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Report to the Ranking Minority Member, Committee on Commerce, House of Representatives

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INTERNATIONAL ENVIRONMENT

Experts' Observations on Enhancing Compliance With a Climate Change Agreement

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Resources, Community, and
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The Honorable John D. Dingell
Ranking Minority Member
Committee on Commerce
House of Representatives

Dear Mr. Dingell:

In December 1997, the parties to the 1992 United Nations Framework Convention on Climate Change adopted the Kyoto Protocol. The protocol was developed to advance the convention's objective, which is to stabilize concentrations of human-made greenhouse gases in the atmosphere. Under the protocol, developed nations (the United States, France, Japan, and 35 others) pledged to limit their emissions of carbon dioxide and other greenhouse gases for the period 2008 through 2012. If the U.S. Senate approves the protocol, the United States would be required to significantly reduce its greenhouse gas emissions.

Ratification has been the subject of much debate. Two main concerns are the costs of complying with the protocol and the possibility that U.S. businesses that invest in reducing their emissions might have to raise the prices of their goods, making them less competitive with goods produced by nations that do not limit their emissions. To date, many of the protocol's key provisions have not been decided and are to be worked out in upcoming meetings among the nations that are parties to the Framework Convention on Climate Change and that negotiated the protocol. In that regard, during meetings in November 1998, these nations developed an action plan, with a deadline of year-end 2000, for adopting the rules and procedures for compliance, including the consequences of noncompliance.

Concerned about the effectiveness of the rules and procedures now being developed, you asked us to identify issues that could enhance compliance with the protocol or any climate change agreement. To do this, we convened a panel of nine experts—representatives from the federal government, industry, academia, and environmental organizations. (See app. I.) This report reflects the results of the panel's discussions, but the issues presented were not necessarily endorsed by all panelists. The report focuses on three issues that could influence compliance with the protocol or other future international environmental treaties on climate change: (1) the clarity of the goals and procedures, (2) the use of incentives that

encourage compliance to supplement punitive measures to punish noncompliance, and (3) the role of environmental and industry groups.

Results in Brief

According to the panelists, three features could enhance compliance with the provisions being negotiated for the Kyoto Protocol on reporting greenhouse gas emissions, monitoring emissions and verifying compliance with emissions limits, and enforcing the protocol's requirements.

- Clear overall goals and procedures for reporting emissions and for monitoring, verifying, and enforcing emissions reductions. While the protocol specifies country-by-country emissions limits, it is not clear how these limits fit into the long-term objective of stabilizing the concentration of greenhouse gases in the atmosphere. Defining this long-term objective for the concentration levels would help build support for the specific actions needed to ensure that nations meet their limits. Similarly, the procedures for implementing the protocol must be clear. Clear reporting requirements, for instance, will help ensure that the data collected on emissions are accurate and comparable. Clearly defined processes for monitoring nations' progress toward their goals and for taking action against those that do not comply will help ensure that the monitoring and enforcement processes are perceived as equitable and, ultimately, make them more effective.
- Incentives that encourage nations to comply with the protocol's requirements. International environmental agreements have tended to use enforcement provisions infrequently or ineffectively. Recent experience with agreements such as the Montreal Protocol on Substances That Deplete the Ozone Layer suggests that supplementing enforcement penalties with incentives can help ensure that nations comply with an agreement's requirements. The panelists discussed three types of incentives that could be incorporated into the Kyoto Protocol's provisions:

  (1) The protocol's requirements must be binding, but different reporting requirements may be appropriate for different nations, depending on, among other things, their levels of greenhouse gas emissions. For example, a nation that produces relatively low emissions could be held to a less demanding standard of reporting than a nation that produces relatively high emissions.

  (2) Because the signatory nations vary widely in terms of the resources they have available to implement the protocol's requirements, some

nations may need technical or financial help to design and implement reporting systems.

(3) Because the ability to buy and sell emissions allowances is an incentive for nations to participate, the protocol needs to specify how the risks involved with an international emissions trading system will be allocated (that is, assigning liability—whether to the seller or the buyer—if a nation sells allowances that it is not entitled to sell).

- A mechanism to recognize environmental organizations, industry groups, and others involved in making the protocol work. Traditionally, official recognition ("standing") for the purpose of monitoring compliance with international agreements has been provided only to the authorized delegates of the nations that are parties to the agreement. Thus, environmental and industry groups traditionally lack standing under these agreements. However, such entities may have data on certain greenhouse gas emissions that could be used to help verify the data that nations report, and they may have resources that could assist in the monitoring of compliance. Recently, these entities have been given monitoring responsibilities under treaties such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora—commonly referred to as CITES—which deals with protecting wildlife. Establishing a means to allow such entities to present information under the protocol could help strengthen reporting and compliance.

Background

The increased understanding of our environment and the recognition that environmental problems do not stop at national boundaries have resulted in global concern about the future of our planet and an increasing number of international agreements to address those concerns. There are currently more than 900 international environmental agreements.[1]

Human activities, primarily those involving emissions from the production and use of energy, are increasing the concentrations of carbon dioxide and other "greenhouse gases" in the atmosphere. Greenhouse gases include carbon dioxide (mainly from burning coal, oil, and natural gas); methane and nitrous oxide (due to agriculture and changes in land use); and hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (manufactured by industry). These gases trap heat in the atmosphere and

[1]Edith Brown Weiss, Daniel Barstow Magraw, and Paul C. Szasz, International Environmental Law: Basic Instruments and References, 2 vols. (Ardsley, N.Y.: Transnational Publishers, Inc.; vol. 1, 1992; vol. 2, in press).

are believed to contribute to global warming, which could lead to future climatic changes.

