

CRS Report for Congress

Climate Change: The Kyoto Protocol, Bali Negotiations, and International Actions

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Susan R. Fletcher
Specialist in International Environmental Policy
Resources, Science, and Industry Division

Larry Parker
Specialist in Energy Policy
Resources, Science, and Industry Division



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Committees of Congress

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Summary

The concerns over climate change, often termed “global warming,” have emerged both in the United States and internationally as major policy issues. Reports in 2007 of the United Nations Intergovernmental Panel on Climate Change (IPCC) provided additional scientific underpinnings for these concerns, and the number of proposals and international meetings devoted to these issues has grown significantly during this year, as discussed in this report.

The first treaty to address climate change, the United Nations Framework Convention on Climate Change (UNFCCC), was completed and opened for signature in 1992. This treaty includes commitments to establish national action plans for voluntary measures that could reduce greenhouse gas emissions to 1990 levels by the year 2000 in order to begin mitigating possible global warming. The United States was one of the first nations to sign and ratify this treaty, and it entered into force in 1994. However, it was soon concluded by parties to the treaty that mandatory reductions in emissions of the six major greenhouse gases (of which carbon dioxide, mainly from burning of fossil fuels, is the most prevalent) would be required. The resulting Kyoto Protocol, which was completed in 1997 and entered into force in February 2005, committed industrialized nations that ratify it to specified, legally binding reductions in emissions of the six major greenhouse gases. The United States has not ratified the Protocol, and thus is not bound by its provisions. In March 2001, the Bush Administration rejected the Kyoto Protocol, and subsequently announced a U.S. policy for climate change that relies on voluntary actions to reduce the “greenhouse gas intensity” (ratio of emissions to economic output) of the U.S. economy by 18% over the next 10 years.

Each of the industrialized nations listed in Annex B of the Kyoto Protocol has a specified emissions target. Overall, the collective commitments are to reduce the Parties’ emissions by at least 5% below their 1990 levels, averaged over the “commitment period” 2008 to 2012. Over the past year, several high-level meetings have focused on the need to deal with climate change, including the G-8 meeting in June 2007 and meetings at the United Nations. President Bush announced on May 31, 2007, that the United States would convene a meeting of major economies to begin a series of meetings in Washington through 2008 to find a voluntary framework for dealing with energy security and climate change. The first of these, the Meeting of Major Economies on Energy Security and Climate Change, was held September 27-28, 2007.

As of November 2007, the UNFCCC Secretariat listed 174 nations and the European Union as parties to the Kyoto Protocol. Annual meetings of the parties continue, and attention at the meeting in Bali, Indonesia, December 3-14, 2007, will focus on finding agreement on a framework for negotiating a successor agreement to the Kyoto Protocol. Major challenges include finding agreement on the nature of commitments, if any, that would prove acceptable to all major players: current parties, developing countries that are major emitters, and the United States.

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Introduction and Overview¹

Responding to concerns that human activities are increasing concentrations of “greenhouse gases” (such as carbon dioxide and methane) in the atmosphere and causing potentially damaging climate change and global warming, nearly all nations of the world joined together in 1992 to sign the United Nations Framework Convention on Climate Change (UNFCCC). The United States was one of the first nations to ratify this treaty. It included a legally non-binding, voluntary pledge that the major industrialized/developed nations would establish national action plans aiming to reduce their greenhouse gas emissions to 1990 levels by the year 2000, and that all nations would undertake voluntary actions to measure and report greenhouse gas emissions to the UNFCCC Secretariat.

The parties to the UNFCCC hold annual meetings called Conferences of the Parties (COPs), at which unresolved issues are negotiated, rules of procedure are established or amended, and reviews of progress are considered. As scientific consensus grew that human activities are having a discernible impact on global climate systems, contributing to a warming of the Earth that could result in major impacts such as sea level rise, changes in weather patterns, and health effects — and as it became apparent that many major nations such as the United States and Japan would not be able to reduce their emissions to 1990 levels by 2000 — parties to the treaty decided in 1995 that it would be necessary to move beyond voluntary measures and to enter into legally binding commitments. Negotiations began on a protocol to establish legally binding limitations or reductions in greenhouse gas emissions. It was decided by the parties that this round of negotiations would, in keeping with principles established in the UNFCCC, establish limitations only for the developed countries — the 38 nations listed in Annex I to the UNFCCC, including the former Communist countries, plus the European Union, and referred to as “Annex I countries.” Developing countries are referred to as “non-Annex I countries.”

A basic principle established in the UNFCCC and continuing in negotiations on the Kyoto Protocol is that parties have “common but differentiated responsibilities” in dealing with climate change issues, and that first steps in reducing greenhouse gas

¹ This report provides discussion of international negotiations and other actions related to decisions on climate change taken by nations. Underlying much of the growth in interest and urgency have been the reports of the Intergovernmental Panel on Climate Change (IPCC) that were issued during 2007. These scientific reports are not discussed in this report; for discussion of the scientific findings and these reports, see CRS Report RL33849, *Climate Change: Science and Policy Implications*, by Jane A. Leggett.

emissions should be taken by the Annex I countries. Because developed countries have emitted the largest share of the greenhouse gases already in the atmosphere (carbon dioxide releases remain in the atmosphere for many decades), and because they are wealthier and more able to incur costs of any necessary changes in their economies, it was agreed by negotiators of the UNFCCC, and subsequently the Kyoto Protocol, that this principle would be a basic tenet of climate negotiations.

The Kyoto Protocol negotiations were completed in late 1997. The protocol establishes legally binding, mandatory emissions reductions for the six major greenhouse gases². It requires that Annex I countries (listed again in Annex B of the Protocol) reduce their aggregate greenhouse gas emissions by 5% below 1990 levels (1990 is the baseline for carbon dioxide, methane, and nitrous oxide; 1995 is the baseline year for the other 3 gases), averaged over the “commitment period” of 2008 to 2012. Each country was assigned individually negotiated targets which differed according to their situations.

