Moving Ahead with Climate Policy

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Moving Ahead with Climate Policy

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Introduction

Following a decade of international meetings and negotiations, more than 160 nations signaled their commitment to address the problem of climate change by initialing the Kyoto Protocol in December 1997. The Protocol requires industrialized “Annex I” countries to reduce their total emissions of carbon dioxide (CO₂) and other greenhouse gases (GHGs) by an average of roughly 5% compared to 1990 levels, by 2008-2012. Developing countries are not required to meet quantitative emission goals, though all signatories to the 1992 United Nations Framework Convention on Climate Change (UNFCCC) have certain obligations to measure and report emissions and to encourage more climate-friendly activities.

Implementation of the Kyoto targets—in particular, the design of international “flexibility mechanisms” for lower-cost GHG abatement—will continue to be negotiated at November 2000 meetings at the Hague. However, questions remain in the United States and other countries about whether, when, and how the Kyoto Protocol will be ratified and implemented.

Over the past decade, climate negotiators have made a series of key policy decisions with far-reaching consequences not fully appreciated at the time. In a number of cases, negotiators passed up options that might have lowered the costs of achieving the long-term objectives of the UNFCCC. I believe that reconsidering these options in the international negotiations will be crucial for long-term success in limiting GHGs.

In this paper I draw upon extensive economic analyses by scholars all over the world over the past decade to address four points that I think can help influence the climate policy debate. They are the following:

* This paper was presented at the Global Climate Change Conference, James A. Baker III Institute for Public Policy, Rice University, 8 September 2000; an earlier version of the same ideas was presented at the Arco Forum of Public Affairs, Harvard University, 15 March 2000. The paper draws upon a number of ideas developed by or with a number of colleagues, including Jason Shogren, Dick Morgenstern, Billy Pizer, Marina Cazorla, and John Anderson. Responsibility for the content of the paper is, however, mine alone.
(1) Efforts are warranted to strengthen the “Kyoto flexibility mechanisms,” but one needs to be realistic about their performance.

(2) A more gradual but accelerating trajectory of GHG abatement would be a better policy in practice than the Kyoto approach on economic and environmental grounds.

(3) It is worthwhile to take modest but effective domestic actions to abate GHGs in the United States today, and prepare for additional actions in the future.

(4) Continued constructive efforts to involve developing countries in global emissions reductions is crucial.

Most of these points can be seen as natural extensions of current climate policy negotiations and policy debates. Point #2, however, represents a conspicuous departure from business-as-usual scenarios in the climate policy process.

As a point of departure for the discussion in this paper, I presume that climate change is a risk requiring some action. Substantial uncertainty surrounds the likelihood and magnitude of these effects. Nevertheless, my premise in this paper is that climate change poses enough of a long-term risk that some response measures today are appropriate. The issue is not whether to respond to today but how to respond effectively while retaining options for adjusting policies as new information about risks and response options becomes available.

Background

Several flexibilities were introduced in the Kyoto Protocol. These include where flexibility, which allows for international trade in carbon emission rights to promote the most cost-effective and lowest-cost abatement opportunities. Where flexibility includes the participation of developing countries in emissions abatement through the “Clean Development Mechanism (CDM).” The Protocol also incorporates what flexibility in that targets can be met by controlling several different gases as well as by increasing long-term uptake of atmospheric CO₂.

However, the Protocol focuses on year-to-year emissions of GHGs rather than the concentration of those gases in the atmosphere that actually affect the climate over the longer term. The Protocol further emphasizes a short-term timetable, 2008-2012, rather than the century-long schedule required to effectively reduce GHGs. This last point is important because there are many paths by which a specific long-term concentration can be reached. Those policies that allow for greater when flexibility will be less costly ways to meet long-term GHG goals than
others. Specifically, approaches with a more gradual beginning that increase in momentum over time will cost less, whereas the more front-loaded the targets (that is, the more emissions control done early), the more it will cost to reach them.

