

An Inquiry on the Issues Affecting the Development and
Implementation of an Effective International Agreement to
Mitigate the Effects of Global Climate Change

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Preface

The current status of the global action to mitigate the known effects of climate change is less than what has been deemed necessary by the Intergovernmental Panel on Climate Change (IPCC). The awareness of this unfortunate situation has led the author to pose the question “What are the main issues affecting the development of an effective international agreement to mitigate the effects of climate change?” The process of the inquiry is intended to develop an ability to logically and critically expand one’s knowledge of a given area of interest and to seek out underlying issues that may help to broaden this understanding. A strategic review of empirical and normative texts (on both the causes of failure and possibilities for success in developing an effective agreement), theoretical frameworks on governing environmental resources and historical and current government actions all relating to climate change have been prepared to develop the desired understanding. Although not a required part of the inquiry project, an attempt is made at the end of the paper to highlight the important issues that must be dealt with in the challenge of combating climate change and some possible means by which to overcome them.

Interest in the field is important due to the recent state of affairs regarding the will/ability of sovereign nations to undertake actions to mitigate climate change as described in the Kyoto Protocol to the United Nations Framework Convention on Climate Change. Recently, Canada has expressed in the news that the status of the country’s Greenhouse Gas emission inventory is such that it will have great difficulty meeting its Kyoto commitments. This comes as only one of many stumbling blocks that the Protocol has faced in its attempts to curb the global production of Greenhouse Gases in the hopes of mitigating climate change.

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Abstract

The potential of climate change to disrupt the weather patterns, biological cycles, ecosystems and economies of the planet on which we live is cause for action in the form of mitigation on an international scale. The development of a widely accepted and binding agreement on behalf of both the world's largest current greenhouse gas emitters as well as the developing countries that are poised to over-take them is an important aspect of the actions required to effectively combat it.

The determination of the main issues hindering the development of this international agreement is the central focus of this paper. Reviewing various schools of thought by experts in their respective fields is necessary to develop a thorough understanding of how these issues have affected actions of the international community. Firstly, to frame the context of the problem at hand, the development of an understanding of governing the global commons, dealing with free riders and how differing world views can alter one's perception of a given issue is undertaken. Secondly, more practical issues such as overcoming economic variables, the use of vague language, ineffective use of scientific data, conflicting policy agendas, lobby groups and personal convictions are explored to further elaborate why an effective agreement has not been reached.

Exploration of the above variables has led to the conclusion that it is the inability to prevent free riders that seriously undermines the international actions designed to mitigate climate change. The other issues discussed, would be less problematic if this basic structure could be changed. Since this situation cannot be changed, the proper incentives must be in place to entice nations to overcome the major issues and to act in accordance with the international expectations defined by the Intergovernmental Panel on Climate Change. Included at the end for further explanation and understanding is a timeline of events that have defined the global state of affairs in climate change arena. This is useful in framing the historical actions as they have exposed the weaknesses in the international regime in its ability to adequately quell climate change.

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Introduction

Modern discussions surrounding the changing climate tend to incorporate aspects concerning social, technical, economic, and environmental factors. The term climate change is used in various circumstances and has had various meanings depending on the intent of the person using it. Climate change is defined by the UN Framework Convention on Climate Change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods” (UNEP, 2006. p.3). This definition which asserts that the influence of humanity’s actions is the essence behind the term, quickly establishes the notion that while naturally occurring variations in the climate do happen, the use of this word implies that those effects are to be considered separately. This is the definition that will be accepted in this paper and the naturally occurring climate variations will be taken as outside the scope of that which we are exploring.

The concern that climate change will have a detrimental effect on the inhabitants (namely humans) of the planet is the driving force in the development of an international agreement aimed at reducing Greenhouse Gases (GHG’s) (which have been identified as the primary cause of climate change as previously defined). In order to help develop the scientific framework on which climate change actions should be based, United Nations Environment Program (UNEP) and the World Meteorological Organisation (WMO) formed the Intergovernmental Panel on Climate Change (IPCC). Their mandate was specifically to “assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of the risk of human-induced climate change, its potential impacts and options for adaptation and mitigation.” (Intergovernmental Panel on Climate Change, 2006) The results of the IPCC reports were intended to provide policymakers with the information they needed to move forward in the development of an international agreement on climate change. Even though the 2001 Report from the IPCC states that “the balance of evidence suggests that there is a discernible human influence on global climate”, nations have not been able to unanimously undertake

programs that are adequate to meet the levels of reductions that the IPCC deems necessary. The manners in which politics, economics and ideological suasions have infiltrated the development and negotiation of the current international agreements (the UNFCCC and the Kyoto Protocol) will be developed in the body of this paper. As well the influence that the prevailing science has had on the final actions taken by the international community will be identified at the relevant points throughout the discussion. These influences are highlighted in the annotated timeline of climate change actions appended at the conclusion of this paper.

The lack of an international governing body necessitates that the various national governments work together to mitigate climate change due to the common resource aspects of the atmosphere. Since no country can isolate itself from the negative effects of climate change nor can any country prevent its actions from affecting the rest of the world, the atmosphere must be governed effectively to protect those that will be most negatively affected by the anticipated changes in the climate.

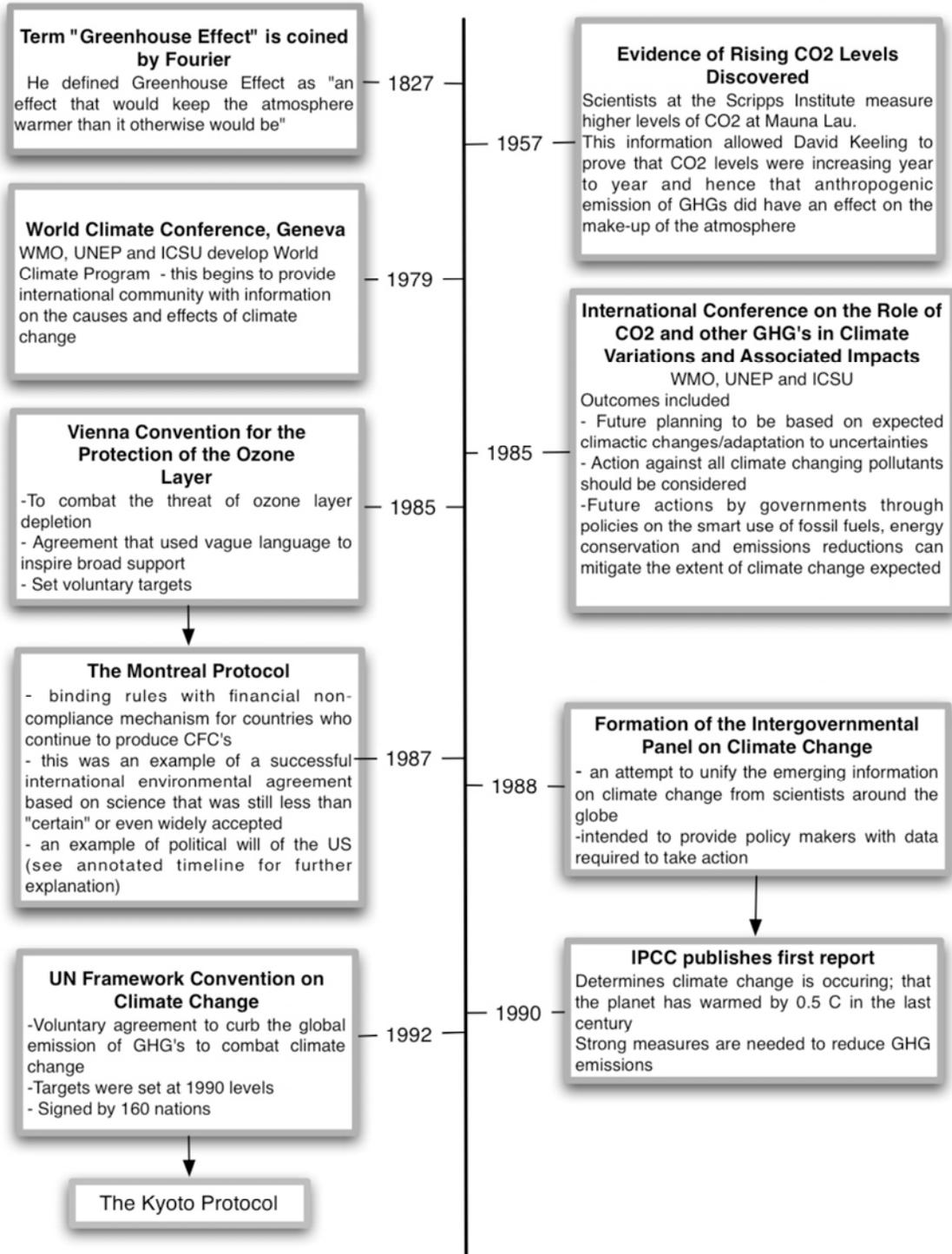
In order to address the central question of “what are the main issues affecting the development of an effective international agreement to mitigate the effects of climate change”, the following methodology is used.

1. Introduction to the theory of common pool resources
2. Discussion of free riders theory and the influence of world views
3. Literature review of contextual issues seen facing governing the atmospheric resource
4. Discussion of main practical issues explored –Vagueness of Language, Ineffective Use of Scientific Information, Economics, Conflicting Policy Agendas, Personal Lobby Groups and Personal Convictions
5. Discussion of Recommendations based on findings

Climate Change Timeline

Following is a condensed timeline to assist the reader in understanding the actions taken to date by the international community in the context of climate change. A comprehensive and annotated timeline can be found appended to the paper which will enhance the understanding of how the main issues developed through the paper have surfaced in the world's struggle to mitigate climate change.