The United Nations Framework Convention on Climate Change (Framework Convention) was signed by 155 nations, including the United States, in 1992. The Framework Convention's objective was to stabilize concentrations of greenhouse gases in the atmosphere at a level that would prevent dangerous anthropogenic (human-made) interference with the climate system. Under the Framework Convention, both developed and developing nations agreed, for example, to report on their greenhouse gas emissions. In addition to the general provisions agreed to by all nations, developed nations agreed to report on their policies and measures with the aim of returning their greenhouse gas emissions to 1990 levels by the year 2000. However, this goal was not binding on the developed nations.

The Framework Convention entered into force in 1994. However, by 1995, the parties to the convention, including the United States, realized that insufficient progress was being made toward its goals and thus decided to begin negotiations on a follow-up protocol for the post-2000 era. In December 1997, the parties reconvened in Kyoto, Japan, to finalize binding measures to reduce greenhouse gas emissions. The resultant Kyoto Protocol to the Framework Convention established binding emissions limitations or targets for the period 2008 through 2012 for the 38 developed nations referred to as Annex B nations (because they are listed in that annex to the protocol, see app. II).[2] The protocol also laid the groundwork for additional measures aimed at decreasing greenhouse gas emissions, including participation in the protocol by developing nations that have no emissions limits but that are expected to have increasing emissions as their economies develop.

The Framework Convention requires all parties to report periodically to the secretariat of the convention on their greenhouse gas emissions and on their plans for developing programs to mitigate climate change and strategies for adapting to the impact of climate change. To date, most developed nations that are parties have reported this information twice. Developing nations have reported less often, depending on their circumstances. The protocol would add the requirement for Annex B nations to establish national systems for estimating greenhouse gas

[2]While the Kyoto Protocol specifies that the emissions reductions are binding, the parties have yet to specify the consequences of not reaching the reduction targets. Those provisions are scheduled to be complete by year-end 2000.

emissions using methodologies adopted by the parties. In addition, Annex B nations would have to report those emissions estimates annually.

One of the Kyoto Protocol's most significant features is the incorporation of market-based mechanisms designed to make it less expensive for Annex B nations to meet their required emissions reductions. Annex B nations would use the so-called flexibility mechanisms when the cost of reducing emissions is higher in one nation than in another, transferring, in effect, greenhouse gas emissions between nations. No other international agreement to date has relied on flexible market mechanisms to the extent called for in the protocol.

Among the Kyoto Protocol's flexibility mechanisms are the following:

- Joint implementation allows Annex B nations to transfer to or acquire from each other credits for emissions reductions associated with projects that reduce emissions. Thus, one Annex B nation may sponsor an emissions reduction project in another Annex B nation; in exchange, the sponsoring nation may claim some part or all of the emissions reductions resulting from the project.
- The Clean Development Mechanism allows Annex B nations to sponsor or finance emissions reduction projects in developing nations that are parties to the protocol and, in exchange, to claim the reduced emissions.
- Under an international emissions trading system, Annex B nations would be able to buy and sell allowances to emit greenhouse gases. For some Annex B nations, the cost of taking domestic actions to reduce emissions to the target levels will be more expensive than in other nations. In those cases, one Annex B nation could increase its target by buying an allowance to emit more greenhouse gases from another Annex B nation, thereby reducing the first nation's costs of meeting the emissions reduction targets. As a result of this transaction, both parties would adjust their net target levels—that of the buyer would be increased, while that of the seller would be decreased. Nations likely to have excess emissions allowances to sell are those with economies in transition to market economies, such as the nations of the former Soviet Union. This is because their emissions are substantially lower than their targets.

Annex B nations vary in the extent to which they expect to rely on the flexibility mechanisms. The European Union's position is to limit the amount of emissions reductions to be achieved through joint implementation, the Clean Development Mechanism, and international

emissions trading. The United States, however, opposes quantitative limits on use of the mechanisms.

All of the flexibility mechanisms require some further clarification by the nations that are parties to the agreement (party nations). How the mechanisms are clarified will influence the implementation of, and compliance with, the obligations of the protocol. Clarification of the mechanisms will be particularly difficult since the mechanisms have little, if any, precedent in international law.

Other important issues that were not addressed at Kyoto include the role of developing nations and the procedures for determining, and the consequences for, noncompliance. Negotiations are continuing on these issues, and the parties have set a deadline for resolving them by the sixth Conference of the Parties, currently scheduled for year-end 2000. The Kyoto Protocol, initially adopted by all of the parties to the Framework Convention, was open for signature until mid-March 1999. As of that deadline, 84 nations, including the United States, had signed, thereby affirming their commitment to work toward the protocol's goals. After signing such an agreement, the nations must also ratify it for it to enter into force. As of July 1, 1999, 12 nations—all developing nations that are not subject to emissions limitations and many of which are small island nations that might be threatened by climate change—have ratified the protocol. Appendix III lists the nations that have signed the protocol and highlights those that have ratified it. U.S. ratification of the Kyoto Protocol, which requires the advice and consent of the Senate, is uncertain at this time.

