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CHAPTER 21

Reclaiming the Atmospheric Commons: Beyond Kyoto

John Byrne[a], Leigh Glover[b], Vernese Inniss[c], Jyoti Kulkarni[d], Yu-Mi Mun[e], Noah Toly[f], and Young-Doo Wang[g]
The Center for Energy and Environmental Policy,
University of Delaware, Newark, Delaware, USA, 19716.

Introduction

To date, international negotiations to address climate change have largely focused on the problem of designing market-based tools to encourage efficient adjustments in the carbon intensity of the global economy. The Conference of Parties[1] (COP) process has promoted this profit-focused strategy in the belief that it is essential to facilitate cooperation in the reduction of greenhouse gas (GHG) emissions. Its work is codified in the Kyoto Protocol[2] and the Marrakech Accord.

The COP process may rightly claim success in realizing a treaty of targets and commitments to lower the release of one of the most ubiquitous chemicals associated with human activity. But it is not clear if activity under the auspices of the treaty will, in fact, reduce emissions. Further, there is a reasonable basis for concern that the treaty may shift the burden of action for greenhouse gas (GHG) reductions to countries with little or no responsibility for the problem. The absence of a penalty for withdrawal by the world's largest GHG emitter – the US – likewise raises doubt about the efficacy of the treaty. And the decision to refocus attention on "adaptation" rather than "mitigation" during the 2002 "Delhi round" suggests that confidence in the treaty is waning (Byrne et al 2002).[3]

Our analysis leads us to conclude that the Kyoto Protocol-Marrakech Accord is unlikely to improve climate justice or sustainability. The alliances underlying the COP-negotiated agreements appear to be largely economic in character, not ecological. As a result, its outcomes are better predicted as elements of neoliberal globalization strategy (Byrne and Glover, 2002) than as commitments to ecological principles, values or goals.

If intemational negotiations are to avoid being coopted as a venue merely for deciding economic advantage, we argue that two principles — equity and sustainability — must guide deliberations. More broadly, we argue that the paradigm of capitalization which has guided nature-society relations in the industrial era needs to be replaced with one that reclaims our climate and atmosphere as elements of a global commons.

Negotiating a Future Climate: An Overview of the COP Process

Throughout the ages, human beings have reflected on the heavens with reverence and fascination. It is troubling to recognize that our era will forever be known for forcing the human sense of awe to compete with a studious interest in the mechanics of climate and the chemistry of the sky. Undeniably, though, the era of atmosphere management is upon us. Its constitutional origin can be traced to the approval of the Kyoto Protocol and the ongoing negotiations that seek to interpret and operationalize it.

The Kyoto Protocol (framed at COP-3) sets binding emission targets for 25 wealthy societies and 13 countries in transition, which are listed in Annex B[4] of the Protocol. Individual Annex B countries were assigned different targets under the principle of "common but differentiated responsibility." Their collective GHG emission reduction target was set at 5% below their aggregate 1990 level. This collective reduction is to be achieved during the Protocol's first budget period (i.e., between the years 2008 and 2012 — see Article 3.1 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1997).

At COP-4 in Buenos Aires and COP-5 in Bonn, great attention was given to a range of market-based policy instruments (called "flexibility mechanisms" in the Kyoto Protocol) that would assist wealthy countries in lowering emissions. Under the flexibility mechanisms, Annex B countries are allowed to purchase emission permits from other Annex B countries that presently release GHGs at a rate below their Kyoto targets, or have lower cost CO_2 reduction options that can be more rapidly realized through emissions trading. Annex B countries may also receive credits toward target reductions through project-based emission reductions or sink expansions in other Annex B countries through Joint Implementation (JI). Finally, Annex B members can earn certified emission reductions (CERs) from project activities in developing countries and apply them in order to comply with GHG reduction targets through the Clean Development Mechanism (CDM).

COP-6 (held in the Hague and Bonn) produced a number of decisions that further shaped national strategies and options under the Kyoto Protocol. The most influential of these was the permission of essentially unrestrained emissions trading. As a result, Annex B participants can take full advantage of available emission permits beyond their borders to

meet national commitments (this is a particular problem for efforts to achieve effective emissions reduction, as explained below). One option created with these negotiations is the purchase of emission credits from Russia and other economies in transition whose current releases are well below their 1990 levels. In effect, an Annex B member can assist economies in transition to upgrade technology efficiency and then claim the difference in the resultant GHG emissions at the same time that economies in transition increase their emissions to 1990 levels. This curious option is discussed at length below.

COP-6 also allowed national carbon 'sink' enhancements to offset GHG emissions in national GHG accounting. The methodology for calculating sink improvements (for example, through reforestation) is provided in Article 3.3 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1997. Any claimed activities must have occurred since 1990 and have been the outcome of human activity. COP-6 revisions enabled countries to count changes in all sources of carbon sinks, most notably land use, land-use change, and forestry (LULUCF), but restricted the level of claims against forest sinks.[5] Inclusion of carbon sinks makes the Kyoto Protocol comprehensive, covering all known elements of the carbon cycle immediately affected by human activity,

Despite acquiescence to its demands for unlimited trading and a liberal interpretation of LULUCF opportunities, the US withdrew from the UNFCCC negotiations before continuation of the COP-6 meeting in Bonn (2001). Voicing nearly identical economic concerns to those of the elder President Bush in 1992 (at the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil), the younger President Bush indicated that the US would follow its own "voluntary" GHG reduction policy, setting in motion what has become a unilateralist orientation in international affairs. Australia has now also withdrawn.

In the wake of the US withdrawal, implementation rules for the flexibility mechanisms were articulated in the 2001 Marrakech Accord (COP-7) that reflect significant compromises thought to be necessary to secure ratification. Without US participation, the cooperation of Japan, Russia, and Poland are essential to bring the Protocol into force. Consequently, a host of monitoring, verification, and compliance issues raised by delegates from these countries were addressed. In this regard, securing sufficient participation for ratification took priority over issues concerning the effectiveness of the policy mechanisms adopted and refined between COP-4 and COP-7 in addressing problems of unsustainability and inequity.

