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**U.S. LEADERSHIP FOR A GLOBAL CLIMATE
CHANGE REGIME**

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MARCH 2003

The publication of this paper was made possible through the generous support of
The J. M. Kaplan Fund.

Abstract.

Climate policy is currently proceeding along two different paths: a multilateral path charted by the Kyoto Protocol, and a unilateral path being pursued by the United States. Both of these approaches will do little to mitigate greenhouse gas emissions. The Kyoto Protocol cannot enforce its required emission reductions, and the U.S. approach is largely voluntary. As explained in this paper, more should be done to mitigate climate change. But doing more will also require a different approach: a global regime embracing full participation. More partial approaches are easily undermined by problems such as free riding behavior, trade leakage, and a failure to reduce emissions cost-effectively. To sustain a global regime in the face of these problems, a strategy is needed to change incentives. Kyoto tries to do this, but fails. Most alternative proposals would also make little difference. A radically different approach is required. This paper proposes a multilateral approach involving short-term mitigation efforts enforced domestically; a long-term cooperative R&D protocol; standards protocols for new technologies; and an adaptation fund for developing countries harmed by climate change.

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Executive Summary

Climate policy is currently proceeding along two different paths: a multilateral path charted by the Kyoto Protocol, and a unilateral path being pursued by the United States. Both of these approaches will do little to mitigate greenhouse gas emissions. The Kyoto Protocol has had to be progressively weakened in order to have a chance of entering into force, and yet it is still unable to enforce its required emission reductions. The U.S. approach is voluntary and will not affect behavior. Virtually nothing has been done to mitigate emissions in the last decade, and the multilateral and unilateral paths being followed now will only repeat this outcome during the next decade. As explained in this paper, more should be done to mitigate climate change. But doing more will also require a radically different approach.

Though the emphasis of the Kyoto negotiations has been with the setting of emission limits and the development of “flexible mechanisms” for implementation, these features of the agreement can change behavior only if the treaty’s obligations can be enforced. Enforcement mechanisms were added to Kyoto only as an afterthought, and they will not work in any event. Indeed, Kyoto requires that these mechanisms not be binding except by means of an amendment. Since an amendment would apply only to the countries that ratified it, the emission limits in Kyoto -- negotiated so painstakingly -- are politically binding, but not legally binding.

There are three likely outcomes. Either Kyoto will not enter into force; it will enter into force but not be implemented fully; or it will enter into force and be implemented fully -- but only because countries would have met the Kyoto emission limits anyway. Alternative enforcement mechanisms, including trade restrictions, are also problematic. The essential problem with Kyoto is that its approach of setting targets and timetables imposes a burden on enforcement that the international system is unable to make effective.

Though some unilateral mitigation is justified, a global regime embracing full or nearly full participation is needed if emissions are to be reduced significantly. More partial approaches are easily undermined by problems such as free riding behavior, trade leakage, and a failure to reduce emissions cost-effectively. Of course, this is why countries negotiated Kyoto in the first place. However, as noted above, Kyoto cannot do what it was intended to do.

These criticisms of the Kyoto Protocol are very different from the criticisms made by the Bush Administration. As explained in this paper, the Bush Administration’s criticisms are not fundamental and can be addressed by a renegotiation of the agreement. The enforcement problem highlighted in this paper means that the fundamental architecture of Kyoto needs to change.

The alternative proposed in this paper abandons the setting of targets and timetables, and seeks to provide a long-term response. There are four elements to the proposal, each of which may be included as protocols to the Framework Convention on Climate Change.

First, a cooperative R&D protocol is needed to provide basic research into alternative technologies for reducing greenhouse gas emissions. Second, follow-on protocols establishing international standards for new technologies are also needed. These standards protocols would build on the R&D protocol, be negotiated years after the R&D protocol entered into force, and incorporate mechanisms for paying developing countries for the incremental costs of these new technologies. The standards protocols would affect mitigation in the medium-to-long-term, and yet a short-term response is also needed.

The third protocol would be similar to the Kyoto Protocol in this regard, with the important exception that countries would likely negotiate policies and measures rather than targets and timetables, and drop the pretense that such a treaty can be enforced internationally. Instead, the pledges made in this agreement would rely entirely on domestic enforcement, though subject also to international review. Finally, an adaptation protocol is needed, in which industrialized nations provide the development assistance needed to prepare developing countries for the climate change that cannot be avoided by the other protocols.

The advantages of this proposal are that it provides a long-term remedy for climate change and that it is easier to enforce internationally. In contrast to Kyoto, contributions to the R&D protocol would be contingent. Moreover, the total cost to every country would be capped. The standards protocols would be designed to promote global adoption of new technologies, facilitated by economies of scale and network externalities. Developing countries would have an incentive to adopt these technologies, because the technologies would become global standards. But they would also be compensated for the incremental costs of adoption, with the contributions by industrialized countries again being contingent. The short-term protocol would emphasize the value of unilateral action, and the adaptation protocol would acknowledge the responsibility of industrialized countries to assist developing countries in adapting to the climate change that cannot be avoided.

This approach is far from ideal. But an ideal remedy for climate change cannot be enforced internationally. A second-best remedy is the best that we can do.

This alternative is only a sketch of a global regime, and its value lies less in its details than in its motivation. The proposal differs from others because it starts from the premise that enforcement is essential and hard to implement. It could provide a basis for an expanded Bush Administration policy, should the Administration want to show real leadership on this issue.

“The issue of climate change respects no border.... Climate change, with its potential to impact every corner of the world, is an issue that must be addressed by the world.... Our country, the United States, is the world’s largest emitter of manmade greenhouse gases.... We recognize the responsibility to reduce our emissions. We also recognize the other part of the story -- that the rest of the world emits 80 percent of all greenhouse gases.... [O]ur approach must be based on global participation, including that of developing countries whose net greenhouse gas emissions now exceed those in the developed countries.”

President George W. Bush, June 11, 2001 (Bush, 2001)

INTRODUCTION

What should be the policy of the United States towards global climate change? In his June 2001 speech, President George W. Bush emphasized the importance of a global approach. However, the President’s February 2002 policy address was more unilateralist. The policy incorporates international elements, including joint research agreements with Japan and Italy, but the Administration’s emission target, and the policies intended to meet it, are purely domestic.

This unilateralist approach is of minor consequence given that the Bush approach is also voluntary-based, aimed at having little if any effect on dampening U.S. emissions. But if it were later decided that substantial mitigation were in the interests of the United States, a global approach will be required, and the Bush Administration has failed to indicate how this might be achieved.