In addition, the fact that the Kyoto negotiators found no agreement on more specific policy targets for developing countries simply postponed an inevitable day of reckoning on how these countries are to be incorporated in global emissions limitations, assuming that the international community seeks limits on GHGs. Just as Kyoto’s quantitative targets for Annex I countries in themselves only delay by a few years the inexorable growth of global GHG concentrations, so the omission of developing countries from quantitative emissions limits implies only a modest slowing down of GHG growth, no matter how draconian the long-term policies are in Annex I.

**Strengthening the Kyoto Mechanisms**

Economic tools help cut the costs of achieving a GHG emissions target because they generate a market price for GHG emissions, which are otherwise treated as a free good. This price creates tangible financial reasons to reduce carbon emissions while providing flexible means to do so at low cost. Emissions taxes and GHG permit trading are many economists’ favorite incentives. A carbon tax can be levied on fossil fuels rather than directly taxing emissions, and in principle it can be extended to other GHGs and to a subsidy for sequestration. Emissions trading means that possession of fossil fuel (or release of some other GHG from a controlled source, like methane from a landfill) is restricted by some kind of permitting system, but the permits can be bought or sold. If GHG sources (or holders of fossil fuels) can reduce emissions more cheaply (through low-cost fuel switching or direct emissions control) they can use fewer of their permits and make the excess available to others who have higher abatement costs.

With either policy, consumers respond to the resulting price signals in a variety of ways. These include: switching to less-carbon-intensive fuels (for example, natural gas for coal); increasing energy efficiency per unit of output by using less-energy-intensive technologies; adopting technologies to reduce the emissions of other GHGs (assuming they are covered in the program); reducing the production of what might become high-cost, carbon-intensive goods; increasing the sequestration of carbon through reforestation; and developing and refining new technologies (for example, renewable energy resources) for avoiding GHG emissions.
GHG trading can be extended around the globe. As already noted, the Kyoto Protocol allows for both formal GHG trading among the “Annex I” developed countries and bilateral trading through the CDM. Under the CDM, emissions reduction activities in non-capped, non-Annex I nations can generate emission reduction credits for Annex I nations. Annex I trading could involve tying together domestic emissions trading programs or a project-level approach in which participants can generate emission credits from emission-reducing actions in other Annex I countries (so-called joint implementation). These various endeavors could be organized and financed by Annex I investors, the developing countries themselves, and international third parties.

The United States has been a strong advocate in the international negotiations for the use of broad international trading to meet Kyoto commitments. Other countries, notably in Western Europe and some parts of the developing world, have been cooler toward decentralized, private-sector emission trading. Some nations like trading, but only if strict rules are imposed, which in a sense may ultimately be self-defeating. European negotiators have advocated trading limits that restrict the degree to which Kyoto Protocol targets could be met through international flexibility mechanisms. These negotiators may have many motivations for taking this view: less concern for the cost of GHG control if economic growth is slower in Europe than in the United States and a desire to increase comparative advantage by limiting U.S. access to low-cost abatement opportunities, as well as concern that the United States does not use harder-to-verify international reductions to displace longer-lasting domestic action. Such “supplementarity” constraints (as they are termed in the debate) have been stoutly resisted by the United States for fear that they would unduly restrict opportunities for cost-effective emissions control and delay the evolution of effective GHG permit markets.

There is every reason to believe that the flexibility provided by the Kyoto mechanisms could lower Annex I countries’ costs of meeting their Kyoto targets. Moreover, the CDM provides a valuable potential for the productive engagement of developing countries in activities that promote sustainable economic development while slowing growth trends for GHG emissions. For these reasons, the United States should continue to promote the implementation of these mechanisms and resist calls for undue supplementarity or other limitations on their use (for example, limits on the projects and technologies eligible for inclusion in the CDM).

But these mechanisms are never going to operate in a textbook fashion. They will inevitably be subject to “transactions costs” that limit their efficiency. Also, concerns about the flow of funds out of the United States to acquire foreign-supplied emissions credits will have to be overcome if the mechanisms are to be used extensively. It is therefore misleading to be too
optimistic about the potentially low costs of meeting the Kyoto targets. In practice the costs may be significantly larger, especially for meeting policy targets as ambitious as Kyoto (which likely will require a reduction in emissions relative to business-as-usual levels of one-third or more). This strengthens the case for explicitly considering costs in evaluating compliance and for considering greater flexibility in the timing of emissions reductions.