COP-7 also continued to polish regulations that govern the Protocol's various flexibility mechanisms and sink allocations. However, many of

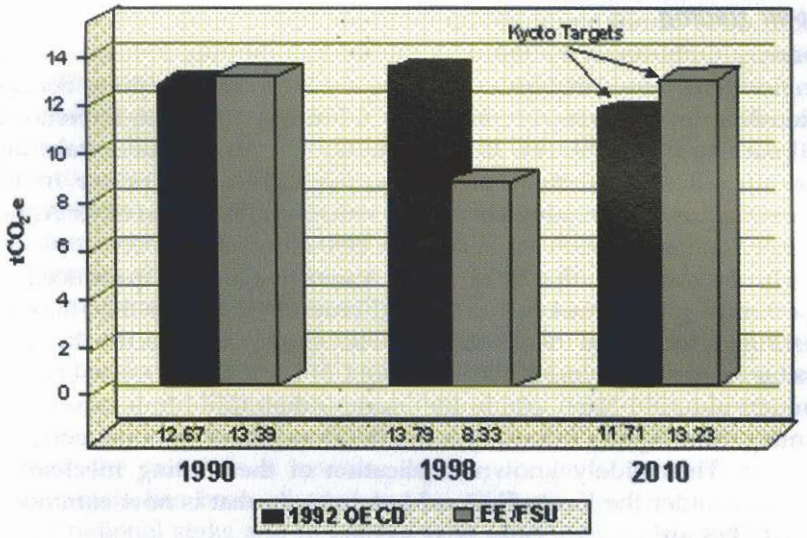
these decisions have the effect of reducing the level of emissions abatement necessary through domestic measures in developed nations by allowing purchase of foreign emission credits, accreditation for foreign investments that reduce emissions and enhance carbon sinks, and inclusion of an array of domestic carbon sinks as offsets to domestic emissions. For example, through the CDM, Annex B nations can purchase credits from non-Annex B nations for afforestation and reforestation projects, but according to a limit of 1% of a country's target emissions. Emissions trading between Annex B nations can be pursued apart from any supplementarity restriction, and full use can be made of surplus emission credits. Credits earned by any of the aforesaid methods can be used immediately, banked for future use (in the Protocol's second budget period, for example), or sold in the emerging emission permits market.

COP-8 (New Delhi, 2002) offered a glimpse of the future of the treaty negotiation process with the exodus of the US. Sensing that the UNFCCC might have little effect on emissions during the first budget period, several Southern countries, including COP-8's host, led an effort to establish a disaster relief fund (to be financed by the wealthy tier) that would assist the poor to "adapt" to climate variation. While details remain for additional discussion, the principal outcome of COP-8 was the commitment to such a fund. In effect, treaty participants have agreed to negotiate compensation for their expected failure to avert climate change (Byrne et al 2002).

The dawn age of managing the atmosphere has already been witness to triumphs and travails. But as the Parties search for direction and hope amid the numerous difficulties associated with organizing human interactions with the sky, an unapologetic belief in markets and profits steers the treaty to its envisioned destination – an efficiently, and profitably, bargained adjustment of global carbon intensity. Still, there are disquieting questions. Will carbon intensity decline because of the treaty? Or, will the treaty simply create another market where money can be made?

Loopholes in the Kyoto Protocol

Notwithstanding COP-8's "no confidence" vote, the treaty retains at least a formal commitment to try to reduce GHG emissions. Each signatory to the Protocol listed under Annex B has an individual national target for emissions reduction, which amounts to collective reduction of 5.2% below the collective 1990 level of emissions. We converted these national targets into the OECD and FSU/EE groupings and derived the Kyoto Protocol target for each on a per capita basis: 11.71 $tC0_2$-e for the OECD and 13.23 tCO_2-e for the FSU/EE (Fig. 21.1).[6] While the Kyoto target for the FSU/EE group is below its baseline rate for 1990, it is higher than the actual emissions by the group in 1998. Economic recessions experienced in the



Sources: 1990,1998 Emissions – Marland et al., 2001; 2010 Emissions Targets – Kyoto Protocol, Population – world Resources Institute, 2001

Fig. 21.1: Actual and target per capita Annex B GHG emissions under the Kyoto Protocol.

region since the breakup of the Soviet Union are the cause of the dramatic decline in GHG emissions and the source of an unusual opportunity under the Protocol (discussed shortly).

Annex B has steadfastly voiced concerns throughout the COP process that improper policy actions could harm the group's economies and, for this reason, has been uninterested in high domestic emission reduction targets. Instead, the group has preferred "practical" "realistic" targets and market-sensitive options that enable members to tailor their reduction strategies, including the ability to trade with other nations, in order to find the most efficient (i.e., cheapest) actions to reduce GHG emissions.

Led by the US, Australia, and Japan, Annex B has promoted the view that the transition to a low-carbon future is largely an economic and technological question best handled (with the proper incentives and enforceable rules) in the global marketplace. This shared belief in markets as guides to national action on a global environmental problem reflects Annex B's core commitment to a policy paradigm in which priority is given to resolutions of environmental conflicts that are least-cost and, where possible, conducive to economic growth. While pursuing economic rationality, unfortunately, the Kyoto mechanisms have created significant loopholes in terms of sustainability, two of which are critically reviewed below.

Hot-air trading

Economic problems in the FSU and Eastern Europe since 1990 have led to significant decreases in GHG emissions throughout the region. Because national performance in meeting UNFCCC is assessed with reference to 1990 baselines, the FSU/EE bloc will likely not need to undertake any domestic GHG abatement programs. Instead, members are in the interesting position of being able to sell emissions growth to other Annex B nations whose releases are above the 1990 baseline.

The inclusion of the EE/FSU in Annex B has thus produced an opportunity for "virtual reductions" (Byrne et. al., 2001) that may be substituted for actual decreases in GHG emissions. Specifically, it is possible under the Kyoto Protocol for OECD members to assist EE/FSU members of Annex B to "efficiently" increase their GHG emissions, while counting this effort as a deduction to OECD members' national emission accounts. This widely known implication of the trading mechanism permitted under the Kyoto Protocol has created what is now commonly termed "hot air".

Under business-as-usual (BaU) projections by the US Energy Information Administration (EIA, 2000), the OECD countries are expected to increase their emissions by 15.8% over the 1998-2010 period, while total GHG emissions in the EE/FSU nations are anticipated to grow by 13.9% during the same period (Marland et al., 2001). In other words, under a BaU scenario, OECD countries (including the US and Australia) will exceed their collective Kyoto target by approximately 3,400 Mt CO_2-e in 2010, while the EE/FSU bloc will release 1,160 Mt CO_2-e less than their Kyoto target. Thus, "hot air" is estimated to meet 36.5% of the total GHG reduction requirement for the OECD countries.[7] Of course, "hot air" availability will increase further if the EE/FSU emission forecast by EIA happens to be high, which is possible since the prospect of additional economic problems for this bloc is considerable.

