation for production has become threatened. We have already lost 70 percent of the world's coral reefs in the last decades, as well as 25 percent of marine ecosystems. On land, in the last half century, we have witnessed a loss, in total, of a fourth of the world's topsoil, and a third of the world's forest cover (Hawkins, Lovins and Lovins; 1999, 4).

We expect technical innovations to overcome non-renewable resource scarcity and provide us with the foundations for a sustainable economy, but what we are beginning to realize is many of these these natural resources, which are to replace fossil fuels, particularly forest stocks and non-food competitive bio-fuels, are at an accelerated rate of decline that must be properly managed now rather than having to deal with a magnified energy crisis in the future. Therefore, it can be determined that the issue of environmental governance is twofold; that of climate change, which is almost entirely accepted by the scientific community to bring disastrous consequences in the event of

its escalation, and an impending energy crisis due to the depletion of renewable and non-renewable resources.

It has become apparent that at no point in the near future can we expect scientists to give us a ‘magic answer’ identifying the exact effects that we are having on natural capital (Gardiner; 2004, 264). Such findings would give policy-makers the necessary information to design mitigation efforts that are most cost efficient, or ideally, there is the possibility that the scientific community could tell us that there is nothing to worry about; that the earth is just going through its natural cycle of increased temperature and that we have no impending natural resource crisis. Given the uncertainty of the issues at hand it is inadvisable to simply carry on our behavior until the resolution of this question, if such information ever materializes at all. From a risk management perspective, it is necessary to act now rather than wait and see what happens, because effectively, the magnitude of the risk that we would be managing is practically unquantifiable due to the precarious nature of climate change. Taking action now, in the form of carbon taxes or emissions restrictions, would be more beneficial than waiting, even if climate change does not materialize (De Leo et al.; 2001; 478 and Woodward and Bishop; 1997, 506). In the event that climate change does not transpire, the investment made through mitigation will not go unappreciated. It is estimated that 1-2 percent of global GDP could stabilize global GHG concentrations and prevent us from becoming increasingly vulnerable to climate change, and will have been spent on giving us a more biodiverse, clean and desirable planet (Stern; 2008, 7).

Equity, Discount Rates and Cost Benefit Analysis in Climate Change Economics

In climate change economics there are two interrelated variables that play a crucial part in financial modeling, discount rates and equity. Inter-temporal equity involves the amount of the burden of climate change mitigation that we should place on our society, vs. the sum that is to be left for future generations to face. To determine cost effective climate change policy, for the purpose of comparing different policies, a discount rate is used to estimate the economic costs of each policy at separate points

in time (Arrow et al.; 1995, 1). Under the same finance principle as ‘time value of money’, where investments are determined upon the size of cash flows at different points in time, the discount rate is used to determine what costs to the economy are deferred by acting against climate change sooner rather than later, and the reverse. Arrow et al. (1995,1) illustrates this dilemma succinctly by comparing two mutually exclusive investments; the reduction of GHG emissions compared with machines and education. If money were spent today on emissions control rather than machines and education, and the rate of return on emissions reductions exceeded that of machines and education, than future generations would benefit more with the decision to invest in climate change. However, a high discount rate for climate change investments will encourage the argument that it is better for future generations to reap the benefits of present day consumption, (economic growth related to the investment in machines and education) and pay a larger burden of the economic costs of GHG reductions themselves. Certainly the discount rate/equity debate is one of the most complex issues surrounding climate change, as it intertwines ethics, scientific projections on pollution, and environmental economics.

Cost Benefit Analysis

Similar to discount rates and inter-temporal equity, conducting a cost benefit analysis (CBA) on climate change mitigation is highly sensitive to the scientific projections for future climate change. A CBA for climate change mitigation has been frequently applied by economists to three central questions concerning emissions reductions; what is the ideal quantity of reductions that should take place? When should emissions be reduced? And how should we go about reducing them (Munasinghe et al.;41, 1995)?

The first question - how much should be reduced? - looks to find a marginal cost of abatement policy that is less than the marginal cost of damages over time. The second, concerning the timing of abatement policy, looks to avoid damages that are irreversible. It assumes that there is a point of no return where abatement policies will no longer be sufficient to mitigate climate change. Also, this question sets out to answer when is the best time to act, seeking to predict marginal cost curves for

abatement that are significantly less than marginal damages. Reduced costs that are a result of innovation in production found through, specifically, energy usage research and development methods.

Conducting a CBA to answer questions two and three *'how much emissions reductions should take place and when?'* brings to light the predictive nature of the entire exercise, based on assumptions that could easily backfire, resulting in a situation where future generations would have to pay for our ignorance. Assumptions on future emissions, warming patterns and magnitude, and other climate change-related aspects such as rainfall and sea level rises are based, to a large degree, on scientific work that is highly uncertain. Climate change scientists can predict that these things will or will not happen with relative confidence, but currently they are not able to be precise enough to meet the demands of a CBA that uses causality models to determine a monetary value for the welfare costs of climate change (Toll; 2009, 2-3, and Broome; 1992, 1). They may be able to predict scenarios, for example, where a certain increase/decrease in rainfall will result in the increase/decrease of agricultural yields and monetize those yields, but there is no certainty in the estimates regarding the levels of rainfall, or the extent to which these fluctuations will be human-induced. This breed of uncertainty affects the reliability of any cost benefit analysis that has implications for policy decisions.

Although there are models that use very precise details to predict the costs of global climate change at various warming scenarios, (see Nordhaus (1994), Rehdanz and Maddison (2005), Mendelsohn, Schlesinger, and Williams (2000), among others) there is very little consensus on which numbers are appropriate in their application, and, therefore, many different cost benefit analysis models have been built that provide results which are highly incompatible. Martin Weitzman attributes this difficulty in utility analysis to, 'deep structural uncertainty in the science, coupled with an economic inability to evaluate meaningfully the catastrophic losses from disastrous temperature changes.' (Weitzman; 1, 2008).

Also, questions regarding the depth of emissions reductions that should take place are difficult to formulate from a holistic global perspective. The preserved quality of life that is assumed by mitigating climate change is predictive at best, and though

greenhouse gas concentrations are, in principal, global in nature, geographically, certain societies are at much higher risk than others, and therefore can attach higher benefits to climate change policies. This outlines a dilemma in global climate change policy where different states will be rationally willing to pay different costs at different times (Toll; 2009, 35, Antroff et. al; 2009, 847 and Munasinghe et. al;1995, 45). If one state determines that it is important to mitigate climate change because of a foreseen environmental catastrophe, but others do not, then any reductions made by the first state, and not followed suit by the others, will have little positive effect.

Only after accepting that it is beneficial to some degree to mitigate climate change, the third question asks how we should go about doing so. Uncertainties in the first two questions provide some guidance for the third. Since we cannot outline an ideal pathway for climate change policy, with cost benefit analysis only providing a loose guide of the cost inherited by climate change and the inputs necessary to avoid these costs, it is essential that emissions reduction policies that retain flexibility be implemented. This is because improved knowledge that accompanies more certain predictions, which can be utilized in a more precise analysis, will inevitably provoke changes in abatement policy goals. As a central question in this paper, the topic of how to reduce emissions will now be explored further.

Why the Market will not Correct Itself in Time

The importance of state-led emissions reduction schemes is evident because of the market's inability to correct itself, and to recognize the value of the atmosphere's function as a sink for anthropogenic greenhouse gas emissions. The market has no way of reacting to atmospheric damage in an appropriate temporal manner, meaning that if the market were to correct itself for the problem of rising atmospheric temperature caused by rapid capitalist industrialization, it would be too late. This is because naturally there is no price point that would indicate that carbon sinks are overly saturated with GHG emissions and therefore there is no market-based incentive to limit emissions, aside from the event of drastic climate change further down the road (Ellermen et. al.; 2010, 2).

To many, a tentative answer to the for-mentioned problem of emissions reduction and the subsequent problem of depleted resources that follows overuse is increased resource efficiency. However, this may not be a formidable solution. Resource efficiency is not necessarily followed by reductions in their use. In the fields of engineering and economics, resource efficiency has different meanings. Engineers define resource efficiency as a situation when less inputs are used to attain the same amount of outputs, differing from the economist's perspective on resource efficiency, (also labeled resource productivity) whereby the calculations are not strictly achieved through inputs and resultant outputs, but rather a measurement of the outputs in terms of the disbursement of capital that it takes to achieve those outputs, comparing the market value of goods produced to the monetary costs of all inputs. In a broader sense, economic efficiency of resources is attained when fiscal policy is being utilized best to minimize the cost of production (Hawkins, Lovins and Lovins; 2008, 9).

