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Towards a Better Climate Treaty

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Summary

The essential problem with the Kyoto approach is that it provides poor incentives for participation and compliance. The minimum participation clause is set at such a low level that the agreement can enter into force while limiting the emissions of less than a third of the global total. The compliance mechanism, negotiated years after the emission limits were agreed upon, essentially requires that non-complying countries punish themselves for failing to comply—a provision that is unlikely to influence behavior. The likely outcome will be an agreement that fails to enter into force, or an agreement that enters into force but is not implemented, or an agreement that enters into force and is implemented but only because it requires that countries do next to nothing about limiting their emissions. These weaknesses cannot be improved by a minor redesign of the treaty. The basic problem stems from the requirement that countries agree to, and meet, emission limitation ceilings—the most central element of the Kyoto Protocol.
My proposal focuses on collective funding of basic research into the development of new, carbon-saving energy technologies, and on standards protocols for the adoption and diffusion of new technologies around the world. The main attraction of this approach is strategic: it does not require that compliance be enforced, and it provides positive incentives for participation. It is not an ideal remedy to global climate change, but the principle of sovereignty means that an ideal remedy does not exist for this problem.

Keywords: Kyoto Protocol, compliance and participation in international environmental agreements, technology standards, cooperative R&D

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Towards a Better Climate Treaty

by Scott Barrett

The Kyoto Protocol is an example of how *not* to construct a treaty. Negotiators began by focusing on the short term, agreeing that the industrialized countries should cut their emissions of greenhouse gases by about five percent relative to 1990 by 2008-2012. Then they agreed that these cuts should be achieved cost-effectively, incorporating "flexible mechanisms." Only later did they worry about whether the treaty created incentives for broad participation and full compliance.

Negotiators should have approached things the other way around. They should have begun by thinking of how they could achieve both broad participation and full compliance, and of how they could reduce emissions in the long term. Had they done so, a better, more effective treaty would have been negotiated.

In this essay I explain why Kyoto is unlikely to succeed in mitigating climate change. I also propose an alternative treaty design that is likely to work better.

What's Wrong with the U.S. Response

The Bush Administration has also been critical of Kyoto, and is now working to devise a U.S. climate policy that is separate from, but presumably not in conflict with, this agreement. Such a U.S. response might help to steer a future path for international cooperation, one that shares Kyoto's ambitions while avoiding Kyoto's design faults. However, there are reasons to think that the Bush Administration's policy may fail in these aims. The Administration has not criticized Kyoto's enforcement mechanisms, and so we cannot be sure that its own proposal will improve on Kyoto. Moreover, the Administration's own criticisms of the agreement are, at least in my view, misguided. Correcting the Administration's perceived flaws in Kyoto while leaving undisturbed the treaty's real flaws may not result in a better policy.

The Administration's first criticism is that the science of climate change is uncertain and that little if anything should be done about the problem until this uncertainty has been resolved. It is true that the science of climate change is uncertain. The basic problem is that scientists can't run a controlled experiment to see how the earth's climate would be different if greenhouse gases had not been pumped into the atmosphere. Comparing current climate with history reveals little, since the climate changes for different reasons, including variations in the heat output of the sun and in ocean circulation. Further research may reduce the magnitude of the uncertainty, but it cannot eliminate it.

This uncertainty must be incorporated into our decision making. Uncertainty is not a reason for doing nothing.

Of course deciding what to do is harder. We are already committed to a certain amount of climate change, due to the historical buildup of greenhouse gases in the atmosphere. While the damages from climate change may be large in total, policy cannot avoid *all* climate change damage. It can only reduce the extent of damage. At the same time, the costs of reducing emissions are likely to increase as efforts to cut those emissions increase. Thus, a balance needs to be struck between, on the one hand, reducing climate damages and, on the other hand, reducing mitigation costs.

I don't think anyone knows exactly what the right balance is, but I don't know anyone who has studied this problem and concluded that nothing should be done to mitigate climate change. Since virtually nothing was done to reduce emissions in the United States under the Clinton Administration, and next to nothing has been done anywhere else in the world, we at least know the correct direction of change. Starting from where we are today, emissions should be reduced as compared with the "business as usual" case.