The United States signed the Protocol in 1998. However, no country is subject to the provisions of a treaty until it has been ratified, which in the United States requires the consent of the U.S. Senate. Because the Senate was on record in mid-1997 in S.Res. 98, objecting to a treaty that had no mandatory obligations for developing countries, President Clinton did not submit the Protocol to the Senate for advice and consent; therefore the United States did not ratify the Protocol during his Administration. Then in March 2001, soon after President George W. Bush took office, he rejected the Kyoto Protocol, and the United States declined further participation in Kyoto Protocol negotiations. After several years, the required number of Annex I countries had ratified (all but the United States and Australia), and the Protocol entered into force in February 2005. As of December 2006, 168 nations plus the European Union had ratified the Protocol, representing 61.6% of Annex I countries’ 1990 greenhouse gas emissions. Since the United States has not ratified the Protocol, it is not subject to its terms.

Negotiations continued after the 1997 treaty was finalized in order to put in place the detailed rules for how the Kyoto Protocol would operate and to establish procedures for how its provisions would be carried out. These negotiations were continued through two subsidiary bodies that address technical issues, and then decisions were made at the annual conferences of the parties (COPs) to the UNFCCC until February 2005 when the Kyoto Protocol had achieved the necessary ratifications to enter into force; the annual meeting is now a UNFCCC COP, combined with a “meeting of the parties (MOP)” to the Protocol. Thus the annual meetings are now referred to as COP/MOP meetings. The United States continues to participate in the discussions and negotiations of the COPs, but as it is not a party to the Kyoto Protocol, it does not participate in Kyoto-related negotiations.

² The six gases covered by the Protocol are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆). The most prominent of these, and the most pervasive in human economic activity, is carbon dioxide, produced when wood or fossil fuels such as oil, coal, and gas are burned. Concentrations of carbon dioxide in the atmosphere have increased from 280 parts per million (ppm) in 1850 to some 380 ppm in 2006.

Key Protocol Provisions

The major commitments in the treaty on the key issues are as follows:

Obligations of All Parties

The Kyoto Protocol calls on all Parties — developed and developing — to take a number of steps outlined in Article 10 to contribute to scientific research and monitoring of the climate system and greenhouse gases in their countries. They are also committed to formulate national and regional programs to improve local emission factors; carry out steps to promote and transfer environmentally sound technologies; strengthen national capacity building activities; and conduct national inventories of greenhouse gas emissions and sinks that remove these gases from the atmosphere.

In keeping with the principle of common but differentiated responsibilities, the UNFCCC and the Kyoto Protocol recognize the relatively low per capita greenhouse gas emissions in developing countries, and the need to take into account the development activities of these countries that will require increased energy use. The Protocol does not impose any binding requirements on developing countries; the commitments in Article 10 are regarded as essentially voluntary.

Obligations to reduce greenhouse gas emissions by Annex I countries are the focus of most of the Kyoto Protocol, which outlines the legally binding emissions reductions that the Parties to the treaty are to undertake, and provides for development of procedures and rules that apply to Parties as they move toward meeting these binding obligations. These are briefly summarized below.

Emissions Reductions

The Kyoto Protocol states that Annex I Parties are committed — individually or jointly — to ensuring that their aggregate anthropogenic carbon dioxide equivalent emissions of greenhouse gases do not exceed amounts assigned to each country in Annex B, “with a view to reducing their overall emissions of such gases by at least 5% below 1990 levels in the commitment period 2008 to 2012.” Negotiations on the Kyoto Protocol included a nation-by-nation allocation of the percentage each Annex I country would be obligated to reduce its greenhouse gas emissions in order to collectively reach the overall 5% reduction agreed to in the Protocol.

Annex B to the Kyoto Protocol lists 39 nations, including the United States, the European Union plus the individual EU nations, Japan, and many of the former Communist nations (the same countries as Annex I to the UNFCCC). The amounts for each country are listed in this annex as percentages of the base year, 1990 (except for some former Communist countries, which use a more recent year), and range from 92% (a reduction of 8%) for most European countries — to 110% (an increase of 10%) for Iceland. In negotiations on the Protocol, the United States agreed to a commitment on this list to 93%, or a reduction of 7% below 1990 levels. These commitments refer to averages that would be below each Party’s 1990 levels for three major greenhouse gases, including carbon dioxide, (and below 1995 levels for

the three other, man-made gases), averaged over the “commitment period” 2008 to 2012. (As noted above, only nations that ratify the Protocol are subject to its terms; the United States later rejected participation, and thus is not bound by it.)³

However, two of the most difficult issues unresolved in 1997 at Kyoto and still under discussion are related to counting emissions of a nation, specifically how to take into account: (1) emissions trading — specifically, how much of a country’s obligation to reduce emissions can be met through purchasing credits from outside, vs. taking domestic action; and (2) the extent to which carbon sequestration by forests, soils and agricultural practices can be counted toward a country’s emission reductions. These are discussed below.

Implementation: “Flexibility” Mechanisms

Emissions Trading. Emissions trading is one of three “flexibility” mechanisms contained in the Kyoto Protocol (article 17).⁴ Under the Kyoto Protocol, developed countries are given greenhouse gas emissions “budgets” (or emissions “caps”) for the compliance period 2008-2012 based on a percentage of their 1990 or 1995 emissions levels (depending on the particular greenhouse gas). If a country determined that it would exceed its emissions limit during the compliance period, emissions trading would permit it to purchase emissions reductions “credits”⁵ from another country that determined it would achieve more emissions reductions than necessary to comply. With emissions trading, countries that can make relatively inexpensive emissions reductions have an incentive to reduce emissions below the level required by the Kyoto Protocol, and sell the extra credits to other countries whose emissions control costs are more expensive. Thus, both the seller and the buyer would have lower costs by virtue of the seller’s profit and the buyer’s savings. This type of implementation scheme is commonly called a “cap-and-trade” program.⁶

This mechanism, however, comes with significant restrictions under the Kyoto Protocol. First, emissions trading is restricted to countries that have legally binding

³ When the United States signed the Protocol, and based on projections of the growth of emissions using current technologies and processes, the reduction in greenhouse gas emissions required of the United States would likely have been between 20% and 30% below where it would be otherwise by the 2008-2012 commitment period. However, inclusion of greenhouse gas sinks [Greenhouse gases, especially CO₂, are absorbed by a number of processes in forests, soils, and other ecosystems. These are called “sinks.”] — which the Protocol adopted as urged by the United States — and emissions trading, means that the domestic U.S. emission reductions from fossil fuels needed to meet a 7% target would have been substantially less.

⁴ The other mechanisms are Joint Implementation (Article 6) and the Clean Development Mechanism (Article 12).