In the section to follow I will look at the discrepancy between the engineer's definition of resource efficiency as a solution to the problem of resource depletion, and then address the problem from an economic perspective, focusing on 'resource productivity' by applying economic instruments to alleviate climate change, as well as a pending resource crisis. To distinguish the two very similar concepts; resource efficiency is the engineer's interpretation, while resource productivity will be that of the economist's in regards to efficient modes of production.

Resource Efficiency

A simplistic answer to climate change mitigation and resource depletion is to reduce resource consumption. Reducing resource use, and in turn reducing GHG emissions directly by evoking restrictions, is not a possible policy option because politicians and economists alike remain wary of implementing reforms that may interrupt economic growth due to the magnitude of the underlying consequences involved in a stagnant world economy where sizable population growth is imminent. Another possible scenario that is intended to reduce resource consumption is resource efficiency, accomplished through the innovation of process engineers targeting various modes of production where equal outputs are gained with fewer inputs. It is believed that the

same economic growth can be achieved if resource efficiency is heightened and, in turn, fewer resources will be needed to maintain growth in the global economy, resulting in a decreased amount of GHGs being released into the atmosphere.

Resource efficiency is definitely part of any solution towards growth in energy consumption, although, as a premise for the reduction of greenhouse gases it is not without its denouncements. Chief Economist at the Canadian Imperial Bank of Commerce, Jeff Rubin, declares that assumptions of energy efficiency, (targeted at non-renewables) are unrealistic answers to reducing energy consumption. Rubin uses an example of the OPEC oil shocks to illustrate his point (Rubin; 2007, 1). When the price of oil rose drastically in the 1970's, oil-intensive industries increased their efficiency greatly. However, consumption was not lowered but rather heightened, because now more could be produced with less oil, encouraging producers to retain regular profits by using more oil that was bought at higher cost. When prices were normalized consumption went through the roof.

The rules of supply and demand are illustrated by Howarth (1997) to show this discrepancy. Consumers' income, as a necessity to increase demand for energy, will augment growth in the world economy, but increased growth will also be tracked by energy needs. If the growth effect is large, which can be supported by increased energy use at lower (more efficient) costs, increased energy consumption will occur at rates higher than if efficient technologies had not been implemented (Howarth; 1997, 2). The expected growth effect is interpreted as too large to be countered by the energy efficiencies when market expansion is left to take advantage of lower input costs. Brookes points to this dilemma by showing, through economic models, that 'increases in multifactor productivity could well be greater than the increase in energy productivity, producing a rise in total energy consumption notwithstanding a fall in the energy consumption per unit of output' (Brookes; 358, 2000).

Ernst Weizsacker's work in *Factor 5*, which envisions a practical pathway towards increasing energy efficiency along with resource consumption, stresses the need for making the consumption of resources expensive (Weizsacker; 2009, 7). Weizsacker insists that we should be working in the direction of cost structures that promote efficiency, effectively instituting policy that makes 'resource consumption so

expensive that total resource consumption rests in a perfect balance with a sustainable supply of renewable (or recycled) resources, and the resulting ability of the biosphere to assimilate the associated pollution and by-products' (Weizsackers; 2009, 310). The following chapter will outline some of these cost structures that are intended, over time, to find the necessary equilibrium in our methods of production that limit environmental degradation for a sustainable future. Here, the idea of resource productivity is utilized.

This chapter outlines the difficulty in climate change economic accounting, expanding on the ideas of the previous chapter which focuses on who should pay for these mitigation efforts by visiting the question of *when should they be implemented?* Different economic models can be established to provide very different answers, but without any definite certainty or rigid answers on the actual effects of climate change and resource usage these models are rather useless. Regardless of the policy that is chosen, there is no reason to believe that an unregulated free market will solve this problem in-time to properly manage the supply and demand of natural capital, therefore it must be accepted that workable policy is to be designed that can be adopted to respond to changes in information on natural capital. This further exemplifies the important relationship between political and economic factors and how they must be responsive to one another in the design of policy. Illustrating again that it is necessary for political actors to manage and design policy that includes dynamic climate change economic beliefs. One example of the necessity for more regulated policy that incorporates a plethora of ideas is the topic of resource efficiency. Many politicians advocate spending large amounts of money on research and design facilities that produce more efficient energy technologies, often their foremost weapon against climate change. This is part of the answer to climate change but not the entire solution, as it has been proven that efficiency alone may not have the desired effects on resource usage; actually making fossil fuel usage cheaper and resulting in the desire to produce or burn more. A more effective policy would not only include increasing industrial efficiency on the production side but finding the correct equilibrium to increase the cost of production without resulting in to large of economic malaise. With an understanding of the major actors in environmental governance and the many push and pull factors that influence climate change policy outlined in the previous two chapters, chapter four goes further into dept on some of

the policy that has been implemented and what is wrong. Specific attention is paid to the CDM and the carbon markets.

Chapter 4- Carbon Markets

Market-Based Instruments to Mitigate Climate Change

Market based environmental policies are designed to utilize the efficiency/productivity of the market to achieve policy goals. They are used because they can achieve these goals at lower cost than specific 'command and control' government regulations that target emissions levels through various methods, which can be inconsiderate of abatement costs, and often take a more all-inclusive approach by setting uniform control targets without much actor flexibility in how these targets are met (Stavins; 2001,1-2). Market mechanisms are deemed appropriate policy instruments because they have both demand and substitution effects on energy usage. The demand for energy is to be lowered due to higher energy costs that accompany either emissions taxes or emissions limits, while simultaneously substitution for cleaner modes of production is encouraged, which are not subjected to restrictions or loss of marginal earnings.

The most pervasive form of environmental regulation is command and control. Command and control, in its most basic form, is where an authority will determine the necessary course of action to produce an intended result by collecting information and then commanding the polluter to undergo specific measures to control the pollution in a very structured strategy (Kolstad; 139, 2000). Because of the hands-on nature of such an exercise it is deemed to be highly inefficient. For example, in emissions reductions schemes, the regulator would have to assess each particular industry and determine the necessary steps that it must take to meet the overall demands of emission reduction targets utilizing a large amount of resources to gather all of the information. Furthermore, command and control is cost-inefficient because it can curtail cost saving innovations because it forces producers to follow certain emissions reduction practices rather than let them find their own methods at a perceivably lower cost.

This paper accepts that any suitable mechanism for emissions reductions by instituting resource productivity is one that puts a price on carbon, as do both pricing

and quantity mechanisms. Although it is beyond the scope of this paper to argue for or against either pricing or quantity instruments, capturing this debate in its entirety, I will look briefly at some of the advantages and disadvantages of each. I follow this brief analysis with a further analysis of the quantity instrument because cap and trade has become the most utilized method of international mitigation policies.

Economic instruments will allow for increased flexibility at the lowest overall cost to society for those with both high and low abatement costs, meanwhile harnessing the free-market to spur innovation in modes of production. From an economic perspective there are many parallels in the two proposed market mechanisms to control carbon emissions; tradable permits and emissions taxes, effectively, if subjected in a competitive environment, both will produce very similar results in cost efficiency and emissions reductions (Stern; 2008, 24 and Smith; 2008, 10). This is because a tax rate (or price on carbon) can be designed to increase incentives to reduce emissions to a certain level, while a permit system (with a cap) can be created to establish a benchmark price for carbon emissions. Although the degree of pollution abatement can reach an equilibrium between both policies, there is a major difference in the two economic instruments; found in the particular 'certainties' that each assumes from its enactment, either a limit to emissions in the quantity-based trading system, or a definite price on carbon in emissions tax policies; information that can have large consequences on fiscal environmental policies, and therefore is imperative information in political negotiations.

Carbon cap and trade involves setting a cap on emissions for a certain amount of time; annualized emissions targets under current policies. The cap will be represented by a specified number of emissions permits allocated to emitters, either for free or purchased. Emitters are then permitted to produce as many emissions as they require as long as they hold the necessary permits. If they do not hold the correct number of permits they either face penalties, or can purchase permits from other emitters who have an excess of permits. By creating a market for emissions permits, the policy simultaneously attaches a price to carbon, encouraging industrial players to become more efficient in order to avoid purchasing added abatement permits at the end of a year, or from benefiting from the sale of unused permits. Since industrial innovators looking to benefit from implementing more efficient technology will reduce the most

at the lowest possible cost, strain on the economy that is caused by emissions reduction policy will be at a minimum cost, a key attribute to carbon cap and trade as a flexible tool for climate change mitigation policy.