Of course, a global climate regime already exists, under the umbrella of the Framework Convention on Climate Change and its associated Kyoto Protocol -- a treaty that the Bush Administration has rejected. However, as will be explained later in this paper, the Kyoto Protocol has failed to create the incentives needed to promote global participation, to reduce emissions both substantially and in the long term, and to implement these reductions in a cost-effective manner. Moreover, it is difficult to see how the Kyoto approach could be modified to create the needed incentives. A different, more radical approach is required.

This paper explains why it is in the interests of the United States to reduce its greenhouse gas emissions, why unilateral approaches should be pursued but will be inadequate, and why the Kyoto Protocol will fail to make a real difference. It also sketches an alternative that is radically different from the Kyoto approach. In his June 2001 speech, President Bush affirmed his commitment to playing “a leadership role on the issue of climate change” (Bush, 2001: 3). The paper concludes by suggesting how the United States could best fulfill this role.

THE NEED TO CUT EMISSIONS SIGNIFICANTLY

The Bush Administration has concluded that substantial climate change mitigation efforts are currently unjustified, though it has also said that, if “...sound science justifies further policy action, the United States will respond with additional measures.” (Bush Administration, 2002a:

2). Of course, the Clinton Administration concluded differently. It maintained that significant emission reductions were already justified, as have the governments of most other industrialized countries.

So far, this difference in views about climate change has not mattered much. Though the Clinton Administration believed that action was warranted, it failed to implement an effective policy for climate mitigation. It supported the Kyoto Protocol, but treaties need to be ratified by a two-thirds majority of the U.S. Senate. The Senate indicated in a non-binding resolution, even before Kyoto was negotiated, that it would not endorse a treaty of that kind. Moreover, despite signing the Kyoto Protocol, President Clinton declined to ask the Senate to ratify it. President George W. Bush rejected the Protocol, but it was unlikely to be approved by the Senate even if Al Gore had become President.

Whichever view about climate change is right, an effective climate change policy is needed -- either to be implemented as a matter of priority, if you agree with the Clinton Administration's rhetoric; or to be prepared as a contingency, in the event that further action is justified, if you agree with the Bush Administration's rhetoric.

Politics aside, what level of emission reductions is really justified? The Framework Convention on Climate Change establishes as its objective the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." I don't know anyone who thinks this is an unreasonable objective, but I also don't know anyone who can say what level of concentration would be "dangerous." There is real concern that a threshold may exist, beyond which climate change may proceed rather suddenly, and perhaps be irreversible. However, no such threshold has yet been identified. An arbitrary level could be set, but the problem here is that mitigation will be costly. We can't look only at the damages from climate change when deciding what to do. We also need to consider the costs of mitigation.

An economically efficient climate change policy would take both damages and costs into account when indicating what it is best to do. In particular, it would equate the marginal benefits of mitigation with the marginal costs.

The marginal benefits of mitigation may not be as large as is sometimes claimed. Often one hears about the damage climate change could do to vulnerable coastal regions, and it is true that these areas could be severely harmed. However, much of this damage cannot be avoided by current policy; even if global emissions were cut to zero, concentrations would remain well above historical levels, and some climate change would ensue. Other regions may benefit, at least in the short-to-medium run, making the total or average avoided damage much smaller, possibly even negative, at least for some sectors and regions. Moreover, the benefits of adaptation would be realized only after a delay of decades, and even small discount rates would reduce the value of these future benefits in present value terms. Finally, countries will have incentives to adapt to climate change. The most valuable coastline may not be lost. Precisely because it is valuable, efforts may be taken to protect it -- by building sea walls, for example.

In addition, the marginal costs of reducing emissions are likely to increase rapidly with the level of reduction, especially if little time is given for the economy to adjust. Some people argue that significant mitigation can be achieved at a zero or even negative cost, but if this were true, there would be less of a need for a global regime. Countries would have strong unilateral incentives to reduce their emissions substantially, even if they were unconcerned about climate change. I do not see much evidence in support of this view, but even if this view were correct, marginal costs will rise beyond some point, and a consideration of marginal benefits would then be needed for deciding by how much emissions should be reduced.

A number of studies have tried to estimate the marginal benefits of mitigation. These studies have to rely on poor data, and their results are subject to significant error. However, they are also all that we have to work with and should be taken seriously if only for that reason. Most estimates are in the range of \$5 to \$50 per ton of carbon, though some estimates are as low as zero and some over \$100 per ton (see Barrett, 2002b for estimates and sources). As already mentioned, all these estimates are rough. However, they do tell us something qualitative: doing something is justified. Presently, the United States -- and, indeed, the world -- is doing virtually nothing. More needs to be done, even if only as an insurance policy.

Though the public good nature of this problem creates incentives for countries to do too little to mitigate climate change, it is possible for policy to err in the other direction -- that is, for us to spend too much on mitigation. Resources spent on climate mitigation have alternative uses. Money spent today on mitigation may dampen the effects of climate change decades from now, but that money might be spent on development assistance, yielding a return on investment that will be paid faster and that may make future adaptation easier. Put more directly, if our concern is with the wellbeing of developing countries, is it better to spend money today that will mitigate climate change decades from now, or is it better to spend that money today to reduce infant mortality and improve primary education -- today? You might say that we should spend money on both mitigation *and* development -- and we should. But the point is that every dollar spent on one activity won't be available to be spent on another. A balance has to be struck.

So, what level of mitigation is justified today? The Kyoto Protocol provides a useful reference point. If implemented cost-effectively, Kyoto is estimated to cost the world less than \$25 per ton of carbon (see below). Given the estimates for marginal benefits provided above, the limits prescribed by Kyoto would thus seem to be economically justified, or at least not wildly out of line -- assuming cost-effective implementation (see Barrett, 1998). The main problems with the Kyoto Protocol aren't really about the level of mitigation set by this treaty -- roughly, a five percent reduction in the emissions of the industrialized countries from 1990 through 2012. The main problems lie elsewhere, primarily with the time given to achieve this level, with the emission reduction targets set for individual countries, with the short-term nature of these emission reductions, with the mechanisms designed for implementing them -- and, as emphasized in this paper, with the inability of the treaty to enforce both participation and compliance.