Estimates of the economic impact of achieving the emissions reductions set for the United States vary greatly; however, all agree that some increase in energy prices and some decrease in gross domestic product will result. U.S. business interests are particularly concerned because they expect higher energy prices to increase their costs of production. Because developing nations do not face emissions limits and comparable energy price increases, U.S. businesses are concerned that their products will become relatively more expensive than—and thereby less competitive with—those of developing nations. Examples of U.S. businesses expected to be most severely affected include chemical, paper, and electronics manufacturers.

Specification of Overall Goals and Procedures for Reporting, Monitoring, and Enforcement Could Enhance Compliance

Ambiguity of goals and procedures has been recognized as an obstacle in the implementation of many international environmental agreements. Experience has shown that when goals and procedures are not clearly stated in an agreement, implementation is often either delayed or prevented until the parties resolve their differences in interpretation. According to some experts, this ambiguity occurs because of the need to obtain consensus during the negotiating process; the more specific the language, the more difficult it is for all parties to agree. Studies have also indicated, however, that as the economic costs of implementing an agreement increase, the parties generally insist that the agreement include specific mechanisms that will ensure that all parties are implementing the terms of the agreement. These mechanisms can include requirements for the periodic reporting of information on each party's implementation of the agreement and monitoring or enforcement procedures.

With respect to the Kyoto Protocol, some of the panelists indicated that its long-term goals and the procedures for implementing its provisions need to be specified. This specificity is important so that the parties to the agreement, who must decide whether to ratify it, and the businesses and environmental organizations that will play important roles in implementing it, can have confidence that the agreement is equitable and that all parties will contribute to attaining its goals. The panelists generally agreed that "transparency"—that is, reporting accurate information about each nation's greenhouse gas emissions, making clear the methodologies used to collect and report the information, and disseminating that information to all parties who have an interest—is one important element needed to obtain the necessary level of confidence and assurance.

The Long-Term Goal for Greenhouse Gas Concentrations Needs to Be Established

Under the Kyoto Protocol, the 38 Annex B nations agreed to either limit or reduce their greenhouse gas emissions during the period 2008 through 2012. It is reasonably certain that the greenhouse gas limitations accepted by these nations would result in lower emissions and lower greenhouse gas concentrations than would have occurred without the agreement. However, the agreement will not necessarily result in a net reduction in worldwide emissions of greenhouse gases because emissions by non-Annex B nations are projected to continue to increase, more than offsetting the reductions by Annex B nations. For this reason, atmospheric concentrations will continue to rise. Stabilization of atmospheric concentrations of greenhouse gases would require additional reductions by either Annex B or non-Annex B nations, or both.

A concern expressed during the panel discussions was that without establishment of a long-term goal, such as a specific target for the concentration of carbon dioxide in the atmosphere, the extent of future reductions that will be needed is unclear. One panelist said, for example, that businesses and developing nations are concerned that the agreement does not specify explicit goals for the longer term. (The Kyoto Protocol only specifies emissions limits for the period 2008 through 2012.) Without long-term goals, the emissions reports required by the protocol could simply become the basis for requiring further emissions reductions, he said. The panelist also stated that specific goals would allow not only the parties but also businesses, which will largely be responsible for reducing emissions, to better assess their role in the agreement.

The Procedures for Implementing the Protocol Need to Be Established

The collection, analysis, and dissemination of accurate information on greenhouse gas emissions are crucial to determining compliance with the protocol's requirements. In this respect, the panelists discussed the quantity and quality of data being reported under existing international environmental agreements. One panelist who has studied this issue indicated that, in general, the problem of party nations either submitting incomplete reports or not reporting at all appears to be diminishing. This panelist referred to the apparent success of the Montreal Protocol on Substances That Deplete the Ozone Layer (Montreal Protocol) in improving reporting rates by making funds available contingent on a party's compliance with the agreement's reporting requirements. Several panelists endorsed the concept of allowing parties to participate in the Kyoto Protocol's proposed flexibility mechanisms only if they meet the reporting requirements. According to one of the panelists familiar with the negotiations, this is one of the issues being considered by the party nations, but specific criteria for a nation's eligibility to participate in the proposed flexibility mechanisms have not yet been determined.

According to a panelist who has studied reporting under international agreements, although the quantity of information being reported under other international environmental agreements is improving, little is known about the quality of the underlying data because independent checks on data sources and the information contained in the reports that the nations submit are rare. The issue of state sovereignty—nations' resisting oversight of their activities within their own borders by outside organizations or by other nations—has precluded extensive reviews of the quality of reported data and has resulted, for the most part, in acceptance of the information that nations report. The Kyoto Protocol does provide for the outside

review of annual inventories of emissions submitted by the Annex B nations. These reviews would be done by teams selected from experts nominated by the party nations and intergovernmental organizations such as the Organization for Economic Cooperation and Development and the International Energy Agency.

However, under the protocol, the review teams would examine only Annex B nations' information; the protocol does not provide for these teams to review information on compliance submitted by parties other than the Annex B nations. In addition, guidelines or procedures that clarify the review teams' authority and responsibility have not been developed. For example, whether the teams will have the authority to conduct on-site inspections and whether they can consider information provided by third parties such as environmental organizations has not been specified.

