

Controlling emissions of greenhouse gases



As only one year remained before the “ Earth Summit” in ROI ? at which nations were slated to adopt the treaty? diplomats deferred most of the substantive issues and instead negotiated a loose framework for future cooperation: the Framework Convention on Climate Change. The United States quickly ratified the Convention, as did nearly every other nation on Earth? the calculus was easy because the Convention required little action beyond what most nations were doing anyway. The Convention’s main obligations require all nations to submit periodic reports on greenhouse gas emissions and policies for controlling emissions.

In addition, the Convention requires that industrialized nations contribute to an international fund that helps developing countries comply with the treaty obligations. Most nations, including the United States, had already committed to such funding because they knew how essential it was to engage developing countries. Since the Framework Convention contained only vague obligations to control emissions, negotiations began in 1995 on a stronger treaty? a “ protocol”? that would augment the Convention.

Diplomats set a meeting for December 1997 in Kyoto as their deadline.

Governments squandered most of the intervening two years with symbolic postures and debate on dozens of poorly fleshed-out proposals.

Most proposals focused on mandating “ targets and timetables” for controlling emissions of industrialized nations to cut emissions of greenhouse gases 15% below 1990 levels by the year 2010. Although the EX. had no plan for meeting its own target, horse raiding around the European target

dominated the public debate rather than sober assessment of what nations actually could implement.

In Kyoto, delegates finally agreed that the industrialized nations? known as “Annex I” countries? would, on average, cut emissions about 5% below 1990 levels during the period 2008-2012. The collective 5% goal was parsed into targets for each of 39 Annex I nations. For example, Japan committed to a 6% reduction, and the United States accepted a 7% cut.

The European Union committed its 15 members to cut 8% collectively and has since doled out that target to each of its embers, requiring Germany and the U. K. To cut deeply while Portugal and Spain actually increase their emissions.

The Kyoto targets were averaged over five years, from 2008 to 2012, instead of aimed at a single year, to help soften the effects of the business cycle. Emissions rise and fall with the economy, so predicting emissions for a particular year is especially tricky.

However, the 5-year period is somewhat arbitrary ? real business cycles vary in length. The Kyoto Protocol includes three mechanisms that can lower the cost of compliance by giving nations more flexibility in meeting their targets. First, the Kyoto targets apply to a “basket” of all six of the major greenhouse gases.

Most global warming (70%) is caused by carbon dioxide, but methane (20%), nitrous oxide (6%) and other gases are also significant. An exchange rate known as the “global warming potential (GAP)” governs the tradeoff

between the gases. For example, the current GAP for methane is about 21, which means that cutting a ton of methane would earn the same credit under the Kyoto Protocol as cutting 21 tons of carbon dioxide.

In some countries and settings, the cost of controlling 21 tons of carbon is more than the cost of mitigating a ton of methane? In those situations, the extra flexibility of the “basket” approach saves money.

In practice, however, making the multicast approach work requires overcoming some extremely difficult technical problems. Among them is the difficulty of measuring the emissions of nearly all the greenhouse gases. Of the major greenhouse gases, only emissions of carbon dioxide caused by burning fossil fuels can be measured with acceptable accuracy (within about 5% to 10%). In addition, scientists calculate GAP values by relying on arbitrary parameters that have no relationship to the real economic choices; some alternative schemes that don't require Gaps have been proposed, but they are complex and still not adequately fleshed out.

Second, the Protocol allows “emission trading”? Annex I nations may trade credits and debits so long as the tally for the group complies with the emission targets.

The program is modeled on the successful emission trading program for sulfur dioxide emissions here in the United States. In principle, trading makes economic sense because it is much cheaper to focus emission controls in Hungary, for example, than in the United States economy already uses energy relatively efficiently. Buying some of the Hungarian quota would allow us to save money while the Hungarian get better technology.

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Since the emissions mix worldwide, it doesn't matter exactly where emission mitigation actually occurs. Emission trading remains extremely contentious.

In Kyoto, some environmental groups as well as many European and developing country delegates viewed trading as an American ruse to avoid serious action to control emissions... .

Designing a workable emission trading system is no easier than delegates in Kyoto agreed in principle to inventing a new monetary system, but deferred agreement on the rules that would govern the system. Diplomats still have not settled those rules because they are discovering that designing a workable emission trading system is no easier than inventing a new monetary system. Care is needed because much is at stake.

If an emission trading system were created, the targets allocated in Kyoto would define the number of emission permits that each country could claim as its own. Reasonable calculations suggest these permits would be assets worth more than \$700 billion, perhaps more than \$1 trillion.