Climate Change Timeline



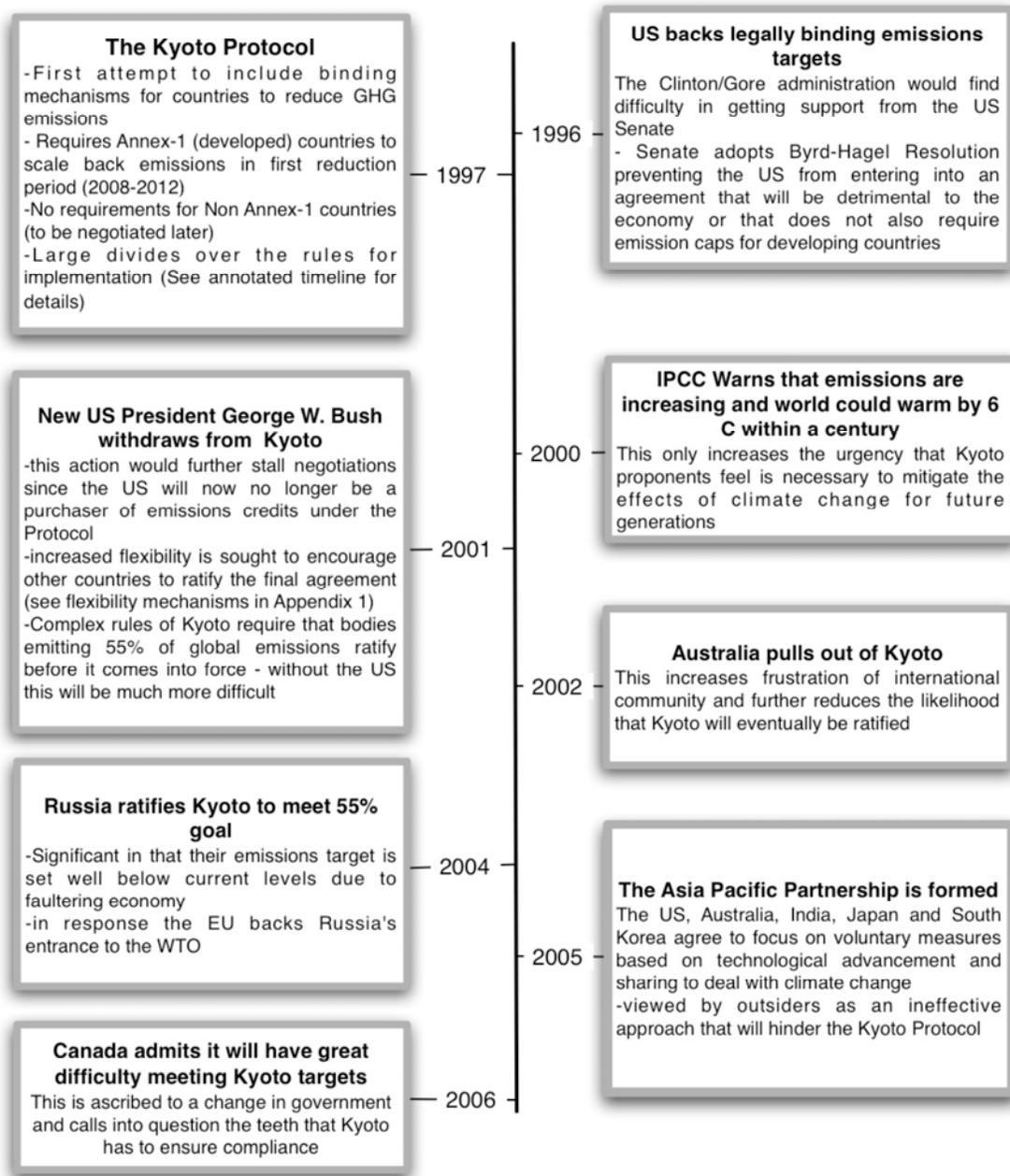


Figure 1. Timeline of Important Events in the Development of an International Agreement to Mitigate Climate Change

Literature Review

The major works reviewed pertaining to governing the environment as a commons and the effects of free riders are Dietz et al. in “Struggle to Govern the Commons” (2004), Ostrom et al. in “The Drama of the Commons” (2001). Dietz et al. outline a number of aspects of a governing scenario that can foster effective commons governance. They ascertain that the ability to monitor usage of the resource at a relatively low cost, the amount of exclusivity of the resource and the availability of factual information about the state of the resource and the effects of human actions are all important factors in how successfully that resource can be managed in a sustainable way. There is also reference made to how power and values of the involved parties are important in determining how they will deal with the conflict that arises when sharing environmental resources. Ostrom et al. focus more theoretically on the issue of the tragedy of the commons and how free riders pose particular problems in these scenarios. Of note is the distinction between common pool resources and common pool sinks that allows the global atmosphere to be more correctly categorised as the latter.

Nick Brooks (2003) suggests that the influence of world view and ideologies are integral to the understanding of the negotiations and debate over how to adequately respond to climate change. He says that it is these differences that account for the variations in approach from the developed and developing world. This theory has implications in all of the practical issues seen throughout the paper such as the ineffective use of science in that he suggests that there is very little debate over differences in opinion over scientific or economic matters but rather over moral preference and world view. The general argument of the paper suggests that there are many spectra upon which ideologies differ and that these infiltrate our basic understanding of goals and actions of modern people, even if we are not aware of them.

Barrett and Stavins (2003) deal directly with issues of compliance and participation in international climate change agreements. This piece of work details a fairly comprehensive list of suggestions for alternatives to the Kyoto Protocol which deal mostly with its architecture. It also relates methods of increasing compliance,

participation and mitigation and how they jointly affect the outcome of an international climate change agreement. The overall conclusions drawn were that the basic issue is one of deterring free riders and that there is not nearly enough scholarly work in existence that would suggest a likely route to ensure the adequate amount of compliance and participation necessary. This work is valuable in assessing the positives and negatives associated with different types of mechanisms meant to increase the effectiveness of climate change mitigation. It is used to help determine the suggestions for action near the end. It is important to note also that this work appeared prior to the development of the Asia Pacific Agreement and the so that type of framework is not incorporated into the work.

Theory of Governing the Public Goods

Aristotle observed “what is common to the greatest number has the least care bestowed upon it. Everyone thinks chiefly of his own, hardly at all of the common interest” (Aristotle, 350 B.C.E). The phrase “tragedy of the commons” first coined by William Forster Lloyd in 1833 depicts the destruction of an openly available and subtractable resource due to the nature of humans as noted by Aristotle. This is an integral theory in the development of a proper picture of the governance of the atmosphere as a resource.

A natural resource such as the global atmosphere has the characteristics of a common pool resource; where a number of people have access to it and their use can negatively affect it (Ostrom et al. 2001). The natural structure of the atmosphere (its technical aspect) is important in understanding why it would be very difficult to prevent most anyone from enjoying/exploiting it. Although this may seem obvious, the ability or inability to exclude others from using the global atmosphere is an important element when discussing how it should be governed. It is nearly impossible (and not necessarily desirable) to exclude any individual from using the atmosphere for his or her own personal consumption. The varieties of beneficial uses of the atmosphere (breathing, pollution sink, solar radiation blocker, climate moderator) make it particularly difficult to determine acceptable and non-acceptable uses. The technical aspects of the atmospheric common pool resource can make the consumptions and withdrawals from the citizenry

very difficult to predict or measure and it is also difficult to determine the accurate replenishment rates required for sustainable use. (Sproule-Jones, 2003)

The typical tragedy of the commons is where one user of the common pool resource has no incentive to restrain usage (or pollution) of that resource if the other users do not do so as well. This seems a reasonable depiction of the global atmospheric resource and the associated threat of climate change. The tragedy occurs when all users then over-consume (or pollute) the resource and the resource becomes unsustainable. In dealing with the atmosphere, the concern is that the excessive emission of GHG's into the atmosphere will cause it to change and hence cause the global climate to change in unpredictable and unsuitable ways. When this happens, the climate may cease to provide the current (or previous) level of benefit to the populations who have been depending on its relative consistency. This unfortunate result however, does not necessarily have to occur if one incorporates the particular rules that have been associated with the resource by society (Sproule-Jones, 1993). In order to prevent this tragedy, governments can set up rules that can persuade people to use the resource in a more sustainable manner and they may, as well, enter into agreements with other governments for the same purpose. Sproule-Jones (1993) determines that it is the nature of these "rules" or agreements that can determine whether or not the resources get used in a mutually productive or mutually destructive manner. The 1997 Kyoto Protocol to the 1992 UN Framework Convention on Climate Change is one such set of rules that are intended to curb the excessive emission of GHG's into the atmosphere.

Again, the technical aspects of the atmospheric resource pool (and any other environmental common pool resource) make these rules and agreements difficult to construct due to their scale, variety of interdependencies, complexity and uncertainty (Sproule-Jones, 2003). The 1987 Montreal Protocol for the Protection of the Ozone Layer is an international agreement similar in its construction to the Kyoto Protocol. The targeted substance in the Montreal Protocol was the Chlorofluorocarbon (CFC) which is a much less integral substance to the overall global economy. This is one of the main

reasons (it is proposed) that the Montreal Protocol was so much more successful than the Kyoto Protocol (Barrett, 2003)¹.