It is reasonable to expect that "hot air" will provide the lowest cost emission credits, after sinks, for Annex B traders. Compared to trades with non-Annex B countries, transaction costs and infrastructure incompatibilities are likely to be lower, and commercial relations more extensive and longer lived, for Annex B-to-Annex B trading.

Sinks

In theory, accounting for sinks as an element of the carbon cycle is unimpeachable. Some environmentalists and those seeking to bolster an array of developmental objectives embraced the inclusion of sinks in the UNFCCC as additional support for laudable objectives such as habitat and catchment protection, agroforestry development, rain-forest preservation, prevention of land clearance, and so on. Indeed, COP-6 reiterated that these activities contribute to the conservation of biodiversity

and sustainable use of natural resources and therefore should be included as a means for nations to meet Protocol targets. Climate change policy under this provision offers the opportunity to support other environment and development objectives while also being responsive to the need for building a "low-carbon" future. Further, it seemingly offers a way in which climate policy can emphasize domestic action (instead of trading away national responsibility) and at the same time economically meet reduction targets.[8]

A broad array of land-based activities is admissible as sinks and credits for them are largely unrestricted (only sinks resulting from forest management are limited under Appendix Z from COP-6). COP negotiations have only limited sink CDM activities to afforestation and reforestation in this first commitment period (i.e., 2008-2012), and capped available credit by these means to 1 % of a country's target reductions.

Since the principle of crediting carbon storage as a means to meet Kyoto targets has been adopted by the COP, the race has been on to register national sinks and to partner with other nations to expand sink capacities and then take credit for them through JI and CDM. The magnitude of available sink credits through these two mechanisms, is sufficient to enable certain Annex B members to avoid domestic emission reduction entirely.

Efforts to incorporate LULUCF into the Convention have been fraught with basic uncertainties in the measurement of sequestration and fluxes, compounding efforts to construct an effective sinks policy. Production of the national GHG inventories, as required under the UNFCCC, has highlighted how indeterminate the LULUCF component is, even for those nations with the best data and research bases. The IPCC's Special Report on the subject provided a sound description of the current state of knowledge, but further highlighted just how few generalizations could be made about sequestration for any given location (IPCC, 2000).

Even if the aforementioned difficulties with the measurement of these factors were resolved, there are a number of ecological concerns that raise doubts about the efficacy of LULUCF measures. For example, the most effective species for optimizing carbon sequestration are fast-growing trees with short rotations, yet this plantation practice would reduce biodiversity. Reconciling the Kyoto Protocol's intention that LULUCF contribute to broader ecological goals with practices to enhance sequestration could prove difficult.

Climate change policy can only be effective if there are permanent reductions in global GHG emissions. At present, the rules that allow carbon sequestration to offset emissions encourage only a temporary reduction of global emissions. Any number of events, such as fire, disease, or climatic factors, can release sequestered carbon into the atmosphere. In

a sense, carbon sinks are simply deferred emissions and are therefore incomparable to actual reductions in GHG emissions, because they fail the test of permanence. Sinks allow GHG emissions to be greater than would otherwise be permitted and pass to future generations an increased burden.

Notwithstanding concerns raised by the IPCC, the COP is proceeding on the basis that quantification, measurement, and verification of sequestration is now possible. This policy appears to be driven less by accurate knowledge than confident expectations of profit.

Assessing the Kyoto Protocol

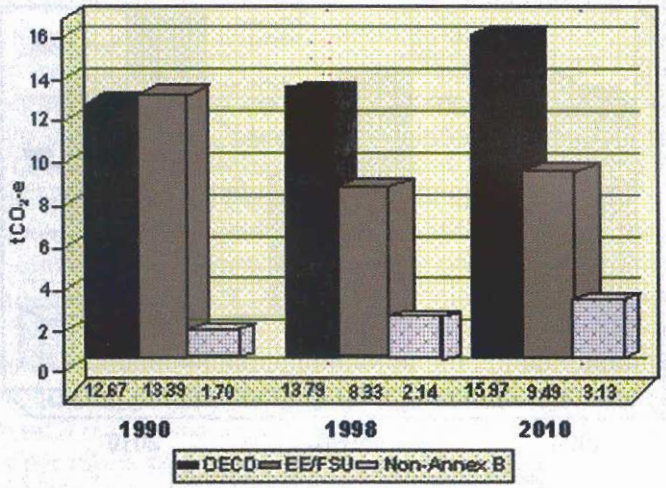
Together, the "hot air" and "sink" loopholes provide the means for a paradoxical result — compliance with the Kyoto Protocol's target of a 5.2% reduction in GHGs by increasing Annex B emissions. A comparison of current and forecasted Annex B emissions with the magnitudes of "virtual" reductions allowed via these loopholes demonstrates the possibility of this result.

Since signing the UNFCCC in 1992, OECD countries have posted steady annual increases in GHG emissions. Of this group, only a few can claim to be on a path of emissions reduction (arguably Germany, the United Kingdom, and Sweden). Other countries such as Australia, Canada, Greece, Ireland, Portugal, and Spain increased their emissions by more than 10% between 1990 and 1998. Most obvious in its continued emissions growth is the US, which posted a 13.1% increase over the same period. As a group, the OECD bloc has seen substantial economic growth over the decade since the Earth Summit, while the economies of the former Soviet Union and Eastern Europe have languished. This bifurcation in economic paths has its parallel in GHG emissions. While emissions of the OECD group grew by nearly 9% between 1990 and 1998, those of the EE/FSU actually declined by almost 40%.

Expectably, there is substantial disparity in national per capita releases of GHGs by region and income. For example, average annual per capita emissions of OECD countries were 13.79 CO_2-e in 1998, whereas average non-Annex B 1998 per capita emissions were 2.14 CO_2-e, less than one-fifth that of the OECD (Fig. 21.2).

Neither trend is expected to change under "business-as-usual" conditions. Per capita emissions from the OECD are forecast by the US, Energy Information Administration (EIA) in its BaU scenario to continue increasing to 15.97 CO_2-e by 2010 (EIA, 2001). In contrast, the per capita emissions of developing nations (non-Annex B under the Kyoto Protocol) are expected to rise to only 3.13 CO_2-e by 2010 (Fig. 21.2).