⁵ A credit would generally represent the reduction of one metric ton of carbon dioxide equivalent emissions.

⁶ For a detailed discussion, see CRS Report RL33799, *Climate Change: Design Approaches for a Greenhouse Gas Reduction Program*, by Larry Parker.

greenhouse gas emission limitations — the Annex 1 parties, which as noted above includes only developed, industrialized countries that have ratified the Protocol.⁷ Another requirement is that emissions credits must “be supplemental to domestic actions for the purpose of meeting quantified emission limitations and reduction commitments....”⁸ However, the Protocol is vague as to what “supplemental” means, and the term is subject to continuing interpretation.

Currently, the largest emissions trading scheme in use under the Kyoto Protocol is the European Union’s Emissions Trading system (ETS). The EU-ETS is a cornerstone of the EU’s efforts to meet its obligation under the Kyoto Protocol, and it currently covers more than 11,500 energy-intensive facilities across the now 27 EU Member countries, including oil refineries, powerplants over 20 megawatts in capacity, coke ovens, and iron and steel plants, along with cement, glass, lime, brick, ceramics, and pulp and paper installations. Covered entities emit about 45% of the EU’s carbon dioxide emissions. The trading program does not cover emissions of non-CO₂ greenhouse gases, which account for about 20% of the EU’s total greenhouse gas emissions. The first trading period began January 1, 2005. A second trading period is scheduled to begin in 2008, covering the period of the Kyoto Protocol, with a third period planned for 2013.⁹

Clean Development Mechanism (CDM). The Kyoto Protocol supplements the cap-and-trade implementation scheme discussed above with two project-based schemes that permit Annex 1 countries to obtain additional credits that they can use to meet their emission caps. The first is CDM — the only mechanism under the Kyoto Protocol that involves non-Annex 1 countries. Under its provisions, industrialized countries can receive Certified Emissions Reduction credits (CERs) for reductions achieved from a greenhouse gas reduction project in a “host” non-Annex 1 country. CERs can then be used by the industrialized country to meet its compliance requirements. The process is overseen by a CDM Executive Board that registers and validates projects, issues CERs, and manages a series of panels and working groups. A critical component of the process is the requirement that CERs issued under the CDM represent only reductions in excess of those that would have occurred in the absence of the project. CERs can be issued from appropriate projects initiated after 2000. In 2005, China, India, and Brazil were estimated by Point Carbon to be responsible for about 63% of the total volume of all projects at the Project Design Document (PDD) stage of development.¹⁰ In the case of China, large

⁷ Although called “Annex 1” countries in reference to Annex 1 of the Framework Convention on Climate Change (FCCC), the correct reference is to Annex B of the Kyoto Protocol. The lists of countries in Annex 1 and Annex B are very similar, but not identical. CRS uses the common usage term, Annex 1, in this report.

⁸ Article 17, Kyoto Protocol.

⁹ For more information, see CRS Report RL33581, *Climate Change: The European Union’s Emission Trading System (EU-ETS)*, by Larry Parker; and CRS Report RL34150, *Climate Change: The EU Emissions Trading Scheme (ETS) Gets Ready for Kyoto*, by Larry Parker.

¹⁰ Point Carbon, *Carbon 2006: Towards a Truly Global Market* (26 February 2006), p. 14. Point Carbon is a company that provides in-depth analysis, forecasting, market intelligence and news about carbon emission markets.

volumes of CDM contracts are primarily the result of a few large HFC-23 reduction projects.

Joint Implementation (JI). In contrast, JI is a program in which industrialized countries can receive Emission Reduction Units (ERUs) from greenhouse gas reduction projects conducted jointly between two Annex 1 countries. Like CERs, ERUs can be used by the participating countries for compliance purposes. There are two tracks under JI (called Track 1 and Track 2). Track 2 mirrors the process used by the CDM but involves different institutions. Track 1 is a simplified process that puts more of the responsibility on the host country. Like the CDM, ERUs issued under JI must represent reductions achieved in addition to those that would have occurred in the absence of the project. Unlike CDM projects, ERUs can only be transferred beginning in 2008. Romania has been the most active host JI country. However, it should be noted that in 2005, the volumes involved in the project markets were overwhelmingly the result of CDM projects, which accounted for 93% of tonnage transacted (397 million metric tons (MMt) compared with 28 MMt for JI).¹¹

Carbon “Sinks”

One of the most contentious issues in the negotiations over Kyoto Protocol rules has been how to give nations credit for carbon “sinks”: forests and land uses that absorb (sequester) carbon from the atmosphere and have the effect of reducing the net additions a country makes to atmospheric CO₂ levels. This has been negotiated under the term “Land Use, Land-Use Change, and Forestry” (LULUCF). Issues include how to allocate credit for existing forest cover (of which some nations, like the United States, have a great deal and others have very little) and what actions in relation to LULUCF would constitute legitimate carbon reductions. Only increased sequestration above 1990 levels, achieved by specific sequestration activities, would be counted.

The final decisions were that only certain activities would be eligible for use as offsets against Protocol obligations: afforestation (planting forest cover where there had been none); reforestation (re-planting tree cover where it had been removed); deforestation prevention; forest management; cropland management; grazing land management; and revegetation. The rules of the Protocol do not put an overall cap on sinks for countries, but instead incorporated country-specific limits on each of the categories of sinks activities, listed in an Appendix Z. Exactly how carbon absorbed in sinks will count toward a nation’s obligations is still the subject of on-going discussion and refinement.

Compliance Mechanism

Achieving agreement among Kyoto Protocol negotiators on compliance — in particular, penalties for non-compliance by Annex B Protocol parties — was difficult, and took several years after the Protocol was finalized in 1997. This was one of several controversial issues that was resolved as part of the Marrakech accords

¹¹ Point Carbon, *Carbon 2006: Towards a Truly Global Market* (26 February 2006), p. 22.

at the COP-7 meeting in 2001. In the final rules on compliance, parties agreed that if a Party falls short of its emissions target during the first commitment period (2008 to 2012), it must make up the difference in the second commitment period plus a penalty of 30%. Such a party will lose its eligibility for emissions trading, and must develop a “compliance action plan.”

