Analysis of **early action** crediting **proposals**

Prepared for the Pew Center on Global Climate Change

by
Robert R. Nordhaus
Stephen C. Fotis
Van Ness Feldman,P.C.
Washington, DC
October 1, 1998

Contents

Foreword *Eileen Claussen, Executive Director, Pew Center on Global Climate Change*

The challenge of our generation will be addressing climate change while sustaining a growing economy. We need to take concrete actions to reduce emissions, both here and abroad. The sooner we begin, the more likely we are to succeed in stabilizing atmospheric concentrations at a level that will prevent dangerous anthropogenic interference with the climate.

This report, which analyzes proposals to credit early, voluntary actions to mitigate greenhouse gas emissions, is the first in a series to be published by the Pew Center on Global Climate Change. The Pew Center was established in 1998 by the Pew Charitable Trusts to bring a new cooperative approach and critical scientific, economic, and technological expertise to the global climate change debate. Some U.S. companies have indicated support for early action programs in keeping with their desire to take immediate action to reduce greenhouse gases and their need for assurance that such actions will be rewarded and not punished.

This report addresses the issues that policy makers will face in designing a domestic early action program, analyzes current proposals, and suggests a set of principles to guide an effective program. It suggests that, regardless of any eventual international framework, the U.S. can take steps to credit reductions in gases now, and therefore encourage and reward companies that act to minimize their emissions. The longer we wait to address climate change, the more it is likely to cost—both environmentally and economically. The Pew Center concludes:

THE COST OF DELAY IS SIGNIFICANT. Steps taken now represent an investment that will pay environmental and economic dividends into the future. Conversely, continued inaction will result in greater environmental challenges and increased costs down the line.

U.S. LEADERSHIP IS IMPERATIVE. Since the U.S. has both the highest greenhouse gas emissions and per capita income, implementing a voluntary early action program demonstrates to the world our commitment to address the problem of climate change.

LEADERSHIP MUST START WITH CONGRESS. Congress must provide the legislative framework to encourage early action.

The Pew Center and its Business Environmental Leadership Council believe climate change is serious business. Our effort is founded on the belief that enough is known about the science and environmental impacts of climate change for us to take action now to address its consequences. Awarding credit for early action is an important first step.

Executive Summary

The ultimate objective of the Rio Convention, which the United States ratified in 1992, is to stabilize atmospheric concentrations of greenhouse gases (ghg) at levels that will prevent dangerous anthropogenic interference with the climate system. Such stabilization will require significant reductions in ghg emissions by the United States and other countries. One mechanism proposed for encouraging U.S. companies to begin reducing ghg emissions now is an early action crediting program. Such a program would provide U.S. companies with credits for ghg reductions achieved prior to the year 2008 (i.e., before the first budget period under the proposed Kyoto Protocol) that would be usable by those companies for compliance with any future domestic ghg regulatory program.

This paper analyzes the legal, policy, and technical issues that policy makers may wish to consider in designing an early action crediting program. Although many of these issues are quite complex and cannot be fully addressed with simple and uniform crediting rules for all industry sectors, the paper attempts to formulate a set of general principles to guide policy makers in fashioning an administratively workable and effective program. The paper begins with a review of current U.S. efforts to mitigate ghg emissions through voluntary actions and programs and provides an analysis of five early action crediting proposals publicly available as of July 1998.

VOLUNTARY GHG MITIGATION EFFORTS IN THE UNITED STATES. The Rio Convention's non-binding goal for developed countries was to return ghg emissions to 1990 levels by 2000. To meet this goal, the Clinton Administration developed the Climate Change Action Plan (CCAP), which outlined a portfolio of about 50 ghg mitigation actions. The plan applied to all sectors of the economy that emit ghg emissions and was intended to foster voluntary partnerships with the private sector and local governments. Generally speaking, the CCAP initiatives were designed to provide information and tools to encourage participants to voluntarily undertake physical or operational changes that will reduce ghg emissions. Although they demonstrate that industry and government can work together to achieve cost-effective ghg reductions, the CCAP initiatives have not achieved the level of reductions necessary to return U.S. emissions to 1990 levels, as contemplated by the Rio Convention.

REVIEW OF DESIGN ISSUES AND OF CURRENT EXTANT EARLY ACTION CREDITING PROPOSALS. The paper provides an analysis of the legal, policy, and technical issues raised in the early action crediting proposals developed by the Environmental Defense Fund, the Coalition to Advance Sustainable Technology, the Center for Clean Air Policy, Resources for the Future, and Niagara Mohawk Power Corporation. Key issues include the legal framework for the program, source of credits, flexibility, actions eligible for credit, and technical design of the program.

PRINCIPLES FOR DESIGNING AN EARLY ACTION PROGRAM. Based on the review of these issues, the paper identifies the following general principles that may be useful as a guide to policy makers in fashioning a workable and effective program:

1 PROVIDE A PREDICTABLE CREDIT MECHANISM AND CLEAR LEGAL FRAMEWORK FOR THE PROGRAM. The principal purpose of an early action crediting program is to encourage voluntary ghg reductions in the near term. The program should provide a substantial and reliable incentive that will stimulate immediate efforts to slow down the increase of, and, ultimately, to decrease, ghg emissions levels in the United States. For such an incentive to be effective, participants must know in advance the credits they will earn for particular ghg reductions or sequestration activities and be given clear assurances that they possess a legally enforceable right to receive earned credits. Existing law does not provide the legal framework to give participants that right. For that reason, the crediting mechanism should be clearly delineated by statute or in agreements authorized by statute.

2 KEEP THE PROGRAM SIMPLE AND FLEXIBLE. Any early action crediting program will be voluntary. The extent of participation in the program will depend, among other things, on whether potential participants perceive benefits of participation to exceed the costs of complying with the requirements of the program. Simplicity and flexibility are key components of minimizing transaction and compliance costs. Because of the range of potential participants, the agency administering the program will need flexibility to tailor the program to the needs and circumstances of particular industries and companies. The program will also need the flexibility to encourage innovation and reward efficiency. The best mechanism for doing this is through agreements between the participants and the government that spell out the specifics of the crediting mechanism for that participant, or industry. Model agreements for particular industries may be useful tools in this regard.

3 REWARD REAL REDUCTIONS, NOT GAMING. An early action crediting program takes ghg credits otherwise available to U.S. companies during the initial period of domestic ghg regulation and gives them to participants in the early action program as a spur to reducing ghg emissions before that initial period. It is important that credits be used to reward real net reductions in ghg emissions, rather than paper reductions. The program needs to incorporate safeguards that give the public and other emitters confidence that the system will not be gamed.

4 PROVIDE SOME FORM OF RECOGNITION OF PAST VOLUNTARY GHG REDUCTIONS. Voluntary ghg reductions achieved between 1990 and 1998 and reported to the federal government should be recognized either in the form of a baseline adjustment or as a direct credit. It is important to maintain the principle that companies will not be disadvantaged because of prior voluntary reductions. However, the reward for past mitigation efforts should be provided only to the extent that the ghg reductions are real, quantifiable, verified, and not double-counted.

5 DON'T PREDETERMINE THE EVENTUAL DOMESTIC REGULATORY PROGRAM. An early action crediting program should be designed to operate within the framework of any likely domestic regulatory or tax program that might be fashioned to control domestic ghg emissions. This includes a range of regulatory options such as carbon taxes, direct regulatory programs, and marketable permit schemes (implemented through, for example, an auction or administrative allocation of allowances).

6 DON'T MAKE THE EARLY ACTION CREDITING PROGRAM CONTINGENT UPON RATIFICATION OF THE KYOTO PROTOCOL. The early action program should not depend upon Senate ratification of the Kyoto Protocol in its present form. Rather, it should be designed to operate in the context of whatever international control regime may eventually be adopted and ratified by the U.S.

7 FOCUS PRINCIPALLY ON DOMESTIC EARLY ACTION. The allocation of credits to the U.S. under Kyoto or any other international agreement is an asset that should be carefully husbanded for use by the U.S. economy. For that reason, the principal but not exclusive focus of the program should be on rewarding early domestic actions to mitigate ghg emissions. There are, however, a number of circumstances where credit for actions outside the U.S. should be considered.

8 DON'T OVER-MORTGAGE THE U.S. GHG ALLOCATION. The Kyoto Protocol, if ratified, will not provide international credit for reductions attained prior to 2008 in developed countries. Early action credits for ghg reductions within the United States thus would have to come out of the U.S. first budget allocation under the Protocol. Careful consideration needs to be given to the impact of an early action credit program on the availability of credits to non-participants once domestic regulation commences, and the extent to which credit should be given for action outside the U.S.

Analysis of Early Action Crediting Proposals

Introduction

The ultimate objective of the United Nations Framework Convention on Climate Change (Rio Convention), which the United States ratified in 1992, is to stabilize atmospheric concentrations of greenhouse gases (ghg) at levels that will prevent dangerous anthropogenic interference with the climate system. Such stabilization will require significant reductions in ghg emissions by the United States and other countries. Those policy makers and companies that accept the scientific view that enough is known about the environmental impacts of climate change to take action now are reviewing means by which the United States can begin to limit its emissions of greenhouse gases. In their view, the long-lived nature of greenhouse gases and the projected global increases in emissions of these gases warrant prompt action, whether or not an international control program is established in the near term.

One mechanism proposed for providing incentives for U.S. companies to begin reducing ghg emissions now is an early action crediting program. Such a program would provide U.S. companies with credits for ghg reductions achieved prior to the effective date of mandatory controls on ghg emissions (which would be 2008 if the Kyoto Protocol is ratified and enters into force). These credits would be usable by those companies for compliance with any future domestic ghg regulatory program. In recent months, a number of early action crediting proposals have been advanced by various organizations. Each of the proposals has outlined a general framework for providing credit for ghg reductions achieved prior to the 2008-2012 budget period under the Kyoto Protocol. Credits earned under an early action program could be used to meet future ghg reduction obligations imposed under any domestic regulatory program established to implement the Protocol.

The design of such an early action crediting program is no easy task. It presents a number of technically complex but economically important legal, policy, and technical issues that must be resolved before a workable system can be put in place. This paper (1) reviews current U.S. efforts to mitigate ghg emissions through voluntary actions and programs, (2) discusses the early action crediting proposals that were publicly available as of July 1998, (3) provides an analysis of the legal, policy, and technical issues that will need to be resolved in designing a workable and effective early action crediting program, and (4) recommends principles that may be useful to policy makers in establishing such a program.

I. Background and Potential Need for Early Action Crediting Program

A. Development of Binding Greenhouse Gas Limitations

In June 1992, the United States and 160 other countries met in Rio de Janeiro, Brazil and signed the Rio Convention. The Convention was ratified by the U.S. Senate on October 7, 1992[1] and entered into full force on March 21, 1994.[2] As noted above, the overall objective of the Convention is to stabilize atmospheric concentrations of greenhouse gases at levels that would "prevent dangerous anthropogenic interference with the climate system." The Convention establishes a series of commitments that signatory countries should meet in order to achieve this objective. As a general matter, Annex I Parties (developed countries and countries in transition to market economies) are required to take the lead in implementing measures designed to curb ghg emissions. Specifically, they must develop national policies and take measures to limit anthropogenic ghg emissions, "with the aim of returning to their 1990 levels" by the year 2000.[3]

Two important points should be noted about the Convention's ghg reduction target. First, the goal of returning to 1990 levels is voluntary in nature: it does not impose any binding international obligation on Annex I Parties to achieve the reduction target. Second, the Convention is silent on signatory countries' obligations to reduce ghg emissions after the year 2000. The issue of post-2000 reduction obligations was deferred until future international treaty negotiations that culminated in Kyoto, Japan last year.