**Increasing Flexibility of International Climate Targets**

*The Issue of Timing*

The UNFCCC declares in Article 3, Section 3 that “policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost.” While there is still debate on this point, there is a growing conviction among economists that the Kyoto Protocol may seek too much abatement, too soon—relative to a slower path that achieves long-term climate protection goals at lower costs and with less economic dislocation. To address this concern requires more gradual but accelerating targets for GHG control and flexible compliance standards that take into account compliance costs as well as quantitative emissions targets. Otherwise political agreement for achieving the desired environmental goals is likely to remain elusive.

A number of papers published in the past several years conclude that the lowest-cost path to any targeted concentration of GHGs in the atmosphere would begin gradually and leave the more drastic reductions in emissions until the later decades of the program. The sharp reductions in emissions by the period 2008-2012 under the Kyoto treaty provide little “when” flexibility and thus do not lie on the lowest-cost path to any plausible long-term GHG concentration target.

Four reasons for back-loading the deeper cuts in emissions (doing more later) are generally offered in the literature. First, the world’s investments in fuel-burning equipment are vast, and to replace that equipment before its normal life has ended would be more expensive. It is quite true that technologies are available that use energy more efficiently and emit less GHGs than much of the present equipment does. But an electric power generating plant, for example, is often built with an expected life of 40 years. To replace it after only 20 imposes a cost on society.

Under the Kyoto treaty, if it is ratified and put into force, the United States would be obligated to reduce its GHG emissions during the period 2008–2012 to a level equal to 7% below 1990 emissions levels. But due to economic expansion, the country's emissions are already 10%
above the 1990 level, and the U.S. Energy Information Administration projections indicate that under present policy, by the year 2010, U.S. emissions would be more than one-third above 1990. The Kyoto target must be met in a time frame hardly longer than the life of an automobile, let alone heavy industrial equipment.

Second, technology steadily finds ways to use energy more efficiently, with fewer emissions. By postponing drastic cuts in emissions for several decades, the world’s economy could take advantage of technology that is not yet available. Third, the discount rate argues in favor of delaying the heavy expenditures. A dollar invested in 1998 at a real (after inflation) interest rate of 2% a year would be worth $1.88 in the year 2030 and could buy almost twice as much then as now. More generally, if a dollar is saved today and invested in science, education, or any of the other contributors to economic development, the savings will result in a richer society. Each dollar spent on emissions control two or three decades from now would represent a smaller proportion of society’s wealth and would be a smaller burden on society.

Fourth and finally, CO₂ in the atmosphere is constantly absorbed by the oceans, the forests, soil, and other sinks. Not all of the CO₂ that human activity throws into the air is absorbed, of course, and that is why concentrations in the atmosphere are rising. But over half of all CO₂ emissions disappears through sinks. If the sharp cuts in emissions are postponed, some of the CO₂ emitted to the atmosphere in the meantime will have disappeared naturally before the concentration reaches the target. This is relevant since it is the long-term concentration of GHGs, not the annual emissions, that influence climate change.

Each of these four points has generated controversy. Will research and development, for example, produce significant advances in energy technology in the absence of the pressure exerted by mandatory emissions cuts? What exactly are the incentives that will produce the technology necessary to reduce emissions substantially without crippling industrial production?

Debates persist in the literature on the importance of induced or endogenous technological change. Goulder and Mathai find that when knowledge is gained through R&D investments, some abatement is shifted from the present to the future, thereby supporting the notion of back-loading. However, when knowledge is gained through learning by doing, the impact on the timing of abatement is ambiguous.

Another central argument against the option of beginning gradually is that, in the absence of dramatic and forceful change, people will not take seriously the need to curb emissions. Companies’ management and private consumers, the argument goes, will not change their habits and begin to make the investments necessary to carry them into an era of lower emissions.
Postponing severe action will merely mean that, in a generation from now, the world will face the same need to cut emissions, but at a much higher level.