This decision included establishment of a Compliance Committee, composed of a plenary, an operational bureau, and two branches: the Facilitative Branch and the Enforcement Branch. The Facilitative Branch is intended to provide advice and assistance to Parties, and to provide an “early warning” to Parties that may be in danger of not complying; the Enforcement Branch would have the responsibility of applying consequences for Parties that do not meet their commitments. A Protocol rulebook provides procedures for considering cases of non-compliance or possible non-compliance, and a procedure for reviewing the cases regarding eligibility to participate in the Protocol’s financial and other mechanisms.

Compliance involves not only meeting emissions reductions commitments, but also preparation of adequate GHG inventories and several other procedural requirements; there are no penalties for failures of compliance in these areas. However, the mechanism’s penalties for failure to meet emissions reductions targets would come into play only when the commitment period is well underway; there remain a number of uncertainties as to how it will function. It does appear, as discussed below, that many parties to the Protocol may find that achieving their emissions reductions obligations will prove to be difficult or impossible within the commitment period.

Leading up to COP-13/MOP-3 in Bali, Indonesia

At the first “Meeting of the Parties” of the Kyoto Protocol in November/December 2005 (the 11th COP of the UNFCCC) — COP-11/MOP-1 — in Montreal, Canada, both the United States and developing countries were resistant to the idea of negotiating new legally binding commitments for the post-Kyoto (after 2012) period.¹² The Kyoto Protocol parties were also reluctant to discuss new commitments in the post-Kyoto period if they did not include all the major emitters — including the United States, China, and India. By the end of that meeting a compromise was reached in which two processes were set in motion to consider next steps:

- An “Ad hoc Working Group” (AWG) was established under the Protocol to begin consideration of next steps for developed country parties in the Post-Kyoto period; since the United States is not a party to the Protocol, it does not play a role in this process (except, of course, as an observer — from which vantage point its position

¹² For more detailed summaries of the COP and COP/MOP meetings, see the reports of the Earth Negotiations Bulletin (ENB) at [http://www.iisd.ca/process/climate_atm.htm] and the Pew Center on Climate Change at [http://www.pewclimate.org/what_s_being_done/in_the_world/].

has generally been made known and generally taken into account by the parties).

- A non-binding, two-year “dialogue on long-term cooperation” was launched under the auspices of the UNFCCC that includes the United States and all parties to the UNFCCC (virtually all of the world’s countries). The decision on establishing the dialogue specifically ruled out including any negotiations leading to new commitments. Its goals are to support implementation of existing commitments under the Convention, support voluntary actions by developing countries, and to support development of national and international responses to climate change. The areas of focus for these discussions are: sustainable development, adaptation, technology development and transfer, and market-based opportunities.

Both of these processes involve workshops and meetings with reports to the COP/MOP meetings in 2006 and 2007. Neither involves any deadlines for completion of the discussions or negotiations.

At COP-12/MOP-2 held in Nairobi, Kenya, in November 2006, both the AWG and the Dialogue were involved in workshops and discussions, and the AWG formulated a work program for future meetings that involve analytical subjects that would underlie any consideration of post-2012 targets for developed countries. The Nairobi meeting also included the beginning of a review of the Protocol’s effectiveness — a somewhat controversial issue because of the implications the review process is thought to have for future commitments. Little progress was made at this COP/MOP, however, and decisions on the scope and content of the review were put off until the COP-14/MOP-4 to be held in 2008. Issues related to adaptation to climate change focused primarily on administration of an Adaptation Fund established to assist adaptation efforts in developing countries. An interim meeting in Bonn, Germany, in May 2007 produced few concrete results but made it clear that reaching agreement in Bali on any of the issues concerning next steps will be difficult.

Focus of Bali Negotiations: A Framework for Negotiating Post-Kyoto Commitments

Over the past year, climate change has gained widespread attention as a critical issue facing the nations of the world, and the negotiations to be held in Bali, Indonesia, December 3-14, 2007, are widely regarded as a key next step in continuing to chart an international course to mitigate global warming and deal with its impacts.

The Kyoto Protocol was always intended to be a first step in moving toward reducing global accumulations of greenhouse gases in the atmosphere. Negotiators recognized that the goals of the Protocol, even if met by all the parties, would not produce the stabilization of atmospheric greenhouse gases posited as the goal of the UNFCCC. The Protocol set forth a timetable for reviewing progress of actions

undertaken to meet the Protocol's goals and to consider "next steps." It has been generally anticipated that next steps after 2012 would consider measures to be taken by both developed and developing countries. Throughout the process developing countries have been unwilling to make binding commitments on greenhouse gas limitations or management.

The Kyoto Protocol commitment period begins in 2008 and runs through 2012; it was widely expected when the Protocol was negotiated that by 2008, next steps for the post-2012 period would be either decided or under active negotiation. However, the challenge before the upcoming COP/MOP meeting in Bali remains how to find agreement on the nature of commitments, if any, that would be acceptable to all the major players — including Kyoto Protocol parties with existing obligations, developing countries that are major GHG emitters, and the United States, whose role is regarded as critical by all potential participants in the post-2012 period.

Expected Outcomes in Bali Negotiations

The outcome of negotiations at the Bali COP/MOP is likely to be, at best, what is termed a "road map" for future negotiations. It is agreed by all parties that negotiations need to be completed by the end of 2009. Some observers note that this is a very tight time frame, in that many parties are aware that the current U.S. administration rejects mandatory greenhouse gas emissions reductions, and they expect that further progress on mandatory GHG limitations cannot be made unless a new administration in 2009 is willing to participate. Further, it appears unlikely that major developing — and developed — countries will be willing to make legally binding commitments in the absence of such a commitment by the United States.

At a preliminary meeting leading up to the December COP/MOP, four key elements were outlined as the focus for a "Bali road map": 1) mitigation of climate change; 2) adaptation to impacts of climate change; 3) financial assistance issues; and 4) technology development and transfer. It is very likely that, while future negotiations will grapple with the effort to obtain some form of legally binding, mandatory commitments from all parties, the recognition of differing national circumstances and differing abilities of nations to take on various types of commitments, will be major elements in the discussions.

The major GHG emitting Non-Annex I countries continue to reject mandatory requirements for themselves, while pushing developed Annex I nations to continue mandatory GHG reduction goals in the negotiations. There are continuing concerns, expressed by advocates of mandatory obligations, that the U.S. "major economies" meetings, focusing as they do on voluntary measures, may serve to reinforce the resistance of developing countries to taking on mandatory obligations. There are further concerns that without U.S. acceptance of mandatory GHG reductions, developing countries — and developed nations as well — may be less willing to take on new or continuing mandatory obligations.