The Rio Convention required each Annex I Party to submit a ghg mitigation action plan by September 1994. Each action plan is intended to articulate the national policies and ghg mitigation measures that the particular Annex I Party plans to implement in order to achieve the Convention's ghg reduction target.[4] However, the United States and most other Annex I Parties are not expected to meet their reduction targets for the year 2000. Current estimates indicate that U.S. ghg emissions in 2000 will be about 12 percent higher than its 1990 emissions.[5] One apparent reason for the Annex I countries' failure to meet the reduction target is the voluntary nature of the target. Without a binding international

obligation, countries had little incentive to develop and implement rigorous and potentially costly regulatory programs or other mandatory national policies necessary for achieving the ghg reductions.

The Kyoto Protocol to the Rio Convention has attempted to address this problem by establishing binding ghg reduction targets for the post-2000 period. Negotiated in December 1997, the Kyoto Protocol calls for developed nations collectively to reduce their average ghg emissions over the 2008-2012 period to about 5 percent below 1990 levels.[6] The Protocol establishes specific limitations on developed countries' emissions of 6 gases: carbon dioxide (CO_2), methane, nitrous oxides, and three industrial gases.[7] The U.S. has agreed to achieve a 7 percent reduction below 1990 levels,[8] which will become a binding international treaty obligation upon the Protocol's ratification and entry into force.[9] According to Administration sources, the 7 percent U.S. reduction translates to about a 3 percent reduction when the accounting rules for the three industrial gases and for sinks are factored into the 1990 baseline.[10] Administration sources calculate the U.S. budget for the 5-year period to be approximately 7,735 million metric tons of carbon equivalent (mmtce).[11]

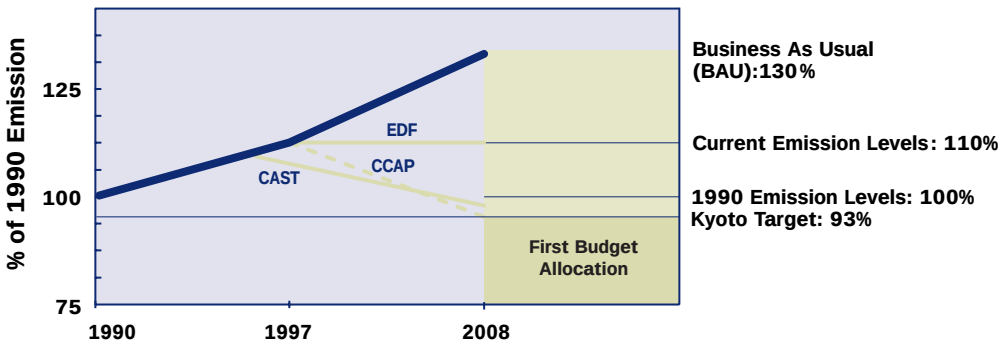
B. Rationale For An Early Action Crediting Program

In addition to direct environmental benefits of acting earlier, several policy reasons have been advanced for developing an early action crediting program. Such a program would provide an incentive to act now, since many companies are concerned that current emissions reductions may not be recognized in a future regulatory program. Such a program would provide a mechanism for managing potential economic impacts associated with implementation of the Kyoto Protocol or other international agreements to control ghg emissions. It could also deal with the "early action discontinuity" in the current Kyoto Protocol: that is, the Protocol provides international credit for voluntary actions prior to 2008 only in developing countries.[12] If comparable credit is to be provided for actions in the U.S., a domestic early action crediting mechanism needs to be developed.

One of the major concerns with the Kyoto Protocol in its present form is the possibility that harm to the U.S. economy might result from the Protocol's imposition of legally binding ghg limitations.[13] The risk of serious disruption to the U.S. economy could be greatly increased if companies fail to begin making the immediate investments necessary to turn around this country's increasing ghg emissions. The projected "business as usual" (BAU) level of ghg emissions is expected to increase

annually to a 2008 level that is about 30 percent above 1990 levels for the United States.[14] This means—as depicted in Figure 1—that when growth is factored in, the Kyoto Protocol could actually require approximately a 24-28 percent reduction in ghg emissions from 2008 levels if the U.S. emissions are left unchecked and U.S. companies are unable to obtain sufficient cost-effective ghg credits from sources outside the U.S. Imposing such an abrupt reduction obligation beginning in the year 2008 could potentially have serious adverse impacts on U.S. output, employment, and income. An early action program could help bend down the upward BAU emission trajectory and enable the U.S. to set a gradual "glide path" for meeting its future anticipated ghg reduction requirements.

Figure 1
Schematic Comparison of Early Action Proposal Baselines*



* This chart provides a general schematic representation of the baselines proposed by the Environmental Defense Fund (EDF), Coalition to Advance Sustainable Technology (CAST) and Center for Clean Air Policy (CCAP). Given the complexity of the proposed baselines, this schematic is presented for illustrative purposes only and is not intended to plot actual baseline levels

Many U.S. companies see significant economic risk if they ignore the possibility of the future imposition of ghg emission limitations.[15] Financial institutions and others also have begun to recognize and quantify the financial risk exposure associated with future emission regulation of certain carbon-intensive industries.[16] Early implementation of carbon-saving technologies and other cost-effective control measures thus allows companies to manage their risk by earning a "bank account" of ghg credits that they could "cash in" and use in order to lessen the economic impacts of any future ghg regulatory program during the 2008-2012 compliance period. Encouraging immediate ghg reductions through an early action crediting program should also permit the United States to consider carefully the merits of the Kyoto Protocol in the ratification process, while preserving the U.S. option of being able to comply with the Protocol during the first budget period if it is eventually ratified.

A second reason for developing an early action crediting program relates to the "early action discontinuity" in the Kyoto Protocol framework. The Protocol provides international credit for implementing

early ghg mitigation projects only in developing countries. International credits earned through the Clean Development Mechanism (CDM) will be added to the U.S. first budget allocation and could be "banked" for later use by companies in meeting their future reduction obligations.[17] Ironically, the Protocol does not establish a comparable mechanism for crediting early actions in the United States and other developed countries.[18] Companies will thus receive no international credit for implementing mitigation projects in developed countries, even though they could receive credit for the same projects if implemented in developing countries. This discontinuity in the Kyoto Protocol may deter emitters in developed countries from pursuing early action strategies absent an initiative to encourage or require ghg reductions prior to 2008.

Finally, there are significant timing issues. There is little prospect that the United States will reach a political consensus on whether or not to ratify the Kyoto Protocol before 2001. Congress likely will need several additional years thereafter to enact into law a comprehensive regulatory framework for implementing the treaty obligations. Ghg reductions could be further delayed while federal agencies develop specific implementing regulations for affected industry sectors. This extended period of uncertainty as to whether the Protocol will be ratified and how it will be implemented may deter companies otherwise willing to reduce their ghg emissions from making those reductions. An early action crediting program provides a framework that permits companies to make immediate ghg reductions while the major international and domestic policy issues are debated.

An early action crediting program may be controversial. Objections to such a program may come from companies in industries that see little prospect of their being able to take advantage of the program because of practical difficulties of their achieving significant ghg reductions prior to the year 2008. These companies are likely to have concerns about the potential impacts of an early action crediting program on a future ghg regulatory program—namely, providing credits to participating companies will necessarily limit the pool of credits available to non-participants. They may regard a poorly designed program as a device simply to redistribute ghg credits within the U.S. economy, without providing significant public benefit.

This paper reviews the legal, policy, and technical considerations that will be important in making an early action program workable and effective, so that policy makers, if they adopt such a program, can have reasonable assurance that it will carry out their objectives. Descriptions and analyses of the 5 early action crediting proposals that were publicly available in July 1998 appear in Section IV. These include proposals by the Environmental Defense Fund (EDF), Coalition to Advance Sustainable Technology (CAST), Center for Clean Air Policy, Resources for the Future (RFF), and Niagara Mohawk Power Corporation (NIMO).

II. U.S. Implementation of Voluntary Actions and Programs

U.S. experience with voluntary programs to limit ghg emissions is described below. The programs have demonstrated modest success so far, but the potential to achieve substantial reductions exists through a properly designed early action crediting program.

Following the negotiation by the Bush Administration and ratification of the Rio Convention, President Clinton called in 1993 for the U.S. to reduce its ghg emissions to 1990 levels by the year 2000 and continue the trend of reduced emissions thereafter. To this end, the Clinton Administration developed the Climate Change Action Plan (CCAP), which outlines a portfolio of nearly 50 ghg mitigation actions. The actions apply to all sectors of the economy that emit ghg emissions and relate to energy efficiency, energy supply, transportation, reduction and recovery of methane and other gases, and forestry. Issued in October 1993, CCAP served as the blueprint for the action plan that the United States ultimately submitted under the Rio Convention and proposed to use in order to meet the Convention's 1990 reduction target by the year 2000.

CCAP was designed for rapid implementation, building on existing programs, technologies, and voluntary efforts to deliver cost-effective ghg reductions, avoidances, and sequestrations. Many of the actions are intended to foster voluntary partnerships with the private sector and local governments. One notable action is the Green Lights Program. This program encourages businesses and other organizations to install energy-efficient lighting in their buildings in order to reduce the use of electricity, thereby reducing CO_2 emissions associated with generating electricity. Other representative programs discussed in Section A are Natural Gas Star, WasteWise, and the Coalbed Methane Outreach Program.

In addition, CCAP contains two "foundation actions" that are intended to encourage broad industry participation in the CCAP voluntary programs as well as the implementation of other ghg mitigation projects. One foundation action is the Climate Challenge Program, which established a flexible framework for facilitating electric utilities to reduce, avoid, or sequester ghg emissions. The second

foundation action is the Climate-Wise Program, which is focused on facilitating energy efficiency, pollution prevention, and other mitigation projects by companies in the industrial sector. The discussion below provides a brief description of key voluntary CCAP programs and foundation actions identified above as well as the voluntary ghg reporting program established under §1605(b) of Energy Policy Act of 1992 (EPAct). The EPAct §1605(b) program provides a flexible mechanism for participants to quantify and report ghg reductions achieved under the CCAP programs and foundation actions.