The signatories also have not decided which, if any, aspects of compliance the review teams will be allowed to determine or the criteria they may use. As one panelist explained, determining a nation's actual emissions is a factual issue, but interpreting the agreement's obligations is a legal issue. For example, determining the number of trees a nation planted or the methodologies used in estimating emissions removed by those trees is a factual issue, but determining whether the trees qualify as afforestation or reforestation (essentially planting trees on open land or new trees on previously forested land) under the agreement is a legal issue.[3]

Providing the review teams with the authority to conduct on-site monitoring or to make legal interpretations would require the party nations to relinquish some of their sovereign authority, and obtaining agreement on such provisions could be difficult. Some panelists questioned, for example, whether the United States would accept on-site monitoring of emissions by an international body. One panelist pointed out that the protocol refers specifically to a nation's emissions estimates rather than to actual emissions and therefore does not imply the need for the monitoring of actual emissions. Instead, the parties would establish guidelines for estimating emissions, and the review teams would examine the procedures that a nation followed in developing its estimates.

In addition to these specific procedures related to reporting and monitoring, specific enforcement procedures also need to be established,

[3]The levels of greenhouse gases in the atmosphere are determined by the difference between the processes that generate the gases and the processes that destroy or remove them. Forests are an agent for removing (sequestering) greenhouse gases. The Kyoto Protocol allows nations to use afforestation and reforestation to offset their emissions.

according to the panelists. Although the Kyoto Protocol established a framework and some requirements for monitoring and reporting, the agreement contains at this time only a general statement that the protocol would include procedures for determining and addressing noncompliance. According to a panelist familiar with the protocol negotiations, the lack of enforcement procedures was due more to the time constraints of the negotiations than to substantive disagreements over the issues. One issue that is being negotiated is whether the consequences for noncompliance will be specifically stated in the protocol or whether a process or group will be established for determining the consequences of noncompliance on a case-by-case basis. Another issue is whether the consequences of noncompliance will be discretionary or automatic. For example, one panelist asked whether, if a party does not comply with the reporting requirements, should it be automatically penalized—for example, prevented from participating in emissions trading—or should some body be granted discretion to decide what the consequences should be. If the consequences are automatic, then there is a risk that a nation could be severely penalized for a relatively minor infraction, such as submitting a report 2 days late. However, business interests are concerned that a discretionary body may not act consistently or equitably on noncompliance.

In addition to the establishment of procedures for enforcement, substantive procedures and rules are also needed for the flexibility mechanisms, which the signatory nations are developing. Panelists mentioned other areas for which additional procedures or guidance could be beneficial. For example, one panelist suggested the development of a quality assurance system that would require parties to verify and cross-check the data in their own inventories. To support the flexibility mechanisms, another panelist suggested an expedited monitoring procedure that would allow the private sector to make more focused and quick evaluations than the review teams' comprehensive efforts could produce.

Features Other Than Penalties May Result in Better Compliance

Historically, few international environmental treaties have used enforcement provisions effectively. Recent experience, such as with the Montreal Protocol, suggests that using economic or other incentives to supplement enforcement penalties can help ensure that nations comply with an agreement's requirements. The panelists discussed various examples of features for encouraging compliance that could be

incorporated into an environmental agreement on climate change such as the Kyoto Protocol.

Enforcement Provisions Have Not Been Effective at Ensuring Compliance

In the past, the effectiveness of international environmental agreements' enforcement provisions has been limited for a number of reasons. An agreement may not specify enforcement procedures, may allow party nations to exempt themselves from enforcement, or may be so limited in scope that the environmental problem is not effectively addressed.

For example, the Northwest Atlantic Fisheries Convention, which applies to all waters of the northwest Atlantic Ocean, has the authority to establish and allocate fishing quotas for all convention members. The convention's Fisheries Commission, which is the body responsible for managing the convention's resources, can adopt proposals for the enforcement of the convention's rules. However, the commission has jurisdiction only in the area that is beyond the 200-mile off-shore economic zone each coastal nation controls; thus, the commission has no jurisdiction over some of the most productive fishing areas. In addition, the convention allows any member of the agreement to exempt itself from any enforcement proposal from the commission by lodging an objection.

Enforcement provisions have also tended to be ineffective because there often is no meaningful or practical enforcement mechanism. The secretariats established by the agreements may not have enforcement authority, or if they have the authority, they do not have the resources or the international jurisdiction that would be needed to carry out enforcement activities. Furthermore, no centralized regulatory body has jurisdiction or enforcement authority for international environmental agreements. As a result, the effectiveness of international environmental agreements has depended almost entirely on voluntary compliance.

Supplementing Enforcement With Incentive Features May Improve Compliance

Rather than relying exclusively on penalties to discourage noncompliance, the protocol might be more effective if it included incentives to encourage compliance, some of the panelists suggested. Three of the incentives that the panelists discussed include

- tailoring the protocol's requirements for reporting emissions so that they are appropriate for different nations, depending on their level of greenhouse gas emissions, among other things;

- providing technical or financial help for nations with insufficient resources; and
- specifying how the liabilities for noncompliance involved in an international emissions trading system should be assigned.