The asset value is the underlying worth of the asset? like the value of a house, rather than the cost of merely renting a house for a year.) Third, the Protocol allows industrialized countries to purchase emission credits from developing countries. Developing countries often use energy extremely inefficiently and offer a cornucopia of low-cost ways to limit emissions.

Yet developing countries have adamantly refused to set targets for controlling emissions because they fear that policies that would be needed

to mitigate emissions would also undermine economic development, and without targets they can't participate in emission trading.

The solution is a scheme, known as the Clean Development Mechanism (CDM), which allows developing countries to earn tradable emission credits on a project-by-project basis. For example, a firm in the United States could invest in a project to build an efficient natural gas power plant in India. The American investor would earn credits for the difference between the actual emission level and the emissions that would have occurred without the project. The Indians would get the technology. Both sides win, and the climate is cooled while costs are controlled.

CDM, like emission trading, is highly contentious. The most important objection is technical: it is difficult to estimate the "baseline" of emissions that would have occurred without any particular project, and thus it is difficult to find a transparent method for solving the "baseline" problem and thus no way to ensure that only worthy credits are distributed. Already without the lure of emission credits there is nearly \$200 billion per year in private investment in developing countries, of which perhaps ten percent is in the energy sector.

Companies such as Enron are already building efficient natural gas-fired power plants in India. With so much money already flowing there is great danger of rewarding projects that would have occurred anyway? Issuing excessive credits will undermine the integrity of the credit system, just as printing money undervalues a currency through inflation.

One solution is to empower an international regulatory body to review every CDC project individually. The problem, however, is that individual review would introduce large transaction costs and high uncertainty that would severely dampen the incentive for firms to invest.

Indeed, the United States has a program under way known as the United States Initiative on Joint Implementation" that operates with project-by-project review. The result is exactly as expected? the program is useful but cumbersome, and consequently the actual investment is far less than the potential. RECOMMENDATIONS (our immediate decision concerns whether to prepare for ratification of the Kyoto Protocol. The United States can't ratify the Protocol unless you and the Senate are confident that the nation can comply with the Protocol's obligations.

Three strategies could bring the United States into compliance with the Protocol.

However, none advances our interests, and thus none should be pursued; even if all were pursued simultaneously we would not be able to comply with the Kyoto emission targets at an acceptable cost. First, the United States could attempt to control emissions within its borders and meet the Kyoto limits without having to resort to the controversial international emission trading or CDC. That scenario is impossible. U.

S. Emissions of carbon dioxide from fossil fuels, as shown in figure 1, are already 15% above 1990 levels and on track to rise perhaps another 10% by 2008. Yet Kyoto requires a 7% cut below 1990 levels.

There is no way, even if the United States began in earnest, to cut 32% from our emissions in less than a decade.

The lifetime of energy equipment is long (2 decades or more); by the end of 2000, 80% of U. S. Electric power generating capacity in 2010 will have been already built. We could comply only by shutting down a large part of the economy or by replacing existing energy equipment before the end of its economically useful lifetime.

The problem of compliance does not become much easier if the United States makes full use of the “ basket” of gases to achieve compliance.

Only 18% of U. S. Emissions are from non-CA gases, most of Inch is methane. The EPA already has several useful programs in place to help firms Implement low-cost controls on methane, and we can achieve more before 2008-2012. However, it is unlikely that the United States can earn more than about to solving the environmental problem.

Kyoto Million metric tons of CA Million metric tons of CA USA IEEE lapin J
1930 1950 1970 year 1980 2010 2020 Figure 1: Trends in CA emissions from combustion of fossil fuels.

Chart shows historical data from four semi-independent data sources and thus indicates the low countries for 1990, the base year for determining compliance with the Kyoto targets, Inch are shown as bars from 2008-2012. U. S. Emissions have continued to rise steeply since the early sass, but emissions in Europe and Japan are more flat.

Data exclude carbon sinks (e. G. , forests and soils) as well as non-CA greenhouse gases. Data sources: Oak Ridge National Laboratory (solid heavy lines), SEASICK (dashed heavy lines), Bamboo (solid light lines), EIA (dashed light lines). 2 rhea best chance for the United States to comply with the Kyoto targets is to play accounting tricks with carbon dioxide.

The Kyoto Protocol includes not only emissions of CA but also CA sinks. When plants grow they accumulate carbon in their biomass? in the trunks, stems, roots and leaves as well as in surrounding soils. Two carbon sinks are especially important. One is trees.