Company reports under EPAct §1605(b) and reports by EPA indicate that the voluntary programs have achieved significant reductions in ghg emissions. However, the U.S. General Accounting Office (GAO) in a recent report has concluded that ghg reductions reported by EPA for its programs and those reported under §1605(b) may be overstated. In GAO's view, many of the reductions would have occurred anyway because of non-program factors. EPA did not concur in GAO's conclusions.[19]

A. Voluntary CCAP Programs for Mitigating GHG Emissions

Green Lights Program. EPA's Green Lights Program is implemented through a non-binding memorandum of understanding (MOU). The MOU calls for Green Lights partners to survey all their domestic facilities and upgrade their lighting where profitable within five years, while EPA commits to assist Green Lights partners by providing them with technical support and public recognition. As of February 1997, the Green Lights Program had registered commitments to upgrade lighting in six billion square feet of floor space, about 9 percent of the national total. Through fiscal year 1996, Green Lights participants reported upgrading the lighting in 1.3 billion square feet of floor space, resulting in ghg reductions of 0.6 mmtce.[20]

Natural Gas Star. Natural Gas Star seeks to achieve voluntary methane reductions by natural gas producers and distributors. Companies enter into MOUs that commit them to implement Best Management Practices for preventing the release of methane gas from their production, processing, transmission, and distribution operations.[21] Natural Gas Star has exceeded CCAP goals by preventing the release of 37.7 billion cubic feet (Bcf) of methane, valued at $75 million.[22]

WasteWise Program. Under this CCAP action, EPA enters into voluntary agreements calling for businesses to reduce the amount of waste they generate and to increase the amount of waste they recycle. EPA reports that 513 companies were participating in WasteWise as of March, 1997. Ghg reductions are estimated to range from 0.8 to 2.3 mmtce in fiscal year 1995.[23]

Coalbed Methane Outreach Program. The Coalbed Methane Outreach Program encourages coal mining companies to capture and use, as an energy source, methane that would otherwise be vented to the atmosphere. As of February 1997, coal companies had initiated 13 projects and had reported gross reductions of 2.7 mmtce for 1996.[24]

B. Foundation Actions for Facilitating Participation in CCAP Programs

1. Climate Challenge Program

The Climate Challenge Program is a joint initiative of the Department of Energy (DOE) and the electric utility sector to reduce ghg emissions voluntarily. The initiative, announced as a foundation action under the CCAP, consists of voluntary commitments by electric utilities to undertake actions to reduce, avoid, or sequester ghg emissions. Utility participants also commit to report annually on activities and achievements in a format consistent with EPAct §1605(b) and to confer periodically with DOE to evaluate the utility's progress under the accord and discuss other possible ghg mitigation projects. As of May 1998, DOE has signed 124 participation accords and letters of participation representing 650 utilities. These commitments contain pledges to reduce over 47 mmtce in the year 2000 alone.[25]

Most utility participants made commitments to undertake specific projects or actions to reduce ghg emissions. In such cases, the utility was not making a commitment to reduce ghg emissions below historic baseline levels for all its domestic operations. Nor was it committing to limit its system-wide emissions below a rising reference line (based on a performance-based emission rate). Rather, the commitments were to implement specific actions, such as energy efficiency improvements, fuel switching, or use of coal fly-ash. Utilities have thus reported reductions achieved for these projects, without regard to total system emissions levels of the utility participant. In many cases, total system emissions have increased by very sizeable amounts due to demand increase and other market factors.

It is difficult to know with certainty whether particular ghg emission reductions are attributable to the Climate Challenge Program. For example, turbine upgrades and other efficiency improvements at nuclear facilities were a significant portion of the ghg reductions projected for the year 2000 (i.e., 15.7 mmtce or 33 percent of the total ghg reductions pledged under the Climate Challenge Program). These nuclear plant upgrades typically involve major capital investments and presumably require substantial management scrutiny before being undertaken. Because it is questionable whether investments of this magnitude would be implemented unless they could be independently cost-justified, some policy makers question whether they are in fact attributable to the Climate Challenge Program.

2. Climate Wise Program

The Climate Wise program is the second foundation action designed to serve as an umbrella for supporting the implementation of other CCAP actions. The focus of the Climate Wise program is to form partnerships with businesses, nonprofit groups, and state and local governments to enhance industrial energy efficiency and reduce and prevent pollution. Climate Wise focuses on measures that "make business sense" by saving money and creating public goodwill. More than 400 companies, including over 40 of the Fortune 500, have entered into Climate Wise partnerships with EPA. Climate Wise participants sign a general agreement to establish a process to identify and implement cost-effective measures for energy efficiency and pollution reduction, form a Climate Wise Action Plan, and report on the results. Climate Wise participants have reported some 700 ghg reduction projects, resulting in the emission reductions of 1.6 million tons of CO_2 in 1997 alone.

C. EPAct §1605(b) Reporting Program

EPAct §1605(b) authorizes the DOE through the Energy Information Agency (EIA) to establish a reporting system for documenting voluntary actions that reduce greenhouse gases or remove such gases from the atmosphere. The DOE guidelines for the §1605(b) program provide information on who may report, what information may be reported, and how projects should be analyzed for reporting.[26] As a general matter, the guidelines are extremely flexible and are structured in such a way

as to promote broad participation. This flexibility has resulted in industry participants registering ghg reductions achieved through a wide range of measures.

Climate Challenge and other CCAP voluntary programs have relied on the §1605(b) reporting program to record and track reductions and sequestrations achieved under these programs. This linkage with CCAP has been one reason that many companies may file §1605(b) reports. Another important motivation for §1605(b) participation is to establish a public record of one's voluntary ghg mitigation efforts for purposes of receiving credit under any future ghg regulatory program. Most reporters indicated that their projects were affiliated with one or more government-sponsored voluntary programs. Electric utilities have been by far the largest participating sector in the voluntary reporting program. Of the projects reported for 1995, for example, 721 were affiliated with Climate Challenge, 29 with Green Lights, and 13 with Climate Wise.[27] Total ghg reductions and sequestrations for all reported projects were estimated to be 411 mmtce for the 1994-96 period, the three years for which EIA has released data.[28]

On March 24, 1998, GAO provided an analysis that, among other things, assessed the accuracy of the §1605(b) reports submitted for 1994 and 1995. Key observations of the GAO were that EIA neither verifies that the reductions actually occurred, nor prohibits the "double reporting" of reductions reported by different entities. According to the GAO, reporting entities assessed the relative accuracy of their own §1605(b) submissions, indicating the data had "high accuracy" in 633 instances, "moderate accuracy" in 1,697 instances, and an accuracy level that could not be determined in 209 instances. These findings suggest that not all ghg reductions reported under §1605(b) merit receiving credits under an early action crediting program that provides recognition to past mitigation activities.[29]

D. Conclusion

Generally speaking, the CCAP programs and foundation actions are designed to provide information and tools to encourage participants to voluntarily undertake physical or operational changes that will reduce ghg emissions. These programs have identified a number of money-saving, low-cost opportunities to reduce emissions and demonstrate that industry and government can work cooperatively to reduce emissions. However, these voluntary programs alone are not capable of producing the reduc-

tions necessary to return U.S. emissions to 1990 levels, much less continue that trend downward. The programs themselves have other limitations as well. For example, participants did not enter into binding agreements that obligated them to implement specific mitigation measures or entitled them to receive credits or other such tangible benefits from the federal government. Rather, they participated in voluntary programs designed to encourage those mitigation actions that in many cases were otherwise cost-justified. This suggests that economic and other business constraints may have significantly limited the level of ghg reductions achievable under the CCAP actions and programs.

In spite of these limitations, the voluntary partnerships and mitigation activities implemented under CCAP have achieved significant ghg reductions between 1990 and 1998 within the industries that are participants in the program. As we discuss below, companies that have responded in good faith to the Administration's call for industry to voluntarily reduce emissions should not be penalized, but rather rewarded—at least in part—for their reductions. Providing some form of credit for past actions that can be quantified and verified is essential for gaining credibility for future early reductions initiatives. Past reductions, such as those reported under the EPAct §1605(b) program or other CCAP initiatives, could be recognized—for example, in the context of emissions trading program—either in the form of a baseline adjustment or as a direct credit.

As noted above, the prospect of legally binding ghg limitations is one important reason for the United States to develop voluntary programs capable of immediately spurring companies to make the investments necessary for limiting their ghg emissions. Prompt and substantial action will be critical if the U.S. hopes to bend down the upward BAU trajectory and set a gradual "glide path" for meeting any future ghg reduction obligations imposed pursuant to international treaty or domestic regulatory program. The current CCAP initiatives will clearly not be adequate to meet the anticipated need for increased ghg reductions in the coming years. If policy makers hope to spur widespread early participation across all sectors, it is evident that the federal government must provide incentives more substantial than those provided under CCAP, such as tax credits, early action crediting, and funding of research and development.

III. Legal, Policy, and Technical Issues in Designing An Early Action Crediting Program

The key issues that policy makers may wish to consider in formulating an early action crediting program are described below. Where appropriate, this analysis draws from the five early action crediting programs described in Section IV. Because the early action crediting proposals contemplate that the reductions would commence well before domestic ghg regulation is enacted, questions will arise (as they have with Climate Challenge and other CCAP programs) as to the relationship between the early crediting program and prospective domestic regulation of ghg. Key questions include:

- *How and when will participants receive credit for early ghg reductions once domestic regulation commences?*
- *If allowances or permits under a future domestic regulatory program are allocated on the basis of historic emissions, will participants' baselines be set so as not to penalize them for early reductions?*
- *What will the criteria be for receiving credit?*
- *What formula will be established for calculating the emissions baselines?*
- *Who will receive credit in situations where steps to reduce or avoid emissions are undertaken by more than one entity (e.g., an appliance manufacturer or a utility)?*

These questions are important and it is by no means clear how they should be addressed at this stage of the debate, when the domestic climate change framework has not yet been established. The discussion below attempts to frame the issues and policy considerations that policy makers might wish to evaluate.

A. Legal Framework

1. Form and Effect of Government Commitment

Early action crediting implies a commitment by the federal government, or at least a rational expectation by participants, that some form of credit will be available to companies that make early ghg reductions. For this reason, careful thought needs to be given to the legal effect of any government commitment to provide credit for early action. The Climate Challenge agreements, for example, did not address the question, although Administration officials indicated on several occasions "appropriate credit" would be given, without indicating the nature of the credit or under what authority it would be provided.[30] This uncertainty as to eventual crediting has resulted in the reluctance of industry to make future commitments in the absence of further clarification.

There are a number of different approaches that might be taken regarding the question of the federal government's obligation:

No Current Commitment. Participants could proceed, as they have since 1994, to reduce emissions without any clear advance commitment from Congress or the President with respect to future regulatory treatment of early reductions. Participants would rely on the credibility of their efforts and/or the EPAct §1605 reporting mechanism to obtain appropriate treatment of early reductions at the time Congress considers domestic regulatory legislation to implement U.S. international commitments.

Moral Commitment. Participants could implement early reductions in reliance on an explicit statement of administration policy that early reductions will be recognized in any regulatory program that the President recommends in the future. Participants thus would make reductions now in reliance on current and future administrations' "moral commitment" to credit early reductions in any future regulatory program. However, the federal government would not be legally bound to provide credit even if the early reductions were attained.

Legally Binding Commitment. Congress could assure credit for early ghg reductions, either by authorizing the President or an executive agency to execute agreements with program participants to provide agreed-upon future regulatory treatment for early reductions, by ratifying through legislation provisional agreements between a federal agency and the participant, or by enacting a "self-executing" program. (See discussion in Section III.A.3.) These approaches give participants legal assurance at the time they make reductions that credit will be forthcoming under any future ghg regulatory program.