WHY FULL PARTICIPATION IS IMPORTANT

It is not obvious that full participation in climate change mitigation is really needed -- or even desirable. It is much easier for a handful of countries to agree what to do than for all the world's countries to do so. Richard Benedick (2001: 5), a chief architect of the successful Montreal Protocol -- a treaty limiting the production and consumption of ozone-damaging CFCs -- has suggested that we would do better by starting with domestic policies, and then building a multilateral regime from there:

“Other policies and measures to stimulate emissions reductions could be coordinated with differing constellations of like-minded nations (depending on the measure) and not necessarily enshrined in a global treaty. It should be possible to break out of the mega-conference mold and open parallel negotiations; one need not negotiate on all subjects with all countries. It is worth noting that only 21 nations (11 industrialized, 10 developing)) account for 80 percent of global emissions. Recall also that the first international action on the ozone front was not a reduction target or formal treaty, but rather a loosely coordinated agreement in the late 1970s that involved just a few countries, including the United States. The banning of CFCs in aerosol spray cans by these governments resulted in a 30 percent drop in CFC consumption globally and paved the way for the targets of the Montreal Protocol a decade later.”

Since the Montreal Protocol was so successful -- it has essentially banned the production of CFCs and related compounds around the world -- this would seem to be good advice. The original Montreal Protocol negotiations involved only about two dozen countries, and even this treaty was preceded by unilateral policies, some of which were coordinated.

However, there are also significant differences between the two environmental problems (see Barrett, 1999b). One is that, because of economies of scale, production of CFCs was concentrated in just a few states. Ultimately, a global agreement was needed, but substantial progress could be made at first by limiting production in a small number of states. Sources of greenhouse gas emissions are not concentrated in the same way.

While it is true that the initial steps to reduce consumption of CFCs were effective in protecting the stratospheric ozone layer, these early responses -- taken by Belgium, Canada, Norway, Sweden, and the United States -- were in the self-interests of these states. International cooperation was not needed to bring about these reductions (Barrett, 2002b). As will be explained in Section 7, I agree with Richard Benedick that unilateral action is justified. But the incentives to mitigate climate change unilaterally are rather weak. And they do not provide much of a platform for multilateral cooperation.

We should recall that a number of countries *did* take steps to reduce their greenhouse gas emissions. Virtually all of the OECD countries established CO₂ emission targets, and the members of the European Union established a collective target, requiring that all member states in the aggregate stabilize their CO₂ emissions at the 1990 level by 2000 (Barrett, 1998). Indeed, the European Community went even farther, agreeing on a policy for meeting this collective target: a carbon/energy tax supplemented by energy conservation measures. However, this policy was never instituted, and most of the national targets were never met.

Why was the European carbon/energy tax not implemented? In the run-up to the Rio Earth Summit, where the Framework Convention on Climate Change was to be signed by most of the world's nations, the Europeans established a precondition for implementation. Europe would implement the tax only if other OECD nations, including the United States and Japan, also implemented the tax. The European countries thus voted with their feet, as it were, and indicated that widespread participation was necessary for climate change policy. Of course, the United States and Japan did not implement the carbon/energy tax -- and for that reason, neither did Europe.

To be sure, some countries have implemented real climate policies unilaterally, and, in some cases, in a coordinated fashion. Most importantly, perhaps, the Scandinavian countries implemented domestic carbon taxes in the early 1990s. However, these are not "pure" carbon taxes. In most cases, they were implemented as part of a wider tax reform, with energy taxes being lowered as carbon taxes were raised. In all cases, the carbon taxes differentiate by sector, with the energy-intensive industries (the entities most able to reduce their emissions) paying the lowest tax, and households (the entities least able to reduce their emissions) paying the highest. These unilateral approaches have not been very successful in curbing emissions -- certainly not as successful as the early actions taken to ban CFCs from aerosols. Indeed, it is worth underlining that the country that has arguably done the most to mitigate its own greenhouse gas emissions -- Sweden -- failed even to stabilize its emissions at the 1990 level by 2000. Unilateral action is not only costly to the country willing to undertake it, but also of limited effectiveness.

Why is unilateral action largely ineffective? The reason is that unilateral action -- whether to reduce CFC consumption or greenhouse gas emissions -- may create incentives for other countries to do even less than they would have otherwise. The climate problem creates incentives for *free riding* -- an outcome in which some of the countries that benefit from the provision of a public good do not contribute to that provision. Free riding usually signals an economically inefficient outcome: too little mitigation is undertaken overall. But it may also be perceived as being unfair. Why should some countries get away with doing nothing while others make real sacrifices for the global good?

A second reason that unilateral action may make little difference is *trade leakage*. If some countries reduce their emissions, comparative advantage in the production of greenhouse-gas-intensive goods is likely to shift to other countries. This would harm the "competitiveness" of industry in the cooperating countries, but it may also increase emissions in the non-cooperating countries as a consequence of the cooperating countries reducing their emissions. Note that trade leakage and free riding are different phenomena. Countries that do not benefit at all from mitigation -- a global public good -- may nonetheless increase their emissions because of the trade mechanism.

Full participation is also needed to ensure a *cost-effective* outcome -- that is, for the climate change problem, an outcome that minimizes the total cost of achieving any given aggregate mitigation level. If, say, 21 countries cooperate and the rest (something close to 175) do not, then the marginal cost of mitigation will be higher for the cooperating countries than for the other countries. That means that the same level of reduction overall could be achieved more cheaply by distributing the burden of abatement more broadly.

Cost-effectiveness is an appealing feature from the perspective of individual countries, and not only from the perspective of all countries collectively. Suppose that countries must choose between two alternative treaties: a “narrow but deep” treaty in which a small number of countries reduce their emissions by a lot, and a “broad but narrow” treaty in which every country reduces its emissions by a little. Then it can be shown that the countries seated at the negotiating table are likely to express a preference for the latter kind of treaty (Barrett, 2002a). Cost-effectiveness lowers the cost of participating. It also makes it possible to enforce greater abatement overall, a subject to which I shall return later.

This is not just a theoretical insight. Having agreed in Berlin in 1995 that the industrialized countries should take the lead in reducing emissions, mainly for reasons of fairness, the Kyoto Protocol allowed industrialized countries to shift their mitigation offshore, as it were, towards developing countries. This was to be achieved by means of the Clean Development Mechanism (CDM), under which an industrialized party can claim credit for the emission reductions it finances in developing party states.

It is interesting to note that the Montreal Protocol established identical long-term obligations for all states, industrialized and developing. Developing parties were given more time to achieve the long-term target, and in a later amendment, the industrialized parties agreed to finance the “agreed incremental costs” of compliance for developing countries. However, the treaty sought from the beginning to create a global regime. A climate agreement must do the same.