However, credibility goes both ways. If a program turns out to be too expensive and disruptive, it will collapse and discredit the whole idea of controlling emissions. Politicians are left to struggle with the same question they have confronted for over a decade: What is the size and shape of an emissions cut big enough to persuade people that profound change is coming, but not so big that they dismiss the whole idea as unrealistic? In confronting this question anew, they must take into account the large potential cost-savings from increased “when” flexibility.

**Building Flexibility into Policy Choices and Compliance Rules**

The costs of meeting the Kyoto targets are uncertain, as illustrated by a comparison of leading computerized models of energy use and economic activity used to study this issue. Optimistic estimates are provided by the Clinton administration’s own analyses and by a study of technological potential by several U.S. national laboratories. Other estimates run higher, in some cases substantially so. For example, even if there are opportunities at present for low-cost technology and management improvements that reduce GHG emissions, will these opportunities be ongoing as GHG targets get stricter, or will they be used up quickly? The rules for international emissions trading under the Kyoto treaty also have yet to be worked out. Since there is no prior experience with broad and substantial GHG cuts, it is not possible to know what assumptions and projections are more accurate or realistic.

A substantial body of economic analyses suggests that debating different, strict quantitative targets is arguing about the wrong issue. We should instead be trying to develop policies that lead to gradual but accelerating GHG limitations over time. Achieving agreement on such policy goals requires addressing the costs associated with meeting different policy targets.

One way to address the issue of cost uncertainty in the context of the Kyoto Protocol targets is to negotiate agreement on compliance rules for Annex I countries that would limit the potential increase in energy costs over the short term while still requiring the use of meaningful abatement measures. The stringency of abatement could then be gradually increased over time, as businesses and consumers adjust to pressures for increased energy efficiency and new technologies for avoiding GHGs emerge. If emissions control is as cheap as advocates of the Kyoto Protocol suggest, then the limits on abatement activities to contain costs would never be
triggered. But if the advocates are wrong, insurance against unacceptable cost run-ups in the short term is critical in expanding the base of political support for meaningful action.

McKibbon and Wilcoxen and Kopp, Morgenstern, and Pizer describe ways for providing this flexibility. Both papers suggest what is sometimes known as a “safety-valve” option. This option would allow Annex I governments to relax their strict quantitative limits once the market price of GHG permits (and thus the domestic cost of additional abatement) reached a certain common ceiling. The ceiling would be maintained by governments standing ready to supply permits on demand at the ceiling price.

The approach suggested by McKibbon and Wilcoxen would allow for national emissions trading within Annex I countries subject to a common ceiling price in lieu of international GHG trading, which in their view could lead to costly and counterproductive international income and capital flows. In the Kopp, Morgenstern and Pizer proposal, the option of international GHG trading is retained; and Annex I governments that used the safety valve would pay into a “compliance fund” an amount equal to their national shortfall in abatement (relative to the Kyoto targets) times the ceiling price (presumably this would be accomplished by charging their regulated entities who exceeded the national emission standards in force). This fund could be used in various ways, including investments in developing countries to further emissions control through the CDM (with resources allocated to specific projects via a competitive auction).

One objection to these kinds of approaches is that they would not guarantee a specific reduction on an agreed timetable. One then returns to the question of what guarantee of emission reductions exists in the current situation. If the Kyoto Protocol is not ratified in a timely way, few if any emission reductions will materialize. Moreover, by starting with more modest policy targets and gaining experience with GHG control while also providing more time for scientific knowledge to accumulate, the world gives up little in the way of options to act more decisively in the future as warranted to limit GHGs.

**Early Reduction of GHG Emissions**

Over the past couple of years there has been much debate in the United States over different policies for encouraging “early reductions” of GHGs prior to the date at which the Kyoto targets would go into force (if the Protocol is ratified, or even if it is not ratified in the near future or at all). Many of these proposals involve programs for granting “early reduction credits”—a promise of more generous regulatory allotments of allowed emissions in the future—to those “good actors” who voluntarily reduce emissions beyond business-as-usual levels.
A common drawback of these proposals is that their effectiveness is stymied by uncertainty over the imposition of mandatory emissions limits in the future. Moreover, the awarding of early credits requires many subjective judgments about what constitutes “additional reductions” versus “anyway reductions.” Depending on how the programs are constructed, they may induce too much early reduction or too little.