Cap and Trade Policies

I will now go into more detail about carbon cap and trade, the quantity-based instrument that the Kyoto Protocol has adapted to meet its emissions reductions targets. Cap and trade has its roots in the United States Clean Air Act of 1990, designed by Robert Stavins, an Environmental Economist working out of Harvard University. Each year the US Environmental Protection Agency auctions off a set number of emissions allowances to the polluters, putting a ‘cap’ in the aggregate amount of sulfur dioxide emissions released, and penalizing with fines those who go beyond their emissions quotas. Allowances are traded amongst industrial players on the Chicago Board of Trade, or retired for the benefit of the environment. The system has been accredited with promoting a large degree of efficiency in industries that rely on emitting sulfur dioxide, as well as eliminating acid rain, which was previously a major environmental hazard in the US. The current Kyoto framework has been inspired by the success of the Clean Air Act as a flexible quantity-based instrument.

Similar to the Clean Air Act, Kyoto cap and trade allocates a certain amount of emissions permits, also known as carbon credits or Certified Emissions Reductions (CERs) under the Clean Development Mechanism (CDMs), to each of the industrialized countries (excluding the USA, the only industrialized nation that did not ratify Kyoto). These permits are then divided up within the nations as seen fit. If the owner of an emissions permit does not need to produce as many emissions as it is entitled to, the owner is allowed to sell carbon credits on the carbon markets to a state or industrial actor in need of increasing their emissions allotment to avoid penalization. The idea behind emissions trading is to meet emissions targets at a minimized cost, with the option of reducing the cap or number of allocated permits, to drive up the price of permits, and in turn, lowering the amount of total emissions in participant states according to the laws of supply and demand. Decreasing the supply of carbon credits promotes industrial efficiency or encourages other modes of

production that reduce the amount of greenhouse gases which would otherwise have been released into the atmosphere. Those that can achieve emissions reductions are able to exploit gains from the trade of emissions permits, while those that cannot reduce their emissions because the costs of doing so are too high or infringe too largely on their profit margins, are able to lower their compliance costs by purchasing CERs on the carbon markets, and/or permits from other players; thus, an advantageous exchange for both actors with high and low compliance costs, as opposed to strict emissions controls or taxes that do not allow for interaction (trade) between the two parties (Fisher, Kerr, and Toman; 2001, 109).

The appeal of a quantity instrument is that it can be designed to allow for a fixed amount of emissions. These fixed amounts can range in their aggressiveness to combat climate change, an appropriate attribute that is used to appease signatories of Kyoto that otherwise would not agree to homogenous environmental policies. The appropriateness of individual states to be treated differently, as is likened to a quantity instrument, has given cap and trade political prowess over carbon taxes. However, political resistances to all types of CO₂ abatement policies are present. This is due to the fact that these policies, both quantity and pricing instruments, will undoubtedly place heavy financial burden on certain industries that are energy intensive, such as utilities companies and oil refineries. Instruments, taxes and cap and trade can significantly reduce the profit margins of these energy intensive industries, and can slow economic growth when costs for energy consumption are heightened. Politically, these groupings have a large degree of power in national policy-making due to their material and organizational capacities, as well as the importance that they play in national progress, and thus are able to avoid abatement policies (Goulder; 2001,125, 2001). The irony is that if these industries are not targeted then the entire exercise will fail to bear fruit, with a large proportion of all industrial emissions not subjected to abatement policies. Here, one of the largest advantages of cap and trade is noticed; it allows governments the flexibility to auction off permits as they see fit, giving them the benefit to distribute the burden of abatement policies more evenly by giving certain industries access to less expensive or free permits, while maintaining compliance to internationally agreed upon national emissions caps.

Although the Kyoto Protocol was, at first, commended for its reach around the globe, the largest and most exceptional carbon trading scheme is the European Union Emissions Trading Scheme (EU ETS). The EU ETS is considered to be the pioneer in carbon market implementation at a multinational level, beginning in 2005 with a subsequent two-year trial period, the years that Kyoto began to waiver, and subsequently faltered, with recurrent noncompliance issues from most parties. The EU ETS has, since 2007, become a guideline for emerging carbon markets, and is considered a successful enterprise, even if perhaps it is still in need of some tweaking. The EU markets have provided for us an example of an influential initiative to mobilize the free-market for the purpose of environmental protection. Currently, under the EU ETS, there are several billion Euros crossing European borders each month in emissions credit purchases, illustrating the significance of the European carbon markets to date (Ellerman, Convery and De Perthuis; 2010, 2). Also, the EU ETS has accepted additional abatement mechanisms, most notably the CDM, to be allowed for European states to meet their emissions reductions targets.

Without going any deeper into the debate between carbon taxes and cap and trade, outlined are the key points made in favor of the quantity based instrument over a carbon tax;

- 1) *It is difficult for countries to approve an internationally harmonized tax.*
- 2) *Trading supports wealth transfers to the developing nations, where taxes do not.*
- 3) *Trading will support a lobby in the private sector in favor of tighter targets.*
- 4) *Trading is preferred by both environmental and industrial lobby groups. The former enjoy the certainty of an emissions cap and the latter have an aversion for anything 'tax', opting for the alternative.*
- 5) *Carbon trading promotes the creation of certain firms that have special expertise in applying their trade as facilitators for emissions reduction, furthering abatement innovation.*

- 6) *Explained with a useful carrot-stick analogy, where taxes are the 'stick', simply a business cost; tradable permits being the 'carrot' in an opportunity to achieve increased profits. (Hepburn; 378, 2007).*

Involving the Developing World: The Clean Development Mechanism

Along with international emissions trading between the 37 Annex 1 countries, the CDM was created under the Kyoto Protocol. In article twelve Kyoto outlines the CDM as a process for non-Annex 1 countries to become involved in emissions reduction schemes. The CDM allows for non-Annex 1 countries to create CERs and trade them within the Kyoto framework to Annex-1 countries that need to offset their emissions. The idea behind the CDM is that carbon emissions that are released anywhere into the atmosphere contribute to increases in global atmospheric temperatures equally. Rather than paying large abatement costs to reduce emissions locally, the option of reducing emissions elsewhere at a lower cost exists under the CDM. By design, creation of a CER is equivalent to 1 metric ton of CO₂ reductions. The project developer must prove that his project would not have happened without the CDM in place; that the wealth transfer that is facilitated by the carbon markets is the catalyzing force behind emissions reduction projects.

Under the CDM there are two key aspects; baseline and additionality. The baseline is the number of emissions realized under circumstances of 'business as usual' or no changes made to less efficient modes of production or traditional lifestyles that are energy intensive. Additionality is the number of emissions saved by the implementation of the CDM project that would not have happened under circumstances of business as usual, and is correlated to the number of CERs attained. To calculate additionality the actual carbon emissions released, once a project has gone online, is subtracted from the baseline. Numerous methodologies to determine how many CERs can be accumulated from the various acceptable projects are outlined by the CDM's six separate assessment procedures that identify: a project's economic and social efforts; financing of the project; creating and certifying CERs through project implementation; properly monitoring and verifying project

performance; and the distribution of development benefits from the project (Toman; 2001, 216).

As of March 2011, the CDM Executive Board had registered 2,867 projects that are projected to accumulate CERs of an equivalence to 798 million tons of CO₂ per year. (Fay et al.; 2011, 1). These projects are important in the global environmental governance architecture because they actively bridge the gap between developed and developing nations as participants in environmental governance. They are designed under the consciousness that any global environmental policy that does not include developing countries will not be sufficient as a means to mitigate climate change, as well as alleviate wasteful resources consumption. Therefore, the CDM is interpreted as a cost effective way to transfer wealth to developing countries by incorporating clean development into environmental policy. It is believed that the CDM can be utilized to decrease emerging economies' rapidly growing appetites for environmentally destructive behaviour, notably in India, China and Brazil. Article 12, paragraph 2 of the of the Kyoto Protocol identifies the aims of the CDM;

1) To assist non-Annex 1 countries in achieving sustainable development.

To assist non-Annex 1 countries in contributing to the ultimate objective of the UNFCCC, described in article 2 as stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner, thereby reducing GHG concentrations in the atmosphere to

1- to assist Annex 1 countries in achieving compliance with their quantified emissions limitations and reduction commitments under Article 3 of the Protocol (UNFCCC article 12) .

