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ENVIRONMENTAL DEFENSE

finding the ways that work

March 19, 2007

Hon. John D. Dingell
Chairman, Committee on Energy and Commerce
Hon. Rick Boucher
Chairman, Subcommittee on Energy and Air Quality
U.S. House of Representatives
Washington, DC 20515

Dear Chairman Dingell and Chairman Boucher:

Environmental Defense is pleased to respond to your letter of February 27, 2007, requesting input and asking a series of questions regarding the Committee's development of national climate legislation. Our responses are given in the attached brief, "Toward a Fair and Effective Climate Policy for the United States."

Environmental Defense believes that the most effective approach will be one that is truly comprehensive, exploits the cost-saving, innovation-driving benefits of an economy-wide cap with a well-designed trading system, and taps additional potential represented by other proven policy mechanisms to deliver a complete and durable solution. Such a program can tap America's world-class talents for innovation and leadership, protecting the climate while also fostering economy prosperity and enhancing energy security. A piecemeal program that fails to integrate reduction programs covering major emitting sectors or leaves significant portions of emissions unaccounted for will fail to be environmentally effective and will also fail to provide an equitable, cost-effective solution to the climate challenge.

To be both environmentally and economically sound, reductions should be initially gradual while putting the country on a path to achieving deep reductions by mid-century. The policy should also protect America's competitiveness with respect to other countries that have not yet capped their emissions. Most importantly, the policy must take effect soon. We believe that a thorough, careful but timely national climate policy can be delivered in this Congress, and we pledge to work with you to realize that goal.

Environmental Defense appreciates your Committee's leadership on this critical issue. Thank you for soliciting our input and please contact us if you have any questions about our response or if we can help you in any other way.

Sincerely,

Elizabeth Thompson
Legislative Director

1875 Connecticut Avenue, NW · Washington, DC 20009 · Tel 202 387 3500 · Fax 202 234 6049 · www.environmentaldefense.org
New York, NY · Oakland, CA · Boulder, CO · Raleigh, NC · Austin, TX · Project Offices · Boston, MA · Los Angeles, CA

Toward a Fair and Effective Climate Policy for the United States

Environmental Defense
response to the
U.S. House of Representatives
Committee on Energy and Commerce and Subcommittee on Energy and Air Quality
March 19, 2007

1. Issues to be Addressed in Domestic Climate Legislation

Please outline which issues should be addressed in the Committee's legislation, how you think they should be resolved, and your recommended timetable for Congressional consideration and enactment.

Environmental Defense believes that the most effective approach to protecting climate will be one that is comprehensive, establishes a progressively tighter legally binding cap on U.S. greenhouse gas (GHG) emissions, and begins as soon as possible. To be both environmentally and economically sound, reductions should be initially gradual while putting the country on a path to achieving deep reductions by mid-century. The policy should also protect America's trade position with regard to countries that have not yet capped their emissions. While many climate policy proposals have been introduced, to date none of them meet all of these objectives. The goal of cost-effectively and equitably reducing U.S. GHG emissions cannot be achieved with a piecemeal strategy.

What do we mean by comprehensive?

The starting point for understanding what constitutes a comprehensive strategy is clarity about the goal: avoiding dangerous climate change in the most cost-effective manner. As elaborated below, that requires a declining emissions budget for the U.S. economy that is based on the science linking atmospheric GHG concentrations to climate stabilization, and on creating the widest possible policy platform for achieving the necessary emissions reductions.

This emissions budget is expressed as a cap, or limit, on the annual inventory of net GHGs emitted by the United States. The cap, which can be specified in a series of multi-year periods, would progressively decline and thereby determine the total GHG emissions reductions needed in any given year. A comprehensive domestic strategy is one that ties the emissions reduction obligations of all major economic sectors together in a legally enforceable framework to meet the cap. Only through such a framework can the country be certain that its GHG inventory stays within the budget necessary for America's contribution to climate protection. Trading provisions, both within the U.S. economy and with other nations, provide a mechanism for meeting the cap flexibly and cost-effectively, as they create the opportunity for finding the lowest cost reductions. Such provisions must meet certain guidelines (also elaborated further below) to ensure the integrity of emissions limits both nationally and internationally.

In short, for a policy to be comprehensive, it must establish a framework that

- has economy-wide reach, namely, is capable of covering *all* major sources of GHG emissions;
- ensures that the sum of GHG emissions from all sectors nets out to a total that meets the economy-wide cap in any given year (or multi-year reduction period); and
- is legally binding.