One more difference between the ozone depletion and climate change problems bears comment. Stratospheric ozone depletion would harm every country, but it would be especially damaging to the industrialized nations. Global climate change will affect every country, but developing countries are likely to be the most affected negatively in relative terms. To deny these countries a seat at the table may threaten the perceived legitimacy of the regime, much as the legitimacy of the Antarctica Treaty has been called into question by the treaty’s exclusionary nature. Kyoto has arguably leaned too much the other way, giving developing countries “representation without taxation” (Bodansky, 2001). But we should not commit the opposite error. A balance can and must be struck.

KYOTO’S PERCEIVED FLAWS

The Bush Administration (2002b) has criticized the Kyoto Protocol for: (1) not limiting the emissions of developing countries; (2) setting targets for industrialized countries that are not based on science; (3) imposing a target for the United States that is overly stringent; and (4) incorporating mechanisms making compliance costs for the United States contingent on the behavior of other states. As explained below, all these criticisms have some validity, but they are also easily corrected, at least in principle. The bigger problem with Kyoto, discussed in detail later, has not been acknowledged by the Bush Administration and cannot be corrected as easily.

Emission limits for developing countries

As already noted, full, or nearly full, participation is essential. However, it is not essential that all countries face an emission ceiling. Indeed, as I shall explain below, it is not essential -- or perhaps even desirable -- that *any* country should face an emission ceiling. From the perspective of cost-effectiveness, it is only essential that abatement be widely distributed.

Theoretically, the CDM could realize this ambition. However, the CDM is likely to be burdened with substantial transaction costs (Barrett, 1998). It is impossible to determine precisely the emissions that would occur were an industrial party's investment in mitigation not to take place. Moreover, both of the parties to a CDM transaction have an incentive to overstate the mitigation achieved by a project. The other parties will know this, and therefore regulate CDM transactions very closely. This will be costly. Trading in emission entitlements should entail much smaller transaction costs.

Imposing an emission ceiling on developing countries would also help suppress leakage. Without an emission cap, there would be nothing to stop greenhouse-gas-intensive industry from relocating to developing countries. Universal acceptance of an emission ceiling with trading would eliminate this potential problem.

I should stress that the Bush Administration (2002b) advocates emission limits for developing countries for a different reason than the ones given above. Its argument is that the developing countries should face emission constraints because they emit a large share of the global total today -- a share that will only increase over time. This is not disputed. However, the developing countries did not cause climate change in the first place; their cumulative emissions are very low in comparison with the industrialized countries. They also believe that they have little or no responsibility to limit their emissions now. Developing countries are also the least able to afford costly mitigation now. Though they may be relatively the most affected by climate change, they also have other priorities.

In principle, the difference between the Bush Administration and developing countries is easily bridged. It is only essential to distinguish between the question of which countries should mitigate climate change and which should pay for mitigation. If developing countries were assigned emission limits with "headroom," say, then they could not lose by participating and may gain by trading their emission surpluses. That is, mitigation might be in the interests of developing countries under a trading regime. Proposals of this kind abound (see the proposals discussed in Barrett and Stavins, 2002). However, and as I shall explain later, emission ceilings create other problems that are not so easily addressed.

Science-based emission limits

It is true that the Kyoto targets are not based on science. They were more or less made up. However, and as noted previously, there are no widely agreed science-based emission limits. Indeed, there are no widely agreed limits for concentrations. To some extent, any constraint on emissions will have to be more or less arbitrary. As arbitrary limits go, the Kyoto values are not bad. If all the "flexible mechanisms" in the Kyoto agreement worked perfectly, marginal implementation costs might be in the range of \$14 to \$23 per ton of carbon (Clinton Administration, 1998). This is within the range of most estimates for global marginal mitigation benefits, as previously discussed, and so would seem justified. The real problem with Kyoto is

not its overall limits. The bigger problems are with the limits imposed on individual countries and with the design of the agreement, which is likely to prevent these limits from being achieved in a cost-effective manner. If the “flexible mechanisms” perform poorly, marginal costs could be as much as ten times their cost-effective levels (Clinton Administration, 1998).

More generally, the emission limits imposed by Kyoto have been criticized for being too stringent given that they are short-term. Climate change is a long-run phenomenon, and it is better to reduce emissions by more in a decade than by a little today. Stringent, short-term targets are costly because they require the replacement of capital that has not been fully depreciated. Indeed, one of the main problems with Kyoto is that it limits emissions only through 2012. The intent of the Kyoto framers was for Kyoto to be succeeded by future agreements, specifying future emission limits. However, with these being unspecified, the market is given ambiguous signals at best as regards the long-run value of near-term mitigation investments. Indeed, countries may be reluctant to invest substantial sums in mitigation now, fearing that as a consequence, they may be impelled to reduce their emissions by even more in the future -- that is, Kyoto may create incentives for states to “strategically under-invest” in mitigation technology.

The U.S. target

The Bush Administration is right that the U.S. emission target agreed by the Clinton Administration and enshrined in the Kyoto Protocol is stringent. The agreement requires U.S. emissions to be seven percent below the 1990 level by 2008-2012. Today, U.S. emissions are more than 12 percent above the 1990 level, or close to 20 percent short of the Kyoto target. Future economic growth will widen this gap. It is widely believed that, short of an effective policy for reducing emissions, U.S. emissions will be around 30 percent higher in 2008-2012 than in 1990. According to the Bush Administration (2002b), implementation of Kyoto without the flexible mechanisms would reduce the U.S. gross domestic product by around one to two percent by 2010.

This is a substantial amount -- much more than justified by the associated benefits for the world, let alone for the United States. However, use of the agreement’s flexible mechanisms would reduce this cost substantially. Indeed, this is why the Clinton Administration emphasized the need for such mechanisms, both in the negotiations and in testimony by officials before Congress.

Partly for the reasons mentioned previously, however, it is unlikely that the flexible mechanisms in the Kyoto Protocol would have reduced costs by enough to satisfy the United States Senate; this is why the Clinton Administration sought to promote “meaningful participation” of developing countries after Kyoto had been negotiated. However, having already agreed on the Kyoto framework -- indeed, having agreed in Berlin in 1995 that only industrialized countries should be bound by emission limits -- it was never going to be easy to renegotiate these terms. The need for global participation should have been anticipated earlier.