Players in the Carbon Markets

Within the carbon markets there are three main types of actors; the compliance players, offset implementers, and their financial intermediaries. The compliance players are the emitters that have a regulatory obligation to meet certain emission

restrictions, or to exercise their market options to stay within the rules of cap and trade. Under the EU ETS, due to the size of some of the major industrial firms, credit allocation to compliance players is relatively concentrated. For instance, 33 percent of the total permits in Europe are distributed to the 10 largest emitters. RWE, a German electric utility company, receives 6 percent of total EU permits (Ellerman, Convery and De Perthuis; 2010, 127). The financial intermediaries are not directly involved in emissions restrictions in the same manner of operational policy as the compliance players. Rather, they seek profit in carbon pricing as a facilitator between different compliance actors to help firms mitigate risk in the carbon markets. Intermediaries accumulate profits in the carbon markets by providing carbon financial services, such as derivate packages, futures, swaps, and options for industrial players, as well as financing emissions offsetting projects. Their appeal to the carbon markets is clearly the large earning potential; the carbon markets have become a \$ 300 billion industry with major financial institutions like Barclays, Goldman Sachs and Citibank holding carbon trading exchanges in Wall Street and London as speculation towards the future of the carbon markets estimate a growth potential of \$2-3 trillion within the next decade (Shapiro; 2010, 31). The offset portion of carbon finance is run by firms looking to capitalize off of the carbon markets by implementing projects that reduce emissions instead of a 'business as usual' scenario, operating under Kyoto's CDM and Joint Implementation (JI) as well as a substantially smaller platform in the voluntary market, which is outside of the scope of either the UNFCCC or the EU ETS, and is subjected to even less regulation.

Chapter four has described the current structure of the carbon markets, showing that they have been a well thought out process, with multiple important players given decisive roles to create a market system for emissions reductions. But tying this information in with previous chapters it is understood why the carbon markets have not had the success that was initially anticipated. The markets were designed as a way to include the developing world in emissions reductions, anticipating that it is more advantageous to the global economy to offset emissions in developing countries by re-routing western fund to the South, paying for these energy related development projects. Basically, instead of placing the entire burden on Western countries' industrial sector at a more expensive cost, industry is given the option to diversify their emissions reduction activities, by purchasing offset credits. A method of wealth

transfer from North to South and encourage sustainable development, while simultaneously reducing 'business as usual' emissions. However, as much importance the current system has given to developing countries, they have not been treated as decision making equals. The following chapters of this paper will look at how these decision makers behave in the carbon markets within the current policy designs with a particular focus on the developing world, whose role in environmental governance has been fiercely debated. Additionally, the following chapters will include some theoretical explanations for these problems, which are important for finding a solution and developing environmental policy, advancing the central argument in this thesis that the carbon markets cannot be open to manipulation through lax regulation, but also must retain a certain amount of flexibility to appease the wide degree of different actors.

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Chapter 5- Legitimacy in Environmental Governance

In the scholarship on global environmental governance increased legitimacy has become a primary focus for the success of environmental reforms. Various critiques of the current public and private governing mechanisms have called to attention legitimacy shortfalls that must be remedied. In global governance, legitimacy can be conceived of in a variety of ways. Predominately, organizational legitimacy will materialize when an organization or regime can justify its existence because its activities are congruent to the social values deemed acceptable in the larger social system that they operate within (Dowling and Pfeffer; 1975, 122). Conversely, a regime is void of legitimacy if it does not operate in a decent, consistent manner, functioning for the greater good. An umbrella definition of legitimacy, as illustrated by Suchman, is when the “actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions” (Suchman; 1995, 574). To ascribe legitimacy to climate governance in accordance to Suchman’s generalized definition, a climate regime must operate under a number of fundamental principles. From a normative perspective, environmental governance will accomplish legitimacy if, among other factors, it is democratic in nature, and whereby legitimacy is retained when the will of the people is conveyed through the actions of a regime in a manner inclusive of transparency and accountability (Lövbrand, Rindeljäll and Nordqvist ; 2009, 77). Here democracy is recognized in the sense of stakeholder democracy, where the wants of society are transplanted onto national and global policy agenda’s. This includes government accountability and representation that reflects the general desires of the people in environmental reforms.

Although a democratic deficit will, without doubt, occur in the decision-making process of transnational regimes due to the lack of direct participation from global citizens, democratic legitimacy can be established when the regime expresses the perceived will of the people. Manifesting when it is generally accepted that the regime’s mandate, and how they operationalize their mandate, will bring environmentally progressive behaviour and, in turn, function to retain our quality of life in our interactions with the ecosystem for future generations. Although it is perceived that developing countries have much less concerned for problems that may occur in the future (increased climate change) , and would rather see solutions to the

problems they face today, it is clear that increased information is changing these opinions and demands for long term sustainable development are becoming more prevalent. Sustainable development includes production and agricultural processes that are designed to have low environmental impacts, while simultaneously, being more resilient to external factors. Incidences such as high drought and natural disasters have encouraged developing countries to pursue more dynamic/sustainable farming practices. Also, energy shortages and lack of energy security has hindered manufacturing capacities in developing countries, resulting in citizens and governments alike insisting that home grown renewable energy must be pursued. These are examples of developing nations appetite for a development policy paradigm shift towards more sustainable development solutions. Solutions that the CDM and EU ETS have been designed to provide.

Good democratic governance can be interpreted when looking at a stakeholder model rather than the traditional state-centric notions of democratic participation. The stakeholder concept brings forth the idea of proper governance without a unified government, where participation at the transnational level occurs when the various stakeholders, businesses, NGO's, civil society and governments, are given influence on the policy in a consistent manner of transparency and accountability (Bernstein; 2005, 147), differing from a traditional sense of democracy where an electoral system gives citizens the power influence decisions by removing or replacing someone in government.

To achieve increased legitimacy in climate governance it is apparent to the author that four additional fundamental principles must be further accomplished; equality, efficiency, sustainability and positive environmental outcomes. Equality transpires when the regime operates in a manner whereby polluters pay proportionately according to the environmental destruction they are causing or have caused in the past. Different states and industries within those states will have varying negative effects on the environment, and also have different means of counterbalancing their actions. When actors are held responsible for their actions, through legally binding mechanisms, the principle of equality is attained. The remaining criteria necessary to gain legitimacy and, in turn, public support, are sustainability, efficiency and positive

environmental outcomes, which can all be considered interrelated. A climate regime must be long-lasting, proving that it has in its ability staying power for multiple generations, as well as providing quantifiable proof that it is, in fact, positively contributing to the mitigation of climate change. Furthermore, this must be done with efficient practices that do not accompany undesirable costs resulting in the disintegration of public support.

The Kyoto regime is lacking in these fundamental principles. Currently, the legitimacy of the Kyoto regime is fractured, with equality between states acting as the largest impediment to the growth of the regime. However, as states come closer to terms with how responsibility for reforms can be administered, as we have witnessed in the 2011 Durban Conference of the Parties, this gap is closing, with nation states providing more conciliatory rhetoric; at the very least agreeing to agree on legally binding emissions reduction by the year 2020. Arguably, Kyoto does fit into the concept of a non-electoral, non-territorial stakeholder democracy due to its inclusion of various participants outside the fora of nation-states. The UN climate change conventions include a large number of parallel events and exhibits held by civil society groups and business organizations which, are allocated a certain degree of influence on decision making. However, this influence is relatively small and the final decisions largely reflect the interests of the most powerful states. Where Kyoto does gain points for legitimacy is in the design of the policy as a market-led initiative that has the ability to become a cost efficient means to pursue emissions reductions. However, the extent to which the free-market is given free reign in climate policy could reduce long-term success. The following pages delve into the issue areas where the Kyoto regime is susceptible to loss of legitimacy, including; the sustainability and effectiveness of the current carbon market structure and the self-governance the free-market is allocated within the policy framework.