To be legally binding, the policy must include enforcement provisions to guarantee that:

- all covered sectors meet their emissions reduction obligations;
- public agencies effectively and punctually implement all necessary policies and measures; and
- trading programs, flexibility provisions and other cost-management mechanisms operate transparently, fairly and with integrity.

While the terms "cap and trade" are frequently used as one, it is important to point out that the *cap* is the foundation for making an approach comprehensive as we define it here. Trading provisions serve the cap and the cause of economic efficiency, and as noted in our responses under Question 2 below, they must be designed with reference to the diverse, complex, sector-specific characteristics of the markets that collectively comprise our economy.

More specifically, when we say that a "cap and trade" paradigm provides the ideal framework for developing a comprehensive climate policy, we are not suggesting a "one size fits all" approach for every sector. Rather, we are saying that all sectors must be tied together under a cap that is served by trading provisions (i.e., a carbon market) *and* other market-compatible measures that make sense for each sector while maximizing economic efficiency across sectors and across national borders. Some markets will require measures that may not be amenable to direct trading of emissions allowances. For example, appliance efficiency standards, building codes, consumer education and incentives for energy-using products and other such programs are crucial ways to help achieve reductions within the power sector. A comprehensive policy will include such tools and establish a framework for agencies to administer them in a manner that cost-effectively contributes to meeting both sector-level and economy-wide goals.

Simply assembling a collection of policies such as sector-specific cap-and-trade programs, performance standards and other measures into a single bill, without a framework for integrating emissions reduction obligations to meet a binding cap, does not pass the litmus test for a truly comprehensive policy. Approaches that attempt to address the climate problem through separate, loosely-related policies that address different parts of the economy are outdated and inadequate. Such piecemeal strategies are unreliable for meeting the country's necessary emissions budget and would therefore be ineffective in protecting the climate. Just as importantly, such piecemeal approaches would be a more costly and less equitable way to reduce emissions. Only a comprehensive approach will be maximally cost-effective and fair. Moreover, excluding sectors from an overarching policy would limit the opportunities for economies of scale in emissions reductions and dampens the stimulus for innovation across multiples sectors of economy.

Policy Design Considerations and Guiding Principles

Crafting comprehensive legislation means making decisions about how to distribute the responsibility for achieving emissions reductions across the major sectors of the economy. While the use of emissions trading can go a long way to balancing the costs and maximizing the ways for businesses to profit from climate protection, designing the policy will entail a set of legislative decisions about how to allocate the obligations and opportunities for GHG emissions reduction. A number of considerations can guide this process, including:

- The relative contributions of emitting sectors;
- Equity (including environmental justice) and fairness, both in terms of the apportionment of responsibility and the scale of reduction obligations
- Cost-effectiveness (economic efficiency)
- Job creation opportunities
- Economic wherewithal: recognizing that some sectors and market actors have greater innovative capacity and access to capital than others
- Competitiveness: ensuring that emissions reductions obligations do not cause competitive disadvantages
- Co-benefits (such as energy security and added environmental benefits)

No one of these principles and considerations can be fully determinative or dominant; rather, all of them must be weighed to create a balanced policy design. We will refer back to these *Policy Design Considerations* at other points in our response below, since considering them will be important for informing many aspects of policy design.

Timetable for Action

Congress should enact legislation that places a progressively declining cap on U.S. GHG emissions to take effect not later than 2010. Delaying enactment and implementation will make the task of stabilizing concentrations even harder, more economically disruptive, and possible only at a higher level of GHG concentrations in the atmosphere.

The ongoing increase of GHG concentrations in the Earth's atmosphere already is causing an accelerated warming of the planet. Alarmingly, Americans are now learning that this warming is producing effects at home and around the globe far faster than almost anyone had expected. Therefore, the United States needs to cap its GHG emissions sooner rather than later. The urgency of U.S. action is heightened because America's leadership is utterly crucial for bringing major developing economies on-board with an international climate protection effort. An approach that would allow emissions to continue to rise for the next 15–20 years (even at a slower rate) is inconsistent with the goal of stabilizing the GHG concentrations in the Earth's atmosphere before irreversible climatic damage occurs.