One key element in the negotiations that go forward at Bali during the December 3-14 negotiations and afterward will be the extent to which technological alternatives to the current energy and development patterns will be or can be adopted by both developing and developed countries. One major key to this question will be

how developing countries can continue to make economic progress and enhance their prosperity while finding the additional resources — including financial assistance — to address the issue of technological change. It is the latter concern that prompts a major focus by these countries on the need for financial support from developed nations.

As noted above, a basic principle in both the UNFCCC and the Kyoto Protocol — and continuing in current discussions — is the principle of “common but differentiated responsibilities,” which has meant in practice that in negotiations related to the Kyoto Protocol, no new commitments for developing countries have been under consideration. This concept arises from two basic principles accepted by all parties to the UNFCCC and the Kyoto Protocol: that the industrialized/developed nations are responsible for most of the greenhouse gases in the atmosphere (several of these gases remain in the atmosphere for decades or a century or more); and that nations have widely different capacities and resources to undertake the costs of mitigation.¹³

In summary, it is widely expected that the outcome in Bali is likely to be decisions that focus only on the framework, time-frame, and procedures for the substantive negotiations to follow on a post-2012 agreement. Substantive issues will be taken up in those negotiations. All parties appear to agree that an agreement needs to be completed by the end of 2009 in order to be ratified by the necessary number of parties by 2012. In addition, as nations, businesses and societies consider their actions and investments in the future, it is regarded as important to provide some certainty about what the future national and international obligations are likely to be.

Prospects for Compliance by Kyoto Protocol Parties

As parties to the Kyoto Protocol contemplate future commitments in the post-2012 period, the question of whether existing commitments are likely to be met is important. This section reviews the status of the parties to the Protocol in relation to their existing commitment and current GHG emissions. Many are facing major challenges to achieving emissions reductions, given the increase in emissions they have had in recent years.

Status of Annex I Countries on Compliance

The Kyoto Protocol mandates compliance over a five-year averaging period — 2008 to 2012. Thus, it is an uncertain business attempting to forecast what countries will be achieving throughout the entire compliance period. Compliance with the Kyoto Protocol is focused on Europe (particularly the European Union (EU) and Russia), New Zealand, Canada and Japan. These countries constitute the vast majority of Annex 1 signatories to the Kyoto Protocol.

¹³ For more detailed discussion, see CRS Report RL32721, *Greenhouse Gas Emissions: Perspectives on the Top 20 Emitters and Developed Versus Developing Nations.*

The most comprehensive effort at compliance has been in Europe. For the EU, the situation puts considerable pressure on the European Commission's (EC) current review of Member countries' National Allocation Plans for the Kyoto commitment period. In October 2007, the EC completed its review of the 27 Members' proposed plans and at least conditionally approved all of them.¹⁴ As noted earlier, the focus of the EU's compliance effort is the Emissions Trading Scheme (ETS) that is completing a three-year trial "learning by doing" period in preparation for Kyoto compliance. After a rocky start resulting primarily from data shortcomings, several positives have emerged from the "learning by doing" exercise that may assist the ETS in making the Kyoto compliance phase run more smoothly, including (1) greatly improving emissions data, (2) encouraging development of the Kyoto Protocol's project-based mechanisms — Clean Development Mechanism (CDM) and Joint Implementation (JI), and (3) influencing corporate behavior to begin pricing in the value of allowances in decision-making, particularly in the electric utility sector. However, several issues that arose during the trial phase remain contentious as the ETS moves into its Kyoto phase, including allocation schemes, shutdown credits and new entrant reserves, and others. In addition, the expansion of the EU and the implementation of the directives linking the ETS to the Kyoto Protocol project-based mechanisms created new issues to which the EC has had to respond.

The EU has consistently stated that it will meet its commitments under the Kyoto Protocol and is currently developing targets for the post-2012 period. In 2006, the European Environmental Agency (EEA) projected the 15 EU Members that had jointly agreed to reduce GHGs by 8% below 1990 levels during the Kyoto compliance period would meet their obligation as a whole, although seven of those countries would not meet their individual obligations.¹⁵ The status of EU countries as estimated by the EEA is shown in **Table 1**. As shown, the EEA estimated that all 10 of the new Member countries with obligations under the treaty would meet them. The EEA also estimated that non-EU countries Iceland and Switzerland would meet their obligations, while Liechtenstein and Norway would not. Interestingly, in October 2007, the EC announced agreement on linking the ETS with emission trading systems in Norway, Iceland, and Liechtenstein.¹⁶ The other major European signatory, the Russian Federation, is anticipated to meet its obligations under the treaty.

¹⁴ For more information on EU activities, see CRS Report RL34150, *Climate Change: The EU Emissions Trading Scheme (ETS) Gets Ready for Kyoto*, by Larry Parker.

¹⁵ Permitted under the Kyoto Protocol, a "bubble" is a regulatory device that permits two or more countries to be treated as one for purposes of the Protocol — their emissions can be averaged in order to reach their targets.

¹⁶ European Commission, *Emissions Trading: Commission announces linkage EU ETS with Norway, Iceland, and Liechtenstein* (Brussels, October 26, 2007).

Table 1. Summary of Projected EU Kyoto Compliance

EEA Projected Status	Countries
Projected to be in compliance with Kyoto Protocol Obligations	EU-15 “Bubble,” Bulgaria, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Romania, Slovenia, Slovakia, Sweden, United Kingdom
Projected to be in non-compliance with Kyoto Protocol Obligations	Austria, Belgium, Denmark, Ireland, Italy, Portugal, Spain
Non-Annex 1 EU Countries	Cyprus, Malta

Source: European Environment Agency, *Greenhouse Gas Emission Trends and Projections in Europe 2006* (Copenhagen, 2006), p. 8.

Outside Europe, the primary Kyoto signatories are New Zealand, Canada, and Japan. In September 2007, the New Zealand government decided to phase in an emission trading scheme beginning in 2008 (last stage beginning in 2013) to assist New Zealand in complying with its Kyoto obligations.¹⁷ However, the Government’s most recent analysis estimates the country will not comply with its Kyoto obligations, although that projection only reflects policies adopted as of April 2007.¹⁸ In contrast, Canada has simply stated that it cannot meet its Kyoto obligations and the government has adopted alternative goals.¹⁹ Finally, Japan is anticipated to have difficulties meeting its Kyoto obligations, and has been developing strategies to acquire substantial credits from the Kyoto flexibility mechanisms (JI and CDM) in an attempt to bridge the expected gap between Japanese emissions and Japan’s Kyoto target.