However, in arguing that the U.S. emission limits are too tight, the Bush Administration is essentially committing a different error. It is suggesting that if these limits were weakened, and other conditions were met as well, Kyoto would then be acceptable to the United States. It seems

to me that the expressed need to renegotiate emission limits calls into question the approach of setting emission limits in the first place.

U.S. dependence on other countries to meet its targets

An important and interesting feature of the Kyoto Protocol is that the costs to the United States, or, indeed, any industrialized country, of participating in the agreement depend not only on its own implementation policies but also on the actions of other countries. As noted by the Bush Administration (2002b), the cost to the United States of participating in the Kyoto Protocol would depend on whether certain other participants were willing and able to sell their emission allowances. As well, because the United States would likely purchase “hot air” allowances from countries such as Russia, money may be spent to comply with the agreement without having any environmental benefit. To make this point more concrete, suppose that Russia agreed to sell only its surplus allowances. As long as the emissions of all Kyoto parties were constrained, allowances would trade at a positive price. The United States would then pay Russia a lot of money for doing nothing. The United States would be willing to do this because, given the constraints imposed by Kyoto, it may be cheaper for the United States to meet its own target by buying Russia’s surplus. But this only begs the question of why the United States would want to be bound by this constraint in the first place.

This problem can be eased by a redistribution of allowances. If the United States were allowed to emit more, and Russia less, with the total quantity of allowances being unchanged, aggregate emissions would be the same. Russia would receive a smaller surplus, but it would still be better off participating than not. The cost to the United States of participating would be reduced. Indeed, if Russia were not given any hot air -- if its allowed emission limit fell short of its allowance -- the United States would still pay Russia to reduce its emissions, and Russia could still gain by participating.

Summary

To sum up, the Bush Administration’s criticisms could be addressed by renegotiating Kyoto: by getting the developing countries to accept emission limits; by lowering the limits overall; and by redistributing the total volume of allowances, with the United States being given more, and countries such as Russia less. The Bush Administration is not alone in proposing such modifications. Richard Benedick (2001), for example, urged the United States to seek a renegotiation of Kyoto at the Marrakech Conference, held in November 2001. “U.S. diplomacy,” Benedick (2001: 4) argues, “could now build on concessions already secured by Japan et al. Everything can be considered open for revision: base year, timetable, targets, and sinks. One can conceive of a new, tailor-made protocol article applying to the ‘special circumstances’ of the United States.” Others have also made similar proposals for alternatives to Kyoto (see the proposals discussed in Barrett and Stavins, 2002).

In my view, this perspective is wrong. President Bush was right to say that the Kyoto Protocol is “fatally flawed in fundamental ways.”¹ But he failed to identify the treaty’s greatest flaw. The weaknesses exposed by the Bush Administration’s own analysis can be easily repaired. The real flaw in Kyoto is much more fundamental.

¹ Bush Administration (2002b: 13).

To understand why, it is best to review a widely celebrated environmental policy designed by the first Bush Administration -- and one that helped inspire the Kyoto Protocol.

TITLE IV VERSUS KYOTO

Title IV of the U.S. Clean Air Act amendments of 1990 was intended to reduce acid rain in the United States, and, incidentally if not deliberately, in Canada, by 50 percent.² Like the Kyoto Protocol, Title IV established targets and timetables for emission reductions and allows these to be traded. In other respects, however, the two regimes couldn't be more different.

First, the total volume of permits under Title IV is set by the U.S. Congress and can be changed only by passage of a new law, whereas the total volume of allowances under the Kyoto Protocol depends on the participation level. Second, the total volume of Title IV permits applies in perpetuity, whereas the Kyoto limits apply only to the 2008-2012 commitment period. Third, emissions under Title IV can be monitored extremely accurately and in real time. Emissions of the classes of gases controlled by the Kyoto Protocol are less easily monitored; are self-reported; and are more difficult to verify. The international nature of climate mitigation also means that there may be a long delay between the time at which emissions occur and the date at which their values are reported.

The most important difference, however, is that the Title IV limits are effectively enforced by the U.S. government. Title IV imposes a fine, set by Congress, of \$2,000 per ton, to be adjusted by inflation; in 2000, the penalty was \$2,682 per ton³. Actual marginal costs for compliance have been about \$187 per ton (Schmalensee *et al.*, 1998), well below the penalty rate, giving polluters (electric utilities, in the case of Title IV) a strong incentive to comply. Title IV also requires that polluters reduce their emissions in the year following a violation to make up for an earlier shortfall. This last requirement effectively reduces the polluter's benefit of non-compliance to the interest earned in one year on the \$187 or so savings in expenditure -- a value of less than \$20. The combined effect of these two measures implies that, from the polluter's perspective, non-compliance is more than a hundred times as costly as compliance. But Title IV doesn't stop there; it gives polluters another reason to comply; it makes violation of the emission limits a felony, punishable by a prison sentence. Taken together, these measures offer an overwhelming incentive to comply, and they have had the expected effect: compliance has been virtually full. In 2000, excess allowances amounted to just 54 tons out of a total of about 10 million tons of allowances available that year. That is, the compliance rate has been about 99.9995 percent -- a pretty good record by any standard.⁴

²See Stavins (1998) for a description of Title IV and an analysis of its adoption. Title IV also forms part of the commitments by the United States under a bilateral agreement between the United States and Canada on air quality.

³See <http://www.epa.gov/airmarkets/cmprpt/arp00/index#allowdeduct>.

⁴Again, see: <http://www.epa.gov/airmarkets/cmprpt/arp00/index#allowdeduct>.

Title IV works because of this effective enforcement. But there is no world government that can enforce Kyoto in the same way that the U.S. government can enforce Title IV. The international system is horizontal, not vertical. Agreements between countries must be self-enforcing. Self-enforcement need not mean that the global environment will be unprotected (Barrett, 2002b). But the constraint of self-enforcement does make protection much more difficult. It may also mean that international problems are better addressed by a different means than domestic problems.

KYOTO'S REAL FLAWS

Compliance

Unlike Title IV, the original Kyoto Protocol did not incorporate a compliance mechanism, though it did require that its parties approve “appropriate and effective procedures and mechanisms” for compliance at the first meeting of the parties. However, according to Article 18, “any procedures and mechanism...entailing binding consequences shall be adopted by means of an amendment to this Protocol.” Under the rules of international law, an amendment is binding only on the countries that ratify it, and on the countries that accede to the original agreement after the amendment enters into law. Since any party to Kyoto could decline to ratify a subsequent compliance amendment, it can avoid being punished for failing to comply. In other words, there is nothing in the agreement that actually makes countries do what they said they would do. As matters now stand, the Kyoto emission limits are more “political” than “legal.”