Passing legislation in time to begin serious emissions control efforts by 2010 is an ambitious but realistic timetable. We take to heart Chairman Dingell's recent comments about "good, fast,

cheap: pick any two." It is essential that America's climate policy not just be good: it must be exemplary. The policy must not be merely cheap: it must be highly cost-effective and stimulate innovation and economic growth. And it can be timely and expedient without being "fast" in the way that "haste makes waste."

1(a) For any policy recommendations, please address the impacts you believe the relevant policy would have on emissions of greenhouse gases and the rate and consequences of climate change.

The policy we recommend would put the United States on a path to achieving deep reductions of GHG emissions by mid-century, starting gradually but following a trajectory that achieves an 80% reduction by 2050, as given in our response to Question 2(f), below.

If such timetable is implemented as soon as possible, and commensurate reductions are achieved by other OECD nations along with timely and effective reductions in high-emitting developing nations, atmospheric GHG concentrations would be stabilized at roughly 450 ppm of CO_2-equivalent. Such levels have a good likelihood of limiting global temperature increases to 2°C, a level above which dangerous consequences for the climate become much more probable.

1(b) For any policy recommendations, please address the impacts you believe the relevant policy would have on the US economy, consumer prices, and jobs.

A firm answer on the question of jobs and economic impact depends wholly upon the ultimate policy choices made by Congress. If Congress chooses a comprehensive policy approach as outlined above, benefits to the environment and economy will be maximized and any costs will be kept to a minimum. Furthermore, as Congress weighs different policy design choices, members should be aware of both the practical limitations of formal quantitative analysis and of the important perspective to be gained from real-life experiences in this field.

These two points are discussed below.

A well-designed policy will deliver large benefits at modest cost

Relative benefits and costs of a policy depend on how well the policy is designed. As proven by America's legacy of cost-effective environmental legislation, a well-crafted policy will have benefits that substantially exceed its costs, guaranteeing substantial net economic benefits to the economy. Environmental Defense believes that the approach described in our opening response to Question 1 will yield the atmospheric benefits necessary *and* economic benefits by taking advantage of economies of scale and by increasing our economic competitiveness through stimulation of innovation across multiple sectors of the economy.

Economic models are limited in their ability to model both costs and benefits

Economic analysis is poorly suited to dealing with issues whose costs and benefits occur over a long period of time. This is often the case in areas of environmental policy, but particularly so in the case of climate change, where the environmental impacts will play out over decades. The time frames involved—both in terms of climate impacts and in terms of the economic response to policy design—far exceed the 10-15 year horizon during which economic forecasting typically has the greatest utility.

The issue of time frames is absolutely critical. Economic analyses typically discount future benefits, which poses a major problem when trying to evaluate forces that have very serious long-term economic impacts, like climate change. For example, what is the long-term benefit to preserving snowpack, and thus essential water supplies, to much of the American West? Alternatively, what is it worth to avoid a withdrawal of populations from coastal areas, either due to sea level rise or because property insurance is no longer available at any price? Will increases in summertime temperatures make areas of the country uninhabitable? At what cost?

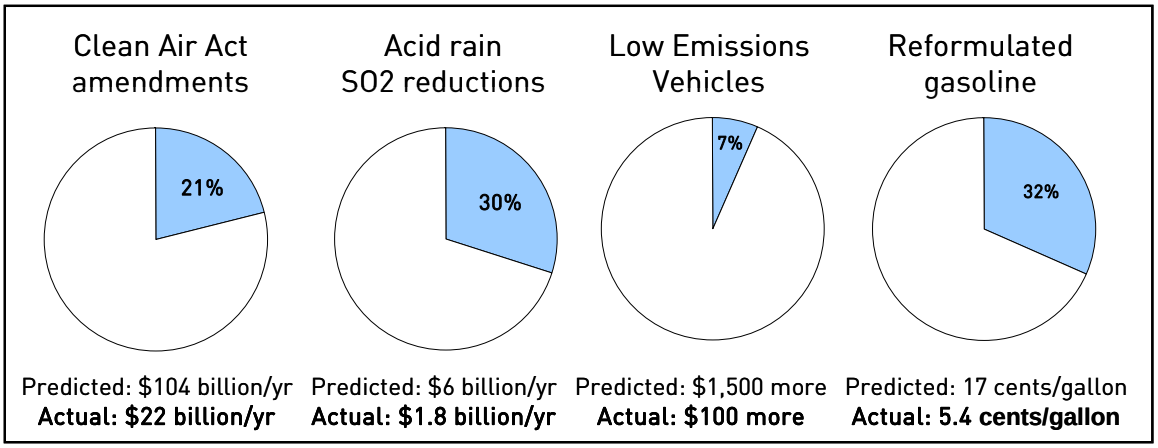
In addition to skewing estimates of benefits downwards, standard analytical techniques also have a tendency to skew estimates of cost upwards because standard methodologies give short shrift to the innovative capacity of the U.S. economy. The inability to adequately account for innovation is one of the biggest failures of economic models, which treat technology as largely static. Imagine if such an approach was used at various points of time over the past century:

