



A Meaningful Second Commitment Period for the Kyoto Protocol

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In 1997, more than 160 nations agreed on the text of the Kyoto Protocol to the United Nations Framework Convention on Climate Change. Shortly afterward, many economists—particularly American economists—began to condemn the Protocol as excessively costly, environmentally ineffective, or politically infeasible. Indeed, we have written such critiques ourselves. Today, however, even if we have not come to praise the Kyoto Protocol, neither have we come to bury it. Rather, we ask

how it can be modified for its second commitment period (2012–2016) so that it will provide a way forward that is scientifically sound, economically rational, and politically pragmatic. We seek to be responsive to two pressing questions that are now being asked: how can the United States be brought on board, and how can meaningful participation by developing countries be financed?

Our answer includes three elements: a means to ensure that key nations are involved; an emphasis on an extended time path of action; and the inclusion of firm-level market-based policy instruments.

WHO—EXPAND PARTICIPATION TO INCLUDE ALL KEY COUNTRIES

Broad participation by major industrialized nations and key developing countries is

essential to address this global commons problem effectively and efficiently in the second commitment period and beyond. China will surpass the United States as the world's leading producer of greenhouse gas emissions by 2009, according to the International Energy Agency. Developing countries are likely to account for more than one-half of global emissions well before 2020.

Many argue that the industrialized countries should take the first steps to combat climate change, since they are responsible for the bulk of man-made current greenhouse gas concentrations. But developing countries currently provide the greatest opportunities for low-cost emissions reductions. Furthermore, if developing countries are not included, comparative advantage in the production of carbon-intensive goods and services will shift outside the coalition of participating countries.

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The shift of production of carbon-intensive goods and services to developing countries will counter the impacts of emissions reductions among participating countries (a phenomenon called “leakage”). Moreover, this shift will push non-participating nations onto more carbon-intensive growth paths, increasing their costs of joining the coalition later.

So, on the one hand, for purposes of environmental effectiveness and economic efficiency, key developing countries should participate. On the other hand, for purposes of distributional equity (and international political pragmatism), they cannot be expected to incur the consequent costs.

It turns out that the two issues can be reconciled. Our answer is a set of growth-indexed emissions limits that are set initially at business-as-usual (BAU) levels for respective developing countries, but become more stringent as those countries become more wealthy. Harvard economist Jeffrey Frankel has noted that this would be a natural extension of the allocation pattern in the Kyoto Protocol’s first commitment period (2008–2012), where targets for industrialized countries become, on average, one percent more stringent for every ten percent increase in

a country’s per-capita gross domestic product (GDP).

Joining the international market for emissions trading could make developing countries better off—even in immediate income terms. The reason is tied to the fact that reductions or reduced increases in emissions for these countries often will be cheaper than for the developed world. As a result, the developing world can sell its “right to pollute” to firms in the developed world in a system that allows trade of emissions permits. Such sales could increase the income of developing countries even if the system requires that they reduce their emissions.

Hence, cost-effectiveness and distributional equity can both be addressed. In fact, tradable permits, which make reductions cost-effective, can be used to achieve distributional equity because the allocation of permits determines the distribution of burdens and benefits.

WHEN—USE AN EXTENDED TIME PATH, AND “RAMP UP”

The Kyoto Protocol’s targets are “too little, too fast.” Global climate change is a long-term problem, because greenhouse gases remain in the atmosphere for decades to centuries. In

this setting, economics would suggest that emissions targets to address the problem of greenhouse gas concentrations ought to begin at BAU levels, then depart gradually, so that emissions increase at first but at rates below BAU. These targets should reach a maximum level and then decrease—eventually becoming much more severe than the constraints implied by the Kyoto Protocol’s first commitment period targets, which translate to an average five percent reduction from 1990 levels by 2008–2012. Let’s take each of these arguments in turn.

Why should targets begin at or close to BAU levels? Moderate targets in the short term will avoid rendering large parts of the capital stock prematurely obsolete. Investment in the capital equipment used in the burning of fossil fuels, like the boilers on electric power plants, have been made in a world of free carbon emissions. Thus, significant emissions reductions today would require the retirement of much of this equipment (how much will depend on the stringency of emissions targets). This equipment, and similar investments by households in automobiles and major appliances, would typically only be replaced every several years, or several decades.

The Protocol's initial targets may sound modest, but they translate into severe 25–30 percent cuts for the United States from its BAU path, because of the rapid economic growth the country experienced during the 1990s. The same is true for other nations that have experienced significant economic growth post-1990, raising the costs of 1990-based emissions targets and making them politically infeasible as well as economically unreasonable. It is not surprising that many signatories to the Protocol are not on track to meet their emissions targets.