With several other RFF colleagues, I have advocated the imposition of a mandatory formal emissions trading program for controlling CO₂ (and gradually other GHGs) within the next three years. This program would apply comprehensively to fossil fuel supplies (so there is no need to measure or impute the emissions of myriad emission sources). Fossil fuel supply permits would be auctioned off and the resulting revenues would be used to offset other burdensome taxes, with transitional assistance to those most adversely affected by the policy (especially displaced workers as well as affected businesses). To limit the economic risk, the government would supply supplemental permits as needed at a fixed price that would rise over time (a domestic application of the “safety valve” idea mentioned above).

This kind of policy deserves continued consideration as the climate policy debate moves ahead. It paves the way for future action if and when the Kyoto Protocol is ratified, while allowing a more explicit balancing of environmental goals against economic costs. Because the program has fixed targets and clearly established claims for emission permits, it avoids the disadvantages of other early reduction programs cited above. Finally, a number of other Annex I countries already are moving ahead with various, moderate GHG control policies. By joining this group with an extremely cost-effective policy design, the United States has a chance to regain a real leadership position in the international climate policy debate.

Engaging Developing Countries in Cooperative GHG Control

International Equity Concerns

Ultimately, achieving international agreement on global responsibilities for reducing GHGs is tantamount to establishing international agreement on how to divide up rights to emit GHGs over the longer term. This is obviously an enormously difficult task. The difficulty is reflected in the real-world controversies surrounding international equity in the climate negotiations, where one finds vehement opposition from developing countries to U.S. and other developed-country proposals for a flexible approach to GHG mitigation on the grounds that it may create economic or environmental disadvantages for the developing world.
Advocates for developing countries in this debate have proposed a variety of formulas for allowing developing countries to increase their emissions concurrent with needed economic growth before these countries begin to curb their emissions. It follows almost arithmetically that given any particular long-term target for the concentration of GHGs in the atmosphere, the longer and higher developing countries’ emissions grow, the faster and lower must be the reductions in industrialized countries’ emissions. Many of the formulas allowing developing countries to postpone emissions reductions reflect a basic premise of an equal per-capita right to emit GHGs, coupled with an assignment of primary responsibility for GHG control to developed countries given their greater affluence and responsibility for historic emissions. Developed countries could expand emissions beyond their allotment, but only by purchasing additional emission allowances from developing countries. Developed countries in turn have staunchly resisted such proposals that involve an after-the-fact liability for emissions and a degree of income redistribution that is politically unacceptable (not to mention concerns that financial resources transferred would not actually generate international environmental benefits).

Even a cursory review of the growing literature on international equity in GHG policy casts grave doubt on the notion that some simple formula will resolve this dilemma. While it is possible to find convex combinations of allocation rules that generate less lopsided distributional consequences than simple approaches like equal GHG allocations per capita or per unit of GDP, it is still questionable whether such ad hoc approaches can command broad political support.

**Policy Options**

Some authors, such as Cooper, doubt that an explicit international agreement on national emissions targets is possible. They emphasize other mutually agreed-on policy measures such as energy taxes (which could allow developing countries to reap more reliable tax revenues and reduce other taxes). Wiener argues instead that international transfers to developing countries are crucial for expanding participation in GHG control and stabilizing the atmosphere, and that such transfers are much more effectively accomplished by the international allocation of GHG rights and their sale through market channels than through intergovernmental redistribution of carbon tax revenues. Wiener also questions whether developing countries would be prepared to impose substantial energy taxes on its citizens, implying that this approach would have limited impact on global GHG emissions.