If a cost study was performed in	*It would not have accounted for*
1900	automobiles or the assembly line
1945	the national highway system or commercial air travel
1970	personal computers or the internet
1980	UPS and FedEx air shipping

When modeling techniques encompass little long-term innovation and heavily discounted longer-term benefits, it's no surprise that results often consistently underplay the benefits of action and overplay the costs of action. Given the especially long-range nature of climate impacts and solutions, these limitations are greatly amplified for climate policy modeling.

Real-world experienceclearly reveals the limitations of prospective economic analysis. The operation of the Clean Air Act provides solid evidence that shows how, when asked, America delivers environmental results ahead of schedule and below cost. A triumph of bipartisanship, both when originally enacted in 1970 and renewed with the 1990 Amendments, the Clean Air Act has delivered cleaner, healthier air to millions of Americans while proving to be perhaps the most cost-effective major regulatory program in history. The U.S. Environmental Protection Agency (EPA) has valued the accumulated health benefits of the Clean Air Act through 1990 at

$22.2 trillion and the total compliance costs over the same years at $0.5 trillion, resulting in net monetary benefits of $21.7 trillion, a benefit:cost ratio ofover 40:1. The statute continues to deliver growing benefits, now enhanced by the considerable health and environmental gains from the Clean Air Act Amendments of 1990, which has also proven much less costly to implement than was foreseen at the time. The following chart provides an illustration of some of this performance, as well as that of other clean air initiatives.



Actual vs. Projected Costs of Air Pollution Regulation in the U.S.

In summary, while economic analyses commonly estimate the costs of action to mitigate climate change, they rarely factor in the costs of inaction. *This is a critical oversight we hope that the Committee will not perpetuate.* The impact of climate change policy on the economy is perhaps best summed up by former Federal Reserve Chair Paul Volker, who said that suggestions that climate policy would harm the economy are "fundamentally false … First of all, I don't think [such a step] is going to have that much of an impact on the economy overall. Second of all, if you don't do it, you can be sure that the economy will go down the drain in the next 30 years."

2. QUESTIONS REGARDING CAP-AND-TRADE POLICY

One particular policy option that has received a substantial amount of attention and analysis is "cap-and-trade." Please answer the following questions regarding the potential enactment of a cap-and-trade policy:

2(a) Which sectors should it cover? Should some sectors be phased-in over time?

The policy must encompass all major sources of emissions and motivate the entire economy to pursue strategies that contribute to the national climate protection goal. No one sector of the economy is responsible for all of the GHG emissions into the atmosphere. Also, innovation does not occur only in one sector of the economy. Thus, the cap itself must be defined on an economy-wide basis, even though the particular mechanisms for allocating and limiting emissions under the national cap may differ according to sector.

Major sectors that must be covered include the electric power, industrial, commercial, and transportation sectors. Designing an integrated strategy that covers all major sectors while respecting their different market structures is one of the key challenges for developing effective climate legislation. We do not have preconceived notions of a "one size fits all" approach and so we look forward to working with American businesses, the Committee, and other policymakers to design an comprehensive system that maximizes coverage while minimizing costs. To limit administrative costs, the policy need cover only those entities within the defined sectors that emit over a certain threshold e.g., 10,000 metric tons of CO_2e per year. This particular threshold would cover, for example, just 2 percent of sources in the manufacturing sector, but would account for more than 80 percent of emissions from that sector.

Smaller sources and unregulated entities may represent, in the aggregate, a substantial source of additional GHG reductions. A market for GHG reductions should be designed to tap this potential through use of economically efficient and environmentally sound emissions offsets, for example, in the agricultural and forestry sectors [see Question 2 (j), below, for more detail].

Additionally, sector-specific policies that tap the potential for greater efficiency throughout the economy should also be considered. Policies that improve energy efficiency of appliances, equipment, and the built environment are examples of important tools for maximizing both the emissions reductions and the cost-effectiveness of a climate policy. While such measures are not administered within a trading program, they should be integrated into climate policy and administered directly in service of the national emissions cap.