What also makes the governance of the atmosphere difficult is that it is a resource sink. Dietz et al (2004) state that it is important to distinguish between two types of common pool resources. There is the standard common pool resource where the concern is that the users will extract too much of the resource and that it will eventually “dry up” and there is also the common pool resource sink where the issue is with putting too much of a contaminant into the resource and that this will reduce the beneficial uses of the resource. The use of the common pool framework in the analysis of common pool resource sinks such as the atmosphere has not been well studied and so Dietz et al. (2004) suggest that the devising of rules for this group of resources should not occur without a careful examination of the local characteristics of the resource use. In this paper the extension of the common resource rules will be used while keeping this suggestion in mind.

Main Issues in Governing Common Pool Resources (CPR)

The following section discusses theoretical issues that make the governing of CPRs difficult. The existence of free riders and the world views held by those in power influence the way in which leaders will approach cooperative measures with other nations in managing CPR's. These two theoretical issues were seen to be of the most influence based on the literature review performed.

Free riders and the Associated Problems

One of the main issues in governing a common pool resource is the problem of free-riders. “If it is not practical to exclude a user nor possible to force that user to contribute

¹ There are many similarities between the Montreal Protocol and the Kyoto Protocol and these are developed more thoroughly in Appendix 1 in the annotated timeline pg.35

to the costs of developing and maintaining the resource, the non-contributing user is called a free rider.” (Dietz et al., 2004)

The effects that individuals or nations have on the climate are hard to distinguish from the effects that other individuals or nations have on the climate. The nature of the atmosphere is such that it is impossible to associate changes with individual actions even though the knowledge is available that can theoretically link actions to expected changes. In the case of the atmospheric resource even the determination of the definition of a free-rider is difficult in the climate change issue. One idea to help define the free rider in this case is that any emission of GHG’s above the “naturally occurring levels” could be considered as polluting or abusing the atmosphere. This level is obviously very difficult to determine and surely many would have differing opinions regarding it. Also, one could attempt to determine the “ideal” emission rate of GHG’s above which the climate would be adversely affected. If this were possible, any emission above that could be considered to be pollution. The inability to easily define what countries, groups or individuals are operating as free-riders or polluting the resource inhibits ones ability to determine how to effectively encourage those thought to be guilty of free-riding to discontinue their actions.

The discontent between the developing and the developed world on the issue of climate change responsibility can be partially attributed to each other’s concern that the other is acting as a free-rider (Richards, 2001). Developed countries such as the United States are aware that without cooperation from the developing countries, actions by the developed world may be negated. This is shown through the adoption of the Byrd-Hagel Resolution by the US administration in 1997 that prevented the US from signing any international agreement on climate change that did not also require actions from developing countries².

Some anticipated problems of climate change have been shown to be quite deleterious and so Barrett and Stavins (2003) suggest that it may then seem reasonable to think that the issue of free-ridership would not occur and that the incentive of a stable climate

² Refer to Appendix 1 for a further discussion on pg 41.

would be cause for action. However, Barrett and Stavins (2003) also point out that this is dependent upon the particular aspects of the issue. In the case of climate change, countries that act to mitigate climate change by reducing GHG emissions will only receive a small part of the total benefits of their actions. Since the marginal cost of reducing GHG's tends to increase, Barrett and Stavins (2003 p.350) suggest that the "incentive for countries to mitigate climate change on their own is greatly reduced". They note that free riding becomes even more problematic as the aggregate gains to cooperation increase (a countries' incentive to mitigate at the margin falls as other counties mitigate more) (Barrett and Stavins, 2003 p.350).

Another issue with free riding is that in the international arena there is a lack of central binding coordination and few if any corresponding laws that can be instituted to accompany this in theory. In "Law Among Nations", von Glahn and Taulbee (2006) discuss how sceptics of international law believe, in essence, that it has no substance because of this lack of central authority and as such, international law does not have the ability to be enforced. A government could choose to not meet the terms of an agreement, when as a result of complying to said agreement, law or treaty, they would incur a short term loss. This lack of jurisdiction makes forever present and to some extent unavoidable the threat that any given country can act as a free rider and reduce the effectiveness of any given international agreement. However, if the benefits of partaking and complying with the law or agreement are superior to most other interests of the countries involved, then the level of reliability for the signatories to the law or agreement increases. Von Glahn and Taulbee (2006) suggest that there are a number of incentives for countries to comply with international law that are often misunderstood and that this can be the reason why people may feel that the lack of substance of international law is due to the absence of formal institutions. Also, they note, there is an incorrect assumption that central institutions produce stable and predictable rules of law and that this is not necessarily the case as seen by the number of coups, revolutions and secessions found throughout the years in different ruling authorities.

Influence of World Views

An important point to note thus far is that the underlying assumption being made by the author is that the global population must consciously take action to mitigate its effect on the global environment for the good of all people. This inherent belief is not necessarily shared by all those taking part in the discussion/literature of climate change. The often-ignored role of ideology and the various philosophical contexts can be crucial in determining peoples' attitude towards environmental issues (Brooks, 2003). The philosophies and values behind peoples' attitudes must be included when attempting to interpret actions and statements made by those involved in the global discourse on how to appropriately deal with the issue of climate change. The manipulation of "scientific" data for ideological purposes can negatively effect the broader public perception of an issue and as well can make the general public sceptical and ill-prepared to interpret publicly provided data in an impartial and objective manner (Brooks, 2003). Brooks (2003) suggests that differences in moral perception and world view can be used to explain the differences of opinion on how societies should choose to develop in light of the scientific information and economic matters of the present day. Two views that can be seen to stand on different ends of the climate change spectrum regarding the appropriate human reaction to climate change are those that conscribe to a more promethean view and those that choose to view the world through more of a precautionary principle focused lens.

Those with a more promethean belief may or may not believe that the emission of excessive amounts of GHG's will alter the climate substantially however they are more inclined to believe that humans will be able to adapt to any climate changes as they have in the past and that humans should develop the world to suit themselves (Brooks, 2003). This way of thinking also accepts that there will be those who will be more negatively affected than others. On the other hand, a precautionary approach to dealing with anthropogenic climate change might be to reduce the total amount of GHG emissions by the global population in the case that humans are unable to deal with the consequences and that this is preferable for the global population as a whole. Brooks (2003) refers to these beliefs as being part of a deep green ideology.

This suggests how their respective proponents can accept both the Kyoto Protocol and the Asia Pacific Partnership. The Kyoto Protocol leans on the precautionary principle to explain the need for immediate actions in light of unknown consequences in the future. The Asia Pacific Partnership on the other hand leverages increased technological capabilities to mitigate climate change and it is as well intended (through the associated development) to further aid developing countries to be better able to adapt to it.

Keeping these contrasting views in mind, while also remembering that most people will lie somewhere in between the two ends of the spectrum, may help to explain actions taken by governments and individuals in the climate change battle that might otherwise seem irrational.

Practical Issues in the Development of an International Environmental Agreement

This section attempts to clarify the issues seen with the development and implementation of an international agreement on climate change. They have been chosen based on the literature reviewed and encompass a variety of ideas from different approaches to understanding what the main hindrances have been.

1. Vagueness in Language for Avoidance of Conflict

“The passage of legislation often requires ambiguous language and contradictory goals to hold together a passing coalition.” (Matlund, 1995 p. 147) This result is a common occurrence where the trade-off between a “broad but shallow” treaty and a “narrow but deep” treaty is integral in determining the extent of the actions to be called for in an international environmental agreement. (Barrett and Stavins, 2003 p. 359) This is one reason for the apparent lack of teeth of many international agreements. Climate change mitigation requires actions by numerous countries since the emission of GHG’s is seen from all countries and not just a few. The maximization of the effectiveness of the actions against climate change and the minimization of the costs seen by any given country are two explanations why the inclusion of a higher number of countries is

sought. However, this also requires greater flexibility in the final agreement since there are bound to be diverging attitudes about how the battle against climate change is to be fought. The need for greater flexibility has played a major role in the negotiation process of the Kyoto Protocol. Differences in the level of development of the country, the dependency on fossil fuels and the current level of emissions of any given country will have a significant effect on their willingness to commit to a binding agreement on the reduction of GHG emissions (Faure, Gupta & Nentjes, 2003). This methodology for working towards a collective decision also inhibits the likelihood that any binding penalties (significant ones especially) are included in the agreement for non-compliance by countries. The inclusion of such a measure greatly reduces the incentives for any given country to partake if the goals of the agreement are too aggressive or there is uncertainty in the countries' ability to comply. This catch-22 style scenario of a financially binding agreement thus makes the inclusion of financial non-compliance measures likely to reduce the number of parties willing to participate and the lack of these measures reduces the likelihood that the participating nations will comply (Richards, 2001). Additionally, by watering down the final agreement into one where no one is completely satisfied increases the difficulties seen in implementation by the signing countries (Matlund, 1995). The eventual retreat of both the United States and Australia from the Kyoto Protocol is a likely consequence of failures to overcome these issues.³.