Nations With Higher Emissions Should Meet More Rigorous Requirements

Although all parties are required to report periodically on their greenhouse gas emissions, under the Kyoto Protocol, only Annex B nations are required to report annually on their emissions. That could change, however. According to some of the panelists, the implementation of the flexibility mechanisms could require more frequent or more specific reporting (for example, project-based reporting) on emissions by the non-Annex B parties that participate in the mechanisms. The panelists discussed the need for standardized reporting by all nations, the difficulty that some nations will have in meeting standardized requirements, and a two-tier reporting system as a means of encouraging all nations to report the necessary data.

The panelists generally agreed that it is important that all parties report on their emissions in a standardized format so that it can be readily determined whether the Annex B nations are in compliance with the protocol's requirements. Standardization is important for other reasons as well. For example, one panelist noted that standardized requirements that do not change frequently would help to ensure a higher quality of reported data. As nations gain experience with the methodologies for collecting and reporting data and build the infrastructure they need to collect and report data, the quality of their data tends to improve and they can become better at targeting their efforts to reduce emissions. Another panelist noted that consistent, standardized data are needed to assure businesses that they will be given credit for the activities that they undertake to reduce emissions.

The panelists acknowledged that standardized reporting could be difficult because of the widely varying resources, experience, and technical capabilities of the nations. Under the Kyoto Protocol, both developed and developing nations—which have the least resources, experience, and technical capabilities—will be required to report on emissions. Experience with the Framework Convention has shown that Annex B nations, which are mostly industrialized and developed nations and theoretically are in the best position to comply, have varied in their ability to meet that agreement's basic reporting requirements and have often fallen short of complying.

Because a relatively few nations account for a large proportion of the world's greenhouse gas emissions, according to some of the panelists, it is more important to know whether the nations that emit the most greenhouse gases are reporting accurately rather than whether all party nations are doing so. For example, 20 nations accounted for about 80 percent of worldwide carbon dioxide emissions in 1997. The top 20 include Annex B nations—such as the United States, the Russian Federation, and Japan—and developing nations—such as China, India, and South Korea. (See app. IV for the complete top 20 list.)

Bearing in mind the differences both in nations' greenhouse gas emissions and in their ability to report on their activities to limit emissions, several of the panelists suggested establishing two levels of requirements. According to one panelist, the World Trade Organization's Trade Policy Review Mechanism is an example of an international agreement that does this—the mechanism requires large trading nations to undergo more frequent reviews than small ones. Under the protocol, the first level of requirements would call for detailed, standardized information on emissions and activities to reduce emissions. The nations that emit the most greenhouse gases would be required to comply with these requirements, thereby furnishing extensive information for analyzing most of the world's emissions.

The second level of requirements would call for data containing common elements needed for good quality reports, but the requirements would be less extensive. The panelists implied that this would be the minimum needed to assure businesses that investments they make to reduce emissions would be acknowledged and to assure signatory nations that other signatory nations are meeting their obligations under the agreement. The second level might also require less frequent reporting. Because of the second level of requirements' limited nature, meeting them would be less costly and less difficult. This is particularly important to nations with small or resource-poor environmental ministries, according to one panelist. Nations that emit relatively small amounts of greenhouse gases would be required to comply with the less extensive requirements and therefore would have an incentive to comply with them. The panelists did not further specify the requirements that should be included in each level.

Technical or Financial Help for Nations With Insufficient Resources

As of July 1999, 84 nations had signed the protocol. The signatories include nations of many sizes and stages of economic development and with different levels of experience in reporting on emissions. Several panelists expressed concern about the ability of some developing nations

and nations in transition to market economies to meet their reporting obligations. They suggested that technical or financial assistance could provide an incentive for those nations to comply.

One panelist noted that it is important for businesses that have emission reduction activities in developing nations to play a role in facilitating data reporting by those nations. However, according to the panelist, businesses are concerned about being overburdened with costly reporting requirements in nations that may not have adequate capacity for that function and believe that it is important that the responsibility—and costs—for establishing reporting systems not be shifted from the governments onto the businesses that invest in those nations.

Other international environmental agreements have successfully provided financial assistance for developing nations that lacked the resources or administrative capacity for fulfilling their obligations. For example, as mentioned earlier, the Montreal Protocol provides funds to boost developing nations' activities to comply with that protocol's provisions. The fund pays for projects in developing nations to gather baseline data and build the administrative capacity to report the data. According to experts, this financial assistance has resulted in better self-reporting of certain data by developing nations.

According to several panelists, getting developing nations to participate in international environmental agreements has, to some degree, required that developed nations pay the additional cost of data reporting by developing nations. The Framework Convention requires developed nations to pay for reporting by developing nations. One panelist noted that the data reporting requirements under a climate change agreement such as the Kyoto Protocol are likely to be more extensive and difficult, and therefore more expensive, than for other international environmental agreements. They anticipated that the developing nations would need assistance if they are to participate. However, according to one panelist, the developed nations may not be willing to absorb all of the additional costs for the developing nations.

One solution is to target financial or technical resources to the specific needs of each developing nation. For example, a nation may give low priority to devoting resources to reporting on emissions because it faces more urgent problems, such as providing safe drinking water to its population. Or a nation may recognize the importance of compliance but be inexperienced in getting government ministries to work together

administratively. Both nations lack the capacity to comply with reporting requirements, but addressing those capacity issues effectively will require different types of assistance.