The Commoditization of Carbon and the Underlying Difficulties

With new-found value tied up in carbon emissions, ‘brokers, consultants, carbon procurement funds, hedge fund managers and other buyers have scoured the globe for opportunities to buy credits associated with projects that reduce emissions in

developing countries' (Capoor and Ambrosi; 2006, ii). All of these players are in search of carbon reductions that they can capitalize on due to the nature of such reductions; found in the developing world where economies generally operate with less efficiency and therefore providing much more investment opportunities and higher available reduction margins than in the more efficient industrialized nations. Also, there are many projects, such as reforestation and carbon sequestering, which are accepted as reducers of emissions under the CDM, and which yield large amounts of CER credits with proportionally less investment than domestic reduction plans in the industrialized states. For these opportunities to be utilized to generate profit in the marketplace, carbon reductions, or offsetting, to use the CDM terminology, must be treated as a tradable commodity where value is attached to carbon reduction credits that can be quantified, owned, and traded on the carbon markets (Bumpus and Liverman; 2008, 134). The commoditization of carbon is taking place due to the inputs of politics, economics and science with the three having a tendency to be uncooperative with one another in regards to climate change, but all are essential for the commoditization process of carbon emissions. Neil Smith illustrates this point by stating that, 'the power of bundling up nature into tradable bits of capital should not be underestimated, but nor should it be exaggerated. The neo-liberalization of nature is far from complete, not without its obstacles, and is anything but a smooth process' (Smith; 2007, 21). This point further illustrates the difficulty of the stakeholder democracy model for environmental governance with different regimes pulling policy in different directions. These stakeholders all have a large degree of power in the realm of environmental governance and must cooperate with one another for effective policy to be implemented. Instead, it is often found that they are at odds with one another in attempts to pursue their own prerogatives. Examples include politicians ignoring or denouncing climate change scientist so that the issue can be sidestepped or framed inside of their own agenda, or economists insisted on certain climate change policies that do not respect the political workings of nation states, and are therefore unachievable.

Any form of GHG management, through either command and control (earlier defined as strict highly structured government-led emissions controls) or market mechanisms will present the opportunity for some producers to obtain an advantage over others. Under carbon trading this can happen in two ways; with total emissions limits firms

can limit their output, resulting in the ability of firms to raise the prices for future outputs above the current competitive level, seeking comparative rents for less production. These higher production costs will be redistributed throughout the entire economy, providing for producers rents by avoiding the inefficiencies of existing taxes and labour (Smith; 2008, 8). Secondly, firms that have low abatement costs but receive a large amount of permits in the permit allocation process are able to use these low abatement costs as a comparative advantage against firms that have higher abatement costs. Essentially, increasing their profits by selling off free permits that they did not need in the first place. However, both of these scenarios can be avoided through a number of industry specific adjustments. For example, producer rents can be reduced by favouring certain industries (providing less expensive permits) with extremely high abatement costs that would otherwise leave them unable to adjust or expand production. Although it is important that allocation mechanisms do not further distort carbon prices when the value (cost) of permits are passed on to consumers, even when the producers receive the permits at low costs. This is explained because producers value these permits, not necessarily in light of how much they paid for them, but in what they can receive upon their sale if they are not subjected to their use, or retirement, after production. An illustration of why giving permits away for free, termed ‘grandfathering’, should be avoided.

Carbon Finance: Susceptible to Manipulation

Essentially, a large aspect of how the carbon financial markets work is likened to trading in derivatives with promises to turn over reduction/offset or unused credits in a specified quantity, at a certain price, by a specific date (Chan; 2009, 6). Paralleling a derivative, carbon is sold on the market in futures or forward contracts with a non-standardized contract written by the parties themselves; industry, investors and project developers. In the Kyoto process the underlying benchmark or value that carbon assumes is in accordance to the supply and demand of emissions reduction credits. Supply is generated by reduction projects and their ability to accrue CER credits, as well as initial permit allocation to states and industry. Permits can be auctioned off, establishing a benchmark price for carbon upon sale, or can be distributed free of charge. By applying the renowned work of economist Ronald Coase in *the Problem of*

Social Cost, it is understood that it does not matter whether or not a benchmark carbon price is established in the onset of permit allocation, having no effect on the supply and demand of emissions permits. Coase demonstrates that free allocation of permits will not restrict the trade of permits and that trade will continue until the price of the permit becomes equal to its costs (the cost of not having the number of permits to cover all emissions released), but only under conditions of high information exchange and low transaction costs (Coase; 1960, 4-19). Demand is two-tiered; partially fixed through political negotiations that set limits to carbon emissions by distributing the rights to generate those emissions and, secondly, in the economic capacity for growth in countries that have carbon emissions' regulations, which are more cost effectively met through reductions elsewhere.

The underlying issue with how the carbon markets will perform is in the speculative nature of growing derivative markets that have not gained proportionate stability to size. Owing to the high-risk nature involved, these markets may prove collapsible under pressure. Inevitably, any risk mitigation will surely be undertaken at the expense of the environment by project developers making sure that they can register CERs, even though, in reality, positive environmental outcomes from reduction projects could be negligent. Such actions are designed to appease investors and attempt to illustrate institutional success, but instead are highly counterproductive when discovered, severely reducing the legitimacy of cap and trade.

Worrisome in the CDM framework is the creation of 'sub-prime credits' or 'sub-prime carbon contracts' that carry with them an extremely high risk of collapsing in value due to the chance that they will not generate verifiable carbon reductions. These 'shoddy' credits threaten the functionality of the entire system when they are traded alongside the distributed emissions allowances that are allocated by governments (Chan; 2009, 7). As a result, 'real' emissions reductions are mixed in with 'fake' ones that are tradable and re-tradable with one another, even before the projects that are forecasted to accumulate reductions have produced any results. Hence, the term 'sub-prime credits' exists due to the difficulty in verifying certain mechanisms that claim to create emissions reductions but may very well fall short. These include, among others, a large variety of carbon capturing and forestry projects that are prevalent in the CDM.

If there is one thing that the 2008 global financial crisis has taught us it is that large-scale finance needs to be regulated. When dealing in billions of dollars there will always be the incentive for large financial institutions to establish a system whereby they can invest money to accumulate greater profits, as was the case in the US banking system when major players were allowed to manipulate derivative and securities markets, sacrificing the stability of the entire system for private gain at the expense of the public. The carbon markets are equally susceptible to the ambitions of global financiers and therefore need to be monitored not only from on-site, where carbon credits are being verified, but from the holdings and investment houses in Wall Street and London. Schemes to ‘invest money’ in the carbon markets are plenty, and in their current infancy stage, the carbon markets have proven to be susceptible to unscrupulous manipulation.

The most often practiced of such schemes is called ‘boosting the baselines’, which occurs on both the industry side of carbon trading and the offset developer’s side (Chan; 2010, 2). On the offset project developer side, a baseline is the amount of GHG emissions that would have been released in the absence of the particular project. On the industry side, a baseline is what you are currently emitting in GHGs. Baselines are used to determine how many credits will be allocated to industrial players or where the starting point of a reduction project begins. Industrial players will inflate their emissions projections to be allocated a greater portion of carbon permits and then sell off these permits later when it is ‘realized’ that they do not actually emit as much as they had stated. Developers seeking offset credits will claim that a project has eliminated a certain number of emissions reflecting the inflated baseline to gain a larger amount of emissions reduction credits to be sold off, referred to as their margin of additionality. This severely decreases the integrity of the system, as it is obvious that such practice results in the false reporting of global emissions reductions.

Another major obstacle in sustaining legitimacy in the carbon markets is evident in the amount of political persuasion that big business has over the system. The largest emitters are known to lobby for their own benefit in regard to environmental policy, rather than encourage productive environmental reforms in an attempt to track larger profits. This is evident in certain policies that reward companies with carbon

reduction credits that they can trade on the market, or use to produce increased emissions themselves for doing virtually nothing, or incorporating 'environmentally friendly' practices that they should be doing anyway, independent of climate regimes like Kyoto that reward them for doing so. An example of such manipulation of the system is found in the 'emissions reductions' made by British Petroleum (BP). Lobbying through the firm Environmental Defense, BP was able to set up a carbon trading scheme that allowed them to easily make their 10 percent reduction requirement, plus a profit, through excess reductions by simply putting a halt to the unnecessary flaring of gas (Mackenzie; 2007 8,). Such practice should not be rewarded under the Kyoto mechanisms, and thus point out an ever-familiar problem of large business' ability to set the GHG emissions reduction agenda to suit their own needs and is, identical to the circumstances that economists have called 'moral hazard'. Moral hazard is an incentive to claim that you would have done something that increases GHG emissions, but are choosing not to for the betterment of the environment, which conveniently accompanies financial restitution. For example, carbon credits have been awarded to organizations for 'avoided deforestation' which is when an organization decides not to cut down a forest, but claim that they would have otherwise done so if there were not an incentive to leave the trees in the ground (Paterson; 2010, 10).