2. Authority to Enter into Binding Agreements

Our review of existing statutory authorities indicates that the Executive Branch currently lacks authority to set up an early action crediting program. If such a program is to have binding effect, then it will have to be authorized by law. The conventional wisdom is that neither the Executive Branch nor the current Congress can bind a future Congress. This wisdom is not entirely accurate, insofar as it applies to an agreement with respect to future regulatory treatment. While such an agreement does not ordinarily preclude Congress from enacting a later inconsistent law, the Supreme Court in *U.S. v. Winstar Corp.,* 116 S.Ct. 2432 (1996), recognized several important qualifications. First, if the agreement makes "unmistakably clear" that future regulatory authority is being surrendered, then the courts will recognize the effect of the agreement. Second, even if such a surrender is not unmistakably clear, the federal government may be deemed to have agreed to shift the risk of regulatory change from the regulated entity to the government and thereby provide the regulated entity a damages remedy against the government. Thus, a properly drafted agreement within the scope of the agency's authority could provide participants substantial comfort that the government commitment would be honored or, if not, the government would be liable for damages.

3. Form of Statutory Authority

If policy makers conclude that they wish to recommend legislation to provide credit for early ghg reductions in order to provide legal assurance that the credits will be honored once domestic implementing legislation takes effect, then the next question is: What should the legislation look like? There are a number of different approaches that could be considered:

Self-Executing Program. Under this approach, Congress by law would provide specified credits for early reductions to any entity that meets the requirements of the legislation. The program would work much the same way a tax credit does—that is, entitlement to credit would be established in the statute, and the only steps the companies would have to take to qualify for credits would be to measure, track, and report emissions, and to reduce emissions below specified baseline levels. All or most of the details for the credit program would be built into the statute (or implementing regulations) rather than negotiated with individual participants or industries. The advantage of this approach is that it provides for greater certainty and leaves little discretion to the President to work out arrangements that favor particular industries or companies. The disadvantage is that all of the detail of the program has to be built into the statute (or into implementing regulations).

Legislation Authorizing Future Agreements. Under this approach, Congress would enact legislation that would authorize the President to enter into early action crediting agreements. The agreements would have to meet certain general criteria specified in the statute. The President would then negotiate the agreements, and they would be effective without further action by Congress. One advantage of using agreements rather than a self-executing statute for a credit program is that agreements with particular companies or industries can accommodate the specific circumstances of companies in different industries. On the other hand, Congress is unlikely to give the President unfettered discretion in this important area. The statute will undoubtedly have to contain standards that agreements must meet in order to qualify the participant for the credit in any future ghg regulatory or tax program. A statute will also need to provide the President with the flexibility to fashion agreements that will be workable for different industry sectors and under a myriad of circumstances in which they may operate.

Another factor to be considered in determining whether to seek legislation authorizing agreements with emitters, as opposed to self-executing legislation, is that under the *Winstar* case, a properly drafted contract gives rise to a well-defined damages remedy in the event the federal government reneges. Such a remedy may not be as clearly available under self-executing legislation.

Agreements Contingent on Future Legislation. Under this approach, the President could offer early action crediting agreements to all comers, specifying the general criteria for

his approval of the agreements. Any agreements negotiated would be subject to subsequent statutory approval by Congress. This approach avoids bringing the issue up in the Congress now. However, it may be difficult to get industry to take negotiations seriously without some signal from Congress that agreements will eventually be approved.

4. Relationship to Kyoto Protocol

An important design issue is whether an early action crediting program should be tied to the Kyoto Protocol. If the awarding of early action credits is contingent upon ratification of the Kyoto Protocol, the credits would have no value in the event that the Protocol is not ratified in its current form, even though some form of domestic ghg regulation ultimately takes effect. Such an outcome would add substantial risk to an early action crediting program—risk that could chill participation by companies or at least limit companies' willingness to make significant capital investment for limiting their ghg emissions. However, there appears to be no particular reason for encumbering the program with such risk. Because there is a good chance that some form of ghg emission limitations will ultimately be adopted, policy makers should consider "de-linking" an early action crediting program to ratification of the Kyoto Protocol. To minimize risk to participants, the program (specifically the awarding of credits) should be operative in the context of any future international agreement or domestic regulatory program designed to reduce ghg emissions.

5. Relationship to Future Regulatory Program

One of the thornier issues to be dealt with in any early action crediting program is the question of "credit against what." The design of the future ghg regulatory program, if one is enacted, is of course unknown at this time. To the extent that domestic implementation has been discussed at all, no consensus has emerged as to how to proceed. Design alternatives include a carbon tax, direct regulatory programs, a marketable permit program, or a combination of one or more of the above. (Additional market-based and fiscal incentives and federal funding mechanisms could complement such a program.) For each of these alternatives, the design elements are virtually endless. A marketable permit program, for example, could distribute the allowances through either an allowance auction or an administrative allocation, while a carbon tax could apply to fuel suppliers or end-users. Any early credit proposal that attempted to foreshadow the design of the final regulatory framework would likely trigger

intense opposition from industries or businesses that might be disadvantaged by whatever was proposed. For that reason, proponents of a credit-for-early-action program may wish to make it clear that neither the legislation nor agreements authorized by legislation bind the government to adopt (or not to adopt) any particular domestic regulatory program (either to implement the Kyoto Protocol if it is ratified or otherwise to control emissions of ghg). Rather, the legislation and agreements with participants would make clear that whatever the shape of the future regulatory program, the following two provisions would be included:

- Credits earned by an entity will be provided in addition to any generally available credit under the otherwise applicable domestic ghg regulatory legislation.
- If a historic emissions baseline is used for allocating ghg credits under a ghg regulatory program, entities will not be penalized for early reductions or for avoiding emissions.

In addition, as discussed in the next section of this paper, credits made available to participants in the program (other than those which are creditable internationally under the Kyoto Protocol or other such international agreement) will have to be subtracted (or "drawn down") from credits otherwise available to U.S. entities in the first budget period.

B. Source and Amount of Credits

The overall design of the Kyoto Protocol is to allocate to each developed country a fixed number of tons of ghg emissions that can be used in the first budget period. A developed country can acquire additional tons for the first budget period through emissions trading, the CDM, and "joint implementation" under Article 6 of the Protocol. However, as a general matter, the Kyoto Protocol does not provide credit for ghg reductions that occur before the first budget period. The only two exceptions are the CDM and certain afforestation credits. As a result, any U.S. program to provide credit for early reductions that goes beyond the CDM and afforestation provisions will have to provide participants credit solely out of the ghg credits available to the U.S. in the first budget period. For that reason, the credits needed to "fund" the early action crediting program will have to be taken out of (or "drawn down" from) the U.S. allocations for the first budget period.

The amount of the reductions in credits otherwise available to U.S. companies (the "draw down") that would result from an early action credit program is difficult to estimate because it depends on assumptions with respect to the design of the program, participation rate, and extent of reductions likely to be attained. For example, a program that gave ton-for-ton credit for all reductions below a BAU baseline, in which every emitter in the economy participated, and which was immediately successful in reducing emissions to 7 percent below 1990 levels, would use about 53 percent of the U.S. credits available in the first budget period (i.e., a 53 percent draw down).[31] On the other hand, a program such as that proposed by the Environmental Defense Fund (see below) which uses a 1996-1998 baseline—if it had a 50 percent participation rate and participants reduced emissions at a rate that would balance their early reduction credits with their projected shortfalls in the first budget period—would use about 4 percent of U.S. credits available in the first budget period (i.e., a 4 percent draw down).[32]

Because some early action credit proponents are concerned that the credit-for-early-reduction program might result in an inordinate reduction in the level of credits otherwise available for the first budget period, they have suggested setting a limit on the number of credits that can be rewarded for early reductions. The Center for Clean Air Policy and NIMO, for example, have proposed a 5 percent limit, with 4 percent allocated to post-1998 reductions and 1 percent to past §1605(b) reductions. A cap introduces a significant complication because of the need to determine how to allocate early reduction credits once the cap is reached. Several different mechanisms have been suggested—pro rata reductions, first-come/first-served, or a "reservation" system. Under a *pro rata reduction* approach, if credits earned exceed the cap (in an annual period or for the duration of the early credit program), earned credits are reduced on a pro rata basis. A *first-come/first-served* approach vests credits as they are earned until the cap is reached, at which point no more credits can be awarded. A *reservation* system allows companies to reserve credits against the cap at the time they sign an early action agreement, but requires them to earn the number reserved in order to keep the reservation.

If projections of the size of the draw down were low enough and if policy makers had sufficient confidence in the accuracy of the projections, a cap could be dispensed with. This has the advantage of avoiding the complication of designing a workable cap. It also minimizes the risk that participants may not receive full credit for ghg reductions achieved. Such risk would necessarily arise under the pro rata reduction and first-come/first-served approaches since participants would not know their allocation of

credits until after they have initiated the mitigation project and begun to achieve ghg reductions. Under these two approaches, participants would have to weigh the risk of implementing projects for which they may not receive some or all of the credits for verified ghg reductions. Such a risk could chill participation in the program, particularly in cases where companies may otherwise be inclined to make major capital investments in ghg mitigation projects.

In contrast, a reservation system, if properly designed, could avoid this risk since participants would know at the time of making the commitment (e.g., signing the early action crediting agreement) the number of credits available for distribution. Companies would thus be able to determine how many credits they could reserve (and therefore receive) if they went forward and implemented their planned ghg mitigation projects.

In sum, an early action crediting program would be simpler and more effective without a cap. The cap could be dispensed with if policy makers had reasonable confidence as to the magnitude of the draw down.

C. Accommodating the Need for Flexibility

All of the credit proposals analyzed in section IV of this paper would provide credit for early actions to all sectors of the economy. Any proposal that is applicable economy-wide must recognize the need to tailor the program to the specific situations of different industries. For example, a credit program that is designed for major stationary sources may not be administratively workable for mobile sources or for residential ghg sources (such as gas-fired appliances). Early reduction credits from these sources are going to be obtained, if at all, not through agreements with individual motorists and homeowners, but through agreements with fuel suppliers, automobile and appliance manufacturers, or homebuilders.

Several approaches are possible for providing the necessary flexibility. One is to build into the statute establishing the program (or its implementing regulations) the detail necessary to make the program workable and effective for the range of industries to which it will apply. (This approach is reflected in the EDF proposal, discussed in Section IV. A, which has general provisions for manufacturing companies as well as special provisions for mobile sources, end-use, and carbon sequestration.) Another approach is to give significant flexibility to the President (or the executive agency implement-

ing the program) to fashion agreements that will accommodate the needs of particular industries and of companies that do not fit neatly into one industrial sector. A third option is to build options for participants into standard industry agreements. Participants, for example, could be given the choice of a 1990 or current baseline, thus permitting companies that achieved reduction below 1990 levels to obtain the benefit of those reductions. The advantage of the third approach is that it allows the executive branch and affected industries to negotiate many difficult technical and policy issues that may be unique to each industry. In addition, the use of standard agreements avoids the daunting task on the one hand of prescribing up-front—through statute or implementing rules—all the details of what necessarily is a complex program, or on the other hand of negotiating a different agreement for every company in every industry.[33]

Finally, for an early action program to be fully effective, it should be accompanied by and integrated into a broader set of policies that stimulate early action, such as market-based incentives, fiscal policies, and funding for research and development.

D. Actions Eligible for Credit

The question of which early reductions qualify for credit raises a number of important issues. One issue is whether the program should apply only to emissions reductions from domestic sources or also to reductions outside the United States. The policy rationale most often given for a credit program is that it provides incentives for U.S. companies to turn over their capital stock in advance of the first budget period, so that the disruption to the U.S. economy that might otherwise occur would be minimized. Providing credits for reductions abroad is inconsistent with this rationale except to the extent that the reductions abroad earn the U.S. credit under the Kyoto Protocol and reduce the compliance burden for U.S. sources. As noted above, the Protocol provides the U.S. credit for early reductions outside the United States only in limited circumstances. Credit is available under the CDM for developing country reductions after 2000 and there is a possibility of limited afforestation credits.

