

Beyond the Kyoto Protocol*

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March 15, 2000

* Paper prepared for presentation at the Chuo Research Unit for Global Environment (CRUGE) International Symposium on “Global Environmental Issues: Theories and International Cooperation” to be held March 22 and the United Nations University Workshop on “Global Environment and International Cooperation” to be held March 23 in Tokyo. We are grateful for financial support from the organizers of these workshops to enable our participation and from the Brookings Institution. The views expressed in this paper are those of the authors and should not be interpreted as reflecting the views of any funding organizations or the organizations with which they are affiliated.

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1. Introduction

The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC), which was negotiated in Kyoto in December 1997, is yet to be ratified. There are still many unresolved problems with implementing this convention -- not least is the problem that the Kyoto Protocol is fundamentally unsustainable². Little progress in implementation of the Kyoto Protocol was achieved at previous meetings in Buenos Aires in 1998 and Bonn in 1999. The next major negotiations will be held in The Hague in November 2000, although there will be intense activity leading up to this meeting, because it will be the last serious chance for countries to implement the Kyoto Protocol. Rhetoric will not achieve the tight targets of the Kyoto Protocol and at some stage either actual policies must be implemented or the Kyoto Protocol must be jettisoned.

Given the likelihood that the current negotiations will not result in a realistic and sustainable climate change policy, it is worth looking beyond the current state of disarray and political maneuvering and revisit the question of what should a realistic climate change policy look like. First, the policy should slow down carbon dioxide emissions where it is cost-effective to do so, but only as an insurance policy until further information on climate change is accumulated. Second, the policy should involve some mechanism for compensating those countries that will be hurt economically without requiring massive transfers of wealth that could undermine economic stability. Third, since climate change is potentially a global problem, any solution will require a high degree of consensus both domestically and internationally. Few countries want to relinquish sovereignty, especially when the policies in question can have large economic effects. A system that does not ultimately include developing countries will do little to achieve the goals of the UNFCCC because these countries are large future emitters of carbon and because the cheapest reductions will be found where carbon-intensive capital investments have not yet been made. Fourth, the regime must allow new countries to enter with minimum disruption and also allow a core group of countries to continue to participate even if other countries exit the system at certain times. A system involving many countries that doesn't survive changing composition over time is destined to fail since the reality is that a country's

² See McKibbin and Wilcoxon (1997a,1997b, 1999b)

commitment to the regime is a function of the commitment of political incumbents at any point of time.

Given these criteria, it is clear why the Kyoto Protocol is not succeeding. We have proposed a different approach: one that sets the price of emission permits in the short run, but over the longer run, allows the market to determine the price of emission allowances.

2. What is wrong with the Kyoto Protocol?

The objective of the Kyoto Protocol is to impose binding greenhouse gas (GHG) emission targets for the world's industrial economies and former communist economies of Europe ("Annex I" countries) to be achieved by the period 2008-2012. By directly binding emissions, policymakers presumably believed that they could achieve the goals of the UNFCCC through political commitment. Given that fixed targets for emissions by Annex I countries have been agreed, although not yet ratified in key countries³, the main issues currently being debated are how to minimize the costs of the Kyoto Protocol and how to bring developing countries into the agreement.

The issues of cost minimization and developing country participation are clearly recognized in the Kyoto Protocol. Costs are addressed through provision for international trading of emission allowances among the countries that accept binding targets. In addition, the Protocol provides for a Clean Development Mechanism, under which agents from industrial countries can earn emission credits for certified reductions from investments in "clean development" projects in developing countries that have not taken on binding targets.

The first problem with the Kyoto Protocol is the focus on achieving rigid "targets and timetables" for emissions reductions at any cost, rather than substantial reductions in emissions at reasonable cost. The problem with fixed targets was understood by some negotiators at Kyoto and, thus, flexibility mechanisms, such as permit trading, were included in the Protocol. A crucial but mostly ignored issue is that any fixed targets, for the world or for a group of countries, even differentiated targets, are likely to be inefficient because we really don't know what these will cost over the long period of time being discussed⁴. If the actual costs of abatement turn out to be much larger than estimated, it is unlikely that countries will continue to voluntarily adhere to the Kyoto Protocol. Some form of extreme enforcement mechanism needs

³ As of October 5, 1999, 84 countries have signed but only 15 have ratified.

⁴ See McKibbin and Wilcoxon (1997a) and Kopp et al (1997) for arguments about the difference between price and quantity caps under uncertainty.

to be designed to hold the Protocol together. Imposing arbitrary but binding targets on developing countries is even more problematic because there is even greater uncertainty about what the appropriate targets should be. An overly tight target will cause countries to depart from the agreement and an overly loose target will mean that low cost opportunities will have been lost.