Carbon offsetting projects are also highly susceptible to bribery and manipulation. Under the CDM, the host nations situated in the developing world, where bribery is most prevalent, are given a large degree of responsibility in choosing which projects will get off the ground, instituting host nation controls over which projects are accepted under the CDM and which ones are not. Although it can be positively looked upon that developing countries are able to make the final decision in which projects are best suited to them, there are negative consequences. There are concerns that less developed countries are highly susceptible to the manipulation of private actors, and may be willing to allow loose standards for emissions reduction verification. The least developed nations are in fierce competition for the foreign direct investment (FDI) that accompanies emissions reduction projects. Therefore, incentive towards sidestepping meaningful, sustainable development mechanisms in exchange for short-term financial rewards is great, ultimately creating a 'race to the bottom' by Annex-1 countries looking for projects that can fulfill their emissions reductions needs with

low abatement costs, irrelevant of sustainable development achievements (Sutter and Parreno; 2007, 76).

A host nation's Designated National Authority (DNA) can easily be paid off to give the go-ahead on a bad project over a good one, thereby establishing projects that have little climate benefit and, on the surface, claim to be creating emissions reductions. Another CDM authority, the Designated Operational Entity (DOE), is also given a great deal of power as the external project validator. The DOE, usually a profit-seeking risk-management firm hired by project developers as project auditors, assess the amount of carbon credits a project will accumulate. As a result of including profit driven institutions in the validation process, the CDM is susceptible to inaccurate and non-transparent reports that can basically be bought from 'expert' validators. On numerous occasions, DOEs have been accused of 'fudging results' to procure further contracts from project developers (Lövbrand, Rindeljäll and Nordqvist; 2009, 83-87, Cabello; 2009, 195 and Paulson; 2009, 66).

To a very large degree the integrity of the CDM market depends on the conduct of the in-country DNA and the DOE external validators. What could be expected if it is realized that too many carbon emissions reductions initiatives have been falsified is the price of carbon might plummet, as we have seen in the past when it was realized that the EU had allocated more carbon credits than was needed and demand was over-estimated (Business Week; 2007). The bursting of a carbon bubble of un-orderly wealth creation is a very probable event if the market is not designed to deter the aforementioned types of activity. Given that cap and trade has, in the last decade, grown at such an exponential rate, it is best to adopt the appropriate policies that will iron out these issues sooner rather than later before the system loses the necessary credibility for it to operate on a political front. Any market collapse at a later stage would have dire effects, not only on the economy at large, but also on the future of our environment.

Carbon Trading for Emerging Economies and Least Developed Nations

As a 'for-profit mechanism', the CDM has a tendency to gravitate towards projects in which the easiest reduction credits can be pursued, and which may be counterproductive to the CDM mandate of encouraging sustainable development. The tendency of project developers towards picking the lowest hanging fruit is occurring both in least and less developed countries. Examples of such are the types of projects that are being implemented in the more developed non-Annex 1 countries that would have most likely occurred without the CDM. In China there have been more than two hundred large-sale hydro electricity plants registered for CER credits, even though these plants had been under construction before it was realized that they could be incorporated into the CDM. (Cabello; 2009,195).

The redistribution of FDI flows towards the least developed nations is supposed to be one of the key tenets of the CDM framework. However, the weakest states are not major beneficiaries of increased FDI flows catalyzed by the CDM. Instead, emerging economies China, India and Brazil have gained the lion's share of FDI flows; nations that have large levels of production and thus greater industrial emissions reduction capabilities in existing production processes. CDM inspired FDI has targeted dirty production methods, making them 'cleaner'; a desirable exercise, but not entirely fulfilling the mandate of the CDM for sustainable development. These types of emissions reductions, for example reducing the flaring of gas or attaching to industry varying emissions filtrations and carbon storage processes, do not provide socio-economic benefits to impoverished communities. The high concentration of like projects in these three countries confines the available opportunities for poorest nations to harness the capital redistribution power of the CDM, notably countries of Southern Asia and Sub-Saharan Africa (Nussbaumer; 2009, 92).

What makes the CDM so attractive to African states is its fast-track ambitions to alleviate poverty through sustainable development that is funded by Western nations. However, current institutional and infrastructural shortcomings make emissions reduction projects in Africa less desirable for investors. Investors will associate more risk with African projects and therefore demand greater returns, placing a substantial

amount of pressure on developers to accrue more credits with less investment, which can have negative results on a CDM project's ability to make environmental progress and provide public goods.

What is important for Africa is less of a reliance on Western initiative to spark these development projects. As of late, we have seen an increased amount of success in home-grown ingenuity funded by Development Finance Institutions (DFIs), set up to encourage the implementation of the CDM in Africa through domestic entrepreneurship and innovation; a crucial factor in Africa's goals in poverty alleviation (Gantscho and Karani; 2007, 335). DFIs, through their many products and services, are most suitable to CDM projects by making available development banking and development assistance, by providing lending and investment guarantees (Karani; 2002, 87). If DFIs can effectively stifle innovation to increase larger amounts of CERs from African projects, then the potential for Africa under the CDM is immense. When Africa can utilize DFIs simultaneously with the CDM to provide clean energy, better agricultural practices and forestry and soil conservation techniques as instruments to increase productivity, African growth can surely be realized. The importance of this reciprocal relationship between DFIs and home-grown innovation is highlighted in the pages of *The Economist*; 'The emerging world will undoubtedly make a growing contribution to breakthrough innovations. People who used to think of the emerging world as a source of cheap labor must now recognize that it can be a source of disruptive innovation as well. The world's creative energy is shifting to the developing countries, which are becoming innovators in their own right rather than just talented imitators. A growing number of the world's business innovations will in the future come not from the "West" but from the "rest".' (Economist; 2010).

Public Leadership in Climate Governance

Ongoing debate over how to appropriately address the climate change dilemma involves, at opposite ends of the spectrum, arguments for strictly economic as well as strictly political solutions. Both camps have been accused of outrageously narrow-minded demands that do not account for the importance of the other in the world we

occupy. There are those that argue that climate change is a problem that governance can fix with tight pollution controls, pursuing hyper-green initiatives that clearly lack a sufficient grasp of global economics, such as activists on the streets outside of international governing conventions like the G20, or the particular summit of the day. On the other side of the spectrum you will find attitudes towards climate change similar to that of Vaclav Klaus, economist and current president of the Czech Republic. Klaus has declared that, to tackle climate change, a full free-market approach without the need for political guidance in the form of regulation is best. Like-minded individuals envision that markets have the ability to 'free initiatives, regulate the scarcity of resources and, in the long run, stimulate the innovations that will provide the solutions to humanity's problems' (Callon; 2009, 535). However, such an approach does not address the inequalities that free-markets are powerless to avoid; that markets alone do not have a great track record in providing public goods (Callon; 2009, 536).

Sir Nicholas Stern contends that the unforeseeable externalities, unavoidable in free-market capitalism, are the root causes of the climate change predicament that we now face (Stern; 2006, 3). The externalities in question are the effects that large-scale economic growth has had on our planet. Stern illustrates that scientific achievements have made the issue of climate change relevant when existing neo-liberal markets would have only served to exasperate global warming without the ability to adjust to these externalities in an appropriate time frame. Therefore, the incidence of climate change can be interpreted as hazardous to the accumulation of capital, but fortunately, can be mitigated through profit driven mechanisms (Bumpus and Liverman, 2008, 131). The threat to capital that comes with environmental change is evident in decreased environmental stability that is currently underway with a greater occurrence of earthquakes and floods, for example, and the general atmosphere of uncertainty that accompanies climate change. The opportunity for varying forms of profit resides in the mitigation of these risks through change in the production processes including the various carbon reduction schemes. Conventional economics explains this profit-seeking response to climate change as introducing innovative responses that allow for a comparative advantage in responding to global concerns and demands for a greener international economy.

Accepting that a market-led approach is the best avenue for climate change action, it must be established that the driving forces behind this approach, i.e: governments that create value in carbon offsets and reduction by establishing emissions taxes or quotas, must continue to play an integral role in the functioning of the system. Good governance in carbon offsetting under the CDM, as well as the carbon markets as a whole, is important for a plethora of reasons. Under the CDM, the main concern involves ethical reasons that limit development potential and climate offset accounting fraud. The gravitation towards illicit behavior is caused by potential profits that accompany attaching flexible climate change initiatives to the global capitalist economy. Large financial institutions will take the shortest road to profits available, which is why good governance needs to step in to ensure that any avenue to a profit must be in concordance with the overall mission of combating climate change. There must be unified international requirements for a robust, transparent system where public and private actors work together to guarantee and support carbon disclosure and emission allowance reporting, and meet the overall objective of carbon markets to efficiently and effectively reduce atmospheric greenhouse gas emissions (Lovell; 2010, 353).