Phasing-in

All sectors require phase-in, with their respective timings dependent on the investment cycles and capital stock turnover patterns specific to each sector. A determination of the best phase-in schedules should be informed by the *Policy Design Considerations* noted above under Question 1. It is important to note that a carbon market will provide the greatest economic efficiencies when it includes all participants.

2(b) To what degree should the details be set in statute by Congress or delegated to another entity?

Congress should choose the major defining elements of federal climate change policy. These will include:

- emissions targets and timetables,
- the scope of market-based measures such as a cap-and-trade program for appropriate sources,
- the scope of other policy measures, such as energy-efficiency or carbon-based performance standards undertaken in the service of the overall economy-wide cap,
- major policy questions, including the method for allocation or auctioning of allowances, and the degree to which emissions offsets are allowed .

Congress must also address several other critical elements needed for a well-functioning policy. One of these is the need for a Federal agency to coordinate measuring, tracking and reporting the U.S. GHG inventory and to inform Congress and the Executive Branch about emissions reduction progress as needed to keep the program on track.

Another need is to create and delegate the responsibility and authority for oversight of the carbon market. Accountable Federal supervision is essential for ensuring the integrity, transparency and enforceability of an emissions trading program.

In addition, a national climate policy will entail a host of technical matters suitable for handling through rulemaking procedures and other Federal agency actions specific to various sectors and sources. Examples include (but are not limited to):

- establishing standards and procedures for calculating and awarding emissions offsets from agricultural and forest practices to sequester carbon;
- establishing standards and safeguards for the geologic sequestration of carbon;
- conducting regional studies on potential infrastructure impacts of climate change and associated adaptation strategies and costs.

In general, Congress should use its oversight role to ensure that all Federal agencies take on their appropriate roles in enabling reliable emission reductions, implementing adaptation measures, and pursuing other climate-related actions as may become necessary.

Finally, given the scope of action needed to effectively control GHG emissions economy-wide, all Federal agencies whose decisions have a significant influence on emissions must be obligated to account for the GHG impacts of their decisions in a manner appropriate to the agency's expertise and mission. An appropriate delegation of responsibilities in this fashion will make for a strong program, one that fully integrates the national climate protection commitment with existing missions and obligations of the Executive Branch.

Thus, while one agency may play a pivotal role in tracking progress overall and in managing areas of policy within its expertise, an obligation and appropriate level of authority should be given to all agencies whose actions influence emissions to ensure "carbon sensitive" decision making within their purviews. This sensibility should extend even to agencies whose main influence is over their own operations (such as buildings, vehicle fleets, etc.), all of whom can contribute to Federal leadership in climate protection.

2(c) Should the program's requirements be imposed upstream or downstream or some combination thereof?

A climate policy will require a combination of "upstream" and "downstream" requirements. This question regarding the best points of regulation entails many issues including considerations of environmental and economic effectiveness, equity and administrative workability.

Stationary sectors

For sectors such as the electric generating or large manufacturing industries, placing the point of regulation at the facility level is appropriate. First, this is where decisions regarding power generation and industrial process options are made. Second, many of the affected entities in these sectors are familiar with the operation of market-based programs for conventional air pollution control. Major facilities-level requirements should be supplemented by tracking and measuring of fossil fuel production at the mine mouth or wellhead for purposes of estimating emission inventories and capturing fuel-cycle GHG impacts (such as emissions from natural gas flaring or resource production and distribution) that occur "upstream" of generation facilities.

Ultimately, success in the electric generating sector depends not only on upstream emissions reductions requirements, but also on efficient appliances, equipment and buildings. Thus, in order to have a policy that maximizes cost-effective emissions reductions, utility-level cap-and-trade programs should be complemented by appliance and equipment energy efficiency standards as well as building codes, consumer education and incentives, and other measures.

Transportation

The transportation sector must be integrated in to the nationwide cap, but through policies that are tailored to the *multiple* factors that determine emissions from this sector. Emissions from transportation are determined by the joint decisions of numerous actors, including major industries such as automaking and petroleum fuel supply, consumers and businesses who use vehicles and other transportation services, and transportation system planners at many levels of government. Thus, a cap-and-trade system modeled after that used for major stationary sources is not readily adaptable to transportation. Nevertheless, for an environmentally effective, economically efficient and equitable overall policy, it is important for the sector to be fully integrated into the economy-wide cap.