2. Ineffective use of Scientific Information

It is the viewpoint of the author that the success of an international agreement on climate change should be based at least in part on what the scientific evidence available at the time the agreement is signed suggests is required to minimize the negative effects on the population. The availability of this information is imperative if there is to be a common understanding from which to base the commitments of the agreement. When all parties

³ A fuller discussion of the reasons for their backing out can be found in the annotated timeline on pgs. 43-45

involved in the development of the agreement have accepted this evidence, it can provide the framework under which the necessary actions can be determined. In the development of the climate change agreements the amount of media attention given to the “science” of climate change should in theory have worked to the advantage of its inclusion into the development of the agreement. Unfortunately, there has been a very divisive approach to the use of it within the UNFCCC and the Kyoto Protocol which will be seen later in the document.

The “soundness” of the science and the uncertainty that is present in the predictions of future weather pattern changes have been attacked by a number of countries/groups despite attempts to unify the world’s foremost climatologists (specifically through the development of the Intergovernmental Panel on Climate Change). The uncertainty surrounding both the science of climate change and the costs of planned responses to it is often used as a justification for inaction. (Brooks, 2003) Another difficulty faced in incorporating science into an international agreement on climate change is the determination of the level above which the emission of GHG’s is seen as pollution (as noted earlier in the discussion). Also, the argument that GHG’s are naturally occurring in the daily operations of the planet seems to give credibility to those who propose that less action is required to reduce the GHG’s emitted.

Brooks (2003) suggests that politicians are in general unable to adequately understand and account for scientific uncertainty and hence are prone to use the science in order to pursue preferred policies. In addition, the developing countries tend to have a relative lack of information about the science of climate change and its effects due to the lack of funding for regional research support (Richards, 2001). This can inhibit the developing countries’ ability to force action on other countries in the development of agreement actions if other developed countries take advantage of the knowledge gap. This imbalanced situation is accompanied by a relatively lower set of negotiating skills, smaller delegations and language problems on the side of the developing countries (Richards, 2001).⁴

⁴ This can be seen in the unsuccessful negotiation of the Clean Development Fund on pg.43 in the annotated timeline.

3. Economics

The economic factors associated with GHG reduction are additionally of primary importance in the development of an international environmental agreement designed to reduce their emission since their production is so intertwined into the everyday operations of the global economy. In Canada, and many other countries, the largest percentage of the production of GHGs is due to the burning of fossil fuels primarily for energy production (Environment Canada, 2006). This is (and has been for a number of years) particularly true in the developed countries who have been the largest contributors of GHG's to the atmosphere. The ways in which GHG emissions can be reduced by a country include technological advances that increase efficiency of burning fossil fuels, finding alternate sources of energy or reducing the energy consumed by the end user (through conservation or more energy efficient machines and devices). Other than increasing conservation, the remaining solutions can require large sums of capital investment and/or an increase in the cost of operating our daily machinery (cars, air conditioners, household heating, etc). The use of economic concerns as a reason for inaction or hesitation to reduce GHG emission is common among the developed world.⁵ These economic concerns (often from economies that are heavily reliant on fossil fuels) can then manifest themselves in the negotiations of international agreements on climate change when they perceive that the regulations required will be damaging to their large industries. This can be seen by the forced incorporation by some developed countries of financial mechanisms such as the Clean Development Mechanism (CDM), Joint Implementation (JI) and Emissions Trading (ET).⁶ Additionally, developing countries may feel that the burden of reducing GHG's is too great for their struggling economies and that it should be those countries whom have already prospered through the combustion of fossil fuels who should bear the economic hardships of reducing their GHG's.

⁵ Refer to Appendix 1 pg 41 for example

⁶ These mechanisms are dealt explained more fully in Appendix 2.

Costs Associated with Measurement

Associated with the free-rider issue is the ability/inability to monitor or measure the usage of the common pool resource. “Effective commons governance is easier to achieve when the resources and use of the resources by humans can be monitored, and the information can be verified and understood at relatively low cost” (Dietz et al, 2004). The policies that the governing bodies can impose on the common pool resource are dependent on this ability and as well as the reliability of predictions of future conditions (Dietz et al., 2004). In the effort to combat or mitigate the effects of climate change due to the excessive emission of GHG’s above the naturally occurring levels into the atmosphere, the global community must rely on the self-monitoring of nations since it would be virtually impossible to monitor the global emissions as a whole. This monitoring is a significant undertaking in itself and the costs associated are substantial. Although these costs can be partially filtered down to the end emitter, this is still a hefty task that may discourage some countries from participating in the sustainable management of the atmosphere and hence from participating in the international agreements aimed at doing so.

4. Conflicting Policy Agendas, Lobby Groups and Personal Convictions

The understanding of priorities set by a governing body helps to explain actions taken by that body since “all policy decisions are ultimately subjective and based on what the decision-maker wants” (Brooks, 2003 p1). The previous section on economics highlights the fact that a number of countries believe that inaction (or free-riding) is the most economically viable manner in which to deal with climate change. A perceived conflict in policy agendas forces the governing body to determine the priority action. Action undertaken only when the economics associated with that action are positive is an example of when economic growth could be chosen as a prioritised policy. The adoption of the Byrd-Hagel resolution in the US, which provides that the US may not enter into an agreement that will negatively affect the US economy, is an example of

this.⁷ This can also be seen when a country alters its commitment/approach to climate change after a transition of political parties has occurred (such as has happened recently in Canada with a transition from a Liberal to a Conservative Federal Government).

In the case of policies pertaining to any environmental issue (including climate change), the actions (or inactions) of the policymakers may be explained by their allegiances to different sectors of the industrial society.

The influence that lobby groups have on a government is extremely important in democratic based systems such as the United States. Powerful industrial lobby groups who would be negatively affected by stringent guidelines on GHG emissions can persuade governments to turn away from international agreements that would require the administration to cap/reduce these emissions. Grossman and Helpman (2001) suggest that a major source of lobbyist groups' power comes from the information that they are able to distribute to government officials, the media and the general public. In the context of climate change they can do this in a number of ways; they can use large financial purses to alter the public opinion through aggressive ad-campaigns developed to reduce the public concern and hence willingness to accept legislation; they can act destructively in bargaining with labour unions on issues where jobs may be lost if regulations are undertaken and they can participate in the international conferences and pose anti-reduction alternatives to the committees involved.

Tim Flannery (2006), a well-known scientist and author explains the problems that have been had working effectively against climate change as follows:

“The transition to a carbon-free economy is eminently achievable because we have all the technology available to do so. It is only a lack of understanding and the pessimism and confusion generated by special interest groups that is stopping us from going forward.” (Flannery, 2005)

⁷ See pg.41 in Appendix 1

Unfortunately, altruism is not the sole incentive for governing officials and so leaders who are financially (or socially or politically) connected to industries that would be negatively affected may make decisions that lie within their own best interests when it comes to signing or negotiating international treaties. These connections can work both in favour of and against those attempting to develop international environmental agreements as will be seen in the appended timeline of climate change related events. One particular circumstance where this may have been a leading factor was in the acceptance of the Montreal Protocol by the US. A few years previous to the agreement, President Reagan had had surgery to remove skin cancer from his nose, which would likely have given him a strong personal connection to the issue and hence provided increased support for the agreement. (Anderson, 2001)

Summary of Main Impediments and Some Possible Solutions

As evidenced through the appended timeline of important climate change related international activities referenced through this paper an effective and widely accepted international agreement to curb the negative effects of climate change in the present and the future has yet to be developed. Some progress has been made on some fronts due to the increasing availability of cleaner technology and conservation initiatives aimed at reducing GHG emissions; however GHG emissions for a number of countries and the planet as a whole continue to rise (Baumert, 2002). Adaptation to unavoidable climate alterations is a necessity yet it does not preclude or make any less necessary further actions to lessen the effects of excess GHG's in the atmosphere for current and future generations. In an attempt to predict what the future might hold in the way of a more effective approach to mitigate global climate change, it is proposed as a logical continuation that the most important issues that have stalled action thus far must be dealt with or circumnavigated in some manner.

The underlying issue that enables the major points of this paper to prevent the development of an effective international environmental agreement on climate change is the inability to prevent free riding. Barrett and Stavins (2003) also suggest that most issues seen in obtaining participation and compliance in climate change international agreements can be attributed to the presence of free riders. They pose that the deficiency of the Kyoto Protocol is in its lack of incentives to stimulate participation and compliance. This being accepted, the solution should then be to improve the incentives provided since free riding cannot be prevented due to the technical aspects of the atmospheric resource. A single suggestion to mitigate this is to tie the reductions required of developing countries to those actually accomplished by the developed countries. This would help to ease the worries that each will free ride on the other's actions. On the other hand however, if the developed countries fail to meet their targets (as is often seen) then this puts the atmosphere at great risk from an overall decrease in mitigation.

The influence of conflicting world views can be overcome by ensuring that negotiators and decision makers are aware of how they influence their ideas (Brooks, 2003). This can take place through education of leaders and through discussions on the topic by the parties in negotiations. Varying opinions on where the responsibility lies for climate change mitigation actions are based on years of international arrangements and relationships (Baumert, 2002). Since these attitudes are not likely to change in the near term, the future agreement must not be significantly more detrimental to any one country's or group of countries' economy or national competitiveness if it is to be widely accepted (this is based on the catch-22 of the inclusion of developing country emission targets described earlier). Additionally, if the various signatory countries may be able to achieve the maximum benefit in the ways seen as most important to them, they might be more willing to participate, particularly if this is done at minimal cost and the end result is for the betterment of the global atmospheric condition (Barrett, 1999).