Another issue is whether the credits should be available only prospectively—that is, for future reductions—or should also be available for past reductions that are real and verifiable. To the extent the credit is regarded as an incentive to spur industry to make ghg reductions that would not otherwise occur, there is little basis for rewarding reductions already achieved (even assuming that the reduc-

tions were accurately reported under §1605(b) or CCAP). Other considerations may argue to the contrary, however. Climate Challenge participants, for example, may have relied on government representations that they would receive "appropriate credit" for their reductions. In addition, a modest credit for past reductions would reward organizations that have shown a prior commitment to mitigating ghg emissions and provide an incentive for participants to agree to future reductions. Finally, there is a strong public policy argument that companies that make voluntary reductions should not be penalized in any future program that relied on a historic baseline. Since most of the proposals reviewed here rely on post-1990 baselines for determining what constitutes an early reduction, participants should be entitled either to a baseline adjustment to reflect their post-1990 voluntary reductions or, as proposed by the Center for Clean Air Policy and NIMO, a direct credit.

It is difficult to estimate the magnitude of past reductions potentially eligible for early reduction credits. One complicating factor is that the EIA reports of §1605(b) reductions for 1997 have not been released, and 1998 mitigation activities are still underway. Another difficulty is that CCAP reductions not reported under the §1605(b) program have not been compiled and quantified into aggregate amounts. The volume of potentially eligible past reductions could be quite large. Estimated ghg reductions and sequestrations reported for 1994, 1995, and 1996 alone are about 420 mmtce.[34] When all reported reductions are ultimately compiled for the 1991-1998 period, this number might be as high as 700 mmtce for the eight year period.[35] This would come to about 9 percent of the U.S. first budget period allocation.

Without better information as to the number of tons that may be claimed for past reductions, it is difficult to formulate a recommendation as to whether a limitation should be placed on the number of early action credits that should be allowed for past reductions. If a limitation were required, one option would be to cap the total number of credits allocated for past reductions. (The Center for Clean Air Policy and NIMO suggest a 1 percent cap.) Another option is to establish specific criteria or decision rules for excluding certain past reductions reported under §1605(b) and other CCAP programs.

E. Design Issues[36]

An early action crediting program raises important design issues that will significantly influence the fairness of the program and its effectiveness as an incentive for early action. The design issues include what sources and sinks are covered by an agreement, baselines for crediting reductions, what gases are covered, "leakage" issues, and numerous questions of administration. Because the credits for domestic early reductions would presumably be "funded" out of the fixed number of credits available to the U.S. in the first budget period, these design issues affect the relative position of U.S. sources in the first budget period rather than the permissible level of emissions in that period.

1. Coverage

Sources. A key issue for the design of any voluntary early reduction program is the question of which sources a participant must cover under an agreement. Must a company cover all sources that it owns under the program, or may the company participate on a project-by-project or source-by-source basis? The objection to the individual source or project approach is that it provides substantial opportunities for gaming. Hypothetically, a participant could include under the agreement all sources that are to be shut down or whose output will decrease, and exclude from the agreement sources whose output and emissions will increase. On the other hand, a policy that requires the coverage of all sources owned by the participant (without regard to source size or emissions levels) might reduce potential gaming opportunities, but would present other problems. For example, industrial companies and utilities operate facilities that are major stationary sources that can be monitored for ghg emissions and operated so as to minimize them. These companies also own a wide range of other sources—including motor vehicle pools, steam boilers in buildings, and company aircraft. Requiring all of these diverse, smaller ghg sources to be covered by an agreement may be infeasible, and may deter companies from participation even though the companies' major stationary sources are the principal target of the program. For that reason, if an all-sources policy is adopted, the President or executive agency should be given flexibility to target agreements at the participants' major ghg sources, and to exclude small or diverse sources. In addition, rules will need to be developed for multinational corporations that own both domestic and foreign sources.

Another issue is accounting for changes in ownership of sources. As participants buy and sell assets, merge with other companies, and spin off particular operations, appropriate adjustments have to be made in baselines and emissions subject to an agreement. In addition, source rules will need to spell out how agreements apply to sources owned by more than one company (such as jointly-owned electric power plants), as well as sources owned by one company and operated by another.

Sinks. Sinks can be important in an early action program since near-term investments in sinks are likely to have great potential benefit in offsetting ghg concentration increases. Yet as with other aspects of early action, coverage of sinks presents some difficulties, such as the establishment of baselines, measurement of sequestration, and assurance that sequestration is long enough in duration to justify crediting. In spite of these concerns, acknowledging the benefit of sinks and rewarding their creation are important objectives of a successful and comprehensive early action program. Uncertainty regarding the calculations of amount of sequestration in managed forests should be addressed in the discussion of how much credit to give, but this uncertainty should not discourage efforts to promote the very real sequestration that can occur (as well as other benefits to landscapes, biodiversity, and water quality).

Mechanisms to quantify, verify, and monitor the benefits derived from sinks should be developed. The same common sense approach outlined above for sources—i.e., focusing on major projects—should be employed in developing a strategy to credit creation of sinks. At a minimum, policy makers may want to consider establishing an opt-in mechanism for sinks. Special rules may be appropriate for companies in the forest products and agriculture sectors.

Opt-ins. If only large sources owned by a participant are required to be covered under an agreement, then consideration should be given to permitting small owned sources, owned sinks, and non-owned sources and sinks to be covered through an opt-in mechanism. In the case of non-owned sources and sinks, the opt-in would presumably have to be conditioned on owner consent, to avoid having two entities claiming credit for the same reductions. An "owner consent" requirement raises the possibility that the owner and the participant seeking the opt-in credit cannot agree on how to share the credits. That issue is one best left to negotiations between the parties.

Gases Covered. The Kyoto Protocol applies to the following six greenhouse gases: CO_2, methane, nitrous oxides, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Two related policy questions that will need to be addressed in any credit program are (1) whether the program will apply to all six gases and (2) whether the participant can selectively choose the gases that it commits to reduce. If the program is set up in a manner that requires a participant to cover all sources owned by the participant or all owned major sources (however defined), then the gases emitted by these sources need to be specified. At a minimum CO_2 would have to be included. It may be feasible to require coverage of HFCs, PFCs, and SF_6, at least in the case of the manufacturers and perhaps certain users of these three industrial gases. Whether it is feasible to include the other gases—for which historic baselines have probably not been established and for which adequate monitoring technology may not be available—is a question. One approach that could be workable for most industries would be to require coverage of CO_2 (and perhaps the industrial gases in certain situations) and permit participants to opt-in other gases.

2. Baseline

Any early action crediting program must establish a baseline from which reductions are to be measured. The challenge of constructing an equitable baseline with sufficient environmental integrity bedeviled DOE in developing the §1605(b) reporting guidelines and measuring ghg reductions achieved under certain CCAP initiatives, such as the Climate Challenge program. The baseline issue will also require careful consideration here. One approach (used under the §1605(b) and Climate Challenge programs) is to project a BAU level of emissions and to provide credit for reductions below the rising BAU reference line. The obvious difficulty with the BAU approach is that an accurate BAU reference line is virtually impossible to project. If set too high, it will reward reductions that never occurred or which would have happened anyway. Because a BAU baseline would be higher than the baselines in most of the proposals reviewed in this paper, it is also costly in terms of tons drawn down from the United States' first budget period allocation.

Another approach, which is used in most of the proposals reviewed in Section IV, is to set a baseline derived from actual emissions in a historic base period, such as a 1990 emissions or current (e.g., 1996-1998) emissions. From this initial reference point, the baseline can decline, remain level or even incline (as just noted under the BAU approach). As discussed below, EDF has proposed a flat baseline based on a participant's average ghg levels emitted over the 1996-1998 period. CAST and the Center for Clean Air Policy have proposed declining baselines, with the CAST baseline declining at 1 percent per year and the Center for Clean Air Policy at a rate extending downward to a 7 percent reduction below 1990 levels. Instead of using actual emissions in a historic base period as the reference point, one other option could involve using specified formulas for calculating the baseline. A participant's baseline, for example, could be calculated by multiplying its current levels of output times an emissions performance standard (expressed in lbs/unit of output).[37] This approach can better accommodate new entry than using actual emissions in a historic period (since new entrants would have a zero baseline).

There appears to be no *a priori* solution to the baseline question. Rather, setting a baseline requires a pragmatic judgment that balances (1) administrative simplicity and the need to provide enough incentive to attract widespread participation in the program, against (2) concerns that an over-generous baseline will reward reductions that did not occur. This balance would probably rule out a BAU baseline as being too generous and a steeply declining baseline as too stringent.

3. *Performance Metric (Rate v. Tons)*

Another key design issue for any early action crediting program is the "rate v. tons" question. Several approaches to establishing a metric of performance have been proposed. The "rate" approach uses a rate-per-unit-of-output metric. A participant that decreases its emissions per unit of output from the baseline level is rewarded with credits. Thus, the CAST proposal (described in section IV.B) provides credits to companies that reduce their pounds of ghg per dollars of sales (ghg/$). The "tons" approach uses a metric expressed in tons of ghg over a specified time period. A participant receives credits to the extent that its ghg tonnage levels are below the baseline. For example, the EDF proposal (described in section IV.A) provides credits for each ton of reductions from the average of a company's 1996-1998 emissions levels as measured over the entire early action period (i.e., 1999-2007).

The rate-per-unit-of-output approach provides flexibility to accommodate economic growth, cyclical fluctuations in output, and changes in an individual company's market share. Another advantage of the rate approach is that it focuses on the efficiency of the sources covered in the program. This attenuates potential concerns that companies could generate credits without achieving a net ghg reduction by shifting production from sources within the program to sources not covered under the program. (This phenomenon is referred to as "leakage" and is addressed in the next section as well as in the paper's analyses of the EDF and CAST proposals.) The disadvantage of the rate approach is that it rewards decreases in emission rates even in circumstances where emissions are sharply increasing as a result of, for example, increases in production. In addition, some commenters view the rate approach as an unfortunate reversion to the rate-based approach of the pre-1990 Clean Air Act, which is fundamentally inconsistent with Kyoto Protocol (which places a tonnage-based cap on U.S. ghg emissions for the first budget period).

Another issue with respect to a rate-based system is determining the denominator in the rate fraction. Historically, the Clean Air Act's new source performance standards used fuel input rather than output in determining emission rates. This is clearly inappropriate for ghg control because it disregards conversion efficiency. Output is the appropriate denominator, but defining the proper measure of output is no easy task. The extant proposals use either dollar value of output (CAST) or some measure of physical production (Center for Clean Air Policy). As the analysis of the CAST proposal indicates, sales volume may be an inappropriate measure of output unless it is stated on a value-added basis. Using a measure of physical output should be workable in some industries, such as electric power or aluminum, but may be difficult for others such as automobiles or capital equipment, where there are outsourcing issues and questions as to what the unit of production is. One important question is how to measure the output of a manufacturer that produces both bulldozers and garden tractors, or both light bulbs and turbo-generators. A further issue is how to translate a reduction in emission rates into tons for purposes of credit, where output does not remain constant.