Permit trading within the Kyoto Protocol is essential to minimize these problems. However even a permit trading system could be problematic. In a series of papers (McKibbin and Wilcoxon (1997a,1997b)) we have pointed out that under some plausible scenarios for the future evolution of the global economy, the economic pressures caused by the large transfers of wealth internationally that underlie the claims over permits could cause severe fluctuations in real exchange rates and international capital and trade flows. Whether this actually emerges as a future problem is highly uncertain but will depend on a number of factors including the ultimate price of permits and the initial allocation of permits. In particular, international wealth transfers may be a problem if permit allocations are used excessively as a way of persuading countries to participate in an agreement. Although there is uncertainty about whether this effect is large or small, the main point is that we can't be sure that the economic problems we highlight will not emerge in the future.

Another problem with permit trading under the Kyoto Protocol is that the price of permits for all countries depends on the demand and supply of permits by large countries. If one large country cheats, then the value of permits for all countries will be affected and the system will likely collapse. There is currently no international rule of law that can prevent this from happening, nor is it easy to see what credible penalties could be imposed to prevent this from happening under all possible scenarios. It is also hard to imagine why developing countries would want to participate in a centralized system like the Kyoto Protocol, especially once the enforcement mechanisms are made explicit and without knowing the possible costs of accepting a binding emissions target.

Overall it seems that both politically and economically, there may be potential problems with the Kyoto Protocol involving the possibly large wealth transfers between economies. More fundamentally, the incentives of key players are not clearly consistent with the protocol under extreme developments, without some, as yet to be identified, enforcement (and monitoring) mechanism.

3. An Alternative Approach

Our proposal is an attempt to design a decentralized but coordinated system that gives participating countries the incentive to participate as well as giving appropriate incentives to households and firms to change the amount of carbon emissions where it is cost effective to do so. We also build in the notion that developing countries should not incur the same costs in the short run as industrialized economies. But investment decisions in the developing countries need to be conditioned on expected future costs of abatement in these countries.

The basis of our system is the creation of two new assets (in each economy) as a part of establishing a clear system of property rights with respect to carbon emissions. The two assets are *emission permits* and *emission endowments*. An emission permit is an asset that is required every year to be held by a carbon producer in order to produce a single unit of carbon. The price of the permits will be equal to the marginal cost of reducing an additional unit of carbon for every carbon emitter in an economy.

An emission endowment gives the owner an annual emission permit that can be used in a given country every year forever. The endowment reflects a country's longer term commitment to emissions reductions but is not a binding constraint in the short run. There would be markets created domestically for both permits and endowments. The holder of an emission endowment can either decide to claim an emission permit and use it for current activities, or to sell that permit on the current market or to sell the endowment depending on the price they currently see versus the price they expect in future years. The price of the emission permit will be the marginal cost of abatement in a given year whereas the price of the emission endowment will be the expected future marginal cost of abatement.

As under the earlier forms of our proposal, in Annex I countries, rather than setting targets for emissions, we propose setting targets for the *marginal abatement costs* – we make the cost of cutting emission certain (i.e. the fixed permit price) and the environmental outcome uncertain. Specifically, the domestic price of permits would be guaranteed within each Annex I country for a period of 10 years at a maximum of \$US10 per ton of carbon⁵. This fixed price is achieved by each government in each Annex 1 market selling as many emission permits as required to keep the price from rising above \$US10 per ton. There is no cap on permits and therefore no cap on emissions but the marginal cost of abatement is known for a fixed period.

⁵ Both the period between negotiations and the price would be the subject of negotiation.

Many studies estimate that the permit price in 2010 associated with the Kyoto targets, range from \$US65 to many hundreds of dollars. Thus in Annex I countries there is likely to be an initial excess demand for permits and the permit price of \$US10 per ton will be binding. The price of emission endowments on the other hand would be flexible (given a fixed quantity of endowments) and would reflect expected future prices of emission permits.

The dilemma facing developing countries is that they are yet to emit the substantial amounts of carbon that have been essential to the development strategies of Annex I countries. Yet to go down the high carbon path of Annex I countries implies possibly very large future costs for developing countries if climate change becomes as fundamentally important as some scenarios would imply. Most of the costs of climate change abatement occur because existing economic structures have to be changed to be less carbon intensive. Most of this cost is a capital loss given that physical capital, which is largely fixed, is expensive to change quickly. Changing economic structures is far less expensive to do before the capital stock is in place rather than after it is in place. Just as there are different costs of carbon abatement across countries, there are also different costs across time. It is clear that a low-cost option for abatement over future years will be found in changing the future energy intensity of developing economies. This issue is recognized in our proposal by the use of endowments versus permits in developing countries in a different way to that in Annex I countries. A developing country would be included in our regime by negotiating an initial endowment allocation that allows for the fact that rapid growth is likely during development.