Because of the flexibility mechanisms discussed above, potential compliance with Kyoto is not necessarily threatened by emissions growth in some countries, since such nations can purchase emissions credits to offset some of their emissions increases. Indeed, current analyses of credits available from economies in transition (mostly eastern European countries) indicate that sufficient surplus credits will exist in such countries to cover the deficit created by emissions growth in other countries. Specifically, as indicated by **Figure 1**, surplus credits are anticipated in Russia, Ukraine, and other eastern European countries — sufficient surplus credits for other countries anticipated to have deficits (such as parts of the EU, Japan, and New Zealand) to purchase them in order to cover their compliance requirements.

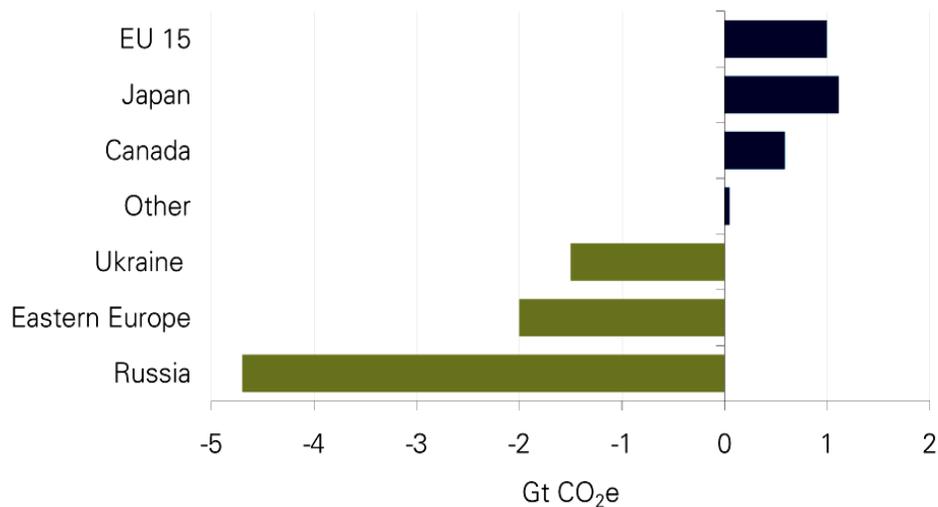
¹⁷ New Zealand Ministry for the Environment, *Emissions Trading Scheme* (Wellington, September 2007).

¹⁸ New Zealand Ministry for the Environment, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol* (Wellington, September 2007).

¹⁹ Governor General (Canada), *Strong Leadership. A Better Canada — Speech from the Throne* (Ottawa, October 16, 2007).

Figure 1. 2005 Point Carbon Assessment of Potential Credit Supply

Net short and long positions for countries and regions, i.e. when all policies and procurement plans have been accounted for. Aggregated for the 5-year Kyoto period



Source: Point Carbon, *Carbon 2006: Towards a Truly Global Market* (February 2006), p. 8.

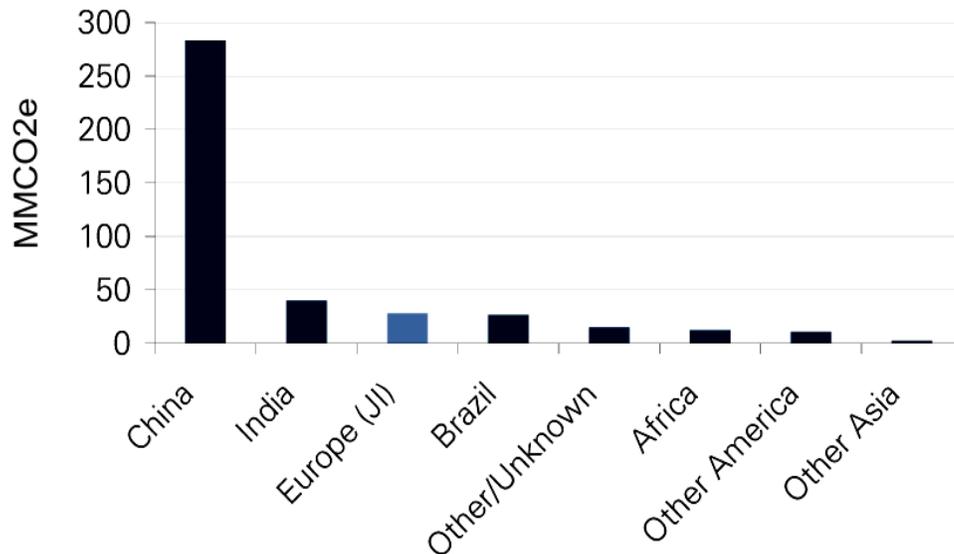
This long position with respect to credits does not include anticipated CERs and ERUs from CDM and JI projects. As indicated by **Figure 2**, the potential for additional credits from these sources is substantial, particularly from China. Of course, there is a range of risk with respect to these sources (including the possibility that any given project may not be built or may not be certified as valid for issuing CERs or ERUs), but indications are that additional credits will be available from these sources.

There are some potential potholes on the road to compliance. Perhaps the most important is the requirement that credits gained through emissions trading and joint implementation be “supplemental to domestic actions.” This requirement under Article 17 has been subject to extensive discussion and interpretation. Resisting efforts by the EU to place a quantitative limit on the procurement of credit via these mechanisms, the Conference of Parties decided to put no quantitative limit on such mechanisms, but that “the use of the mechanism shall be supplemental to domestic action and domestic action shall thus constitute a significant element of the effort made by each party.”²⁰ No means of determining the significance of domestic actions has been finalized. As noted, some countries, such as Japan, are anticipated to use the mechanisms substantially in meeting their requirements.

²⁰ *Preparations for the first session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (Decision 8/CP.4): Decision 5/CP.6 implementation of the Buenos Aires Plan of Action, FCCC/CP/2001/1.7 (July 24, 2001).*

Figure 2. 2005 Point Carbon Assessment of CDM and JI Transactions

Contract volumes in host countries, as registered by Point Carbon, in MMCO₂e



Source: Point Carbon, *Carbon 2006: Towards a Truly Global Market* (February 28, 2006) p. 23.