The advantage of a tonnage approach is that it is relatively simple, relies on quantification of emissions themselves and thus relates directly to environmental benefits, and provides the most flexible mechanism for companies to achieve the goal through whatever mechanism they choose. In considering these two approaches, policy makers should tailor their approach to the particular sectors, since a rate approach may be more workable in some industries while a tons approach could be preferable in others.

4. Leakage

A voluntary early reduction program will almost certainly cover only a subset of sources of ghg emissions, because some firms will decline to participate in the program. A source of concern in designing an effective program is "leakage"—that is, displacement of emissions from sources within the program to sources outside of the program. One of the objections to permitting participation on a source-by-source basis is that companies will include under their agreements sources with declining emissions but exclude those with increasing emissions. An "all-sources" coverage policy (requiring a participant to cover all owned sources) deals with the leakage problem at the company level, but still does not deal with it at the intercompany level. For example, there are issues of adverse selection (companies with declining market share join; companies with increasing market share stay out) and outsourcing energy-intensive operations (an automobile company purchases steel rather than producing it; a power company purchases power rather than generating it). To the extent that intercompany leakage is regarded as a problem, there are a number of ways that early action crediting agreements can be drafted to deal with the issue. One option—based on the "reduced utilization" mechanism under the acid rain program[38]—involves adjusting downward a participant's baseline to reflect any decrease in output that is not offset by increased output by other sources covered by the program. Accounting for such changes of output, however, could be a complex task that raises many of the same issues discussed in the rate vs. tons discussion above. (Also, it should be noted that encouraging broad participation in the program will also help minimize the problem of "leakage.")

Another issue is "negative leakage"—that is, emission increases in one sector that are more than offset by emission reductions in another sector. For example, introduction of electric vehicles increases emissions from electric generators, but those emission increases may be more than offset by reductions in mobile source emissions. As a threshold matter, policy makers should assess whether negative leakage is a significant concern that warrants developing a mechanism to account for these offsets. One possible approach is establishing a mechanism that permits participants to opt-in sources owned by others with their consent.

Finally, "international leakage"—displacing emissions from domestic sources to sources outside the United States—raises economic policy and political issues that designers of a credit program may need to address.

5. *Double-Counting*

A significant issue both for current §1605(b) reporting and for any early action crediting program is avoiding double-counting—that is, multiple participants claiming credit for the same reductions. A familiar example occurs in residential and commercial energy efficiency programs where both utilities and appliance manufacturers claim credit for energy savings and emission reductions from installation of more efficient appliances. It is not clear how serious a problem this is likely to be, but it is one that can be resolved technically. One approach is to establish a simple decision rule that gives all credit to the owner of the ghg emissions source. If other entities wish to obtain the credit, they must obtain owner consent as a condition of claiming the credit. Under this rule, in the case of electric end-use efficiency programs, electric utilities would be entitled to the credit unless they relinquished it to the manufacturers. In the case of gas programs, home owners and businesses would be entitled to the credit, but could cede it either to utilities or manufacturers. A different, more complicated rule would attempt to give the credit to whoever funds the improvement.

IV. Analysis of Current Early Reductions Proposals

This section provides an analysis of the five early reduction credit proposals that were publicly available at the commencement of this study (July 1998). We should note that the proponents of most of these proposals are in the process of revising key elements of their proposals. Thus, many of the specific observations in this paper's analysis of the proposals may be mooted by revisions that the proposals' proponents are now considering.

For purposes of reference, a matrix depicting the key design elements and a chart comparing the baselines of each proposal appear at the end of this section in Figures 2 and 3 respectively.

A. Environmental Defense Fund

1. Key Elements of Proposal

The Environmental Defense Fund (EDF) has developed a proposal that would provide credit for early ghg reductions achieved through voluntary actions for the years 1999 through 2007. Ton-for-ton credit would be provided for each ton of ghg emissions reduced or sequestered under two situations. The first involves domestic actions in cases where a participant has reduced its aggregate emissions during the 1999-2007 period below an historic baseline. A participant's baseline would generally be calculated by looking back to the activity and ghg emission levels over the 1996-1998 period. The second situation involves ghg reductions achieved through actions taken in other countries. Participants would be "guaranteed" credit for international reductions to the extent they resulted in an addition to the U.S. emissions budget for the 2008-2012 compliance period.[39] The EDF proposal outlines a general crediting mechanism that would apply to all sectors of the economy. General baseline and accounting rules are presented for the following four categories: companies, mobile sources, end-use products, and carbon sequestration. The general rules for companies (e.g., manufacturing, electric power) are briefly summarized below for illustrative purposes.

The baseline for companies would be based on the average annual ghg emissions over the 3 year period of 1996-1998. In calculating the baseline, a company must include all domestic sources of ghg emissions in operation during the 1996-1998 period; companies would not have the option of setting multiple baselines on a facility-by-facility basis. Baselines are adjusted downward for shut-downs or sales of ghg emissions sources and adjusted upward for acquisition of such existing sources. Baselines would not be adjusted upward for the addition of new sources coming on line after the year 1998. Participating companies would be expected to offset increased emissions from new sources through reductions by other sources affected under the program.[40]

Companies would only receive credits to the extent that their net cumulative ghg emissions are less than their baseline for the entire early action period. As an alternative, companies may enter into pooling arrangements pursuant to which multiple companies would aggregate emissions and reductions for the purposes of earning credits. Credit for the pool would accrue to the extent that pooling companies achieved a net ghg reduction below the aggregate baseline established for the pool. Companies would be precluded from claiming early reduction credits that may have resulted from the shifting of production to locations outside of the United States (referred to in this paper as "international leakage"). EDF does not address whether companies may receive credit for reductions resulting from domestic shifts in output—that is, shifting production from sources covered under the program to other domestic sources not covered under the program (referred to as "domestic leakage").[41]

Domestic credits earned would be deducted or "drawn down" from the United States' first budget allocation for the 2008-2012 compliance period. No limitation would be placed on the number of credits that could be drawn down from the U.S. budget allocation. Since international reductions creditable under the Kyoto Protocol are added to the U.S. budget allocation, such international credits will not negatively affect the number of credits available for allocation to sources in the United States during the first budget period.

2. Analysis of Proposal

The EDF proposal does not spell out a specific legal framework for administering the early action crediting program. The proposal leaves open the question of whether the President (or a specific federal agency) would be provided authority to negotiate binding early action crediting agreements or whether the credits would be automatically awarded under a self-executing program. It does, however,

indicate that "legislation" would be necessary to "establish the government's obligation to credit voluntary actions taken between 1999 and 2008."[42]

One important design element of EDF's approach has been the establishment of a fixed tonnage emissions cap that applies to all of a participating company's sources.[43] EDF has sought to incorporate this design element into its early action crediting proposal through tonnage baselines that would be established for each participating company. EDF's tonnage baselines place limits on the extent to which "high-growth" companies—whose production is projected to increase significantly over the next decade—can earn credits. It will also be a problem for new entrants. In effect, these baselines require companies to reduce their emissions increases due to growth through efficiency improvements, fuel switching, or other actions that are designed to reduce ghg emissions from their U.S. operations or to purchase credits from other companies. For example, a company whose output is projected to grow by 2 percent per year between 1997 and 2007 would have to offset the increased CO_2 emissions associated with approximately a 20 percent output increase over the 10 year pre-Kyoto period. This means that no credits would accrue unless the company is first able to avoid entirely the projected emissions resulting from its increased output. Although significant ghg emissions are avoided from what would have occurred under BAU scenario, the company would only receive credits for the actual ghg reductions achieved below the historic baseline level. The significant challenge to offset future growth by a "tonnage baseline" approach helps to explain why EDF is proposing a recent historic (1996-1998) baseline. High-growth companies—challenged to reduce emissions below 1996-1998 emissions levels—may have virtually no chance to reduce below 1990 levels.

The EDF approach is predicated on the assumption that high-growth companies are precisely those having the greatest self interest in accumulating a "bank account" of early ghg credits for use in a future ghg reduction program. For this reason, EDF has structured its early action crediting program to allow for pooling arrangements and other emissions trading options for earning ghg credits. These marketable trading options may provide a viable alternate option for high-growth companies to earn credits in cases where additional ghg reductions may not be cost-effective or even feasible through efficiency improvements, fuel switching, and other mitigation activities at their own company facilities.

A fixed tonnage approach raises concerns with regard to companies subject to cyclical changes in demand or wide fluctuations in market share. Companies could theoretically earn credits whenever their actual emissions fell below baseline emissions levels even if the reduced emissions levels were attributable to a decline in market share or a cyclical downturn and not to the implementation of concrete actions for mitigating their ghg emissions. Although not specifically mentioned in the EDF proposal, regulatory mechanisms exist for dealing with these types of reduced output situations. The acid rain program, for example, has established a "reduced utilization" mechanism that precludes electric utilities from receiving credit for reduced utilizations of power plants affected under Phase I of the SO_2 emissions trading scheme.[44]

Another important design issue arising under a fixed tonnage approach concerns leakage or shifting of production to sources outside the early action program. The EDF proposal calls for a mechanism to address international, but not domestic, leakage. Either type of leakage could be viewed as a circumvention of the environmental objective of encouraging *net* ghg reductions through an early action crediting program. Domestic leakage is worthy of special mention here, especially with regard to the electric power generation sector. With the opening of competitive wholesale and retail power markets, significant opportunities exist for electric utilities to shift electric generation from covered sources to other sources outside the program.

The EDF program is only prospective in nature. Participants may earn ghg credits only for ghg reductions achieved during the 1999-2007 period. No credit would be provided for past ghg mitigation projects implemented prior to 1999, even if they have been verified and reported under the EPAct §1605(b) program. EDF states that the credits earned under the program would be "turned into guaranteed allowances," indicating that companies would have the right to convert credits into allowances in the event that an allowance-based trading program were ever established for CO_2 or other greenhouse gas. The EDF proposal does not specify whether the credits would have value under another type of regulatory or tax program and, if so, what type of value.

B. Coalition to Advance Sustainable Technology

1. Key Elements of Proposal

The Coalition to Advance Sustainable Technology (CAST) has developed an innovative proposal that would provide credit economy-wide for domestic reductions below a company-specific baseline rate. The description below is based on the June 12, 1998 version of the CAST proposal. CAST indicates that key aspects of the proposal are being re-examined and could undergo significant revision. These changes, if adopted, would significantly alter the CAST proposal and deal with many of the issues raised in the analysis below.

The June 12 CAST proposal would establish a baseline rate expressed in terms of ghg emissions per unit of revenue (e.g., lbs of CO_2 equivalent/dollar of company sales).[45] A two-part process is proposed for constructing this baseline rate. First, the company would use emissions and revenue levels for the baseline year in calculating its initial baseline rate, expressed in terms of lbs of CO_2 equivalent/dollar of company sales. The June 12 proposal set 1995 as the base year, although CAST is reportedly considering other base years to ensure that prior bona fide mitigation actions are eligible to receive credit. Second, the baseline rate is adjusted downward by 1 percent per year to reflect BAU improvement in efficiency.[46]

Companies would receive credits under the following two early action options.[47] The first is referred to as the "Meet Kyoto" option under the CAST proposal. Under this option, companies would agree to achieve a minimum of 3 percent per year efficiency increase below the declining 1995 baseline rate.[48] This means, for example, the reduction target in 1998 would be a 9 percent efficiency improvement below the 1995 baseline rate and would increase to a 39 percent efficiency improvement in the year 2007. Each company selecting the "Meet Kyoto" option would receive ghg credits for 80 percent of the amount of the tons by which their improved net efficiency exceeded a 1 percent per year baseline efficiency increase. The second option is referred to as "Beat Kyoto."[49] Companies selecting this option would agree to achieve a minimum of 5 percent per year efficiency increase. Since each year's performance is measured against a declining baseline rate, companies would be required to achieve a 15 percent efficiency improvement in 1998 and an 65 percent efficiency improvement in the year 2007. Each company selecting the "Beat Kyoto" option would receive ghg

credits for 100 percent of the amount of the tons by which their improved net efficiency exceeded this same declining baseline rate.[50] CAST is considering replacing the separate "Meet Kyoto" and "Beat Kyoto" options with a single formula.