Another approach would be to encourage nations with similar conditions and problems to work together when their individual resources are insufficient. According to the panelists, some nations have used this technique effectively for other international agreements. For example, officials from Latin American and Asian nations meet periodically to learn from each others' experiences with the Montreal Protocol's multilateral fund, focusing on problems they have encountered and solutions that have been effective.

Assignment of Risks Within an International Emissions Trading System

The ability to buy and sell emissions allowances provides an incentive for nations to participate in the protocol. A nation whose emissions are less than its limit under the protocol or that can reduce its emissions at low cost stands to gain financially by selling part of its emissions allowance. A nation that finds it expensive to reduce its emissions to meet its limit under the protocol may prefer to buy those allowances rather than make the investments needed to bring down its emissions. However, if a nation that sells allowances fails to meet its emissions target level, then the allowances are not backed by real reductions in emissions.

According to most of the panelists, for this incentive to be effective and for an Annex B nation to be willing to participate in international emissions trading, a nation must have assurance that the allowances it is buying are valid (that is, that the seller has not actually exceeded its assigned emissions limit). Thus, the allowances can be used to increase the buyer nation's emissions target. Which nation—the seller or the buyer—will assume the risk of ensuring that allowances are valid needs to be specified. The Kyoto Protocol does not currently address this issue; however, some analysts believe that seller liability is implied by the agreement.

A system of seller liability makes sellers responsible for ensuring that the allowances they sell are valid. The seller liability system relies on effective penalties for noncompliance—penalties that are large enough to discourage the seller from selling invalid credits. Seller liability may not be effective in an international emissions trading system, however, for two reasons. First, although the Kyoto Protocol's penalties for noncompliance remain to be negotiated, as already discussed, penalties for noncompliance with international agreements in general are typically

weak and difficult to enforce. Second, no international regulatory body currently has authority to carry out enforcement provisions, although the enforcement regime for the Kyoto Protocol currently being negotiated by the parties may specify that authority.

As a result, some panelists have suggested that buyer liability might be appropriate for this agreement because it relies on price incentives rather than penalties and enforcement. If the buyer is liable for ensuring the validity of the allowances being purchased, the buyer will weigh the likelihood that the seller will exceed its emissions limit. Hence, a buyer will offer a lower price for allowances whenever the buyer believes that the risk is higher that the allowances may prove to be invalid. Sellers will therefore have an incentive to comply with their emissions limits because their allowances will then be worth more to buyers.

However, according to some of the panelists, a system of buyer liability could be costly and difficult for buyers. Without a mechanism to provide basic information on the reliability of sellers, buyers may have to carry out separate investigations of each seller. Such a process could be costly, especially during the early phases of the agreement's implementation when there is little experience with evaluating sellers' performance. In some cases, buyers may not have the capability to perform these investigations. One panelist suggested that some form of insurance might be created to cover some of the costs and difficulty for buyers. It was also suggested that the trading system could include a process for verifying that allowances are valid before they can be traded.

Increased Involvement in the Process by Other Groups Could Improve Compliance

The Framework Convention has formal mechanisms for groups other than the parties to the convention to provide input into negotiations. Groups that have participated in negotiations for the Kyoto Protocol include intergovernmental organizations—for example, the International Energy Agency—and nongovernmental organizations, including business representatives—for example, The Nature Conservancy and the Edison Electric Institute. Both of these groups have the knowledge and experience to provide information on possible policy options, technical feasibility, and the costs and benefits of implementing agreements.

Some businesses and environmental organizations carry out emissions monitoring programs, and some experts believe that the data that they compile are more reliable than that reported by the signatory nations. Procedures for determining how information provided by groups other

than the signatory nations could be included in determining compliance are being considered by the signatory nations. Some of the panelists supported including provisions in the protocol that would allow these groups to provide input into the protocol's procedures for determining compliance.

Data collected by such groups have sometimes been used in international environmental agreements. For example, a panelist noted that under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (commonly referred to as CITES), almost all of the major instances of noncompliance have been identified by environmental organizations working inside the nations that signed the convention. Conversely, another panelist cited an example of businesses obtaining information that showed a country was not complying with the provisions of the Montreal Protocol; however, in that case, no action was taken despite attempts by businesses to provide the information to responsible authorities.

One panelist pointed out that because most fossil fuels, which are the primary source of carbon dioxide (the main source of global warming), are traded in commercial markets, there are many sources of independent data that could be used under the Kyoto Protocol to compute estimated emissions. However, panelists noted that under the protocol as it now exists, there is no mechanism for gathering or considering information from groups other than the signatory nations. Another panelist suggested the possibility that the review teams established to review the inventories submitted by the parties could be given the authority to accept and consider information provided by other groups such as the environmental organizations.

Agency Comments

We provided a draft of this report to the Secretary of State and the Administrator of the Environmental Protection Agency for review and comment. Neither agency commented on the report. The panelists from both agencies reviewed the report and suggested technical corrections, which we incorporated as appropriate.

Scope and Methodology

This report summarizes the discussions of the panel of nine experts that we convened for one day in Washington, D.C., in December 1998. We selected the panelists because of their prominence in the areas of international environmental agreements and the Kyoto Protocol, choosing

a cross section from the federal government, business, academia, and environmental organizations. A knowledgeable senior analyst from the Congressional Research Service moderated the panelists' discussions. The panelists discussed reporting, monitoring and verification, and enforcement of international environmental agreements and the historical lessons that could be applied to an agreement on climate change such as the Kyoto Protocol. As a starting point for the discussions, we prepared a summary of recent literature on those issues.[4] The panelists made many insightful comments throughout the day; we have included in this report those that were most prominent during the discussion. Profiles of the panelists and moderator are contained in appendix I. We performed our work from July 1998 through August 1999.