A Combined Solution

In order to address the main practical concerns of this paper, the way forward must incorporate the benefits currently being seen by both the Kyoto Protocol and the Asia-Pacific Partnership. Momentum of action is an important factor in any process that involves large numbers of participants and since both of these arrangements have already seen a great deal of effort, it would be wise to incorporate the two.

The main benefits of the Kyoto Protocol are recognizable targets for emission reductions and the flexibility to achieve them in different ways (Baumert, 2002). The inclusion of measurement allows for successful actions to be determined and continued and for non-effective ones to be dismissed (Dietz et al., 2004). Reporting is required to ensure effectiveness and overall acceptance. If this is done openly and so the benefits of measurement and tracking can be seen, then the ability of countries to suggest that the costs of reporting are a deterring factor are reduced. Also, as more research is being done on the ability of climate friendly alternatives to enhance a society's economic output, the excuse of economic hardship due to increased regulations is also diminished.

For cases of countries in extreme economic hardship, transfer payments would be a necessity. Benedick (2001) suggests using a small carbon tax to fund research for new technologies aimed at reducing the emission of GHG's. Instead, this funding could be used to help entice developing countries to accept emissions targets by aiding their actions to incorporate cleaner technologies and furthering sustainable development actions such as Aldy, Orszag and Stiglitz (2001) recommend.

The flexibility of the financial mechanisms seen in the Kyoto Protocol is somewhat able to reduce the amount of vague language in the agreement. Allowing countries to reduce their emissions in the ways seen to be most effective by them and hence reduce the need to overcome conflict does this. The Asia Pacific Partnership has the ability to develop long lasting technologies that will benefit all countries in ways that they can determine will best fit their countries' economic profile. If these two agreements could somehow combine their efforts and integrate their successes, there would be a relatively higher

likelihood of acceptance due to the increased incentives as seen by all countries. Also, efforts already undertaken by countries must be accepted into the new agreement and hence a brand new arrangement is unlikely to be successful (Baumert, 2002)

To ensure that the available science is adequately incorporated into the agreements, these top-down approaches are necessary however they are not sufficient. Developed concurrently should be an institution aimed at providing consumers knowledge about the level of GHG emissions associated with their consumer items. The Advisory Committee on Consumer Products and the Environment (2002) in the UK recommends incorporating the energy efficiency of consumer items into their climate change action program since reducing the need for electricity reduces the overall GHG emitted from the energy production sector. However, the consumer population could be made even more aware if the GHG emissions required to produce the product were given a rating as well. This could serve as an incentive for corporations to invest in more climate change friendly technologies. The same group responsible for developing these standards would have a mandate to increase global awareness of the effects that consumers can have on the development of climate change through their more educated purchases.

The Asia Pacific Partnership's dedication to increasing the level and availability of cleaner technology could as well be incorporated into the Protocol. A standardised system that rates the technologies available could be used in order to determine the correct implementation of a carbon tax as discussed earlier. Companies that use the cleanest technology available would be exempt from the tax. This would either provide incentives for companies to switch to these cleaner technologies or the taxes collected by the program could be used to develop even more advanced technologies (more effective and inexpensive to implement) or help developing countries implement the current technologies where foreign investment is lacking.

The concerns regarding lobbying groups, personal convictions and conflicting policy agendas are much more difficult to address. The situations where these obstacles arise appear to be independent of the structure of the agreement and more a result of the

particular aspects of the country involved. Hence, these issues must be overcome or dealt with on a national basis as they are encountered.

Conclusion

The challenges associated with climate change are not only technical but they are also political, social and economic (Baumert, 2002). The urgency for action is increasing as global temperatures are steadily climbing along with GHG emissions (IPCC, 2002). The current situation of global action on climate change is neither stable nor particularly promising. Continued global action that is sufficient to fully reverse the impacts of human released GHG's on the climate is not a realistic short-term possibility. GHG's already emitted into the atmosphere will stay there for at least 100 years and the effects of these emissions will continue to be felt (Environment Canada, 2006). The only way forward is with both mitigation and adaptation. Insufficient political will in not only previous decades but in the current political arena to face head on the challenge of climate change must be changed if we are to behave ethically on the behalf of future generations. By recognizing that all countries will benefit from coordinated efforts to reduce GHG emissions and that free-riding countries must be prevented even if at great cost, the international community has the opportunity to provide the necessary framework that can be used to effectively mitigate the long-term effects of climate change. Business-as-usual tactics have not succeeded thus far in this process and so the political leaders must recognize the commonalities in their goals to move forward to a more inclusive and effective international climate change agreement. By incorporating the benefits of the two current mechanisms (the Kyoto Protocol and the Asia Pacific Partnership), a more widespread approach can be developed.

Perfection is an impossible task and an indefinable goal. In the climate change actions of the future, common goals must be used as way to overcome differences and invite active participation in a process that will benefit all people of our planet in the future.

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Appendix 1

Annotated Timeline of Climate Change Related Events, Findings and Agreements

The following is a detailed timeline of important developments of the world's response to the issue of climate change. It is annotated to incorporate where applicable the views and theories explored in the earlier sections of the paper.

Early Climate Change Related Events

1827 – Jean Baptiste Fourier discovers and coins the term Greenhouse Effect

1957 – Scripps Institute data is evidence that atmospheric CO₂ levels are rising.

The term Greenhouse effect was first coined in 1827 by Jean-Baptiste Fourier, an early intellectual in the study of heat propagation, as a description of an effect that would keep the atmosphere warmer than it otherwise would be. (NewScientist, 2006) Later, in 1896, scientists would be better able to quantify the expected effects after Svante Arrhenius calculated that a “doubling of CO₂ could lead to a temperature rise of around 5 degrees C” (Jones, 1997 p 4). During this time, both he and American P.C. Chamberlain would become aware independently that the burning of fossil fuels may be a cause for this temperature rise in the atmosphere (NewScientist, 2006). It wasn't until 1957 that evidence of these increasing CO₂ levels would be available after the Scripps Oceanographic Institute began their continuous monitoring of levels at Mauna Lau as part of the Carbon Dioxide Research Group (Scripps Institute of Oceanography Archives, 2006). This information would soon be used by David Keeling to prove that CO₂ levels were indeed rising year to year in the atmosphere (NewScientist, 2006). From these early scientific works, which have led to our current climate based discoveries we can see that knowledge and awareness of humanity's capability to impact on its surrounding environment and climate is not a relatively new concept. With this now put into context, the next 50 years are witness to the action/inaction of our global population in its attempts to reconcile its effects on the global climate.

1970-1980

1972 - UN Conference on Human Environment (Stockholm, Sweden)

1979 – World Climate Conference (Geneva, Switzerland)

UN Conference on Human Environment (1972)

Although not directly for the purpose of climate change minimization, in 1972 the United Nations held the UN Conference on the Human Environment in Stockholm, Sweden. The results of this meeting would form the Declaration of the United Nations Conference on the Human Environment, which would provide a verbal framework in international law for discussion on “common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment”. (UNEP, 2006a) Most applicable from this document in the steps toward global action against climate change is Principle 21:

“States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.”

The language in this excerpt is expertly vague in its clear intent but lack of definition of the word “damage”. So, though all may agree with the intent of this statement, the ways in which different countries can apply it to their environmental practices is left quite open to interpretation.

As previously noted that the knowledge of climate effects due to the burning of fossil fuels were suspected to exist, it wasn't until 1979 that the World Meteorological Organisation (WMO) realised that the possible effects of climate change were not well enough understood and that a meeting must be held amongst scientists from around the world so that they could begin to quantify these effects.

The World Climate Conference (1979)

The WMO hence organised and held the First World Climate Conference in Geneva Switzerland with the help of a number of other international bodies. The main outcome of this conference was the development of the World Climate Program which was to be jointly managed by the WMO, UNEP and the International Council of Scientific Unions (ICSU) (IUCC, 1993) The formation of this body and the information that it would provide in the future could enable policies to be based on more in depth and substantial research on the causes and effects of climate change; something that had been lacking until this time.

1980-1990

1985 - The International Conference on Assessment of the Role of Carbon Dioxide and Other Greenhouse Gases in Climate Variations and Associated Impacts (Villach, Austria)

1988 – NASA is 99% sure that temperatures had increased and that there was some global warming

1988 – Formation of the Intergovernmental Panel on Climate Change (IPCC)

In 1985 the WMO, UNEP and ICSU came together again to further explore climate change and they were now, after having already compiled 6 years of information, ready to discuss it in terms of CO₂ and other greenhouse gas emissions. The International Conference on the Assessment of the Role of Carbon Dioxide and of Other Greenhouse Gases in Climate Variations and Associated Impacts held in Villach, Austria came to the following determination

“As a result of the increasing concentrations of greenhouse gases, it is now believed that in the first half of the next century a rise of global mean temperature could occur which is greater than any in man's history.” (WMO, 1986)

This declaration is posed in a very alarming tone and was based on the available scientific data of the time, yet no actions would be taken by the international community; a trend that will be seen to continue. Another declaration of importance from this

conference was that “gases other than CO₂, such as methane, ozone, CFCs and nitrous oxide, also contribute to warming” (NewScientist, 2006). In addition to this, they developed 3 main recommendations to those in a position to influence their countries’ future actions.