Another major issue to be resolved is the volatility of the credit markets at the current time. Credit prices for the ETS during its “learning by doing” phase have ranged from less than 1 euro a ton to about 30 euro a ton — currently the price is less than 1 euro. Such volatility makes planning, implementation, and participation in emissions reduction programs difficult.

U.S. Positions

The United States took an active role in the negotiations that shaped the 1997 Kyoto Protocol. It signed the Protocol in 1998, but President Clinton did not submit it to the Senate for approval, citing the Byrd-Hagel resolution, S.Res. 98, that passed unanimously just prior to the completion of the Protocol in Kyoto. This non-binding resolution expressed the sense of the Senate that it would not support a treaty that did not include obligations for developing countries, or that would harm the U.S. economy.

In March 2001, President George W. Bush rejected the Kyoto Protocol, and the United States has not formally participated in further negotiations on the Protocol. Meetings to negotiate details and procedures of the Kyoto Protocol’s rules occurred annually in conjunction with the conference of parties (COP) to the UNFCCC. The United States has attended these meetings and has participated in discussions or negotiations pertaining only to the UNFCCC; it also has been active behind the

scenes in discussions of Kyoto Protocol issues, but has not formally participated. Regaining U.S. participation and ratification of the Kyoto Protocol remains a major goal for parties to the Kyoto Protocol, along with engaging major developing country participation, since meaningful reduction in global greenhouse gas emissions will depend on reductions in emissions by the largest emitters.

In February 2002, President Bush announced a U.S. policy of reducing the net “greenhouse gas intensity” of the U.S. economy by 18% over the next 10 years.²¹ Greenhouse gas intensity measures the ratio of greenhouse gas emissions to economic output. GHG intensity has been declining in the United States, and the 18% reduction goal compares to a projected “business as usual” decline in intensity of 14%²² for the 10-year period. According to some, the 18% goal would not achieve reductions of greenhouse gases significantly more than the existing trend.

The Administration stated that the goal, to be met through voluntary action, is to achieve efficiency improvements that would reduce the 183 metric tons of emissions per million dollars of gross domestic product (GDP) expected under “business as usual” to 151 metric tons in 2012. The plan noted that “if, in 2012, we find that we are not on track toward meeting our goal, and sound science justifies further policy action, the United States will respond with additional measures that may include a broad, market-based program” and other incentives and voluntary measures to accelerate technology development.

U.S. actions related to climate change include extensive scientific and research programs²³, and continuing international activities to cooperate on a bilateral basis or through other international forums to support voluntary action.

Among the most prominent international U.S. activities have been the initiative taken in the Asia-Pacific Partnership on Clean Development and Climate, and the initiative by President Bush announced to convene a series of Major Economies Meetings on Energy Security and Environment, beginning in September 2007, including the largest greenhouse-gas-emitting countries — developed and developing — to discuss how to deal with climate change. These are discussed below.

Asia-Pacific Partnership on Clean Development and Climate

On July 27, 2005, the United States announced formation of a six-nation Asia-Pacific Partnership on Clean Development and Climate (commonly denoted by the acronym ‘APP’), which would work on cooperatively reducing greenhouse gas intensity of their economies. This partnership agreement included three of the

²¹ See the White House website for a summary and discussion of this policy, at [<http://www.whitehouse.gov/news/releases/2002/02/climatechange.html>].

²² See CRS Report 98-235, *Global Climate Change: U.S. Greenhouse Gas Emissions — Status, Trends, and Projections*, by John Blodgett and Larry Parker.

²³ See CRS Report RL33817, *Climate Change: Federal Expenditures*, by Jane A. Leggett.

world's largest emitters of greenhouse gases: the United States, China, and India, plus Japan, Australia, and South Korea. Of the three developed country nations in the partnership — the United States, Australia, and Japan — only Japan has ratified the Kyoto Protocol.

The participants described the focus of the partnership as technology development and reduction of greenhouse gas intensity, on a voluntary basis. No specific targets were announced. The members of the partnership indicated that their goal was to “complement, but not replace the Kyoto Protocol.” However, concerns have been raised by some observers as to whether this partnership and its approach would in fact reinforce the resistance of the two largest developing country greenhouse gas emitters — China and India — to taking on mandatory emissions commitments in the next phase of the Kyoto Protocol.

The purposes identified by partnership members include to “Create a voluntary, non-legally binding framework for international cooperation to facilitate the development, diffusion, deployment, and transfer of existing, emerging and longer-term cost-effective, cleaner, more efficient technologies and practices among the Partners through concrete and substantial cooperation so as to achieve practical results.”²⁴

Task forces focused on eight industrial or business sectors were established to review the status of their sectors with regard to clean development and climate, to identify cost and performance objectives and realistic goals, and report on recommended actions within their sectors. The eight Task Forces are: (1) Cleaner Fossil Energy, (2) Renewable Energy and Distributed Generation, (3) Power Generation and Transmission, (4) Steel, (5) Aluminum, (6) Cement, (7) Coal Mining, and (8) Buildings and Construction. The task force reports, termed Action Plans, are now complete and can be accessed on the partnership website.

The Executive Summary of the Task Force Action Plans describes the projects to be undertaken, which include sectoral assessments, identifying best practices, capacity building, and technology research and demonstration. These activities are described as “a significant first step toward a more comprehensive set of actions to address clean development and climate goals.”²⁵

The remaining questions include the degree to which funding and investment will be forthcoming for the work plan goals. Also unclear is the degree to which the developing country partners will undertake activities in addition to those receiving outside funding. Another question — critical to the future of the Kyoto Protocol, and raised initially when the partnership was first announced — is whether the two largest developing country emitters of greenhouse gases, China and India, will see this parallel effort as indeed complementary to the Kyoto Protocol, or whether they will continue to resist binding emissions reductions in the next commitment period

²⁴ Extensive information about the partnership is available on its website at [<http://www.asiapacificpartnership.org>].

²⁵ See Executive Summary at [<http://www.asiapacificpartnership.org>]. This Summary provides examples of projects identified by each Task Force's action plans.

of the Kyoto Protocol in favor of the non-binding, voluntary approach espoused by the Asia-Pacific Partnership, with greenhouse gas intensity reduction as their focus.