A second Bush Administration criticism is that Kyoto is lopsided, imposing obligations on the industrialized countries but not on the developing countries. I agree that climate change is a global problem requiring a global solution. But we must take account of the interests of other states and of our responsibility to them. A country with an average per capita income of a dollar a day, with high infant mortality, and with weak regulatory powers can hardly be expected to do much about climate change. At the same time, developing countries are the most vulnerable to climate change, and the historical buildup of greenhouse gas concentrations was caused by industrialization in the rich countries. Walking away from the problem is no remedy. We have a responsibility to help developing countries, by reducing our own emissions, by helping to finance "clean development" in the developing countries, and by assisting the most vulnerable countries to adapt to climate change.

The Bush Administration's third criticism of Kyoto is that it would be costly to the U.S. economy. This is almost certainly true. Moreover, a different schedule for emission reductions could probably lower the costs of mitigation substantially. Alternatively, for the same cost, more emission reduction could be achieved in the long run. One of the problems with Kyoto is that it requires very substantial emission reductions in the short run. A longer lead-time, allowing the turnover of existing capital, would reduce costs substantially without compromising environmental integrity. At the same time, however, the aim of Kyoto was to reduce greenhouse gas emissions, not to boost the economy. Rejecting Kyoto saves costs but offers nothing in the way of an environmental benefit.

The challenge is to construct a treaty system that maximizes the difference between benefits and costs for the world as a whole while at the same time ensuring that every country is made better off as compared with the status quo. Kyoto is unlikely to accomplish these goals, but rejecting Kyoto with no suggested alternative does nothing to solve the problem either.

What's Wrong with Kyoto

The most important flaw in the Kyoto treaty is that it will do little to dampen the effects of climate change. 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 for which the Kyoto constraints are binding account for just 19% of global emissions. And these countries are required to reduce their emissions by only a little over 5%. Such a small reduction in emissions by such a small piece of the climate problem over such a short period of time will barely have any effect on the climate. Other provisions in the agreement such as trading in surplus emissions ("hot air") would limit the environmental benefits of Kyoto even further (even if they would also reduce mitigation costs).

Even this overstates Kyoto's potential, however, because the agreement offers no incentive for ratifying countries to comply. Indeed, Article 18 says that any compliance mechanisms entailing "binding consequences" must be approved by amendment. An amendment is essentially a new treaty. 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 even the ratifying countries do what they said they would do.

It is not enough, by the way, to trust countries to do what they pledge to do. The Framework Convention on Climate Change pledged the industrialized countries to stabilize their emissions at their 1990 levels by 2000, and yet very few did so. Moreover, those that did limit their emissions did so for reasons having little to do with climate policy. Germany did so because of unification, Britain because of industrial restructuring.

Last summer in Bonn, countries did agree on a compliance mechanism. This requires that a country that fails to meet its emission ceiling in the first control period (2008-2012) make up for the shortfall and reduce its emissions by an additional 30% of this amount in the next control period

(2013-2017). Though this penalty for non-compliance may seem tough, it is a defective proposal, and not only because it cannot be binding for the first control period.

One problem with the proposed mechanism is that it 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? This problem has not yet been addressed. Another problem is that 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 hold out for easy targets in the second control period-so that the punishment, if triggered, doesn't actually bite. Finally, the treaty offers little incentive for a country to participate. Put differently, a country may only make its participation conditional on easy terms-and easy terms will not protect the climate.

Ominously, there is already talk that the Kyoto targets may not be met even by the ratifying countries. Worse, I have heard leading Kyoto supporters say that this would not be such a bad thing. The view seems to be that it is keeping Kyoto alive that matters, especially now that President Bush has rejected it. But this reasoning turns the negotiating problem on its head. What is the point of negotiating specific targets and of constructing an elaborate architecture for flexible implementation when the parties are indifferent to achieving what they have agreed should be done? How is this going to help the climate?