Early action credits would be deducted from the U.S. first budget allocation to the extent that the early action credits are converted into allowances for a future emissions trading program or otherwise used for compliance in other future regulatory programs. No limitation would be placed on the number of credits that could be drawn down from the U.S. budget allocation.

2. Analysis of Proposal

The CAST proposal provides no details on the legal framework for administering the early action crediting program. In some regards, it is structured like a self-executing program. Companies receive 80 percent credit if they attain the "Meet Kyoto" performance level and a full 100 percent credit if they achieve the "Beat Kyoto" performance level. However, there appears to be no reason why the CAST proposal could not be implemented by requiring companies to enter into specific early action crediting agreements with the federal government. The CAST proposal outlines a framework mechanism that rewards companies for future voluntary actions. Although not detailing any specific implementation mechanism, the proposal does state that "legitimate mitigation efforts" achieved under prior voluntary programs "should be appropriately recognized and credited."[51] A key concern with the CAST proposal is whether the cumulative level of efficiency improvement by 2008 (i.e., 39 percent for "Meet Kyoto," 65 percent for "Beat Kyoto") can feasibly be achieved by any more than a small number of companies.[52]

Generally speaking, the proposal's "emissions rate" approach tends to minimize a number of the potential concerns inherent with the "fixed tonnage" paradigm discussed in the EDF proposal. One advantage of using a baseline rate (instead of fixed tonnage level) is that "high-growth" companies are not penalized for bringing on-line new sources that may be much more efficient and cleaner than existing stock. Instead of having to offset the ghg emissions associated with the new sources, companies will be able to earn credits to the extent that new sources, when combined with other existing operations, can do better than the "Meet Kyoto" or "Beat Kyoto" standards. On the other hand, it must be noted that the emissions rate places no limits on growth and could create situations where

companies are earning considerable credits even though they are exceeding current historic (e.g., tonnage) baseline levels by very significant amounts.

A rate-based system also attenuates some of the "leakage" concerns associated with a fixed tonnage approach. Companies cannot generate credits by curtailing output from sources covered under the program and shifting that output to sources outside the program. A rate-based system, however, may nonetheless encourage companies to curtail operation of their less efficient, high-emitting units in order to improve their ghg performance rate. To the extent that this occurs, it is possible that the production output could be shifted to sources outside the program that would offset any ghg benefit resulting from the curtailment. This could occur if, for example, a utility decides to shut down an old coal-fired power plant in order to achieve the "Beat Kyoto" performance target. The CAST proposal would allow the utility to earn credits based on its improved emissions rate, even though it may purchase compensating electric power from comparable coal-fired generation units outside the program.[53]

Several potential problems appear to exist with using lbs of CO_2 equivalent/dollar of company sales as the crediting metric. One problem is the significant impacts that price change and other market fluctuations could have on measuring a company's ghg performance. A manufacturer, for example, may receive no credit for significant mitigation accomplishments if it experiences substantial price declines over time. The CAST crediting metric also could produce arbitrary results for companies whose revenues fluctuate due to changes in product mix that are unrelated to energy use (for example, an auto assembly plant converts from the production of cars to sport utility vehicles).[54]

Another concern is that the crediting metric has no way to account for the changes in vertical integration. A company that manufactures the same product types but "outsources" the production of significant components will have very different ghg/$ of sale rate than a company which does not. Mergers, acquisitions, and other corporate restructuring could also create distortions for the CAST crediting metric. A vehicle manufacturer, for example, that subsequently sells off steel manufacturing operations or other significant manufacturing facilities for component parts could dramatically decrease its ghg emissions for sale of the same vehicle.[55] Similar capricious results could arise in cases where a utility sells off some or all of its electric power generation assets to a non-participating company.[56] Some of these problems could be avoided by using value added rather than total sales revenues as the measure of output.

C. Center for Clean Air Policy

1. Key Elements of Proposal

The Center for Clean Air Policy has proposed an economy-wide early action crediting program that would start in 1998 and run through 2007. Companies would report on a comprehensive, company-wide basis rather than facility by facility. Credits would not be awarded for shutdowns or sale of existing facilities, but they would be allocated for "replacements." The proposal outlines three possible accounting mechanisms for awarding early action credits. The first (and primary) approach involves establishing company-specific baselines that are expressed in tons per year and would decline over time. Each company's baseline would be determined by drawing a straight line between 1998 actual emissions (in tons per year) and the 7 percent reduction target. Companies would earn credits to the extent that their ghg emissions were below the declining baseline.

A second approach would involve establishing a declining generation performance standard (GPS) (expressed in carbon per kWh). This alternative would apply only to the electric utility sector. The GPS would be established by drawing a declining straight line between the company's performance rate (i.e., pounds of carbon per kWh) in 1998[57] and a desired national performance rate in 2007. The performance rate would be the national average carbon per kWh that the power generation sector would have to achieve in 2008 in order to achieve the equivalent of a 7 percent reduction below 1990 level for the utility industry. Credits would be calculated by determining the amount by which a company exceeds (e.g., does better than) its GPS for any particular year and multiplying that rate by the amount of kWhs generated for any particular year. A third option would award credits based on a project-specific basis, instead of crediting reductions below a declining company wide baseline (either tonnage cap or GPS). Under this approach, the Administration would establish a "bounty schedule" that would list a limited set of "creditable actions" and the specific quantification protocols for calculating the number of credits that would be awarded for those actions. The bounty schedule approach is intended as a supplemental approach applicable only (1) to "difficult to reach" sources that do not lend themselves to the entity-wide tonnage approach and (2) as a mechanism to discourage early retirement of existing zero-emissions utility sources.[58]

The proposal identifies several options for crediting reductions already achieved and reported under the EPAct §1605(b) program. The leading option would be to annualize and add a company's verified §1605(b) reductions to its 1998 baseline levels. The advantage of this approach is that companies would not be penalized for ghg mitigation projects (such as fuel switching from coal to gas) implemented prior to the year 1998. A second option would involve providing early action credit for past §1605(b) reductions. Under this alternative, a limitation would be imposed on the total number of credits that could be allocated for §1605(b) reductions achieved between 1991 and 1998.[59] Early action credits would be "drawn down" from the U.S. first budget allocation. The draw down would be limited to 5 percent of the total first budget allowances. If companies are to receive early action credit for verified §1605(b) reductions achieved between 1991 and 1998, 1 percent would be allocated to those past §1605(b) reductions and 4 percent would be allocated to post-1998 domestic reductions.

2. Analysis of Proposal

The Center for Clean Air Policy's proposal identifies a range of possible approaches for administering an early action crediting program. Such flexibility may be useful in developing a crediting scheme that is workable for all the major industry sectors. The proposal is in general terms and does not provide detail on how the program would work or address how a number of implementation issues might be resolved. For example, the first crediting methodology would establish a tonnage baseline, based on each company's "straight line" reduction trajectory from current emissions levels to the Kyoto Protocol's 7 percent reduction target. No details were provided on how to address potential leakage that might result from a fixed tonnage system.[60] It should also be noted that the stringency of the declining straight line reduction baselines proposed under the first two options could chill participation under the program. The Center for Clean Air Policy points out that the stringency of its declining baseline is also likely to limit the opportunity for companies to benefit from earning credits from leakage or other situations where real quantifiable reductions are not being achieved.

The Center for Clean Air Policy's proposal is the only one that has a project-specific approach. One potential advantage of the "bounty schedule" alternative is increased administrative simplicity: difficult issues (such as leakage) could largely be avoided through rigorous accounting and quantification rules established for each category of mitigation activities. A second advantage is that the bounty schedule should encourage broader program participation, since all companies—even those with high-

growth rates or other special considerations—could earn early action credits for specific mitigation projects. On the other hand, such an early action credit program would be limited to a narrow set of mitigation activities and could require a resource-intensive effort to develop quantification procedures for each mitigation project. The Center for Clean Air Policy appears to recognize this fact since it proposes to apply the bounty schedule to only a specific subset of sources and activities.

One distinctive design element of the proposal is that a cap would be imposed on the total number of credits that could be distributed under the early action crediting program. The Center for Clean Air Policy believes that such a cap is necessary to ensure the availability of a sufficient number of credits for distribution during the 2008-2012 compliance period under the Kyoto Protocol. Specifically, a cap will ensure that "companies that are not able to play in the early reductions program for whatever reason are not left in an untenable situation in the first commitment period." The Center for Clean Air Policy also notes that if the early reductions program is a success and the first allotment of credits is fully subscribed, then an additional allotment could be established.

D. Resources For the Future

1. Key Elements of Proposal

Resources for the Future (RFF) takes a fundamentally different approach to the early action crediting issue. All of the other proposals attempt to work within the existing framework established in the Kyoto Protocol. That framework does not provide any credit or other tangible incentive for ghg reductions implemented in developed countries prior to the 2008-2012 compliance period. As already noted in Section I above, the only way to generate bankable early action credits is through ghg mitigation projects in developing countries under the CDM. The other proposals deal with this inherent treaty limitation by allowing a portion of the first budget allocations for the U.S. to be drawn down and distributed to early action participants. RFF, in contrast, proposes to address the underlying barrier to developed countries generating bankable early reduction credits through an amendment to the Kyoto Protocol. This amendment would authorize developed countries to receive internationally recognized credits for domestic reductions achieved prior to the year 2008. Such credits would be added to the first budget allocation assigned to each developed nation.

The RFF approach would require the establishment of internationally recognized baseline for measuring the early reductions. This could be best achieved by providing a binding ghg limitation and a corresponding budget allocation for each developed nation. Reductions below budget allocations could be banked and used to offset future treaty obligations beginning in the year 2008.

2. Analysis of Proposal

The RFF crediting proposal faces several significant challenges. First, under one interpretation of the Kyoto Protocol, signatory nations may not seek to amend or modify the Protocol until it takes legal effect. If that interpretation is correct, this requirement could be a significant barrier to implementing the RFF proposal since the timing and outcome of ratification is far from certain. Second, the amendment itself must be agreed to by the signatory countries and ratified by the U.S. Even under the most favorable circumstances, the process of amending the Protocol would be a resource-intensive and lengthy process. Third, the crediting of early reductions will necessitate the establishment of binding, country-specific limitations for those developed nations wishing to participate in an early action crediting program. Based on what occurred in Kyoto last December, the negotiation of such limitations is likely to a very contentious process.[61] Fourth, the RFF approach would accelerate the implementation challenges facing the United States and other developed countries during the 2008-2012 compliance period. Congress and the Administration would have less time to work out major implementation issues, such as the allocation of ghg reduction levels among major industry sectors, establishment of source-specific emissions limitations that could be used for measuring early reduction credits, and procedures for verifying emissions reductions. Meeting these and other challenges appears daunting.