1. That future social and economic planning not be based on historical climate trends and instead incorporate new information on expected climactic changes and the ability to adapt to newly arising uncertainties
2. To consider action against all climate changing pollutants including those that cause ozone depletion and acid rain in conjunction as reducing these will aid in the reduction of rate of climate change
3. That although some climate change is inevitable due to previous GHG emissions, the rate of this change can still be effected through government policies on the smart use of fossil fuels, energy conservation and emission reductions. (WMO, 1986)

These recommendations were based on what was deemed to be the consensus of current basic scientific understanding of the time. In brief: that CO₂ and other GHG’s are increasing in the atmosphere due to anthropogenic causes such as burning fossil fuels and that these will cause the climate to change in ways not yet completely known although they will most surely cause humans to be unprepared to adequately deal with them if action is not taken. Also however, if the necessary precautions are taken, the impacts can be lessened and we can make ourselves adequately prepared to withstand them. And thirdly, that if we continue to act in this manner, the effects will only be increased. (WMO, 1986) The attempt of scientists to use their discoveries to aid in the global decisions being made at the sovereign level is an important piece of the history. Certainty of scientific information and predictions will prove to be an important obstacle that change-makers will continually face. This is one of the major issues in the attempt to manufacture an effective global climate change policy and will be seen throughout this timeline.

Vienna Convention for the Protection of the Ozone Layer (1985)

As the body of scientific evidence on climate change was mounting in the 1980's, scientists were concurrently becoming aware of the negative effects of releasing CFC's into the atmosphere. These CFC's were believed to cause a depletion of the ozone layer which in turn could lead to skin cancer of those exposed to the unfiltered radiation of the sun. As a result of these concerns, early in 1985, the UN opened up the Vienna Convention for the Protection of the Ozone Layer for signatures. This convention was written with deliberately vague language to ensure broad ranging support and that there would be few if any arguments over the contents or requirements. (Anderson, 2001) This is significant because it would provide an example of how the global community of nations could effectively work together to mitigate the effects of pollutants that would effect all countries despite which countries were contributing the most to the pollution (in this case ozone depleting substances). It was thought that this initial convention would allow for the formal processes of research and consultation to begin (Anderson, 2001) so that more effective and binding agreements could be made in future once the effects were better understood and hence the appropriate actions could be better determined.

Specifically, nations agreed in Vienna to take "appropriate measures...to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the Ozone Layer" (The Vienna Convention to Protect the Ozone Layer, 2001).

"The Vienna Convention set an important precedent. For the first time a large number of nations agreed in principle to tackle a global environmental problem before its effects were felt, or even scientifically proven". (UNEP, 2006b) The convention also provided the avenue for countries to have future protocols and defined the procedures for amendments and dispute settlement. (UNEP, 2006b)

The Montreal Protocol (1987)

Over the next few years the scientific community was able to develop the needed data that would provide the framework for policy arrangements to curb the deterioration of the ozone layer; the Montreal Protocol came into effect in 1987 and had specific and measurable targets for reducing ozone depleting emissions. Specifically there was a study

published in “Nature” magazine in May of 1985 describing the depletion of the Ozone layer in the Antarctic. “The paper’s findings were confirmed by American satellite observations and offered the first proof of severe ozone depletion and making the need for definite measures more urgent” (UNEO, 2006b). This correlation of scientific evidence and expected outcomes of the release of CFC’s into the atmosphere was important in helping the public to associate a clear and present danger with claims that scientists were making about holes in the ozone layer. Aside from the public interest however, there were a few other key political and economic reasons why the Protocol could be agreed and acted upon so quickly.

One of the countries that was a major proponent of the Protocol was the United States. Economically, CFC’s were not a major product of US industries and there were already a number of substitutes on the market. Additionally, US companies felt that they were at least as prepared, if not more so in fact, than their European counterparts to incorporate changes in their usage of these products (Anderson, 2001). These economic factors were instrumental in the Reagan administration’s push to ban the CFC’s on the international market. Increased political will to encourage binding reductions may have also come from the fact that a few years previous to the agreement, President Reagan had had surgery to remove skin cancer from his nose (Anderson, 2001).

Now that there was an acceptance that the science was to be heeded and action needed to be taken, and the necessary parties were willing to participate due to the reasons above, the negotiation of the Montreal Protocol began. The Montreal Protocol was able to set emission limits for all countries; industrialised countries limits were immediately binding and developing countries limits included a grace period before they would require them to cut their emissions to the same level set by for the industrialised countries. (Barrett and Stavins, 2003) What was also impressive about this Protocol was the inclusion of a non-compliance mechanism that had teeth. In Article 4A of the Montreal Protocol, when a country is unable to meet its commitments to phase out a controlled substance under the Protocol, it calls for a ban on the export of that substance from the non-complying country. The Montreal Protocol was extremely successful in effectively eliminating the

release of CFC's in to the atmosphere and the desired results are beginning to be apparent. The levels of ozone depleting chemicals in the atmosphere have been dropping since 1994 and the ozone layer is expected to recover by mid-century (The Economist, 2003). Worth noting at this time is that the success of this Protocol can almost be entirely attributed to the willingness of a highly influential country (the US) with high bargaining strength having the political will to take action due to the underlying economic and social factors associated with it. The similarities and differences between this international agreement and the UNFCCC and the Kyoto Protocol are important and will help to explain the differences in action seen further.

Returning to climate change specific debate, in 1988 the Senate Committee on Science, Technology and Space heard James Hansen, director of the Goddard Institute for Space Studies at NASA, make the statement that he was "99% sure that temperatures had increased and that there was some global warming". (Jones, 1997 p 5)

At the same time, scientists at Congressional hearings in Washington DC were blaming major US drought on global warming; the media continued to provide extensive coverage (New Scientist, 2006) which in turn should have provided an increased incentive for political action to appease public concerns.

The development of substantial evidence allows for a "meeting of climate scientists in Toronto to subsequently call for 20% cuts in global CO2 emissions by the year 2005" (New Scientist, 2006) in order to effectively work to mitigate the negative effects of climate change.

It would seem that in light of the numerous studies and research being done on the topic this was the year that UNEP and the WMO agreed that a body would be formed to determine the "soundness" and authenticity of the many studies that were being performed. As such, the Inter-governmental Panel on Climate Change (IPCC) was founded in order to analyze and report on the current findings with respect to climate change in the international community (New Scientist, 2006).

The Intergovernmental Panel on Climate Change, IPCC (1988)

The IPCC in theory would provide the research and data required by policymakers so that international policies and agreements could be based upon shared and accepted scientific conclusions. The IPCC was to be made up of members from both the developing and developed world to ensure that there were minimal biases in the amalgamation and interpretation of the climate change data. Also, this would help to ensure that the skills and information gained in the development of the body of knowledge would be distributed more evenly among the countries.

1990-2000

1990 – IPCC publishes first report and states that climate change is occurring and that the planet had warmed by 0.5 C in the past century

1991: - Mount Pinatubo erupts in the Philippines, throwing debris into the stratosphere that shields the Earth from solar energy, which helps interrupt the warming trend. Average temperatures drop for two years before rising again. Scientists point out that this event shows how sensitive global temperatures are to disruption.” (New Scientist, 2006)

1992 – UN Framework Convention on Climate Change is signed (Rio de Janeiro, Brazil)

1994 - The Alliance of Small Island States - many of whom fear they will disappear beneath the waves as sea levels rise - adopt a demand for 20% cuts in emissions by the year 2005. This, they say, will cap sea-level rise at 20 centimetres. (New Scientist, 2006)

1995 – Hottest year on record to date

1996 – US backs legally binding emissions targets

1997 – The Kyoto Protocol to the UNFCCC gets signed (Kyoto, Japan)

1998 - Hottest year in the hottest decade of the hottest century of the millennium. (New Scientist, 2006)

2000 - IPCC scientists re-assess likely future emissions and warn that, if things go badly, the world could warm by 6°C within a century. A series of major floods around the world reinforce public concerns that global warming is raising the risk of extreme weather events. (New Scientist, 2006)

Two years after its formation, the IPCC would publish its first report. In this report, it would clearly state that climate change was occurring (that the planet has warmed by 0.5°C in the past century) and claimed that strong measures were needed to reduce the volume of GHG's that were being emitted into the atmosphere. This report should have provided the necessary scientific data required by policy makers in order to begin the process of negotiations toward a climate change convention. (New Scientist, 2006)

The UN Framework Convention on Climate Change (1992)

The first attempt at an international agreement to help combat climate change took place at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. Representatives from 160 nations negotiated on targets to be set for GHG emissions and the “provisions for technology transfer and financial resources to developing countries” (Government of India, 2006). What resulted was the UN Framework Convention on Climate Change (UNFCCC) which was intended to “stabilise greenhouse gas (GHG) emissions by Annex 1 countries”. (CSE India, 2006) This was a voluntary treaty with the “aim of countries returning individually or jointly to their 1990 levels the anthropogenic emissions of carbon dioxide and other greenhouse gases not controlled by the Montreal Protocol.” (UNFCCC COP11, 2006) Similar to the Vienna Convention where vagueness was used to encourage wider participation, the UNFCCC also watered down the requirements; only this time it was to satisfy the complaints of the US who were unwilling to accept that immediate action was necessary. The lack of political will of the US would become increasingly apparent. They would choose not to accept the warnings of the international scientific community who suggested that the science was certain enough to determine the level of action required. This is contrasted to their level of participation at the Montreal Protocol where the science was also (if not more so) under scientific scrutiny and contention. It is important to note at this time the changes in positions of two of the key players in the climate change negotiations since the time of the Montreal Protocol, namely the US and the EU. Compared to the earlier Reagan administration that was in power during the negotiations of the Montreal

Protocol, the Bush administration more fiercely resisted regulation and interference with markets (Anderson, 2001). Also, the industrial base in the US was not as willing to see changes in the usage of fossil fuels as they had been with CFC's; this was of particular importance due to the influence of the "coal, oil, gas and power producers which were huge powers and as well their interests were defended not only by corporations, but also increasingly influential labour unions" (Anderson, 2001 p.15)

Although over 150 countries signed the UNFCCC, in the end it was only accomplished by a few (Jones, 1997 p.5). There were no penalties associated with non-compliance and few incentives to comply since the benefits of maintaining free-rider status could be substantial. Although it was stated very clearly in the document that the brunt of the initial work was to be done by the developed country parties, the will of these countries and their pledges never materialized into the necessary actions to succeed at meeting the reduction targets agreed to.