But the Kyoto Protocol is presented by its negotiators as altering the BaU conditions of our future. Thus, it seems reasonable to ask if its

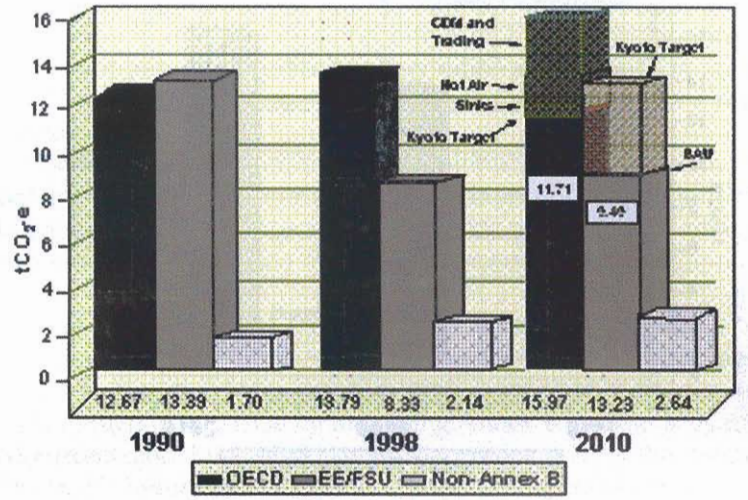


Sources: 1990, 1998 Emissions—Marland, et al., 2001; 2010 Emissions Projects—EIA, 2001; Population—World Resources Institute, 2001.

Fig. 21. 2. Projected global per capita GHG emissions under business-as-usual assumptions.

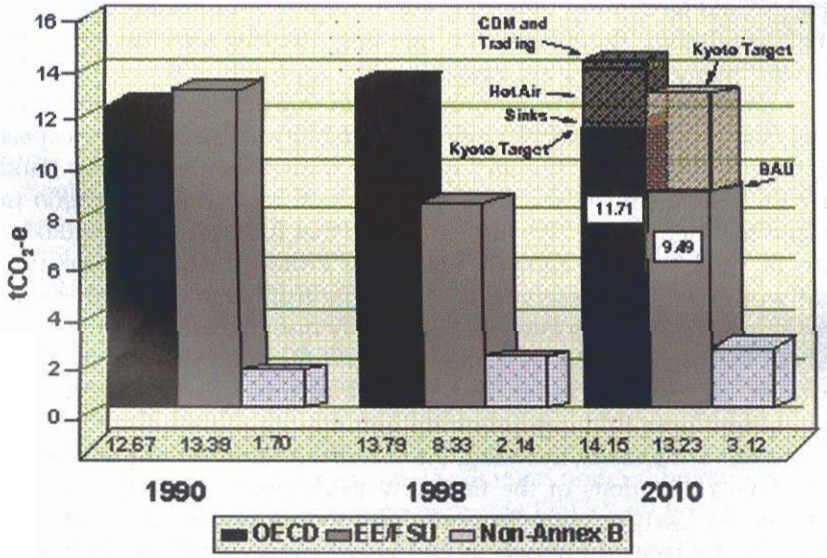
impact would be to lower and bring greater equity to emissions compared to BaU conditions. Because such a question involves forecasts of future behavior, many answers are possible. Our approach is to assume that Annex B behavior would be motivated by the core principle that animated its negotiation of the Protocol, namely, profitability. In this vein, we expect that the full volume of "hot air" would be traded – unless Russia and other EE/FSU members use their veto position regarding ratification to demand too high a price. We also anticipate that full advantage would be taken of "sink" offsets allowed under the Protocol. And we fear that CDM would deliver a reservoir of *"low-lying fruit" that could adversely* harm long-term Southern interests but cheaply meet the first budget period needs of the Annex B bloc (e.g., Agarwal and Narain, 1997; Lynch, 1998; Byrne et al., 2001). Under these assumptions, the prospects for improvement over BaU conditions are dim.

If Annex B members, including the U.S. and Australia,[9] take advantage of the low-cost options of the flexibility mechanisms, per capita CO_2-e emissions are likely to climb to nearly 16 tons per year by 2010 (see Fig. 21.3a). The anticipated increase in OECD emissions would be the largest single anthropocentric contributor to climate instability in 2010. At the same time, non-Annex B emissions might increase less quickly if CDM investments actually transfer the promised clean energy technology envisioned in the Kyoto Protocol. The result would be no difference between BaU and Kyoto-influenced emissions of the Annex B bloc and



Sources : 1990,1998 Emission–Marland, et al., 2001, 2010 Emissions Projections—EIA, 2001; Population – World Resources Institute, 2001

Fig. 21.3a: Possible per capita global GHG emissions when Kyoto Flexibility Mechanisms are fully employed and the US and Australia participate.



Sources: 1990,1998 Emissions – Marland, et al, 2001; 2010 Emissions Projections – EIA. 2001; Population — World Resources Institute, 2001

Fig. 21.3b: Possible per capita GHG emissions of the treaty parties when Kyoto Flexibility Mechanisms are fully employed and the US and Australia withdraw.

slower growth in per capita emissions among non-Annex B members, thereby widening the gap between the two groups.

Rather than decreasing emissions by 5.2% by 2010 (i.e., the Kyoto target for Annex B), OECD countries could increase their releases by 26% and comply with the treaty. "Hot air"would furnish over one-third of the "virtual" GHG reduction requirements needed by OECD countries for compliance (assuming that the US and Australia are participants). Sink accounting would benefit both the OECD and EE/FSU blocs, with nearly one-tenth of the OECD's "virtual" reductions possibly derived from this source. Burden-shifting via CDM projects could furnish the remaining "virtual" reductions.

Figure 21.3b depicts the case wherein the US and Australia fail to participate. In this instance, the remaining Annex B participants in the Protocol would realize smaller per capita growth, with emissions reaching 14.15 tons per capita per year. Non-Annex B per capita emissions would rise faster in this scenario because more than 80% of the Annex B reduction target (with the US and Australia not participating) is met with the purchase of "hot air". As a result, a very small amount of CDM trading is expected.