In the midst of this long-term uncertainty about how to structure long-term global agreement, it may be useful to look for a *process* that can gradually increase the engagement of
developing countries in GHG control, while increasing current understanding of the options available and building international confidence in international mechanisms as they evolve. The CDM is a first key step in pursuing this approach. It could generate both low-cost emissions reductions for developed countries and tangible environmental and economic benefits to the host country through the transfer of efficient, low-carbon technology. Even the most ardent proponents of the CDM concede that it will have higher transactions costs, greater monitoring difficulties, and lower overall efficiency than other options like a full-blown permit trading system. But it is a good place to start.

However, many obstacles remain. One key immediate question is how to design a credible monitoring and enforcement system that does not impose such high transaction costs that it inhibits CDM trades. People will not start a project if the time, effort, and financial outlays needed to search out, negotiate, and obtain governmental approvals are too onerous.

Developing countries also have expressed concerns about an uneven playing field for negotiating CDM deals. One proposed solution to this problem is the embedding of CDM in a multilateral institution, in which developing countries individually and collectively can exert influence on what CDM projects are undertaken and how. The problem with this approach is that it risks drowning an imperfect but potentially valuable international market mechanism in a more inflexible international bureaucracy. Developed countries should stand fast to the idea of promoting the CDM as a market mechanism with maximum operational participation by the private sector, while also acknowledging the need for auditing to ensure environmental credibility and the right of host developing countries to veto projects they find unacceptable.

Another developing country concern has been the risk of “giving up the low fruit,” or undertaking low-cost CDM projects early with international partners and then having these options available later when or if binding commitments are undertaken by developing countries. However, developing countries can negotiate terms and conditions for CDM projects that reflect the best tradeoff for them between short-term economic and environmental benefits, and the longer-term value of retaining low-cost options for GHG domestic control. Given the scarcity of capital in many developing countries, the prospects for local environmental benefits from CDM projects, and the possibility that today’s low-cost GHG abatement opportunities may be tomorrow’s “lost fruit” because of technical progress, CDM projects could yield substantial benefits to developing countries as well as their Annex I partners.

While the CDM can help start international climate cooperation, it is not a substitute for broadening formal international commitments and developing more cost-effective mechanisms.
Eventually there will need to be some kind of bargaining over the distribution of national responsibilities. It is unlikely that this can be accomplished in a one-shot deal. One approach to the problem is through some kind of long-term “graduation” formula. The essence of this idea is that developing countries would gradually assume more responsibility, in a relatively predictable way, as their economic circumstances and thus their ability to pay improves. While negotiating over the terms of such an approach is not easy, the CDM may offer enough flexibility to provide ways for accommodating the interests of both developing and developed countries.

Concluding Remarks

It is a gigantic undertaking even to organize a cooperative worldwide program limiting the emissions of GHGs. Some 180 governments are now involved, and all now realize that any useful attempt must affect their economies deeply. But amidst all the gaping uncertainties surrounding this subject, there is one thing that can be stated with assurance: A program that offers great flexibility and relatively low economic costs will have a better chance of actually being adopted than an inflexible and expensive one. In the range of all possible approaches, the Kyoto Protocol lacks significant elements of “when” and “how” flexibility.

At first glance, the present process of post-Kyoto negotiations looks like nothing more than a tedious process of jockeying over minor technical points. However, many governments have begun to realize the extent to which the treaty introduces difficult questions requiring further thought. They are now grappling, not with final details, but with the enormous economic implications of the treaty itself. Progress toward completing it is turning out to be very slow, and the fate of the Protocol remains uncertain.

If this slow progress continues, governments will eventually have to consider whether Kyoto was not a false start. As this paper has suggested, there are alternative policies that, in economic terms, offer a way to move ahead. These include not only the development of the Kyoto mechanisms, but increased “when” and “how” flexibility through emission control targets that are early and modest but accelerate over time, and through price-based policies to limit compliance cost shocks. For developed and developing countries alike, the challenge is to find ways to use the concept of the CDM to the best possible effect and to continue discussions on how all Parties’ interests can be served by a gradual broadening of GHG control commitments. This evolutionary approach to policy is consistent with the still-evolving science of climate change risks and the legitimate aspirations of poor countries for increased development.
Further Readings