An alternative to the RFF proposal that could be easier to put in place would be an amendment to the Kyoto Protocol that removes the Protocol's "early action discontinuity." Such an amendment would establish a mechanism similar to the CDM that would award credits for ghg reductions achieved in developed countries prior to the year 2008.

E. Niagara Mohawk Power Corporation

1. Key Elements of the Proposal

Niagara Mohawk Power Corporation (NIMO) has developed a detailed crediting mechanism that applies only to past ghg reductions that were implemented between 1991 and 1998. The NIMO proposal anticipates that future early reductions implemented after 1998 would receive credit under one of the other proposals discussed in this paper. One important purpose for focusing only on past actions is to recognize and at least partially reward companies that responded in good faith to the President's call for industry to voluntarily reduce ghg emissions. According to NIMO, providing credit for past actions is vital to the credibility of any future early action crediting program.

Under the NIMO proposal, one requirement for eligibility is that the ghg reductions (achieved between 1991 and 1998) were either reported under the EPAct §1605(b) program or otherwise documented under an EPA early reduction program. The amount of credit provided would be determined in accordance with specific crediting rules that strongly favor companies that have achieved ghg reductions below the Kyoto target (e.g., 7 percent below 1990 baseline levels).[62] The proposal also recommends that a simple decision rule be applied in cases in which the same project reductions are reported by several entities. One option suggested by NIMO would require the two parties to share the credits equally unless they agree to a different allocation.

Early action credits would be "drawn down" from the U.S. first budget allocation. The draw down for the 1991-1998 reductions would be limited to 1 percent of the total first budget allowances. Another 4 percent of the first budget would be set aside for early reduction credits earned during 1999 and 2007. The NIMO proposal, however, does not address how companies would earn credits for such prospective ghg reductions.

2. Analysis of Proposal

The NIMO proposal provides a useful starting point from which to evaluate creating options for past reductions achieved during the 1991-1998 period. The proposal, for example, provides detailed decision rules for valuing past reductions based whether or not each company was able to achieve the Kyoto reduction target and what type of §1605(b) report (e.g., entity-wide v. project level) was submitted by the reporting company. It also suggests a simple decision rule for addressing the "double counting" issue and a 1 percent limit on credits that might be drawn down from the first budget allocation.

Figure 2

Key Design Elements Of Early Actions Crediting Proposals[1]

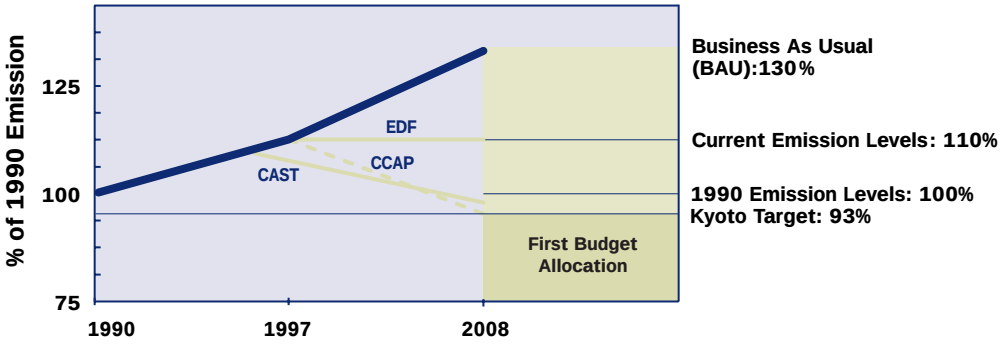
Proposals	Design Elements: Scope of Program	Source of Credits	Amount of Credits	Baseline Metric	Baseline Levels	Activities Covered	Past/Future Reductions	Accounting Rules For
Environmental Defense Fund	All Sectors Company-Wide All Sources and Sinks	U.S. First Budget Period	No Limit	Tons	Actual Emissions 1996 Over 1998 Period	Domestic & International	Future	Sale & Acquisition of Units, Leakage
Coalition to Advance Sustainable Technology	All Sectors Company-Wide All Sources	U.S. First Budget Period	No Limit	Pounds of ghg Per Dollar of Sales Additional Metrics Under Consideration	Declining From 1995 Rate	Domestic & International	Past Future	Not Specified
Center for Clean Air Policy	All Sectors Company-Wide All Sources Sinks Not Specified	U.S. First Budget Period	5% Limit[2]	Tons or Rate or Project Specific	Declining From 1998 Levels or Project Specific	Domestic	Past Future	Sale & Acquisition of Units, Replaced Units, Leakage
Resources for the Future	Not Specified	Amendment to Kyoto Protocol	To be Negotiated by Each Country	Not Specified	Not Specified	Not Specified	Future	Not Specified
Niagara Mohawk	Not Specified	U.S. First Budget Period	5% Limit[2]	Not Specified	Not Specified	Domestic & International	Past	Not Specified

[1] This matrix is based on versions of the early action crediting proposals available in July 1998. Since several of the proposals are currently undergoing revisions, the design elements for any of the proposals may be subject to change.

[2] 1% limit on past reductions; 4% limit on future reductions

Figure 3

Schematic Comparison of Early Action Proposal Baselines*



* This chart provides a general schematic representation of the baselines proposed by the Environmental Defense Fund (EDF), Coalition to Advance Sustainable Technology (CAST) and Center for Clean Air Policy (CCAP). Given the complexity of the proposed baselines, this schematic is presented for illustrative purposes only and is not intended to plot actual baseline levels

V. Principles

As the preceding analysis shows, the design and implementation of an early action crediting program raises numerous legal, policy, and technical issues. Although many of these issues are quite complex and cannot be fully addressed with simple and uniform crediting rules for all industry sectors, the following general principles have been formulated to guide policy makers in fashioning a workable and effective program.

1. Provide a predictable credit mechanism and clear legal framework for the program. The principal purpose of an early action crediting program is to encourage ghg reductions in the near term—that is, prior to the first compliance period under the Kyoto Protocol or other international agreement. The program should provide a substantial and reliable incentive that will stimulate immediate efforts to slow down the increase of and, ultimately, to decrease ghg emissions levels in the United States. For such an incentive to be effective, participants must know in advance the credits they will earn for particular ghg reductions or sequestration activities and be given clear assurances that they possess a legally enforceable right to receive earned credits. For those reasons, the crediting mechanism should be clearly delineated by statute or in an agreement authorized by statute.

2. Keep the program simple and flexible. Any early action crediting program will be voluntary. The extent of participation in the program will depend, among other things, on whether potential participants perceive benefits of participation to exceed the costs of complying with the requirements of the program. Simplicity and flexibility are key components of minimizing transaction and compliance costs. Because of the range of potential participants, the agency administering the program will need flexibility to tailor the program to the needs and circumstances of particular industries and companies. The best mechanism for doing this is through agreements between the participants and the government that spell out the specifics of the crediting mechanism for that participant or industry. Model agreements for particular industries may be useful tools in this regard.

Design issues, such as the "rate v. tons" debate, should be resolved on the basis of which approach is most workable for a particular industry, unless there is a clear danger of rewarding phantom reductions. (See discussion in principle number three.) Participants should be given reasonable flexibility through an opt-in mechanism on which sources and sinks they cover, but with a careful eye on potential for gaming. Similarly, participants should be permitted a reasonable range of choices on which gases in addition to CO_2 are to be covered under an agreement.

3. Reward real reductions, not gaming. An early action crediting program takes ghg credits otherwise available to U.S. companies during the initial period of domestic ghg regulation and gives them to participants in the early action program as a spur to reducing ghg emissions before that initial period. It is important that credits be used to reward real, net reductions rather than paper reductions. The program needs to incorporate safeguards that give the public and other emitters confidence that the system will not be gamed.

The program should establish realistic baselines not based on theoretical rising BAU projections that could over-reward participants or on steeply declining reference lines that create significant barriers to participation. A reasonable baseline should be tied to current emissions and performance levels that will give credit for actions that result in real reductions. The program should establish simple rules for avoiding double-counting and accounting for domestic leakage (the shifting of production output from sources covered under the program to other domestic sources not covered under the program). The program should also contain straightforward rules that adjust the baseline for sales, acquisitions, mergers, shutdowns, curtailments, etc.

4. Provide some form of recognition of past voluntary ghg reductions. Voluntary ghg reductions achieved between 1990 and 1998, e.g., as reported under the EPAct §1605(b) program or one of the CCAP programs, should be recognized either in the form of a baseline adjustment or as a direct credit. It is important to maintain the principle that companies will not be disadvantaged because of prior voluntary reductions. However, the reward for past mitigation efforts should be provided only to the extent that the ghg reductions are real, quantifiable, verified, and not double-counted. Any early action crediting legislation should establish a review process and criteria for evaluating and/or screening out those reduction efforts deserving full, partial, or no ghg credit under

the program. The likely magnitude of credits for past reductions needs to be reviewed, and considerations should be given to imposing a ceiling on the total amount of credits allowed for this purpose.

5. Don't predetermine the eventual domestic regulatory program. An early action crediting program should be designed to operate within the framework of any of the likely domestic regulatory or tax programs that might be fashioned to control domestic ghg emissions. This includes a range of regulatory options such as carbon taxes, direct regulatory programs, and marketable permit schemes (implemented through, for example, an auction or administrative allocation of allowances). For an early action program to be truly effective, it should be accompanied by and integrated into a broader set of policies that stimulate early action, such as market-based incentives, fiscal policies, and funding for research and development.

6. Don't make the early action crediting program contingent upon ratification of the Kyoto Protocol. The early action program should not depend upon Senate ratification of the Kyoto Protocol in its present form. Rather, it should be designed to achieve maximum reductions regardless of whatever international control regime may eventually be adopted and ratified by the United States.

7. Focus principally on domestic early action. International projects through the CDM will be credited under the Kyoto Protocol after 2000. As long as the international control regime does not recognize early reductions in developed countries or reductions before 2000 in developing countries, credits for these early reductions will come out of the U.S. budget allocation. This allocation is an asset that should be carefully husbanded for use by the U.S. economy. For that reason, the principal focus of a program should be on rewarding early domestic actions to mitigate ghg emissions. However, the program should also guarantee that participants receive credit for international actions that are creditable under the Kyoto Protocol and result in an addition to the U.S. budget allocation for the 2008-2012 compliance period. Policy makers should also consider recognizing international actions not creditable under Kyoto (such as projects already accepted into the U.S. Initiative on Joint Implementation) if they result in real, verifiable reductions.

8. Don't over-mortgage the U.S. ghg allocation. The Kyoto Protocol, if ratified, will establish ghg budget allocations for developed countries that are not adjusted to reflect early reductions in those countries. As long as this remains a feature of the international control regime, credits for early domestic reductions will have to come out of the U.S. budget under the Protocol. Careful consideration needs to be given to the impact of an early action credit program on the availability of credits to non-participants once domestic regulation commences. The preferred option would be to establish a framework and design features (such as reasonable baselines) that will limit the number of credits projected to be earned under a successful early action crediting program. In the alternative, the program could establish rules for allocating credits under an over-subscribed program. The pool of available credits should be allocated through a reservation system that rewards those participants that make the earliest commitment to ghg reductions so as to provide incentives for early involvement.