If the enforcement mechanisms in Kyoto are flawed, can't we simply employ better ones? The most obvious alternative is to incorporate trade restrictions. But trade restrictions are not a panacea. All trade contributes to climate change, and so a trade restriction would have to be applied across-the-board. At the same time, the quantity of greenhouse gases emitted in the manufacture of different goods, produced using different processes, varies tremendously, and so border tax adjustments applied to traded goods would have to vary-a flat fee or simple tariff would not have the desired incentive effect. Computational difficulties, however, make the setting of a product-specific tax impractical. Moreover, 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. Imposition of a severe trade restriction would harm the importing nation as well as the exporter, undermining the credibility of the threat. Ad hoc trade restrictions could be devised to enhance credibility, but they would at the same time threaten the multilateral trading system.

To sum up, if Kyoto enters into force and achieves full compliance, the reason will be that the agreement achieves very little. A more ambitious version of Kyoto, on the other hand, would likely either fail to enter into force or fail to sustain full compliance. Though Kyoto is only a first step, if

the subsequent stages in the process replicate the Kyoto formula, the outcome is likely to be very little change from "business as usual." Moreover, since many of the proposals for Kyoto alternatives also do not address the fundamental issues of enforcement and participation, they too are likely to fail.

What Should be Done

To make a difference to the climate, a treaty has to create incentives for long-term technical innovation and diffusion. Both "push" and "pull" incentives are needed. Push incentives affect the supply of research and development. Pull incentives affect the demand for the fruits of R&D. To use an example from medicine, funding of basic research by the National Institutes of Health is a push incentive for innovation. The patent system, giving monopoly rights to invention, creates a pull incentive for both innovation and diffusion.

Kyoto aspires to create a pull incentive only. In limiting emissions, Kyoto 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. But, while this is a good way to design a domestic environmental program, it requires robust enforcement-and for the reasons explained earlier, this will be hard to sustain in a climate change treaty.

A push program for R&D is also needed; yet, Kyoto does not require that any country fund R&D. Indeed, in the years since Kyoto was first negotiated, most industrialized countries have actually scaled back their R&D funding, just the opposite of what is needed.

The knowledge obtained from basic research is in part a public good, and so is likely to be under-provided if done unilaterally. Basic R&D is best supplied 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. A similar collaborative effort, incorporated within a new protocol, is needed to fund research into new energy technologies, particularly technologies that produce energy without emitting carbon or that capture and store carbon safely.

The research emphasis should be on electric power and transportation, and the R&D protocol should be open for signature to every country. To provide incentives for participation, each country's contribution to the collaborative effort should be contingent on the total 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.

In contrast to Kyoto, my approach addresses the long-term challenges and creates incentives for participation. It also does not entail detrimental leakage. 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.

The R&D protocol also has the advantage of capping total expenditure. Parties to this agreement will know their maximum financial commitment. This is not true of the Kyoto approach.

A complementary pull incentive is also needed-one that, in contrast to the Kyoto approach, eases the constraints on compliance and participation.

The most attractive approach is to agree on common standards for technologies identified by the collective R&D effort. These standards should be established in complementary protocols. As examples, energy efficiency standards could be established for automobiles, requiring, say, the use of the new hybrid engines or fuel cells. Standards for fossil-fuel-fired power plants might require carbon capture and storage.

Economists normally reject the setting of technology standards, but they have a strategic advantage in the case of a climate protocol.

The strategic value in standard setting is best illustrated by the example of the standard of requiring catalytic converters in automobiles. This technology, coupled with the use of unleaded gasoline (catalytic converters only work in cars fueled by unleaded gasoline), has effectively spread around the world. Why? One reason is that, by a combination of economies of scale and learning, the costs of producing both technologies have fallen. 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 enforce and that are permitted by the rules of the World Trade Organization (WTO). If a country requires that all cars sold within its borders meet a given standard, then both domestic and foreign manufacturers would be able to compete to supply the standard on a level playing field, and the non-discrimination provisions of the WTO would be upheld.