United States forests are growing rapidly as former farmland reverts to forest. More than two-thirds of Connecticut used to be pastures and crops; today, nearly all the state is woodland.

All told, as much as 1 billion tons of carbon dioxide are sequestered every year in these growing forests; that offsets our emissions of greenhouse gases, which total about 6. 6 billion tons of carbon dioxide equivalents today. Carbon dioxide “ equivalents” are the sum of all emissions of all greenhouse gases, weighted by the GAP exchange rate; of that total, 5.

3 billion tons are in the form of carbon dioxide and the rest is other greenhouse gases.) The other sink is agricultural soils.

Starting in about 1910? when tractors made it easier for farmers to plow deeper? intensive tilling has reduced the carbon content of America’s soils. Since the sass, to help slow soil erosion farmers have shifted to “ no till” techniques that have also caused the carbon content of soils to rise. There

are no good data on exactly how much carbon the soils are absorbing, UT luck and clever accounting could deliver a large number. The problem with using these sinks for a large fraction of our Kyoto commitment is that both trends long pre- date concern about carbon emissions and global warming.

Rules that will govern credits for these sinks have not yet been adopted, but the Kyoto Protocol implies that credit should be awarded only for activities that are caused by humans and somehow relate to efforts to slow global warming. Should you instruct your diplomats to secure rules that let us take credit for these sinks and twist our books into compliance? This is unwise for several reasons: Most other industrialized countries are in a similar or better position to take advantage of lenient rules. Russian's carbon sink from trees is perhaps twice the size of the U. S. Ink, maybe larger; and in Europe, Japan and Australia the forests are also growing.

We don't know the trends in agricultural soil carbon, but countries with historically poor agriculture practices might be in even better position than the United States to claim credit for agricultural sinks as they improve soil management techniques. Fundamentally, no sound method yet exists for determining the credit that should e awarded for soils and forests. Good methods exist for verifying the carbon balance at particular well-monitored plots, but methods are not yet adequate for measuring the carbon balance of whole countries. Under international legal agreements such as the Kyoto Protocol, ultimate responsibility lies with countries and thus good accounting is needed at the country level.) It is important to develop good methods for including forest and soil carbon, but pushing this agenda now, just for the sake for finding a way to comply with the Kyoto Protocol, would build a

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foundation of sand for future emission accounting systems. In short, time has run out for America to comply with the Kyoto targets mainly through actions within our borders.

En must look to other countries for credits.

A second strategy is to comply by purchasing credits through the emission trading system. The problem with this scenario is that Russia and Ukraine are by far the cheapest source of emission credits? not because the Russians and Ukrainians have had an epiphany about the risks of global warming but rather because their savvy negotiators got an emission target in Kyoto that far exceeds the likely level of emissions. Russia and Ukraine greed in Kyoto to freeze emissions at 1990 levels, but the collapse of the Soviet economy in the early sass means that their emissions are already far below that target and unlikely to recover fully by 2008.

Selling the windfall to nations in emissions deficit? notably the United States? could earn Russia and Ukraine \$50 to \$1 50 billion.

(About fourths of that windfall would flow to Russia.) Since the windfall IS free? completely an artifact of the luck and skill of the diplomats in Kyoto rather than the result of any effort to control emissions? these permits would squeeze out bona fide efforts to control emissions. That buys paper compliance but no reduction in global warming. Don't expect Congress to be fooled by this ploy, not least because big financial transfers to Russia are not politically popular.

None of the proposed solutions to the problem of windfall permits? also known as “hot attractive. For example, the European Union has proposed a general rule that would cap the use of emission trading at 50% of each country effort towards the Kyoto targets, but that rule would not halt the flow of windfall permits from Russia; rather, it would cause more harm than good by ensuring that each country filled its cap with windfall permits and probably eliminated any bona fide permits from the international emission trading market.

Moreover, the proposed cap would set a bad precedent for the future because an emission trading system would be most efficient if trading were unlimited. The real problem is not the trading rules but that the Kyoto allocation of quotas is severely biased in favor of Russia.

Reallocating the permits would require renegotiating the protocol. Finally, a third strategy envisions using the CDC to earn credits. However, it is unlikely that the United States could earn more than perhaps five percent of its Kyoto commitment through the CDC.

Firms can't sensibly parachute into developing countries with tens (or hundreds) of billions of dollars in additional investments in efficient power plants, forestation projects and other activities that earn large quantities of CDC credits before 2008-2012. Even though the clock is ticking, governments still have not agreed on the rules that would govern the CDC system; nor have they built the institutions that would be needed to oversee and approve CDC projects. In principle, the CDC is extremely important

because it is a concrete way to engage developing countries and to diffuse modern technology into evolving economies.