Thus, the OECD group (with or without US and Australia participation) could increase per capita emissions under Kyoto,[10] inequality could worsen as Annex B releases grow while non-Annex B emissions slow and, according to its own logic and terms, the Protocol would have successfully concluded its first phase. In effect, uncapped flexibility mechanisms are likely to nullify any substantial claim on the part of the Protocol that it advances goals of sustainability or equity. Instead a "virtual reality" of "efficient" 'emission adjustments that disguises a "real" reality of actual emission expansions would ensue (Byrne et al., 2001).

The Protocol's architects may defend the package as a "first step" and the only practical pathway politically available at this time. But even if it is supposed that an efficient allocation of resources would prevail because of the flexibility mechanisms, and emission reductions would therefore occur at considerably more cost-effective levels, this represents an untenable trade off. The scenarios depicted in Figures 21.3a and 21.3b suggest deepening social and ecological risk, especially for the least advantaged two-thirds of the world's population.

Failure to Govern: US Withdrawal and the Kyoto Protocol

COP-7's major contribution to future climate change governance was arguably its establishment of a compliance regime for the Kyoto Protocol. The basic elements of an enforcement system were delimited in Marrakech,

including an effort to penalize nations failing to meet their emission reduction commitments in the first commitment period. Countries that exceed emissions quotas in the first budget period (2008-2012) will be required to compensate for the excess in the second period, 2013-2017, while assuming a penalty equal to 30% of the shortfall and being excluded from emission credits trading until compliance is realized. A basic institutional design for overseeing the compliance system was also agreed, featuring committees, expert reviewers, voting procedures, appeals, and other matters. Several commentators have commended the efforts at COP-7, some proclaiming the compliance system a breakthrough in international environmental policy (see Dessai, 2001; Ott, 2002; Wiser, 2002).

Despite COP-7's successful design of a compliance system, a basic flaw remains—there is no guidance on a key problem facing climate change governance today, namely the withdrawal of the US and Australia from the Kyoto Protocol. In this respect, the Protocol is fundamentally weakened by not having devised a penalty for the instance of refusal of major GHG emitters to participate in the emissions reduction regime.

The absence of the US and Australia from the UNFCCC process is possibly temporary. Abundant low-cost opportunities for US emission reduction through energy conservation and improved energy efficiency have been identified by leading US researchers. In fact, the best estimate of an important US research group is that 75% of the needed reductions to meet the Kyoto-assigned target to the US could be achieved by profitable domestic investments (i.e., investments with payback periods of less than five years; see IWG, 1997, 2001). It is likely that Australia has similar cost-effective, energy efficiency-based alternatives. Moreover, the market-based policy mechanisms developed under the Kyoto Protocol would spur a new and sizable global market of GHG emissions trading, creating many opportunities for the economies of both countries and their corporations, to profit from carbon commerce. Indeed, the world's first carbon trade in London was executed by the local office of the US corporate giant, DuPont (Cormier and Lowell, 2001). Far from being an aberration, US firms can be expected to participate in the profits available in the emerging carbon trading market to the extent possible under US foreign policy. Firms would lobby both governments to be allowed to participate without restraint, an activity doubtless already underway. Indeed, trading with the former Soviet bloc was anticipated by the Clinton administration to provide as much as 56% of its Kyoto commitments (Kopp and Anderson, 1998). Through such trades and other market-based policies available under the Protocol, there is the arresting possibility that the US could meet its Kyoto obligation for reducing emissions by actually increasing its carbon releases (Figure 21.3a; Flavin and Dunn, 1998; Pearce, 1998). Thus, one wonders if the renegade position of the US and Australia is a

bargaining tactic to win more concessions (and profit), before returning to the Protocol.

Regardless, COP-7's failure to deal with the withdrawal of the US and Australia has several consequences that the global community needs to contemplate. Because COP-7 demurred on a domestic reduction obligation, the world has greater assurance of a burgeoning global carbon market than of real GHG emissions reduction. The US and Australia will be uniquely advantaged by their decision to withdraw from this global agreement because of the weakness of the COP-7 decisions on the compliance system. Although no longer required to incur the costs of emissions reduction that all other major economies have agreed to undertake, there are no provisions in the Kyoto Protocol to prevent the two withdrawn parties from profiting in the global carbon market. At the same time, the US and Australia can market products at higher carbon intensities, and lower prices. Clearly, the circumstance represents a failure of governance.

Not unexpectedly, the prospect of advantages accruing to the US and Australia because of their withdrawal from Kyoto has drawn sharp criticism and some efforts to prevent its occurrence. Members of the European Commission have publicly expressed their anger over the action. For example, EU Commissioner for the Environment, Margot Wallstrom, has said that President Bush's declaration is a "very, very serious statement and totally unacceptable to the outside world and I think this is what we have to make absolutely clear" (Castle, 2001).

Several civil organizations have filed a class action suit in a US district court against the US Export/Import Bank and the Overseas Private Investment Corporation, citing violation of the US National Environmental Policy Act over the global warming consequences of their loans for fossil fuel energy projects (EV World, 2001). The island nation of Tuvalu announced it would take legal action against the US and Australia regarding their responsibility for global warming and the consequences of inundation of their homeland (Reuters News Service, 2002).

There is a pressing need to reform the compliance system so as to prevent the US, Australia, and other nations from undermining the integrity and effectiveness of policies aimed at restoring the atmosphere to commons status. Several precedents exist for cases where in nations are in contravention of international environmental agreements and offer lessons in considering penalties for US intransigence.

Under the Montreal Protocol, nations who are party to the agreement may not trade with non-Parties in substances controlled by the Protocol. Similarly, the Basel Convention on the Transboundary Movement of Hazardous Wastes prohibits the movement of waste between Parties to the Convention and non-Parties without special agreements being in place.

And the Convention on International Trade in Endangered Species of Flora and Fauna imposes strict limits on relations between participating nations and non-Parties. Researchers are investigating ways of applying such restrictions to countries electing not to participate in the Kyoto Protocol (e.g., Dannenmeier and Cohen, 2000).

Explaining Failures of the Kyoto Protocol: A Political Ecology Approach[11]

The problem of climate change has attracted the energies and ideas of a wide range of political and ecological interests. Alongside the expected involvement of nation states and the corporate tier, the COP process has itself drawn organized and sustained interventions from an incredibly diverse array of representations of civil society. From science groups to human rights movements, from "green" technologists to environmental justice activists, a myriad voices of civil concern about the evolving project to administer the sky have been raised. Yet, the COP process has hatched a plan that rhetorically acknowledges civil demands for goals of sustainability and equity, but painstakingly works on the economic problem of climate change. Why is this? We argue that the explanation lies, in part, in the informing ideology of modern liberal democracy (embodied in the politics of Europe and the US) and, in part, in economic globalization (embodied in the corporate strategy of US, European, and Japanese multinational firms). Together, these forces empower a neoliberal globalization strategy that is unable to understand the counterforces of ecological justice and sustainability (Byrne and Glover, 2002).