Transportation's subsectors have very different market characteristics themselves. Commercial freight (trucking, rail) and aviation each have their own unique market structures. It is likely that a mixture of policy tools will be needed to address emissions from the freight and air subsectors while integrating them into an economy-wide framework; further analysis and engagement of the relevant stakeholders will be needed to help develop appropriate policy designs.

Automobiles constitute the largest portion (roughly 60%) of transportation GHG emissions in the United States. While Corporate Average Fuel Economy (CAFE) standards, or similar regulations based on CO_2 emissions per mile, are one mechanism for addressing the auto sector, they address only one of the factors that determine automobile GHG emissions. The other two key factors are fuel carbon content and the amount of driving. (Fuel carbon content refers here to full-fuel cycle GHG emissions per unit of delivered fuel.) Moreover, vehicle efficiency is the product of market decision making that depends on consumer choices as well as automaker product strategies.

Bearing these factors in mind, Congress might consider addressing the automotive sector using one of three basic approaches:

- *Performance standards for both vehicles and fuels*

  This approach would apply fuel economy or GHG emissions standards to motor vehicles and carbon content standards to motor fuels. Such an approach would be analogous to the CAA approaches that "treat the vehicle and the fuel as a system."

- *A cap on fuel-related emissions, plus vehicle CO_2 standards*

  This approach would pair a declining cap on fuel-related GHG emissions with motor vehicle GHG emissions standards; the vehicle emissions standards would contribute to helping fuel suppliers meet their declining caps.

- *A cap on automaker's new fleet carbon emissions, plus fuel carbon standards*

  This approach would pair a declining cap on the expected lifetime GHG emissions associated with automakers' new vehicle fleets with declining fuel carbon content standards; the fuel standards would contribute to helping automakers meet their declining caps.

Any of these three approaches can be used to give the key auto sector industries well-defined responsibilities for emissions reductions under a cap. Environmental Defense will be insistent that an effective climate policy must include a regulatory measure that specifically binds the auto industry. For each of these approaches, further analyses are needed to define levels of responsibility and to develop appropriate trading, flexibility and other cost-management provisions. Also needed are measures targeting consumers, since without sufficient consumer interest in low-carbon vehicles and fuels, it may be difficult for either the auto or fuels industries to meet their emissions reductions goals. Additionally, Congress should include incentives and other measures to encourage efficient transportation infrastructure and land use planning.

2 (d) How should allowances be allocated? By whom? What percentage of the allowances, if any, should be auctioned? Should non-emitting sources, such as nuclear plants, be given allowances?

Allowances as a Cost Management Device

The question of allowance allocations versus allowance auctions is, in its essence, a question that largely pertains to the management of costs (and benefits) in terms of where emissions reductions requirements fall.

So long as the total allowance pool does not exceed the level of the cap set by Congress, the choice of auctions versus allocations should be guided by the considerations articulated under Question 1. Each system has its advocates. ; Auctioning advocates cite its economic efficiency, its revenue and "public benefits" possibilities, and its simplicity for policymakers who would not have to make political choices that create winners and losers through allocation. Allocation advocates prefer this method, very often, precisely *because* it enables the "creation" of winners and losers by government choice. A choice by Congress to direct allowance allocation can indeed be an additional means of addressing members' sectoral concerns related to cost management and

equity in climate policy. It should be clear to members that this route does not necessarily come at a lower cost to consumers than an auction methodology, as some have implied. Experience in the EU ETS market has shown that even when allowances are given to emitters at no cost, the recipients of these allowances will still pass along to consumers some portion of the "opportunity cost" incurred by holding the asset represented by the allowances. Special-purpose allocation has the additional drawback that as more allowances are set aside for specific market participants, the costs for remaining market participants rise because allowance set-asides diminish the remaining pool of allowances available freely on the market.

This last point is key: special allowance allocations must not "bust the cap." *Any allowances designated by Congress for specific purposes*—whether to render a particular industry functionally "exempt" from emissions limits, to diminish the regulatory burden placed on a particular businesses, to give a "bonus" to low-emitting sources, or any of a variety of other purposes—*must come from the total allowance pool as defined by the cap on emissions*. Devices that allow emissions limits to be exceeded—like price-triggered "safety valves," or special funds or allowance pools that are additional to the total defined by the cap—not only undermine the environmental integrity of the program but can also severely damage the innovation drivers created by a market with a clear and consistent price signal.