Does this matter? Chayes and Chayes (1995) argue that binding compliance mechanisms are not needed. Indeed, they argue that such mechanisms can be counterproductive. However, the evidence -- even limiting our attention to the climate regime -- fails to support this view. The industrialized parties to the Framework Convention on Climate Change pledged to stabilize their emissions at their 1990 levels, and yet very few did so. Moreover, those that did limit their emissions did so for reasons having little to do with climate policy.

The countries negotiating the Kyoto Protocol seem to agree that further incentives are needed to enforce compliance. In Bonn last year, they agreed that a party that failed to meet its emission ceiling in the first control period (2008-2012) must make up for the shortfall and reduce its emissions by an additional 30 percent of this amount in the next control period (2013-2017). The 30 percent value was meant to reflect “interest” earned on the shortfall by removing the incentive for countries to “borrow” emission reductions from the future, plus a penalty for failing to comply.

This is a defective mechanism, and not only because it cannot be binding for the first control period, except by means of an amendment. First, the mechanism relies on every party punishing itself for failing to comply. But what happens if a country doesn't implement the compliance punishment in the second control period? How is the enforcement mechanism to be enforced? This problem has not yet been addressed. Second, the emission limits for the second control period have yet to be negotiated. A country that worries that it may not be able to comply in the first control period may thus hold out for easy targets in the second control period -- so that the punishment, if triggered, doesn't actually bite. Finally, and perhaps most importantly, a country can always avoid the punishment -- by not ratifying the Protocol, or by not participating in a

future protocol or amendment, or even by withdrawing from the Protocol. Since this is the easiest option available, participation is a key challenge for enforcement.

Participation

Why do countries participate in a treaty? The answer isn't obvious, given that an effective treaty must make countries do things that they wouldn't otherwise do -- reduce their greenhouse gas emissions, for example. Countries may be willing to make such a sacrifice because others are making a similar sacrifice or because doing so is simply the right thing to do. They may also be willing to make such a sacrifice because, were they not to do so, others would not do so. It turns out that this last reason is especially important. Cooperation is often sustained by a strategy of reciprocity.

In a climate agreement, reciprocity would require that, were one country not to reduce its emissions, others would not reduce *their* emissions. In a bilateral setting, reciprocity is often very effective. Indeed, this is how the multilateral trading rules are enforced under the World Trade Organization. Climate change mitigation, however, is a global public good, and when some countries punish another for failing to mitigate emissions, they harm themselves in the process. In other words, for global public goods, severe punishments are often not credible.

Intuitively, a punishment must "fit the crime." A small deviation can be deterred by means of a small punishment. A larger deviation can be deterred only by means of a larger punishment. The largest credible deviation is for a country to mitigate to the level associated with its non-participation. Hence, large punishments are needed to deter non-participation. Smaller punishments will suffice to deter non-compliance. Since small punishments are more credible, this means that if parties to a treaty can deter non-participation, they should also be able to deter non-compliance. In other words, participation is the binding constraint on international cooperation (Barrett, 1999a; 2002b).

Kyoto provides very weak incentives for participation. As of July 2002, the Kyoto Protocol has been signed by 84 countries, and ratified by 76. To enter into force, Kyoto must be ratified by at least 55 countries, accounting for at least 55 percent of the 1990 CO₂ emissions of the countries listed in Annex I of the Framework Convention for Climate Change; these countries correspond roughly to the countries listed in Annex B of the Kyoto Protocol.⁵ Hence, only the latter trigger for entry into force remains to be fulfilled. But this was always going to be the harder trigger to satisfy, because only the countries listed in Annex I are required to limit their emissions under the Kyoto Protocol.

As of July 2002, 21 Annex I countries have ratified the Kyoto Protocol. These include the member states of the European Union, the Czech Republic, Japan, Latvia, Norway, Romania, and Slovakia. Together, these countries account for only 36 percent of Annex I emissions. Entry into force will thus require participation by other Annex I countries, especially Russia. This second trigger may well be satisfied, but entry into force will come at a price. In Bonn and

⁵The list of Annex I countries included in the second trigger for entry into force excludes Croatia, Lithuania, Slovenia, and Ukraine.

Marrakech, country-specific concessions were given to a number of countries, including Japan and Russia, to facilitate their participation. However, these concessions -- more generous allowances for sinks -- effectively relaxed the emissions constraints negotiated previously in Kyoto. Other modifications, such as the decision not to impose a quantitative limit on trading, also helped promote compliance while at the same time reducing the environmental effectiveness of the treaty by releasing more hot air. Most importantly, Kyoto failed to secure participation by the United States, the world's largest emitter and only superpower. The United States is also the country most constrained by Kyoto. Without the United States, Kyoto may not reduce global emissions at all (Buchner, Carraro, and Cersosimo, 2001).

Even if Kyoto did reduce emissions, it would have only an insignificant effect. The countries that can trigger Kyoto's entry into force account for about 56% of global emissions. But the treaty enters into force if countries accounting for just 55% of this amount ratify the agreement. This means that the treaty can enter into force when the countries that must actually limit their emissions account for just 31% of global emissions. Of these countries, however, many will not have to reduce their emissions at all. Russia, for example, emits far less today than it is allowed to emit under the Kyoto Protocol. The countries that would actually have to reduce their emissions under the agreement account for just 19% of global emissions (Barrett, 2002b). Small reductions in emissions by such a small part of the problem over such a short period of time, since Kyoto stops in 2012, will barely have any effect on the trajectory of global emissions. Global emissions are almost certain to rise, even if Kyoto enters into force.

Could a redesign of Kyoto do better at sustaining compliance and participation? The obvious alternative is to use trade restrictions, as, for example, in the Montreal Protocol. However, there are a number of problems with imposing trade restrictions in a climate treaty. To be effective, such restrictions would need to be both credible and severe. The history of environmental diplomacy shows how hard it is to meet both of these requirements (Barrett, 2002b). In the case of a climate treaty, all trade would need to be affected, creating the risk that trade restrictions would strain the multilateral trading system to the breaking point.