But there should be no illusion about the difficulty, time and expense of building a viable CDC system; time has run out for the CDC to play a major role before 2008-2012. All the other industrialized countries also face difficult choices, but most are not nearly in as tough a bind. For them, the first strategy? meeting the Kyoto targets mainly through their own actions? is much easier because special factors and sluggish economic growth have kept emissions low. For example, in Britain the collapse of the coal industry and the shift to gas and nuclear power have reduced emissions of carbon dioxide.

Compared with coal, natural gas emits only half the carbon dioxide per unit of energy; nuclear power causes essentially no emissions of carbon dioxide or other greenhouse gases. No wonder that Tony Blair has suddenly become one of Kyoto's greatest advocates and the U. K. Government is seriously considering cutting emissions beyond its Kyoto-related obligations.

In Germany, the incorporation of the former communist East has also sharply cut emissions, mainly through economic recession and the replacement of inefficient equipment in the East.

Together, Britain and Germany have propelled the European Union remarkably close to its Kyoto target. In Japan, persistent economic troubles have kept emissions low. The silver lining to a cloud of economic trouble is that the European Union and Japan are both already close to compliance and can plausibly claim that the Kyoto targets are achievable, although in <https://assignbuster.com/controlling-emissions-of-greenhouse-gases/>

reality they, too, will find it difficult to comply with the Kyoto targets fully.

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U. S. Emissions have continued to increase emissions have continued to increase strongly? and the gap between actual actual

U. S. Emissions and the Kyoto U. S.

Emissions and the Kyoto target target has widened? thanks mainly has widened? thanks mainly to the to the unprecedented robust unprecedented robust growth of the growth of the U. S. Economy. U. S.

Economy. Since the United States can't comply Ninth Kyoto, we should make no effort to ratify it. However, you should not openly make that decision because doing so will incur the wrath of Kyoto supporters here and overseas.

For many, supporting Kyoto is synonymous with the mission of slowing latter, not least because the United States was the main architect of the Kyoto pact.

Formally rejecting Kyoto will put the U.

S. Government on the defensive and undermine any effort to build a sensible alternative. Instead, you should make no formal decision about Kyoto. Over the next few years it will become clear that the Clinton administration has put you in a bind because the United States can't meet its Kyoto commitments? that fact is already clear to close observers of the scene.

It is better that the bad news seep slowly and that fingers point to the previous administration than for you to paint a bull's eye on your administration by announcing a formal decision to abandon Kyoto.

Moreover, formally rejecting Kyoto will not destroy a framework that continues to be useful. The Kyoto process is leading to the development of generic rules and institutions? for example, carbon accounting systems for forests and agricultural soils? that will be needed in any international cooperative effort to slow global warming.

Those precedents will form the starting point for the effort to build a successor to Kyoto. U.

S. Diplomats are deeply involved in these efforts; they should be instructed to pursue rules that make economic and scientific sense and not to adopt any rules whose main purpose is simply to make the Kyoto emission targets for 2008-2012 easier to honor. 56 After Kyoto Given the resources already invested in Kyoto, there will be very strong political pressure? in the United States and abroad? to leave the basic framework intact.

As it becomes obvious that the United States and some other nations will not ratify the agreement, Kyoto backers will merely want to stretch out the timetables and adjust the targets to make it easier to comply.

However, the problems with the Kyoto Protocol are not merely the result of unrealistic targets and timetables that could be fixed through diplomatic tweaking. Rather, the problems are fundamental, and fixing them will . . . A superior framework must require a different framework. The emerge from

consultations with United States should take the lead in about six of the largest emitters developing this alternative.

Its exact form of greenhouse gases? the United should emerge through consultation with States, the European Union, your top advisors and key allies. A few Japan, China, India and Brazil. Elements to help start the rethinking process are outlined below. If you agree that an alternative is needed [o should be prepared to back it with action and resources? the United States will e blamed for Kyoto collapse, and an alternative will not gain acceptance unless it generates tangible and prompt results.

First, a superior framework must emerge from consultations with about six of the largest emitters of greenhouse gases? the United States, the European Union, Japan, China, India and Brazil.

Let us call this group the Climate 6 (CA); they account for most emissions of greenhouse gases today and include the main developing countries that will be the largest emitters of greenhouse gases in the future. A small group is needed because the current United