Establishing the CDM under the Kyoto Protocol and the subsequent EU ETS left some very large holes in how carbon trading was meant to function. The governing of the carbon markets became a highly contested issue, so it was for the most part looked at as a market-led experiment, and perceived that governance structures would be institutionalized on a need-be bases. Whether these forms of governance were to be created through international policies or by the market alone, it was left undecided. Kyoto simply gained international consensus that a carbon market was the most practical way to lower emissions levels, but left the cap and trade system to function on its own, setting up no more than a bare framework of a market, with little detail on how trading was to actually take place (Mackenzie; 2007, 8).

Chapter 6- Theory: Legitimacy vs. Accumulation

Theoretical Underpinnings: Critical Social Theory

To effectively examine the tension of accumulation and legitimacy in the carbon markets one can turn to Karl Polanyi's 'double movement' (Polanyi; 1944). In Polanyi's seminal work, *The Great Transformation*, two conflicting forces shape a double movement; the first being the efforts of capitalist institutions moving towards great expansion of laissez-faire and the self-regulating markets; the opposing movement is the initiatives of various social actors who are attempting to insulate society from the 'destructive impacts of market pressures' (Block; 2008, 1). The emergence of a double movement has been especially present since the 1980s when neo-liberalism became the focus of western policy-makers generating market fundamentalism and the Washington consensus, subsequently inspiring a large counter movement against these powerful forces as it became clear that regulatory apparatuses must be put in place to avoid destructive social, environmental, and economic consequences (Evans; 2008, 273).

Polanyi's postulation is that the market system cannot exist independently of governments which must dictate how much power is given to actors on both sides of the double movement, and, ultimately, governments allocate power to the various actors in the clash between accumulation and legitimacy. He insists that the exercise of state power will determine the playing field for this confrontation (Block; 2008). When there is no such exercise of power in an all-consuming free-market and conditions are created that ensure the 'market is the only organizing power in the economic sphere', results can be 'disastrous' (Polanyi; 2001, 72). Polanyi's contention is that a truly free-market is especially unsustainable when commodities that are not actually produced for sale in the market place operate under the same capitalist or 'market society' principles as those that are. These commodities are destructive because the market cannot identify their demise in a timely manner, and instead, society is best suited to provide such information acting as a legitimizing force (Barham; 2008, 481).

Polanyi uses the terminology ‘fictitious commodities’ to describe key elements of the world economy that cannot alone be produced by the market, namely; land, labor and money. These are commodities that the state must become involved in by managing the supply and demand to ensure that sustainable quantities are made available as they are vital to the production process (Block; 2003, 21). Although they are not vital to the production process, for now that is, it is conceivable that long-term emissions control could be one of the most important aspects of the production process. There are parallels between the commoditization of carbon and Polanyi's fictitious commodities. For one, the existence of carbon as a tradable commodity with attached value is only conceivable through the actions of states, responsive to environmental concerns that invoke public policy such as the Kyoto Protocol and the Clean Air Act in the USA, amongst other emerging carbon trading policies. Without the recent establishment of international consensus that something must be done to fight climate change, the commoditization of carbon is unimaginable. Also, the supply and demand of carbon can only be monitored by governments. This is because of the linear relationship between science, society's perceptions that there must some sort of intervention in the world economy that mitigates climate change, and governmental decisions to implement policy that targets carbon emissions. Hence, the supply and demand must be controlled by the government dictating informed societal goals onto the market. The market must then respond to these ambitions for the entire system to operate properly, in the end leaving the market susceptible to the actions of government.

Legitimacy vs. Accumulation

Polanyi's double movement is apparent in the carbon markets with ongoing tension between accumulation (free-market) and legitimacy (societal pressures). While the system seeks legitimacy to stabilize the markets, the mechanisms of the industry-emissions trading, offset markets, reporting and disclosure, are all responsive to profit-seeking private governance structures. The legitimacy vs. accumulation dual will always be present with initiatives that need credibility to operate, but also need to track large profits to keep afloat. What is necessary is to establish that the legitimacy of the various carbon schemes does not give way to a self-regulated industry that is

willing to compromise the initial objective for increased profits. Such a move would surely pull the societal support out from under the system. Therefore, it is important that the scope of private governance is limited. Instead, international organizations, for example the UN and EU who have outlined the framework for carbon governance, take a more active role and become an impartial force in this arena. However, a counter argument can be made that an attempt to over-regulate the carbon markets through political processes, like setting up institutions to impartially monitor offsetting projects and carbon finance that incorporate stale bureaucracy, can be counterproductive to the success of the emissions reduction system, and carbon finance will lose its attractiveness to investors, limiting the potential efficiency of the system (Paterson; 2010, 15). A notable argument, however, given the great deal of capital exchange involved in these growing markets, is that surely finances can be put aside to fund carbon change observers without retracting a great deal of the intended cost effectiveness of cap and trade. Furthermore, it is not necessary that the entire system be regulated and monitored by public officials, thereby eliminating the private regulators, but that public officials are in control of the regulation processes in a hierarchal manner with private operators in subordinate roles.

Accumulation and legitimacy should not be made to function as two opposing poles, but rather with the same aim in which proper governance structures assert that accumulation is impossible without incorporating legitimacy. This would result in providing financial rewards only for effective initiatives, rather than for the current system, which provides incentives to get into carbon finance without necessarily providing environmental benefits. Bernstein succinctly illustrates the current tension between legitimacy and accumulation in the political economy of environmentalism, when stating ‘the contemporary legitimacy challenge’, stems, in part, from the very success of liberal environmentalism when governing arrangements have gone too far towards elevating the normative status of markets, thus, in effect, subordinating environmental purposes to economic goals, even within ostensibly environmental institutions (Bernstein; 2005, 164). Consequently, it is important that a proper equilibrium is managed between private and public governance without the former being able to free itself from social and political constraints. The carbon markets must be adapted to retain the necessary amount of efficiency, as well as the support that it needs from the public as the ‘way forward’ towards a sustainable solution to GHG

emissions reductions, and most importantly, produce results.

In the works of Antonio Gramsci, the concept of hegemony is used to recognize the influence of societal groupings on rules, norms and policies to systematically benefit certain groups by maintaining economic and social structures (Levy and Newell; 2002, 87, Levy and Egan; 2003, 824). Gramsci uses hegemony to describe; ‘not only a unison of economic and political aims, but also intellectual and moral unity . . . the development and expansion of the group are conceived of, and presented, as being the motor force of a universal expansion. . . . the dominant group is coordinated concretely with the general interests of the subordinate groups’ (Gramsci; 1971, 181). Here civil society is structured to preserve the hegemonic stability of the economic and political order by aligning general interests with those of the elite, but ensuring that the interests of the elite prevail within the system.

By applying a neo-Gramscian perspective to understanding environmental governance, it can be said that hegemony exists as a structural safeguard for political and economic stability. Those in dominant roles in society will respond to public concerns for the environment by giving the impression that certain reforms are targeted to increase environmental sustainability when, in fact, they are actually functioning to also fulfill, simultaneously, completely separate goals. Actors who control these economic and political structures will amend the political and economic relationships with the environment, but will not do so in a way that is likely to threaten the current order, in effect, remaining, in a hierarchical sense, on top by maintaining hegemony over environmental governance with the appearance that specific reforms are solely environmental efforts. As a result of this façade, firms and political actors are able to project that they are legitimate actors in environmental governance, when they may be pursuing goals that are not principally environmental, but strategically accommodating for their own well-being (Levy and Newell; 2002, 93).

Conclusion: Regulating the Carbon Markets

One answer to the aforementioned difficulty in the carbon markets of accumulation vs. legitimacy is increased regulatory reforms. Regulating the carbon markets by way of government intervention is attractive because the carbon markets are very much still in their infancy. Regulation would help to protect the capital investments in new markets, following the same logic that argues for state-led interventions in other privatizations and commodifications where the commodity in question is a political construct, and thus reliant on good governance for market stability.