An alternative approach⁶

To make a difference to the climate, a treaty has to create incentives for long-term technical innovation. Kyoto creates a short-term "pull" incentive. In limiting emissions, it raises the cost of emitting carbon dioxide, creating a market for carbon-saving technologies and thus an incentive for the invention and diffusion of such technologies. This is a good way to design a domestic environmental program such as Title IV, but it cuts against the grain of international relations. A substantial pull incentive requires robust enforcement -- and as I have already explained, this will be hard to sustain in a climate change treaty.

In any event, a "push" program for R&D is also needed, and yet Kyoto makes no provision for this. Basic research is in part a public good, and is best done cooperatively. Examples of "big science" collaboration include the International Space Station, the recent initiatives to develop vaccines for HIV, and the Consultative Group on International Agricultural Research (CGIAR). A similar collaborative effort, incorporated within a new protocol, is needed to fund research into

⁶ This section draws from Barrett (2001).

new energy technologies, particularly technologies that produce energy without emitting carbon or that capture and store carbon safely. The emphasis should be on electric power and transportation. To provide incentives for participation, each country's contribution to the collaborative effort should be contingent on the level of participation. Base-level contributions should be determined on the basis of both ability and willingness to pay, and could be set according to the United Nations scale of assessments. Partners in the R&D program should be given free access to the fruits of all basic research.

Note that, in contrast to Kyoto, this approach addresses the long-term challenge and creates incentives for participation. It also does not entail any leakage problems. As noted previously, one of the problems with the Kyoto approach is that, as one group of countries limits emissions, comparative advantage in the emitting industries may shift towards other countries, causing emissions by these countries to rise. With collaborative R&D, the opposite is more likely to occur. If non-participants acquire the fruits of the R&D, they will be able to reduce their emissions more cheaply, and leakage may be negative.

It is important as well to note here that all the while that Kyoto has been negotiated, most industrialized countries have actually scaled back their R&D funding, just the opposite of what is needed (Battelle, 2001).

Finally, the R&D protocol has the advantage of capping total expenditure. Parties to this agreement will know how much money they will be spending. This is not true of the Kyoto approach.

A push incentive by itself is not enough, however; a pull incentive is also needed. Just as we rely on the private sector to develop and produce vaccines, so we must rely on business to develop and produce new energy technologies. Supplemental protocols should establish a system for agreeing on common standards for technologies that can be developed using the R&D. Economists normally reject the setting of technology standards. But they have a strategic advantage. The standard of requiring catalytic converters on automobiles, coupled with the use of unleaded gasoline, has effectively spread this technology around the world. Why? One reason is that a combination of economies of scale and learning has lowered the costs of producing both technologies. A second reason is that countries manufacturing either autos or gasoline want to be able to sell their products in the leading markets -- so they will produce to these standards for commercial reasons. A third reason is that network externalities mean that every country wants to do what its neighbors are doing. If your neighbor requires catalytic converters, your own gas stations will supply unleaded gasoline to meet the demand of cars and trucks crossing your border. Having done so, it then becomes cheaper to require catalytic converters domestically. Fourth, there will be a domestic demand for the new technologies. It is hard for a country to argue for an environmental standard that is weaker than available abroad; why should our country's public health be valued less than that of other countries? Finally, standards create automatic trade restrictions -- restrictions that are easy to monitor and enforce, and that are permitted by the rules of the World Trade Organization.

Again, notice the strategic effect of this approach. As more countries adopt a standard, it becomes more attractive for others to adopt the same standard. This kind of incentive is lacking

in the Kyoto approach. In contrast to Kyoto, compliance with the protocol would also be easy to monitor and verify. Standards agreements already exist in related areas. One multilateral agreement establishes auto standards. Another establishes standards for oil tankers.

There are, to be sure, problems with the standards approach. One problem is that standards will work better for some sectors than for others. For automobiles, network externalities are relatively important, leading to a positive feedback in the adoption of new technologies such as the fuel cell. For other sectors, such as electric power generation, economies of scale may be important, but network externalities will be less so.

Another disadvantage is that standards are not always the most cost-effective way of reducing emissions. Certain parts of the economy will not be affected by the standards protocols. Standards may “lock in” a technology, rather than promote continuous innovation and improvement. The standards approach is very much a second best proposal. However, the nature of this problem means that first best solutions cannot be implemented. One of the problems with Kyoto is that the negotiators took it on faith that participation and compliance would be rather easily taken care of. They were wrong.

I have emphasized the strategic advantage of standards, but others have noted a different advantage to any policy and measure as compared to an emission limit (see Cooper, 2001; Schelling, 2002). When countries sign up to an emission limit, they do so without knowing how much implementation will cost. With policies and measures, including standards, it is harder to know the final effect of implementation on emissions, but it is easier to estimate the cost.⁷ The allocation problems associated with Kyoto -- in which the United States is given a very stringent target and Russia an overly generous one -- are thus eased by a policies-and-measures approach. This advantage would be especially important if the system were subject to unanticipated shocks. Timing of the economic cycle and fluctuations in energy prices can have a huge effect on emissions, but they would have little effect on the adoption of technologies.

I should emphasize, however, that standards, like targets, must be carefully chosen. They must, in particular, offer every party a benefit in excess of the cost. The standards approach is basically intended to affect a technological transformation of the global economic system, but the extent of the transformation could be large or small, depending partly on the success of the joint R&D and partly on the level of mitigation countries think is justified. At the one extreme, standards could mandate hybrid engines for new automobiles. At the other extreme, they could mandate fuel cells or electric vehicles coupled with carbon capture and storage in electricity supply. The essential point is that, for strategic reasons, it may be better to negotiate agreements promoting the development and diffusion of new technologies directly. The Kyoto approach promotes technological development and diffusion indirectly, by raising the cost of emitting greenhouse gases. Both approaches have to make choices about the policy goals or *ends*, which are substantial versus modest mitigation. Where they differ is in the choice of the policy instrument or *means*.

⁷ For a similar reason, price caps also have an advantage; see the AECS paper by Richard Morgenstern.

The standards protocols, like the cooperative R&D protocol, should also be open to every country to sign. It is almost certain that the technologies needed to meet the standards will be more costly than those currently available. Even if the incentive to adopt the new technologies is strong, developing countries should be compensated, at least in part, for agreeing to the new standards. A relevant model here is the Montreal Protocol's Multilateral Fund, which compensated developing countries for the "agreed incremental costs" of complying with the agreement to phase out ozone-depleting substances. Note the difference between this approach and both the CDM and trading. With the CDM, it is impossible to know the baseline with much precision. Transactions will thus be costly. With trading, these problems do not matter, but trading can transfer huge surpluses from one country to another. Funding technology transfer is different. Baselines are less tricky, and surpluses can be virtually eliminated.