Initiative by President Bush to Develop Post-2012 Framework on Climate Change

Just prior to the G-8 meeting, President Bush announced May 31, 2007, that the United States would convene a meeting in Washington in late September of “major economies” — those that are “major emitters” of GHG — on “Energy Security and Climate Change.” He indicated this would begin a series of meetings, starting in September, to support “an effort to develop a new Post-2012 framework on climate change by the end of 2008.” Some observers argued that this initiative could undercut the Kyoto Protocol negotiations, but others seemed more positive in hoping that all efforts toward dealing with climate change, especially when they include major emitters like India and China, can prove useful.

A White House fact sheet indicated that this proposal “breaks new ground in advancing areas of common interest between developed countries and the major emerging economies” and indicated that this effort “will build on and advance U.S. relations with the Asia-Pacific Partnership on Clean Development and Climate and other technology and bilateral partnerships.”

In early August 2007, President Bush announced that the first meeting of this initiative, held September 27-28, would include invitations to the European Union (the current EU President and European Commission) plus France, Germany, Italy, and the United Kingdom; and Japan, China, Canada, India, Brazil, South Korea, Mexico, Russia, Australia, Indonesia, South Africa, and the United Nations. In his letter of invitation to heads of governments of the invited nations, President Bush noted that he was “... pleased to join the other G-8 leaders in June in recognizing the vital need for the major economies to work together to achieve the common objectives of reducing global greenhouse gas emissions, increasing energy security and efficiency, and sustaining economic growth.”

Noting that the G-8 leaders had welcomed his proposed series of meetings, he continued: “The United States is committed to collaborating with other major economies to agree on a detailed contribution for a new global framework by the end of 2008, which would contribute to a global agreement under the U.N. Framework Convention on Climate Change by 2009.”²⁶

It was a matter of concern among G-8 nations prior to the G-8 meeting in June that this initiative could serve to undermine both the G-8 discussions on climate, and the upcoming negotiations at the COP-13/MOP-3 meeting in Bali, Indonesia. However, both the outcome of the G-8 meeting in June (discussed below) and the final statements inviting participants to the September meeting emphasized the

²⁶ [<http://www.whitehouse.gov/news/releases/2007/08/20070803-7.html>].

integration of these high-level dialogues into a constructive contribution to the UNFCCC negotiations.

Although some attendees had expressed their concerns that this initiative could undercut the Kyoto Protocol negotiations, all attendees welcomed the acknowledgment by the United States that climate change is a major global problem, and the endorsement by the United States of the U.N. process as the major forum for negotiating international action on climate change. The U.S. summary of the September 27-28 Major Economies Meeting on Energy Security and Climate Change stated, "Discussion reflected a common understanding that any long term goal is aspirational, and that it should not be used as a basis for burden sharing." This continuing rejection of mandatory limits in favor of "aspirational goals" was a disappointment to those (in particular, the European participants) who hoped for a breakthrough in the U.S. approach. At the meeting, future meetings of these participants were discussed, to be held after the December 2007 Bali meeting.

Other International Meetings

In addition to the UNFCCC and Kyoto Protocol processes, and the initiatives by the United States discussed above, several major international meetings focused on climate change have taken place in 2007.

United Nations Security Council. On April 17, 2007, the United Nations Security Council held its first-ever debate on the relationship among climate change, energy, peace, and security. The meeting was convened by the United Kingdom, in its capacity as President of the Security Council for April. Some 50 delegations spoke at the meeting, some objecting that climate change was better handled by ongoing U.N. efforts (such as the UNFCCC), but others endorsing the need to deal with climate change as a security issue. Secretary General Ban Ki-moon has indicated that he places a high priority on dealing with climate change as part of the United Nations agenda.

Group of 8 (G-8) Meeting in Germany. The Leaders of the "G-8" nations — the United States, Canada, France, Germany, Italy, Japan, Russia and the United Kingdom — met June 6-8, 2007, in Germany to discuss wide-ranging issues, with climate change high on the agenda. The outcome of this meeting was widely regarded as a key indicator of how successful negotiations on a post-Kyoto framework could be. In preliminary discussions on the outcome of the meeting, the European nations had encountered strong resistance by the United States to the German Chancellor's proposed framework, which included a 50% reduction in greenhouse gas (GHG) emissions by 2050, limiting global warming to a rise of 2 degrees Celsius (3.6 degrees Fahrenheit), and establishing a global GHG trading market. In the week preceding this meeting, President Bush announced a different approach to include major GHG emitting developing and developed countries in a process aimed at voluntary measures (discussed above).

The final declaration of the G-8 Summit on June 7 was widely described as a "compromise" and as a "step in the right direction" by the United States and the G-8

leaders. The Summit Declaration section on climate change²⁷ stated that the G-8 nations are “committed to taking strong and early action to tackle climate change in order to stabilize greenhouse gas concentrations...” at levels that would avoid dangerous interference with the climate system. The declaration stated that the EU, Canadian, and Japanese decisions that include halving global emissions by 2050 would be seriously considered. It welcomed the “wide range” of activities underway in industrialized and developing countries and noted the need to address not only climate change but also energy security, economic growth, and sustainable development objectives.

The statement reiterated the UNFCCC principle of common but differentiated responsibilities and capabilities of nations and stated, “We recognise however, that the efforts of developed economies will not be sufficient and that new approaches for contributions by other countries are needed.” It further acknowledged that “the UN climate process is the appropriate forum for negotiating future global action on climate change.” The statement noted that the G-8 members had met with the representatives of Brazil, China, India, Mexico, and South Africa, and welcomed the offer of the United States to host a meeting later this year to continue engaging “these and other major energy consuming and greenhouse gas emitting countries to consider the necessary components for successfully combating climate change.”

United Nations General Assembly. Reflecting the high priority for climate change expressed by U.N. Secretary-General Ban Ki-moon, a high-level heads of state and ministerial meeting on climate change was held at the U.N. General Assembly meeting on September 24, 2007, at U.N. Headquarters in New York. The meeting consisted of statements by many members of the General Assembly on the importance of dealing with climate change. President Bush did not address this meeting, but attended a dinner following the session.

²⁷ See paragraphs 48-53 in the G-8 Summit Declaration of June 7, 2007, at [<http://www.whitehouse.gov/g8/2007/g8agenda.pdf>].