Three years after the signing of the UNFCCC, the first Conference of the Parties (COP-1) takes place in Berlin which turns out to be, coincidentally, the hottest year on record. (New Scientist, 2006) At this Conference the Parties agree to the Berlin Mandate which acknowledges the need for industrialized countries to make real cuts in their GHG emissions which are to be determined by 1997 (New Scientist, 2006) and are to be effective until 2020. Additionally, they agree to implement a test phase of Joint Implementation (JI) called Activities Implemented Jointly (AIJ) which allows voluntary cooperation among Parties to mitigate GHG emissions. (CSE India, 2006) In the following year, 1996, the IPCC released its Second Assessment Report which was able to state that "'The balance of evidence suggests that there is a discernible human influence on climate change".

"In 1996 at the second meeting of the Climate Change Convention, the US agrees for the first time to legally binding emissions targets and sides with the IPCC against influential sceptical scientists." (New Scientist, 2006) This bold move was seen as a departure from the previous path of the government and could be believed to have evolved with the growing amount of scientific evidence. The Clinton-Gore administration would then

however be unable to gain support for this international stance with an increasingly conservative US Congress (Gore, 2006).

The Kyoto Protocol (1997)

In a similar fashion to the process developed for action against ozone layer depletion, the international governing body entered into negotiations for a Protocol to the Convention on Climate Change in the hopes of garnering support for binding agreements for the reduction of GHG's on an international level. 1997 would see the first stages of development of the Kyoto Protocol to the UNFCCC. Large divisions would become apparent among countries in their quest for a common framework that met their social, economic and political needs. The initial discussions described the countries expected to reduce in the first reduction period as Annex-1 countries and those able to postpone required action until the second phase of reductions as Non Annex-1 countries. The Clean Development Fund was proposed by the Brazilians and "was based upon the principle of penalizing the non-complying Annex-1 countries and using a percentage of this financial penalty to compensate the non-Annex 1 countries that were mostly vulnerable to the vagaries of global climate change". (CSE India, 2006) This was not seen to be in the best interests of the Annex-1 countries and was not accepted. The US would subsequently adopt the Byrd-Hagel Resolution which stated that any international climate change resolution signed by the US should not unduly require the Annex-1 countries to increase reductions without additionally requiring non Annex-1 countries to scale back GHG emissions in the same compliance period or that would substantially hurt the US economy. (CSE India, 2006) The passing of this particular resolution emphatically highlights the clear priorities of the US administration at the time. The US point of view was that economics were paramount and that action on climate change was everyone's equal responsibility regardless of who had more greatly contributed to it in the past.

When the Parties met in late December in 1997 in Kyoto Japan for COP-3, they would have significant difficulties in accommodating the varying concerns. Finally, on December 11, 1997, after two and a half years of negotiations among parties, the Kyoto

Protocol was adopted though still there were many issues that had not yet been resolved. “The Protocol sketched out the basic features of its “mechanisms” and compliance system, for example, but did not explain the all-important rules of how they would operate.” (USEPA, 2002) This was the first step towards a real agreement between parties even though there were still serious hesitations on the behalf of the signing parties. The level and extent of actions that would likely be required under the protocol would be significant and hence it is easy to see why the parties would want more details about the rules of the protocol before eventually ratifying it. This marked the beginning of a new round of negotiations that would be required in order to make it legally binding.

Prior to COP-4 in Buenos Aires, the Subsidiary Body for Implementation (SBI) and the Subsidiary Body for Scientific and Technical Advice (SBSTA) met to lay the groundwork in Bonn, Germany. At this time, still less than half of the parties had signed the Protocol and actions had yet to begin since the rules had not yet been established. Studies by the Australian government relating the insufficiency of Annex-1 Parties reductions in being able to successfully combat climate change were used by US officials in their urging of more parties (ie Non Annex-1 countries) to be involved in the first stages of the plan. (CSE India, 2006)

In 1998, negotiations continued in Buenos Aires but were unable to come to any final resolution on the rulebook for the Kyoto Protocol. A deadline of the year 2000 was agreed upon for final decisions on financial mechanisms, technology transfer, rules governing Kyoto and the Clean Development Mechanism (CDM). (CSE India, 2006) A further explanation of these will be found in Appendix 2.

Concurrently at COP-6 in The Hague, concerns over financing, CDM and technology transfer continue to prohibit movement forward in negotiations. The details of CDM are highly controversial. The costs of the projects developed under CDM in the developing countries by the developed countries are posed as international investment by the US in an attempt to get China and the G-77 on board. (CSE India, 2006)

2000 -2006

2001 – US withdraws from the Kyoto Protocol

2002 – Australia withdraws from the Kyoto Protocol

2004 – Kyoto is ratified with Russia's inclusion

2005 – Formation of the Asia Pacific Partnership

2006 – Canada states that it will have great difficulty meeting its Kyoto targets

(Unfortunately) in 2001, newly elected US President George W. Bush pulls out of the Kyoto Protocol due to concerns over the negative impacts on the US economy. Without the US, the largest buyer of emission credits, the trade under CDM is also expected to shrink. (CSE India, 2006) This is another reason talks with the US are so important for the profitability of the CDM and for others to get involved. However, despite this, the remainder of the Parties agree to continue to work towards ratification.

At this point the continuous watering down of the Protocol to gain wider participation raises questions as to whether the acceptable reductions being negotiated are sufficient to provide the actions required to mitigate the effects of climate change sufficiently. The negotiations are suffering instead of gaining from the vagueness/conflict trade-off approach discussed earlier. Analysts say that loopholes have pegged agreed cuts in emissions from rich-nation signatories to less than a third of the original Kyoto promise. (New Scientist, 2006) Inter-country politics begin to play an increasing role in the race to ratify Kyoto. In order for it to be ratified, nations responsible for 55% of the pollution from the group of industrialised nations must ratify individually. With the withdrawal of the US, countries such as Canada, Australia, Japan and Russia are being looked to in order to meet the requirements. The ability of the remaining countries to make or break the agreement with their acceptance, forces more concessions to be made in terms of flexibility by those countries already feeling that the agreement is too weak.

Later in 2001, COP-7 meets and agrees on the Marrakesh Accords, which set out the rules dealing with Joint Implementation, Emissions Trading and the Clean Development Mechanism. With the rules now in place it should be easier for countries to ratify because the unknowns have been reduced. By 2002, both the US and Australia have

backed out of Kyoto and it is left to Russia to make up the 55% of emission reductions required to begin enforcing the Protocol.

Also in 2002, the US Climate Action Report was published and stated that

“Based on his Cabinet’s review and recommendation, President Bush recently announced a commitment to reduce greenhouse gas intensity in the United States by 18 percent over the next decade through a combination of voluntary, incentive-based, and existing mandatory measures. This represents a 4.5 percent reduction from forecast emissions in 2012, a serious, sensible, and science-based response to this global problem—despite the remaining uncertainties concerning the precise magnitude, timing, and regional patterns of climate change.” (US Climate Action Report 2002, p 3)

These emissions reductions targets contradicted the IPCC suggested targets upon which the Protocol was based and clearly represented a disconnect between the science of the international community and the policy on climate change in the US. The report also stated that there was likely to be severe weather occurrences in the future due to “several decades’ worth of carbon dioxide and other heat-trapping gases already in the atmosphere.” (Greenhousenet, 2006)

By 2003, there is still no agreement on the final rules of the Protocol and the 55% participation target has not been reached. The summer would bring a heat wave into Europe which would kill over 30,000 people. In addition, estimates put extreme weather event costs at \$60 billion for the year. (New Scientist, 2006) COP-9 takes place in Milan, Italy and the Protocol is further disseminated and made more flexible for countries to include CDM projects under the agreement. (CSE India, 2006)

Finally in 2004, Kyoto is ratified when Russian President Vladimir Putin agrees to come on board. This now enables countries to begin to register actions under CDM and importantly the Protocol can now be enforced. With Russia, the signatories of Kyoto make up 64% of GHG polluting bodies. Connected to this decision is the EU’s agreement to back the Russian membership to the WTO. (New Scientist, 2006) Also instrumental in Russia’s decision to ratify was the establishment of an emissions ceiling

for Russia well below the expected emission level due to its faltering economy (the difference between the two numbers is often referred to as hot air) (Barrett and Stavins, 2003 p353). This is another clear example of a trade-off in the goal of ratification. With emissions trading (refer to Appendix 1) allowed in the protocol, Russia can now sell credits to other countries that they have had not had to reduce from their current emissions. This also provides a mechanism that drives the price of credits down and effectively allows for an overall increase in global emissions. (Barrett and Stavins, 2003)