Obviously, there are entrenched economic interests in the US, Japan, Europe and elsewhere whose wealth and power could be threatened by a treaty to create and enforce limits on GHG emissions. But at least since the Club of Rome, there has been evidence of a significant corporate interest in the management of environmental resources (see, e.g., Golub and Townsend, 1977 and more recently, Escobar, 1996), and certainly, some policy regimes to rein in GHG emissions could be consonant with capitalist development aims. Thus, it would be oversimplifying to argue that the neglect of issues of ecological justice and sustainability in the COP process is entirely due to corporate interests.

Beyond the expected opposition from at least some sectors of industry, there is a deep-rooted problem in the democracy celebrated by liberal societies, especially with regard to relations with the natural world. The foundational principles of contemporary liberal democracy were born in an era when emancipation meant freedom from not only political tyranny, but natural constraint as well. Indeed, the salient question to 17th through 19th century architects of the new democratic society in thinking about nature was its conquest—the transformation of a stingy nature to a

productive contributor to the majestic aims of a liberal democracy able to feed, clothe, and house all people. As Sheldon Wolin observed in his brilliant critique of the new democracy (1960), liberalism in the West sought to harness what it believed to be the liberatory forces of science, technology, markets, and democracy to defeat the old dynastic-feudal and natural orders. Releasing humanity from the chains of the old political, economic, intellectual, and cultural hierarchies was seen as the enterprise of science, technology and market economy. But these forces were also to be directed to the transformation of nature into a tool for use in building a cornucopic future of not only liberty but material happiness for all. The liberatory function of politics was to be situated, under liberalism, in the act of sweeping away all resistance—human and natural—to the new ideas, values, and purposes of science, technology, and market economy. From Locke and Smith, to Condorcet, Saint-Simon, and Franklin, hope was sought in a political order that would free the new productive forces to realize a wealthy modernity. Liberalism would not be satisfied with anything less: freedom and equality cannot be regarded as fully achieved until material happiness is secured (in addition to Wolin, 1960, see also Kumar, 1978, 1995).

This view led liberalism to conceive the productivity of science, technology, and economics as the alter ego of progress: one can only be gained with the other. The neoliberal revision of the last 50 years simply fine tunes this ideology to current events (Byrne and Glover, 2002). Environmental negotiations — such as those of trade (GATT) — have consistently been viewed by neoliberalism as the art of guiding the productive forces of science, technology and markets to achieve positive economic results. For an ideology that understood the natural world as unreasonable and unproductive (see especially Merchant's discussion of the mechanistic turn in Western thinking about nature in her 1980 volume), the conquest of nature meant the application of rational, productive thinking to the inspiring goal of material plenty.

Thus, it cannot be surprising that neoliberalism would be blind to the idea of sustainability when it means that the natural order should somehow be consulted to set limits on social futures. Simply put, such thinking for neoliberalism would be irrational. Ultimately, liberalism would anticipate that such a policy would halt progress.

The Kyoto negotiations follow the neoliberal script on this score. Negotiators focus on the flexibility mechanisms because they are the essential tools for organizing a global efficiency response to the prospect of climate change. At bottom, these mechanisms conceive climate change as a productivity problem: in essence, existing technology and market arrangements inefficiently use the atmosphere to dump GHG emissions. With proper market signals and with a concerted scientific effort, an

efficient regime of atmospneric use will be found which allows the productive forces of modernity to resume the quest for modern progress.

While some members of the European Community have insisted that limits should be placed on the use of such mechanisms to meet emission targets, the setting of emission targets themselves has ignored sustainability questions so far. Even limiting the use of flexibility mechanisms, so that the treaty avoids becoming little more than a pact to redistribute the sources of emissions, has failed to occur.

Thus, preoccupation with efficiency mechanisms, at the risk of unsustainability, is expectable. The policies championed by the liberal democracies throughout the COP process are a continuation of liberalism's original formula—to exploit the state of nature to improve the state of commerce. This formula is traceable to liberalism's effort to effect a peculiar alliance of efficiency and equality. Although historically and currently, wealthy countries have overused the atmosphere as a CO_2 dump (see Byrne 1997), the Kyoto flexibility mechanisms permit them to avoid domestic reductions in emissions by paying others to reduce theirs so that the cornucopic ideal of government by markets, science, and technology is undisturbed. A novel ethic ensues in which those who have benefited from centuries of ecologically reckless behavior are relieved of responsibility by paying the Third World to imitate the Western progress formula, but more efficiently.

Pounded on neoliberalism's association of progress with productivity and cornucopia, the Kyoto flexibility mechanisms create climate markets controlled by polluters because they promise profitable actions to address global warming. The risk that climate markets may well accentuate, rather than reverse, the unsustainable and unequal state of nature of modernity is deemed an acceptable one in order to protect the state of commerce.

Neoliberal ideology can explain the negotiating behavior of powerful nation states such as those of North America and Europe, but there remains the question of how society-nature relations are institutionally structured to create and continue the threat of climate change. For answers to this question, we look to explanations of political economy. In our use of the term, a political economy represents a system of political and economic power that, among other things,[12] institutionalizes social access to and use of nature, propounds ideas of nature, society and their relations and broadly seeks to frame the value of nature to society. In our era, capitalist relations underpin the system of power and motivate worldwide efforts to remove obstacles that might prevent the "free flow" of goods, services, and capital. The successful spread of capitalist relations, especially over the last century, has led to an emerging global structure of capital, technology and knowledge that extends the reach and strengthens the power of this system.

Economic globalization is leading the way in rendering natural processes—not simply resources found in nature — as phenomena subject to global management. The capture of core processes of the natural order, such as the carbon cycle, in the languages of science and economics clears the way for policy regimes that intend to choose a state of nature for modem society, or at least its elites. The environment becomes an object for scientific and economic design as this capture occurs. In this way, earlier processes of the commodification of nature that transformed natural phenomena (e.g., forests) into resources that could be traded for profit are revised to valorize nature as capital.