Our second argument is that targets should “ramp up” over time, eventually reaching levels much more stringent than the Protocol's targets. This approach, if made clear at the outset, will alter firms' (and households') capital investment decisions, setting countries on a carbon-intensity path that will allow the achievement of long-run targets. Most importantly, stringent long-run targets known today will spur current and future technological change, bringing down costs over time. Of course, the long-term targets should be flexible, because there is great uncertainty throughout the policy-economics-biophysical system, some of which will be resolved over time.

Our proposal is also consistent with a time path of “price” targets—for example, a time-profile of carbon prices (taxes on the carbon content of fossil fuels). In any event, such a long-term time path of targets involving increasingly aggressive action is the most cost-effective and fair approach. It is also a politically pragmatic approach. Politicians in representative democracies are frequently condemned when they yield to incentives to place greater costs on future rather than current voters. This is typically a politically pragmatic strategy, one that is often denigrated as “politics as usual.” In the case of global climate policy, however, this may also be the scientifically correct and economically rational approach.

HOW—EMPLOY MARKET-BASED POLICY INSTRUMENTS

Most economists agree that conventional regulatory approaches cannot do the job, certainly not at acceptable costs. To keep costs down in the short term and bring them down even lower in the long term through technological change, it is essential to embrace market-based instruments.

On a domestic level, systems of tradable permits might be used to achieve national targets.

This approach was used in the United States to phase out leaded gasoline in the 1980s at a savings of more than \$250 million per year over an equivalent traditional regulatory approach, and is now used to cut sulfur dioxide (SO₂) emissions from power plants by half, at an annual cost savings of \$1 billion compared to a command-and-control approach. The better policy model for climate change is the upstream lead-rights system in which trading occurred at the refinery level (analogous to trading on the carbon content of fossil fuels), rather than the downstream SO₂ emissions-trading system.

For some countries, systems of domestic carbon taxes (as opposed to permits) may be more attractive. A particularly promising approach is a hybrid of tax and tradable-permit systems—an ordinary tradable permit system, plus a government promise to sell additional permits at a stated price (the “tax” component). This “safety-valve” approach addresses cost uncertainty by creating a price (and thereby cost) ceiling so that if reductions prove more costly than expected there will be a known and limited increase in the cost of carbon emissions.

International policy instruments are also required, and the Kyoto Protocol already

includes a system whereby the parties to the agreement can trade their “assigned amounts”—their national reduction targets—translated into emissions terms. In theory, such a system of international tradable permits—if implemented only for the industrialized countries—could reduce costs by 50 percent. If such a system were to include major developing countries as well, costs could be lowered by half again, according to the estimates of Jae Edmonds and his co-authors.

To be effective, however, trading must ultimately be among sources (firms), not among nations per se. Nations are not simple cost-minimizers, nor do they have the information needed to make cost-effective trades. Therefore, an international trading system must be designed to facilitate integration with a set of domestic trading systems.

International carbon trading markets are of course subject to the same problems as any other market and may not work well if transaction costs are high or some nations or firms have a sufficient concentration of permits (or excess permits). The latter concern is a real one in the climate policy context. If, for example, the majority of excess permits (allowable emissions in

excess of BAU emissions) is found in a relatively small number of nations, then the possibility increases of collusion among sellers, as a recent *Energy Policy* article by Alan Manne and Richard Richels points out.

In any event, the initial allocation of permits among nations can imply exceptionally large international wealth transfers. Several analysts have identified this as a major objection to an international carbon trading regime, and have endorsed international tax approaches for this and other reasons. However, taxes will also have distributional effects through the recycling of revenues; moreover if tax rates are equalized across countries as efficiency requires, they do not provide control over the wealth transfers. Wealth transfers can be broadly controlled to achieve distributional equity with particular permit allocations. And it is precisely this feature of the permit allocation that allows cost-effectiveness *and* distributional equity to be addressed simultaneously.

THE WAY FORWARD

The three-part global climate policy architecture we propose can form the foundation for the second commitment period (and beyond) for

the Kyoto Protocol. But can countries credibly commit to the long-term program that is part of this proposed architecture? Our answer is that once nations have ratified the agreement, implementing legislation within respective nations would translate the agreed long-term targets into domestic policy commitments. Such commitments would send signals to private industry and create incentives to take action. Ultimately, such domestic actions provide the signals that other countries need to see. This represents a logical and ultimately feasible chain of credible commitment.

This overall approach is scientifically sound, economically rational, and politically pragmatic. Without doubt, the challenges facing adoption and successful implementation of this architecture for the Kyoto Protocol's second commitment period and beyond are significant, but they are no greater than the challenges facing other approaches to the threat of global climate change.

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