As arranged with your office, unless you announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies to congressional committees with jurisdiction over international environmental affairs; interested Members of Congress; the Honorable Madeleine K. Albright, Secretary of State; the Honorable Carol M. Browner, Administrator, Environmental Protection Agency; and other interested parties. We will also make copies available to others on request.

Should you or your staff need further information, please contact me or David Marwick at (202) 512-6111. Key contributors to this assignment were Karla Springer; William H. Roach, Jr.; and John A. Crossen.

Sincerely yours,

David G. Wood

David G. Wood
Associate Director, Environmental
Protection Issues

[4]International Environment: Literature on the Effectiveness of International Environmental Agreements (GAO/RCED-99-148, May 1999).

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Abbreviations

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CRS	Congressional Research Service

Profiles of the Participants on the Expert Panel

Ruth Greenspan Bell is the director of the International Institutional Development and Environmental Assistance Program at Resources for the Future. This program is designed to help governments, nongovernmental organizations, development banks, and other institutions become more effective in implementing natural resource management and environmental protection laws and related international environmental obligations. Prior to this position, she was an attorney in the Office of General Counsel at the Environmental Protection Agency. She has also designed and coordinated environmental assistance programs, principally in Central and Eastern Europe and the countries of the former Soviet Union. She chairs the board of the Women's Foreign Policy Group and is a member of the Council on Foreign Relations.

Susan Biniaz is an assistant legal adviser in the Bureau of Oceans, International Environmental and Scientific Affairs, at the Department of State. In this capacity, she has been the legal adviser for many treaty negotiations, including the International Space Station agreement, the United States-Russian maritime boundary treaty, the 1992 Framework Convention on Climate Change, the Kyoto Protocol on Climate Change, the United States-Canadian Air Quality Agreement, and various amendments to the Montreal Ozone Protocol and Basel Convention on Transboundary Movement of Hazardous Waste. Prior to accepting her present position, she was the assistant legal adviser for European and Canadian Affairs at the State Department.

Clare Breidenich is a policy analyst at the Environmental Protection Agency. In this capacity, she works on the development of international policy to address climate change and has been a member of the U.S. delegation to the climate change negotiations for the past 5 years. Her particular expertise is in matters relating to reporting, verification, and review of greenhouse gas emissions. Ms. Breidenich holds masters' degrees in environmental science and in public affairs from Indiana University, School of Public and Environmental Affairs.

Edith Brown Weiss is the Francis Cabell Brown Professor of International Law at the Georgetown University Law Center and is active in the areas of public international, environmental, and water resources law. Her professional experience includes positions as associate general counsel for international activities at the Environmental Protection Agency, assistant professor of civil engineering and politics at Princeton University, and a research associate at Columbia University and the Brookings Institution. She served as an attorney-adviser to the U.S. Arms

Control and Disarmament Agency. She has been a member of numerous scientific and legal advisory committees on international environmental law. She served as president of the American Society of International Law and chair of the Committee for Research in Global Environmental Change of the Social Science Research Council. She serves on the Board of Directors of the Japanese Institute for Global Environmental Strategies and on the Council of Advisers to the Cousteau Society. In 1988, Professor Brown Weiss became a member of the board of editors of the American Journal of International Law and a member of the editorial advisory boards for Global Governance, the Berkeley Journal of International Law, and Environment Magazine. She has published numerous articles on international and environmental law and is the author of many books.

Kevin Fay is the executive director for the Alliance for Responsible Atmospheric Policy, a coalition of several hundred companies and trade associations working to develop international policies to address ozone depletion issues. He is also the executive director of the International Climate Change Partnership, which he helped to organize. The partnership is an industry organization dedicated to facilitating responsible industry participation in the climate change policy process at the international and national levels. He has been an industry representative on the U.S. delegation at the international climate change negotiations and has been involved in all the negotiating sessions pertaining to the Montreal Protocol on Substances That Deplete the Ozone Layer. He also has participated with U.S. officials in a roundtable dialogue with the European Union on the subject of trade and the environment; in legislative activities dealing with energy and environment issues, particularly the Clean Air Act Amendments of 1990; and numerous other legislative issues at the state and local level.

Susan Fletcher (moderator of the panel) is a senior analyst in international environmental policy at the Congressional Research Service (CRS), Library of Congress—the research arm of the Congress. She advises the Congress, writing reports and organizing research efforts and assisting with hearings and legislation on a wide variety of issues pertaining to the international environment. Currently the division coordinator for climate change issues, she has written CRS materials on the Kyoto Protocol and other treaty issues concerning climate change and oversaw the preparation of an electronic briefing book on these issues. She also has done research and written on such issues as sustainable development, trade and the environment, biological diversity, global forests, and foreign assistance related to the environment. As a congressional observer, she

was a member of the U.S. delegation to the 1992 Earth Summit in Rio de Janeiro and to the preparatory negotiating meetings for the Rio conference, as well as to three annual follow-up meetings of the United Nations Commission on Sustainable Development, which is charged with overseeing the implementation of Earth Summit decisions.