For example an endowment of $(100+X)\%$ for each participating non-Annex I country would allow a large expansion in fossil fuel use before the constraint becomes binding. If the government in the non-Annex I country were to distribute all of this endowment, the price of permits would be zero in the first year because there would be an excess supply of permits. Thus a developing country would face no short run cost of emitting carbon. However, the price of endowments would be non-zero because the future expected price of permits would be expected to rise as the constraint becomes binding. We have introduced a price signal to current firms and households within non-Annex I countries that future carbon emissions will be priced. Thus they have the incentive to begin investing in low carbon emitting technology so that they can sell their future permits or their endowments and make a future profit from planning low-cost abatement over time. There are no direct costs introduced into the economy in the short term because the annual price of permits will initially be zero. However, there is a price signal through the price

of endowments. Thus decisions about future energy use can incorporate the cost of carbon emissions without imposing short run costs. Of course, the price of the emission endowments in any economy will reflect the credibility of that government's commitment as well as the expected future growth prospects of the economy.

Another important aspect of this approach, is that developing economies that grow slowly will hit a binding emissions constraint much later than rapidly growing economies. Thus countries begin to contribute to the global reduction of carbon emissions when a country's capacity to pay is higher.

In the long run, all countries are paying the same price for carbon whereas we have allowed a transition path with differential abatement between Annex I and non-Annex I economies. This is an important difference to the Kyoto Protocol because there is currently no firm commitment by developing economies. Once a developing country joins the Kyoto permit trading system, its price of carbon and hence marginal cost of abatement would be the same as in industrial economies, which some argue is not equitable. No amount of initial permit allocation within a multi-country permit trading system would change the fact that they incur short run costs for carbon emissions - the same as industrial economies. This is precisely why developing countries have not committed to the Kyoto Protocol.

We believe it should be up to individual countries how they allocate the emission endowments. Once the endowments are created the system then evolves over time with the annual price of permits being set every ten years by international agreement. There is no need for international trade in emission permits because the price of permits is the same in all markets by construction. There is no reason for a Japanese firm to buy an emission permit from Russia when they can get a permit from the Japanese government for the same price. There is no trade allowed in emission endowments even though the values of these may differ across countries – this is the tradeoff of short run efficiency for equity.

The net effect of this policy would be to raise the current and expected future price of emitting carbon in Annex I countries. This would discourage increases in emissions, and encourage reductions in emissions where they are cost-effective, but without levying a sudden multi-billion dollar burden on fuel users. This also creates a mechanism for banking and renting emission rights that is internally consistent and credible. To temporarily raise emissions above an initial endowment holding, a firm can buy a short term emission permit from the permit market. To bank emission reductions for future use a firm can sell permits in the permit market (just like

renting the emission endowments annually) but hold the emission endowment for future emission increases. No special institutional constructions are required outside the creation of the two assets and a domestic mechanism that ensures the value of these assets through monitoring and enforcement mechanisms and a rule of law that exists *within* each economy. It is true that techniques of monitoring and enforcement will likely will differ across countries, but this difference does not directly harm the effectiveness of a given outcome in another country.

A key feature of the policy is that it is flexible. The permit price could be adjusted by international negotiation at a regular interval (we propose every decade) or as needed when better information becomes available on the seriousness or otherwise of climate change and the cost of reducing emissions. Equally important, it would be easy to add countries to the system over time: those interested in joining would only have to adopt the policy domestically and no international negotiations would be required. This flexibility is crucial because it is clear from current negotiations that only a small subset of countries would agree to be initial participants in a climate change treaty. Also countries can defect from the scheme without debasing the value of the permits for the remaining countries. Although the defection of a country would be undesirable, the system is sustainable.

Since the policy does not focus on achieving a specified target at any cost (indeed the cost of our proposal is known with certainty), such a system would be far more likely to be ratified, and by more countries. The political attractiveness of our proposal is that it is a decentralized, coordinated system implemented by individual countries within national rather than supranational institutional structures.

4. Conclusion

The system we advocate is flexible enough to adapt to changing political, economic and climate circumstances. Most importantly, we believe that the system we have designed although simple in concept, solves many of the insurmountable problems of the Kyoto Protocol and delivers an outcome in which global emissions will be lower than otherwise would be the case.

Key elements of the McKibbin Wilcoxon Proposal

All countries create two assets:

- an *emission permit* which is required by fossil fuel industries to supply a unit of carbon annually;
- an *emission endowment* which gives the owner an emission permit every year forever.

All countries create two domestic markets:

- a domestic *emission permit* trading system with a fixed price of \$US10 per ton of carbon in Annex I countries and a cap price of \$US10 in non-Annex I countries;
- a domestic *emission endowment* trading system with a flexible price.

In 2000, all countries are allowed to make a one off allocation of emission endowments domestically based on Kyoto targets for Annex I countries and current emissions plus x% for non-Annex I countries. Trading in both markets begins in January 2001.

Permits must be reconciled against production or imports of carbon at an annual basis at the top of the carbon production chain – coal mines, oil refineries, gas refiners. Production that is exported is exempted.

Every decade there is a meeting of the Conference of the Parties to the UNFCCC to evaluate the extent of abatement and the climate science and to negotiate a new price for permits.

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