Two further supplemental protocols can be added. First, countries could agree on the actions that can and should be taken domestically and in the short run. Countries could, as in Kyoto, establish targets and timetables. A better approach, for the reasons noted earlier, would be to focus on actions and policies. In contrast to Kyoto, however, the pledges would be domestically enforced, though cast within a multilateral framework. The process of pledging may create a kind of "tote board" for action, and so have some minimal effect over and above pure unilateralism (see Levy, 1993). However, the pretense in Kyoto that specific emission limits can be enforced would be dropped.

Second, it must be acknowledged that climate change is almost sure to happen no matter what we do now to try to mitigate it. Since the developing countries are relatively the most vulnerable, and since the industrialized countries are responsible for the cumulative build-up in atmospheric concentrations, an adaptation fund should be established. One advantage of the adaptation fund is that money needs to be spent only after the effects of climate change become manifest. For reasons explained previously, it will be difficult to know whether a particular climate event has been caused by the accumulation of greenhouse gases. But it is important that the principle of assistance be acknowledged. It is a necessary ingredient for establishing fairness in the international response. Incorporating "cooperative adaptation" also creates an incentive for parties to balance adaptation and global mitigation.

Though the approach proposed here is radically different from Kyoto, it would not in any way undermine Kyoto. Nor is it inconsistent with the Bush climate policy. For both reasons, it constitutes a regime towards which the international system may evolve -- given the jump-start of U.S. leadership.

ROLE FOR THE UNITED STATES

President George W. Bush has said that his administration "is committed to a leadership role on the issue of climate change" (Bush, 2001: 3). Given that, what does the analysis above suggest should be the policy of the United States?

The United States should adopt a policy that advances its own interests. Climate change is likely to harm the United States -- and the United States would benefit from global mitigation. This is the most obvious reason for a U.S. policy. However, there are also others.

First, if other countries adopt a climate change policy independently of the United States, U.S. industry may be affected. U.S. companies may need to meet different standards in different markets, possibly raising their costs relative to their competition. Foreign companies, needing to innovate to lower mitigation costs, may possibly gain a competitive advantage over U.S. industry, if U.S. industry later has to “catch up” to their innovation.

More importantly, other countries may feel the need to impose trade restrictions such as border tax adjustments to make their own mitigation efforts effective -- and to protect their industries. In theory, such adjustments can have neutral effects on trade. However, in practice, neutrality will be impossible to achieve, and countries will have incentives to use the trade instrument as a means for gaining a competitive advantage. The use of trade restrictions to enforce a Kyoto-like agreement poses different risks for the United States. Not only may the United States be harmed directly by the trade restrictions but, precisely for this reason, the United States may retaliate. The threat of retaliation may be sufficient to deter the imposition of restrictions in the first place, but if push comes to shove and trade is restricted, retaliation by the United States may injure the multilateral trading system -- an outcome that would make all countries worse off, including the United States.

Second, the United States has a global responsibility. This is both a moral and a legal responsibility. Moral, because the United States is substantially responsible for the build-up of greenhouse gases in the atmosphere, because the United States can take action to reduce global emissions substantially, and because the United States, among the richest of all nations, can afford the sacrifice. Legal, because the United States, like all other states, has a responsibility not to harm other states, and a duty also to cooperate with other states in addressing shared environmental problems.

It is important to recognize the special role of the United States. Non-participation by New Zealand in a global climate regime would make little difference, either to the climate or to the behavior of other states. Non-participation by the United States, however, would affect both global emissions and the decisions by others to participate. As we have seen, U.S. withdrawal from the Kyoto process created pressures for other countries to do likewise -- or to negotiate easier obligations. This is for a number of reasons. Industry based within the territory of the Kyoto parties will incur higher costs than U.S. industry, and so will suffer a loss in competitiveness, notwithstanding the arguments about competitiveness noted above. Mitigation efforts without the United States -- and, I would add, countries such as China and India also -- would be more costly overall and make little difference to the climate. There is also a moral dimension to U.S. non-participation. A number of countries may ask, why should *we* make sacrifices when the world's only superpower will not? Morally, other countries may feel justified in doing very little, given that the United States does very little -- and the United States may be held accountable for these secondary consequences.

Third, while the rest of the world needs the assistance of the United States in dealing with this problem, the United States needs the assistance of other countries in dealing with other problems, including international trade, protection of intellectual property rights, proliferation of weapons of mass destruction, and the fight against terrorism. If the United States does not assist others in

addressing a problem of importance to *them*, why should these others assist the United States in addressing a problem of interest mainly to the United States? When President George W. Bush rejected Kyoto because it was not, he believed, in the interests of the United States, other countries were outraged. Kyoto, they believed, was in *their* interests, and President Bush showed no concern for the consequences of a U.S. withdrawal for other countries.

Though I have emphasized the need for a global regime, there remains an incentive also for countries -- and especially a country as large as the United States -- to undertake some measures unilaterally. The Bush Administration has a policy, but being mainly voluntary, it is unlikely to have much effect. The United States can and should do more.

But the main thrust of the Bush Administration's policy on climate change should, in my view, involve preparing negotiations for an effective global regime -- one that falls within the Framework Convention on Climate Change. As I have repeatedly argued in this paper, effective mitigation will require participation by a large number of countries.

As also explained previously, Kyoto is not the right model. But nor is the alternative proposed above harmful to Kyoto -- an important consideration given the likelihood that Kyoto will enter into force, and given also the huge political support invested in this treaty by other countries. Advocacy of a cooperative R&D protocol, for example, would begin to address the long-term aspects of climate change while at the same time lower the costs of complying with Kyoto. Such a protocol would also reinforce the Bush policy, which incorporates bilateral joint research agreements with Japan, Italy, and Central America. Depending on the success of this joint research, and depending also on the unfolding science of climate change, follow-on protocols could be negotiated to create standards for technologies that can reduce emissions. These again would not pose a challenge to Kyoto. The standards could rather be seen as devices for facilitating implementation of the Kyoto Protocol. Nor would these agreements contradict the Bush Administration's policy. The Administration has already proposed a tax credit for new hybrid or fuel cell vehicles -- technologies that could qualify for inclusion in a multilateral vehicle standards protocol. Finally, the proposal for an adaptation fund is already embodied within Kyoto, and compatible with the Bush policy of increasing funding for international development.

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