Jennifer Morgan is a senior program associate in the Climate Campaign Program at the World Wildlife Fund. In this position, she is responsible for representing World Wildlife Fund-U.S. in the international climate negotiations and formulating and advocating climate change policies on the international and national levels. Prior to joining the World Wildlife Fund, she worked at the U.S. Climate Action Network, which is a network of over 200 environmental groups worldwide working on global climate change. In 1996, she received a fellowship with the Robert Bosch Foundation in Germany, where she worked for the European Business Council for a Sustainable Energy Future and for the Federal Ministry of Environment. She also has worked on international trade issues at the Natural Resources Defense Council and on World Bank policy at the National Audubon Society.

Stephen Porter is a staff attorney at the Center for International Environmental Law and an adjunct professor of law at The American University's Washington College of Law, where he has taught courses on trade and the environment and an international environmental law research seminar. At the Center for International Environmental Law, he focuses primarily on climate-related work, including most recently a study of compliance mechanisms in the global climate regime. Previously, he was an environmental associate in a private law firm, did forestry and erosion control work in Mali as a Peace Corps volunteer, and was a budget analyst at the Congressional Budget Office.

David Victor is a Robert W. Johnson, Jr., fellow in science and technology at the Council on Foreign Relations. In this position, he is writing a book on "A Technology Strategy to Combat Global Warming" and is leading a project on protection of the world's forests. Previously, he directed a project on implementation of international environmental treaties at the International Institute for Applied Systems Analysis in Laxenburg, Austria. He recently published a book on treaty implementation and coauthored an article in Scientific American that projects worldwide passenger mobility to the year 2050.

Richard C. Visek is an adjunct professor at the Georgetown University Law Center, where he teaches "Comparative Law: Legal Systems in Transition." He recently joined the Department of State's Office of the Legal Adviser and, previously, worked on overseas "Rule of Law" assistance programs and environmental enforcement litigation for the Department of Justice. He also has taught courses in international law and European Community law and has worked on environmental litigation in private practice.

Nations Listed in Annex B to the Kyoto Protocol

Thirty-eight nations, including 13 nations in transition to market economies (indicated by an asterisk), agreed to emissions limitations or reductions in the Kyoto Protocol and are listed in Annex B to the protocol. They are Australia, Austria, Belgium, Bulgaria,* Canada, Croatia,* Czech Republic,* Denmark, Estonia,* Finland, France, Germany, Greece, Hungary,* Iceland, Ireland, Italy, Japan, Latvia,* Liechtenstein, Lithuania,* Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland,* Portugal, Romania,* Russian Federation,* Slovakia,* Slovenia,* Spain, Sweden, Switzerland, Ukraine,* United Kingdom of Great Britain and Northern Ireland, and the United States.

Nations That Have Signed or Ratified the Kyoto Protocol

Annex B nations		
Australia	Germany	Poland
Austria	Greece	Portugal
Belgium	Ireland	Romania
Bulgaria	Italy	Russian Federation
Canada	Japan	Slovakia
Croatia	Latvia	Slovenia
Czech Republic	Liechtenstein	Spain
Denmark	Lithuania	Sweden
Estonia	Luxembourg	Switzerland
European Union	Monaco	Ukraine
Finland	Netherlands	United Kingdom
France	New Zealand	United States
Georgia[a]	Norway	
Non-Annex B nations		
Antigua and Barbuda	Israel	Paraguay
Argentina	**Jamaica**[a]	Peru
Bahamas[a]	Kazakhstan	Philippines
Bolivia	Korea, Republic of	Saint Lucia
Brazil	Malaysia	Saint Vincent and the Grenadines
Chile	**Maldives**	Samoa
China	Mali	Seychelles
Cook Islands	Malta	Solomon Islands
Costa Rica	Marshall Islands	Thailand
Cuba	Mexico	**Trinidad and Tobago**
Ecuador	**Micronesia, Federal States of**	Turkmenistan
Egypt	Nicaragua	**Tuvalu**
El Salvador	Niger	Uruguay
Figi	**Niue**	Vietnam
Guatemala	**Panama**	Uzbekistan
Honduras	Papua New Guinea	Zambia
Indonesia		

Notes: Bold type indicates the nation has ratified the Kyoto Protocol.

[a]This nation ratified the protocol but has not signed it.

Source: Web site of the U.N. Framework Convention on Climate Change (July 1, 1999).

Top 20 Carbon Dioxide-Producing Nations

Metric tons in millions	
	1997 emissions
Annex B nations	
United States	1,488
Russia[a]	422
Japan	297
Germany	234
United Kingdom	157
Canada	143
Italy	116
Ukraine[a]	106
France	102
Poland[a]	95
Australia	89
Spain	68
Non-Annex B nations	
China	822
India	237
South Korea	116
South Africa	99
Mexico	94
Brazil	77
Saudi Arabia	74
Iran	73
Total – 20 largest CO_2 emitters	4,909
Total – worldwide CO_2 emissions	**6,232**
Percentage of worldwide CO_2 emitted by top 20 nations	**79%**

[a]Nation in transition to a market economy.

Source: World Carbon Dioxide Emissions From the Consumption and Flaring of Fossil Fuels, 1988-1997; International Energy Annual 1997, Energy Information Administration, Department of Energy. These are the latest data available on carbon dioxide emissions.

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