The new valuation of nature encourages ethos to "manage environmental resources to ensure sustainable human progress and human survival" (WCED, 1987:1). This managerial orientation perfectly matches the aims of globalization. Technical and organizational intelligence is concentrated on increasing the productivity of nature as a whole. As Sachs (1993) argued, modernity is based on the exploitation of nature (human and physical) through the collaboration of dominant actors in government, the economy, and the sciences (1964). Indeed, as Mumford (1964) noted some years ago, the agreement of these three institutional elements on the direction and purposes of society has provided the very definition of what constitutes progress for the West.

Management of nature requires global economic, bureaucratic, and technological organization. Elites who control capital, technologies, and information are the only interests, practically speaking, who could aspire to the role of global manager. Under an emergent regime of "managed nature", the global atmosphere is fast becoming, alternatively, an ecological laboratory and bank, cared for by scientific experts and financial managers. The sustainability interest in the era of globalization is to protect environmental capital for future generations, not the regenerative capacities of the natural environment. This new form of capital is to be managed in the public and scientific interest for future exploitation. In this specific sense, globalization's interest is in the "capitalization of nature" (Escobar, 1996), rather than its protection per se.

Equity and Sustainability in the Greenhouse: Beyond Kyoto

If the design of the Kyoto Protocol can be explained by powerful underlying forces such as neoliberalism and globalization, how might an alternative be constructed? Two things would seem to be needed: first, a break with the logic of the capitalization of nature; and second, the substitution of noncapitalist values for efficiency and profitability in the design of policy.

Consideration of a commons-based (rather than a capitalization-based) regime built on commitments to sustainability and equity (rather than

efficiency and profitability) offers a starting point. However, this raises the broader question of defining what is meant by "sustainability" and "equity", and the treatment of the atmosphere as a "commons". Controversies regarding the definitions of these concepts abound and we do not presume that a consensus has been found. Still, we are prepared to offer operational definitions of these concepts for the purpose of investigating an alternative to the neoliberal globalization response to climate change. Hopefully, in this way a constructive debate of alternatives can be engaged.

With respect to sustainability, we suggest an operational definition that limits global GHG emissions to levels consistent with the known properties of the carbon cycle. With respect to equity, we propose a definition that determines country-specific emission targets in a manner that is broadly consistent with an assignment of per capita entitlements. Both definitions have been discussed elsewhere (see, e.g., Agarwal and Narain, 1993; Byrne, 1997; and Byrne et al., 1998).

To establish a numerical benchmark for sustainability reflecting the above definition, we turn to the work of the Intergovernmental Panel on Climate Change (IPCC). The reduction necessary to achieve long-term stabilization of atmospheric GHG concentrations has been reported by this body to be more than 60% of 1990 CO_2 (and CO_2 equivalent) emissions (IPCC, 1992, 1996). To arrest the process of climate change in the new century, we would likely need to act by mid-century to reduce emissions by the IPCC estimate.

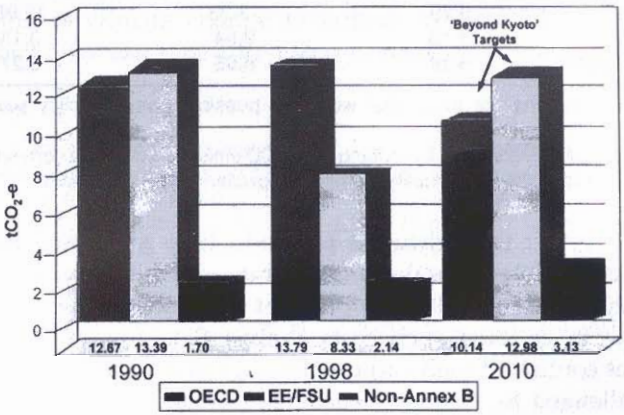
A frequently cited equity approach to allocating the global burden of emissions reduction among nations is per capita responsibilities (see especially Agarwal and Narain, 1993). Each nation's climate action responsibility is established on the basis of a "global atmospheric commons regime" to which all peoples have equal access and share equal responsibility. Using the 1990 world population, it is possible to assign carbon "budgets" by country.

Combining these two norms – a sustainability commitment based on the IPCC's estimate of a 60% emissions reduction requirement and a democratic commitment of per capita emissions equality – an equitable and sustainable GHG emissions rate, or $ESCO_2$, can be estimated as 3.3 tons of carbon dioxide and equivalents (tCO_2^{-e}) (see Byrne et al.,1998). Using a longer term 2050 stabilization target year for per capita equity to be realized, progress can then be gauged by international action to reduce GHG emissions to eventual parity. The emissions of transitional economies (EE/FSU) and developing countries may be expected to rise above 3.3 tCO_2^{-e} in the early period, but all would eventually be asked to arrest this trend and begin a steady decline to the $ESCO_2$ rate.

In a commons-based regime with an $ESCO_2$ target, neither "hot air"

trading nor sink offsets would be supportable. Such devices to virtualize GHG emission abatement only stall action on behalf of a sustainable and equitable relation between society and the global commons. Thus, the outlines of an alternative to the Kyoro Protocol can be specified: the absence of "hot air" trading, elimination of sink offsets, and setting a sustainability target for progress toward eventual $ESCO_2$ parity. Regarding a target, we propose adoption of the so-called "Toronto Target" of 20% urged in 1988 at a meeting of scientific experts and government ministers that presaged formation of the IPCC (Byrne and Inniss, 2000). Further, full Annex B participation would be obliged with specific penalties assessed for failures to comply.

Under what we have termed a "Beyond Kyoto" scenario (see below), all nations would pursue the goals of contraction and convergence (Meyer, 2000) consistent with the IPCC's findings on carbon-carrying capacity and with principles of equity and sustainability (as defined above). The purpose of collective effort in this case is to begin the process of withdrawing society from activities presumed appropriate for designing nature. Instead, humanity would embrace the goal of restoring a commons relation between society, the atmosphere, and climate.



Sources: 1990,1998 Emissions – Marland, et al., 2001; 2010 Emissions Projections – EIA. 2001; Population – 'World Resources Institute. 2001

Fig. 21.4: Projected per capita global GHG emissions under a "Beyond Kyoto" scenario.