Concurrently in 2004, the COP-10 discussed mechanisms for adaptation of climate change which is now expected to be unavoidable. (CSE India, 2006) In the COP -11 Report the Subsidiary Body for Scientific and Technological Advice decided to take upon a five year programme of work with the objective stated as follows:

“The objective of this programme of work of the Subsidiary Body for Scientific and Technological Advice (SBSTA) is to assist all Parties, in particular developing countries, including the least developed countries and small island developing States, to improve their understanding and assessment of impacts, vulnerability and adaptation, and to make informed decisions on practical adaptation actions and measures to respond to climate change on a sound, scientific, technical and socioeconomic basis, taking into account current and future climate change and variability.” (UNFCCC COP11, 2006)

By 2005, climate change related events are frequently emerging in the media ranging from the effects of an increasing temperature in the arctic regions (ENS, 2005) to desertification in the rainforests (Independent, 2006). This year would also see the beginning of the issuance of Carbon Emission Reduction credits from the Joint Implementation structure. The signatories also began to discuss emission targets for the second compliance period beginning in 2012. (New Scientist, 2006)

An unprecedented statement was given by the national science academies of the G8 nations and Brazil, China and India. The purpose of this statement was to address the false notions of scientific uncertainty that have been used to justify inaction or slow action against climate change. Specifically they stated that

“the scientific understanding of climate change is now sufficiently clear to justify nations taking prompt action and calls on world leaders, including those meeting at the G8 summit at Gleneagles in July 2005, to do the following.” (The Royal Society, 2005)

Shortly following this statement, in July of 2005 the countries of the United States, Australia, China, India, Japan, and South Korea agreed on an alternative arrangement to deal with climate change called the Asia Pacific Partnership on Clean Development (APP). This partnership is detailed by the Office of the Press Secretary of the Whitehouse as a “partnership that will focus on voluntary practical measures taken by these six countries in the Asia-Pacific region to create new investment opportunities, build local capacity, and remove barriers to the introduction of clean, more efficient technologies.” (US Department of State, 2005)

This turned out to be an internationally controversial arrangement. The agreement’s voluntary nature and lack of hard targets and hence absence of criteria for success or failure are the prime concerns of its sceptics. Again, this arrangement does not agree with what the current scientific consensus has declared as required to mitigate the effects of climate change. Specifically it does not address the need for short-term action in the struggle to lessen the impacts of climate change. It deals only with longer-term clean development and technologies. The IPCC urges the need for both short term and long term action of significant weight (above that which can be expected from the APP).

Currently in 2006, the political climate appears mixed at best. Some signatories are making great strides and will likely beat their Kyoto targets, while others have as much as admitted failure before the mandatory reduction period of 2008-2012 even begins. After the conversion from a Liberal to Conservative ruling Federal party, Canada expressed great concern about meeting its targets by the looming reduction period. Not only has Canada recently experienced the warmest winter in recorded history (Oliveira, 2006) elevated temperatures and unusual climactic occurrences are making the news all over the world. Following 2005, which had been the hottest year on record, in 2006 the world has seen noticeable thinning of the Antarctic ice sheet which causes additional concerns over rising sea levels, high acidity in the oceans, drought in the Amazonian

rainforests and an increase in the severity of various hurricane systems (Refer to Appendix 3 for further reading). As the scientific evidence mounts and the effects are being felt, urgency for international action is of top priority for activists and adaptation plans are more necessary than ever.

Appendix 2

Financial Mechanisms

Definitions and explanations found in this appendix have been taken directly from the UNFCCC Website - http://unfccc.int/kyoto_mechanisms/items/1673.php (accessed Sept 01, 2006)

Clean Development Mechanism

The clean development mechanism (CDM) defined in Article 12 of the Kyoto Protocol provides for Annex I Parties to implement project activities that reduce emissions in non-Annex I Parties, in return for certified emission reductions (CERs). The CERs generated by such project activities can be used by Annex I Parties to help meet their emissions targets under the Kyoto Protocol. Article 12 also stresses that such project activities are to assist the developing country host Parties in achieving sustainable development and in contributing to the ultimate objective of the Convention.

The current modalities and procedures for the CDM focus on activities that reduce emissions. A CDM project activity might involve, for example, a rural electrification project using solar panels or the installation of more energy efficient boilers. Annex I Parties are to refrain from using CERs generated through nuclear facilities to meet their emission targets.

Definitions and modalities have been developed for including afforestation and reforestation activities (often referred to as “sinks”) in the CDM for the first commitment period. However, Annex I Parties are limited in how much they may use CERs from such activities towards their targets (up to 1% of the Party’s emissions in its base year, for each of the five years of the commitment period).

The CDM is expected to generate investment in developing countries, especially from the private sector, and promote the transfer of environmentally-friendly technologies in that direction. In addition, the finance and technology transfer commitments of Annex

II Parties under the Convention and Kyoto Protocol are separate and remain valid. Furthermore, public funding for CDM project activities must not result in the diversion of official development assistance.

Joint Implementation

Joint Implementation (JI) and the Clean Development Mechanism (CDM) are the two project-based mechanisms of the Kyoto Protocol that may be used by Annex I Parties to fulfil their Kyoto targets. The basic principles of the mechanism commonly referred to as “Joint Implementation” are defined in Article 6 of the Kyoto Protocol.

“For the purpose of meeting its commitments ..., any Party included in Annex I may transfer to, or acquire from, any other such Party emission reduction units resulting from projects aimed at reducing anthropogenic emissions by sources or enhancing anthropogenic removals by sinks of greenhouse gases in any sector of the economy”, provided that certain (participation) requirements are fulfilled. In other words, under JI, an Annex I Party (with a commitment inscribed in Annex B of the Kyoto Protocol) may implement an emission-reducing project or a project that enhances removals by sinks in the territory of another Annex I Party (with a commitment inscribed in Annex B of the Kyoto Protocol) and count the resulting emission reduction units (ERUs) towards meeting its own Kyoto target. An Annex I Party may also authorize legal entities to participate in JI projects.

Any JI project shall have the approval of the Parties involved and provide a reduction in emissions by sources, or an enhancement of removals by sinks, that is additional to any that would otherwise occur.

Projects starting as of the year 2000 may be eligible as JI projects if they meet the relevant requirements, but ERUs may only be issued for a crediting period starting after the beginning of the year 2008. If a host Party meets all the eligibility requirements to transfer and/or acquire ERUs, it may verify reductions in anthropogenic emissions by sources or enhancements of anthropogenic removals by sinks from a JI project as being

additional to any that would otherwise occur. Upon such verification, the host Party may issue the appropriate quantity of ERUs. This “simplified” procedure is commonly referred to as the “Track 1 procedure”. If a host Party does not meet all, but the minimum eligibility requirements, the verification of reductions in emissions by sources or enhancements of removals by sinks as being additional has to occur through the verification procedure under the Joint Implementation Supervisory Committee (JISC). Under this so-called “Track 2 procedure” ERUs may only be transferred if an independent entity accredited by the JISC determines that the relevant requirements are met.

A host Party which meets all the eligibility requirements may at any time choose to use the Track 2 procedure. The transfer of ERUs verified in accordance with the Track 2 procedure is not subject to any provisions relating to the commitment period reserve or other limitations to transfers under Article 17

Emissions Trading

Emissions trading, as set out in Article 17 of the Kyoto Protocol, provides for Annex I Parties to acquire units from other Annex I Parties and use them towards meeting their emissions targets under the Kyoto Protocol. This enables Parties to make use of lower cost opportunities to reduce emissions, irrespective of the Party in which Party those opportunities exist, in order to lower the overall cost of reducing emissions.

Only Annex I Parties to the Kyoto Protocol with emission limitation and reduction commitments inscribed in Annex B to the Protocol may participate in such trading. Such Parties may therefore be prepared to transfer units when they do not require them for compliance with their own emission targets.

The units which may be transferred under Article 17 emissions trading, each equal to one metric tonne of emissions (in CO₂-equivalent terms), may be in the form of:

1. An assigned amount unit (AAU) issued by an Annex I Party on the basis of its

assigned amount pursuant to Articles 3.7 and 3.8 of the Protocol.

2. A removal unit (RMU) issued by an Annex I Party on the basis of land use, land-use change and forestry (LULUCF) activities under Articles 3.3 and 3.4 of the Kyoto Protocol.
3. An emission reduction unit (ERU) generated by a joint implementation project under Article 6 of the Kyoto Protocol.
4. A certified emission reduction (CER) generated from a clean development mechanism project activity under Article 12 of the Kyoto Protocol.

Transfers and acquisitions of these units are to be tracked and recorded through the registry systems under the Kyoto Protocol. These include a national registry to be established and maintained by each Annex I Party.

Parties may also authorize legal entities (e.g. businesses, non-governmental organizations and other entities) to participate, under their responsibility, in Article 17 emissions trading. Accounts may be created in national registries to provide for such participation by legal entities.

Appendix 3

Current Climate Change Natural Events in the Media

Recommended Articles:

Environmental News Service: Available Internet. <http://www.ens-newswire.com/>

January 25, 2006 (2005 Edges out 1998 as Warmest Year on Record) New York, NY

February 4, 2005 (Catastrophic Climate Change Risk Accelerating, Scientists Warn) Exeter, UK

The Independent Online Edition: Available Internet. <http://www.independent.co.uk/>

July 23, 2006 (Amazon rainforest 'could become a desert): Geoffrey Lean and Fred Pearce