Most important is the strategic effect of technology standards. As more countries adopt a standard, it becomes more attractive for others to adopt the same standard. Indeed, what is remarkable about this example is how a common standard has been adopted even for dealing with a purely local environmental problem (catalytic converters reduce pollutants like carbon monoxide, not carbon dioxide). This kind of positive feedback is lacking in the Kyoto approach. In contrast to Kyoto, compliance with the protocol would also be easy to monitor and verify. A multilateral treaty for automobile standards already exists.

There are, of course, problems with the standards approach. One is that governments may not be good at "picking winners." But the free market may not be good at picking the right standards either. These concerns only mean that we need to be careful in creating an effective process for standard setting, one that is almost certain to require public-private collaboration.

A second concern is that we may get locked in to a particular standard, removing incentives for further innovation. However, lock-in is to some extent inevitable. For example, the installed base of gasoline stations makes it hard, though not impossible, for alternative technologies (like fuel cells or electric cars) requiring refueling to compete with the conventional internal combustion engine. Care must be taken to promote innovation whether standards are mandated or whether they emerge spontaneously.

Care must also be exercised in ensuring that the adoption of standards offers every party a benefit in excess of the cost. Moreover, they must promote cost-effective mitigation. In this regard, standards have another advantage over the Kyoto approach. Kyoto insists that emissions be reduced in the near term, requiring costly, early retirement of plant and equipment. The standards approach could be implemented in a more incremental fashion. Standards should apply to *new* capital—new power plants and private transportation systems (obviously, companion incentives would be needed to ensure that the lifetime of the existing stock of capital was not overextended).

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 new standards will be more costly than the technologies used today, and this additional cost must be a price that the industrialized countries think is worth paying. But even if each country's incentive to adopt the new technologies is strong given widespread adoption by other countries, developing countries should be compensated, at least in part, for adopting the new standards. Remember that the industrialized countries are responsible for the historic buildup of greenhouse gases. The developing countries are likely to be the biggest emitters in the future, and their emissions-output ratio has to be reduced if global emissions are to fall. But this must be done without sacrificing the need for the developing economies to grow. The model here is of the Montreal Protocol Fund, which compensated developing countries for the "agreed incremental costs" of complying with the treaty's ceilings on the emissions of ozone-destroying chemicals.

My approach focuses on the long term. Further protocols, however, could and probably should be added to address the short term. One approach may be to establish targets and timetables, as in the Kyoto Protocol. Even better would be an emphasis on policies and measures. Either way, however, the pledges made in such a treaty would be unilateral, though cast within a multilateral framework. One of the problems with Kyoto is that it has deflected attention away from what countries can and should do on their own to mitigate climate change. This supplemental agreement would turn the focus around. In contrast to Kyoto, it would also be enforced using domestic institutions only. The pretense that Kyoto-like targets can be enforced internationally would be dropped.

It should also 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-as agreed in the Bonn meetings last summer. 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.

My proposal is not what you'd expect from an economist, but it is based on an understanding of the problem and of the incentives for participation and compliance. It is not an ideal remedy, but an ideal remedy is not feasible for global climate change because of problems with international governance. Therefore, my proposal is best viewed as a second best remedy.

Importantly, the protocols proposed here can be incorporated under the umbrella of the Framework Convention on Climate Change (negotiated by the president's father) and need not replace Kyoto. There appears to be huge political support for Kyoto outside of the U.S., and there is a good chance that Kyoto will be ratified by a number of countries, the fifteen states of the European Union included. Kyoto may even enter into force. The proposal put forward here does not undermine this process. To the contrary, Kyoto can be incorporated within this broader, long-term framework. At the same time, my proposal would shift the multilateral process onto a different track, one that is better suited to addressing global climate change while at the same time being more compatible with U.S. interests.

In the post-September 11th world, the proposal has an added advantage: it would demonstrate the willingness of the United States to help other countries and to contribute to another multilateral effort besides the war against global terrorism.

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