Reforms in the offset markets are first and foremost necessary to improve methodologies for accurately determining and quantifying emissions reductions. Such reforms will go a long way towards preventing gaming and fraud. In doing so it is important to observe which CDM activities and their prescribed emissions reduction accounting methodologies can be fixed, scrapped, or remain unchanged. Given that the CDM encompasses such a wide scope of activities that reduce, avoid or sequester GHGs, it is conceivable that some of these existing methodologies are simply not suitable as a part of the CDM.

There have been numerous CDM projects that accumulate 'smoke stack' credits by simply altering or filtering pollution that is generated by already profitable industries. Most of these projects have taken place in more developed countries like China and India, and result in claims to offset emissions in numbers that are extremely difficult to verify (Financial Times; 2007). Furthermore, these projects do not at all fulfill the developmental criteria of the CDM, in reality only benefiting already wealthy factory owners and carbon market players. In contrast to the 'smoke stack' credits, there are many CDM methodologies that have easily quantifiable emissions offsets, as well as developmental benefits, notably, efficient cook-stove projects that are becoming popular with a great deal of success throughout Sub-Saharan Africa. These projects, by way of a simple explanation, are designed to catalyze a fuel switch in the domestic setting from a carbon intensive to a less carbon environmentally destructive fuel source, (i.e. charcoal to wood) or reduce the amount of fuel that is being burned by using technologically advanced stoves. Without the financial attractiveness that the

CERs bring to such projects, the high tech stoves and socio-economic benefits that they accompany are not foreseeable. Efficient cook-stove projects not only fulfill the emission reduction criteria of the CDM by reducing deforestation in Sub-Saharan Africa, a considerable problem, where over one half of the deforestation is directly caused by the demand in cooking fuels, but fulfil the developmental criteria as well. They allow for women reduced cooking and fuel gathering time, lowered household energy costs, as well as health benefits in reduced smoke inhalation. The comparison of these two CDM project types illustrates that the CDM can be a successful venture if properly applied. Although it may have seemed like a good idea to build an ambitious all-inclusive offsetting mechanism, simply put, certain types of projects are just not adaptable as part of the CDM.

The CDM Executive Board (EB) is also in need of some alterations aimed at achieving tighter regulation in the offset markets. The EB and its staff are responsible for supervising the entire system from an overly top down perspective. Paulson suggests that the CDM Executive Board take on a more direct role in projects by applying CDM transaction costs to the validation process (Paulson; 2009, 5). Instead of letting profit-seeking firms into the validation process, the EB should include under its control a centralized entity that more strictly follows the CER verification standards. Likewise, the EB has the ability to work closely with DNA's to prevent project manipulation, which would be accomplished through a more open information exchange between the EB and project developers.

The EB controls which projects are accepted and is meant to reduce perverse incentives for players in the offset markets. However, the UNFCCC Secretariat does not give the EB a large leadership or regulatory function, instead leaving these important roles, respectively, up to the nation states' DNAs and the DOEs that are contracted by project developers (Purdy; 2009, 10). The DNA is often inexperienced and unqualified in the CDM, and unable to provide the guidance that the stringent CDM methodologies require. The DOE is, due to profit seeking and conflict of interest, not suitable as a regulatory vehicle. To overcome this downfall the EB could increase its relatively meager staff and take on more regulatory and advisory responsibilities by employing technical experts that communicate with project developers more closely. A more capable EB could act to reduce the risk of projects

failing to accumulate CERs and, in turn, disincentivise malpractice in offset project development. Considering that the EB currently levies an administration fee of 2 percent of credits from projects and operates at about a 50 percent annual surplus, the expansion of the EB to enforce greater regulation and more fluid information exchanges would be welcomed at very little cost

In general carbon finance, including the financial managers of carbon assets - the intermediaries between the buyers and sellers of carbon credits - a number of regulatory measures could strengthen the market place. First of all, the risk involved in carbon trading must be addressed. Carbon credits, when traded as derivatives, do very little to actually reduce this risk as is intended, but instead spread it around and hide it; likewise to the securitization of assets that triggered the 2008 financial crisis. This redistribution of volatile assets is referred to as 'financial contagion', whereby a number of bad apples (similar to bad mortgages) could eventually bring down the entire system if risk is not properly calculated, if calculation of such risk is even possible. To tackle this problem the carbon markets could establish benchmark and maximum prices that would bring increased investor confidence and reduce speculative behavior. In addition, this would reduce the creation of obscure financial packages and money-making schemes; a policy that would be, although politically difficult, led by states to prop up the carbon markets when faltering, and rein them in when necessary. Such a system would be hybrid in nature, with the benefits of both quality and quantity economic instruments; a quota on emissions, but also price controls comparable to a carbon tax.

Carbon price ceilings and guarantees would bring welcome predictability to the carbon markets for industry and utility companies that need to apply the cost of carbon to long-term financial planning of energy intensive ventures. To be successful, a hybrid policy instrument should be developed that is cost effective without having too high or too low caps that result in excess cost or excess leniency, (Held and Hervey; 2009, 13). This can be addressed by creating a regulatory body that oversees the carbon markets and re-adjusts these prices as seen fit. If it is argued that this is too much control on a commodity, then let's look at the OPEC nations and the control that a group of mostly non-democratic countries have on the world's most valuable

commodity. Surely a regulatory body that encourages flexibility in the price of carbon would be a lot less intrusive than OPEC in the oil markets?

Christian de Perthuis, writing in regards to the EU ETS, demonstrates that an independent carbon central bank may be a feasible solution as a regulatory arm in carbon finance. In Europe, a CO₂ central bank would be established as an independent body that reports to the European Council, EU Parliament and European Commission, designed to focus on long-term strategy for efficient carbon markets, (De Perthuis; 2011, 10). Although De Perthuis only mentions a European solution, essentially because Europe holds the most successful experiences in carbon market performance, the idea of a central carbon bank could be globally inclusive, responding and reporting to a plethora of international organizations, (EU, OPEC, UN, etc.). Owing to the centralized manner of such an institution, behaviors like transaction fraud, double counting (recycling) credits, and cyber fraud would be more successfully avoided. Furthermore, investor confidence could be retained with a coordinating body that may act in a similar fashion to monetary markets' 'lender of last resort', as a 'safety valve', suppressing the cost of carbon when soaring prices would otherwise result in negative repercussions in the global economy (De Perthuis; 2011, 10).

Civil regulation can also play a large part in fine tuning the carbon markets. Civil regulation will encourage increased transparency in carbon accounting through various non-state market driven carbon disclosure mechanisms and certification schemes that target certain industries, from a normative perspective outlining the standards that corporate governance should follow in their carbon market performance (Cormier et al. 2005, 9 and Levy, Kolke and Pinske; 2008, 726). Carbon disclosure will allow for civil society to monitor the progress made by certain firms in their emissions reduction efforts; a process that will undoubtedly put pressure on firms that are not implementing environmentally progressive behavior in reduced emissions, or who are refusing to disclose their emission levels, to alter their behavior. Firms that are having success in emissions reductions, and those that are even able to claim a neutral carbon footprint, can benefit from advertising their emissions reduction success. However, we are far from institutionalizing any such mechanism that will have reliable results in carbon disclosure. There are many NGOs

that loosely monitor the environmental behaviour of firms, but a great deal of difficulty still exists in obtaining emissions data to be given to the general public on the actual achievements of specific firms. Instead, in communications with the general public we see firms boasting about emissions reduction performances when possible, but otherwise concealing their conduct.

In conclusion, the idea of carbon cap and trade is highly commendable for its ability to become a major factor in addressing a pending climate crisis. If properly applied the carbon markets can be part of a wider reality in environmental economic convergence, a holistic interpretation of environmentally progressive behavior. Environmental convergence involves all walks of life, making necessary strides towards a more sustainable existence by implementing low carbon technologies, business and everyday practices that act in accordance with environmental conscientiousness. The idea is likened to a 'partnership in which governments, businesses, moderate environmentalists, and scientists cooperate in the restructuring of the capitalist economy along more environmentally defensible lines. (Dryzek; 1997, 145). Also termed 'ecological modernization' the concept of economic convergence is set out to exemplify modifications that are economically beneficial for the long-term, as well as aligned to extended political goals (Giddens; 2009, 70). Although the coordination of such goals has proven to be an incredibly onerous task under the current international structure of competing regimes, cap and trade can be successful as a flexible emissions reduction policy if it is given the time to mature in the right political environment with states safeguarding these potentially critical markets.

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