Results of the "Beyond Kyoto" approach are presented in Figure 21.4. Per capita emissions targets at 2010 for OECD nations under the "Beyond Kyoto" architecture represent a 20% reduction from 1990 levels. "For the EE/FSU group under the same target, per capita emissions meet a goal of proportional effort to that required of the OECD bloc. Just as the OECD

bloc is expected to reduce emissions at roughly three times the Kyoto reduction requirement, we have set the "Beyond Kyoto" target for the EE/FSU at three times their original Kyoto obligation. Because non-Annex B countries remain below the $ESCO_2$ rate through 2010, the BaU forecast for this bloc is accepted.

It is possible to compare progress in meeting the goals of equity and sustainability between the existing Protocol and our "Beyond Kyoto" scenario by considering the ratio of per capita emissions of the wealthy and developing nations. Termed an inequality ratio, comparisons using this metric are reported in Table 21.1. While the Kyoto-Marrakech Protocol, according to our projection, may actually exacerbate inequality, our "Beyond Kyoto" proposal reduces inequality by more than one-third from the 1990 baseline, and by nearly two-thirds from our projection for the Kyoto Protocol.

Table 21.1: Allowable* per capita emissions under the existing Kyoto Protocol and a "beyond Kyoto" scenario (assuming US and Australian participation) (tCO_2^{-e})

Country blocs	BaU	Kyoto Protocol	Beyond Kyoto
OECD	15.97	15.97	10.14
EE/FSU	9.49	13.23	12.98
Non-Annex B	3.13	2.64	3.13
Inequality Ratio**	**5.10**	**6.05**	**3.27**

* Allowable emissions are those that would be possible given a policy scenario's targets.

** The Inequality Ratio is formed by dividing an OECD emissions rate by a corresponding non-Annex B rate. Perfect equality would be represented by a 1:1 ratio.

Genuine, rather than virtual, GHG reductions are anticipated under our "Beyond Kyoto" proposal. While the rate of reduction in this scenario would surely be more costly to implement than the Kyoto Protocol, there is little logic in gauging such costs against BaU conditions. Doing so assumes that continued high-carbon global growth is acceptable, a notion directly challenged by norms of sustainability and equity. Further, such growth would presume commodity status of the atmosphere. In this respect, our analysis underscores the dichotomous choices before us: a Kyoto approach built on core economic values of efficiency and profit and leading to the capitalization of the atmosphere; or a socio-ecological approach built on values of sustainability and equity and conceiving society-atmosphere relations as commons-based.

Reclaiming our Atmospheric Commons

In an era of neoliberal globalism, building an equitable, sustainable, and commons-based relation with the atmosphere will not be easy. For the

past 200 years, modernity has depended upon a basic formula for resolving social problems, namely, the promotion of wealth and economic opportunity. Having experienced economic growth for two centuries and now occupying the apex of the wealth pyramid, Northerners in particular often assume that the human condition, or at least their condition, has been bettered by the pursuit of cornucopic ideals. While improvements in Northerners' health and economic security have accompanied adherence to this mode of development, the world is now confronted with social and environmental problems that are uniquely the result of the North's dubious "success" — persistent social inequality and environmental unsustainability. The prospect of global warming and the inequities it augurs appears to be the inescapable threat of unchecked modem development into the 21st century.

Our best hope for a future free of the hubris of atmosphere management lies in a rejection of proposals to capitalize nature and a renewed understanding of the gifts of nature — including our atmosphere and climate — as elements of a commons of life. The sustainability of this commons depends upon societal exercise of normative constraints that enable all forms of life to prosper. Modernity has recklessly breached the constraints underpinning nature-society relations. Through efforts to shape the agenda of climate change to adhere to principles of equity and sustainability, we can take a first step in reclaiming our commons of life.

Footnotes

1 The Conference of Parties is comprised of the 161 signatories of the United Nations Framework Convention on Climate Change and is charged with negotiating revisions to the treaty and procedures for its implementation.

2 The product of COP-3 in 1997, the Kyoto Protocol set specific greenhouse gas emission reduction targets for Annex B countries (which include nations of the Organization for Economic Cooperation and Development (OECD) and those of the former Soviet Union (FSU) and Eastern Europe (EE). Membership of the OECD has expanded since 1992 when FCCC was signed. New entrants include South Korea and Mexico, neither of whom has been assigned GHG reduction targets under the Kyoto Protocol. In this chapter all references to the OECD designate the composition of the organization at the time of the signing of the UNFCCC. The Marrakech Accord was adopted at COP-7 (2001) and finalized operational language for the implementation of the Kyoto Protocol.

3 During COP-8, held in New Delhi in late October 2002, a number of nations (and researchers - see, for example, Muller, 2002) urged a shift in focus to the actions needed and costs required for developing countries, especially, to adapt to climate change. In the original draft of the so-called "Delhi Declaration," the requirement of Annex B countries to reduce emissions as a means of mitigating climate change was not mentioned. After heated negotiations, the official communication of COP-8 indicates, briefly, the existence of this obligation.

4 The Annex B nations of the Kyoto Protocol are identical to the Annex 1 nations of the UNFCCC, except for Turkey and Belarus, which are not included in the Annex B group, and Kazakhstan, which voluntarily joined Annex B.

5 Forest sink limits for Annex B nations are listed under COP-6's Appendix Z. While

most quotas are relatively small, a few nations were allocated significant sinks (notably, Canada – 12 MtC, Japan – 13 MtC, and the Russian Federation – 33 MtC).

6 Reasons for the use of per capita emissions are given below.

7 This assumes that the US and Australia participate in the Kyoto Protocol. As discussed later, the withdrawal of the US and Australia means that "hot air" can provide more than 80% of the target reduction for the remaining OECD participants. While most FSU and East European nations in Annex B have some"hot air" to sell, about 95% of "hot air" would likely be provided by Russia, Ukraine, and Romania.

8 Research (noted in IPCC, 2000) has suggested that domestic sequestration can offer low-cost emission offset options.

9 As explained below, it is possible that the US and Australia will seek to rejoin the Protocol before the first budget period is concluded. Thus, an assessment of the Protocol requires consideration of scenarios that include and exclude the participation of the US and Australia.

10 Whereas we anticipate increased GHG emissions, Nordhaus projects modest reductions of 1.5% from BaU projections in 2010; if forestry offsets are included, he expects a decrease of only 0.8% (Nordhaus, 2001).

11 This section draws heavily from Byrne and Yun (1999) and is provided with permission of the editor of Bulletin of Science, Technology and Society.

12 A political economy organizes power over many human activities. Because our focus here is on society-nature relations, we have limited our discussion to the organization of power over nature.

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