Instead of devices that allow emissions limits to be exceeded, the Congress can establish a program utilizing allowance set-asides under the emissions limit to manage costs borne by individuals, companies, sectors, and the economy at large. The specific mechanism could vary for each entity. For example:

- For companies and individuals, a small number of allowances (perhaps 1% of the annual allocation) could be set aside in a reserve as an insurance fund for the benefit of affected consumers or individual companies. The Secretary of the administering agency would have the authority to award allowances out of the reserve, upon application, based on predetermined criteria to companies that would be otherwise unable to meet their allowance obligations because of extreme financial hardship. Alternatively, a number of allowances could be sold from the reserve, and the proceeds channeled to assist a disproportionately affected community.
- For specific economic sectors, a larger number of allowances (perhaps 4%), while initially allocated in some fashion, could be reallocated periodically among economic sectors (again, according to predetermined criteria) to address changing circumstances and particular sector concerns. These allowances could be sold to provide funds for worker assistance or other adjustment measures.
- Finally, if there were to be some unexpected, highly significant event that impacted the economy as a whole or at least many sectors within it, the relevant agency could authorize a "wholesale borrowing" of allowances from future compliance years to be used in the time period of concern. Because those allowances would eventually be "paid back" with interest once the economy had adjusted to the event, overall environmental integrity would not be at risk. Such a system would not allow emitters exceeding their limits to pass the cost on to general consumers and taxpayers.

Protecting future generations from the dramatic effects of climate change can be done in a way that minimizes cost to the overall economy. In addition to availing themselves of low-cost offsets, companies will be best served in their efforts to manage costs—no matter what the system of allowance distribution—by clear and consistent rules for allowance banking and borrowing. We discuss this approach further under 2(i).

Allowances for non-emitting sources

Allowances have economic value, so distribution of allowances is a means of providing financial assistance to specific types of technologies. Congress should consider the scale of benefits associated with this type of assistance, especially in light of any other forms of financial assistance already being provided to the sector in question.

2(e) How should the cap be set (e.g., tons of greenhouse gases emitted, CO_2 intensity)?

A cap on GHG emissions ("carbon cap") must be set on the basis of tons of CO_2-equivalent greenhouse gases emitted economy-wide. Climate change results from the accumulation of GHGs in the atmosphere; the concentration of these gases in the atmosphere determines the degree of warming that will occur. In order to avert dangerous climatic changes, emissions must be limited to a level that avoids buildup of GHGs beyond safe concentrations.

An absolute cap is the only reliable way to provide certainty for an emissions reduction pathway that stabilizes atmospheric GHG concentrations. A cap on emissions also provides a point of reference against which emissions reduction progress can be evaluated, so that adjustments in the strategy can be made on a regular basis to keep the climate protection program on track. An intensity target (e.g., one based on GHGs per unit of GDP) does not guarantee adequate reduction of GHG emissions. In fact, an intensity target provides no assurance that emissions will even fall. For example, GHG intensity in the U.S. decreased by 20% from 1990 to 2004, but actual emissions increased by 21% during that same period.

A well-defined, absolute cap is also necessary for creating an effective and efficient market for emissions-reducing innovations. In contrast, an intensity target would also unnecessarily complicate the market, forcing it to anticipate trends in both macroeconomics as well as CO_2 emissions (as well as their interaction), and so fail to be an effective mechanism that motivates innovation and finds the most cost-effective ways to cut emissions.

Because an intensity target does not constrain emissions, it does not provide a sound basis for policy. It would fail to halt the buildup of GHGs and so would have to be abandoned after a few years. And that would be economically the most destructive, wealth-destroying path of all: having to start over after several years of failure. Those who are most worried about economic impacts have the largest stake in getting it right the first time.

2(f) Where should the cap be set for different years?

The national cap should be set to follow a GHG emissions reduction trajectory which, as part of an international climate protection regime, puts the U.S. economy on a path for achieving deep reductions in emissions by mid-century. While lead time is needed for policies to take effect and for capital stocks to turn over, Congress should select short- and mid-term targets that make it clear that the country is committed to a well-defined, legally enforceable pathway that slows, stops and reverses the growth of U.S. GHG emissions.

Environmental Defense is a member of the U.S. Climate Action Partnership (USCAP), which recommended a band of targets that would contribute to stabilization of atmospheric GHG concentrations. Environmental Defense advocates the more stringent end of this band, with the following targets:

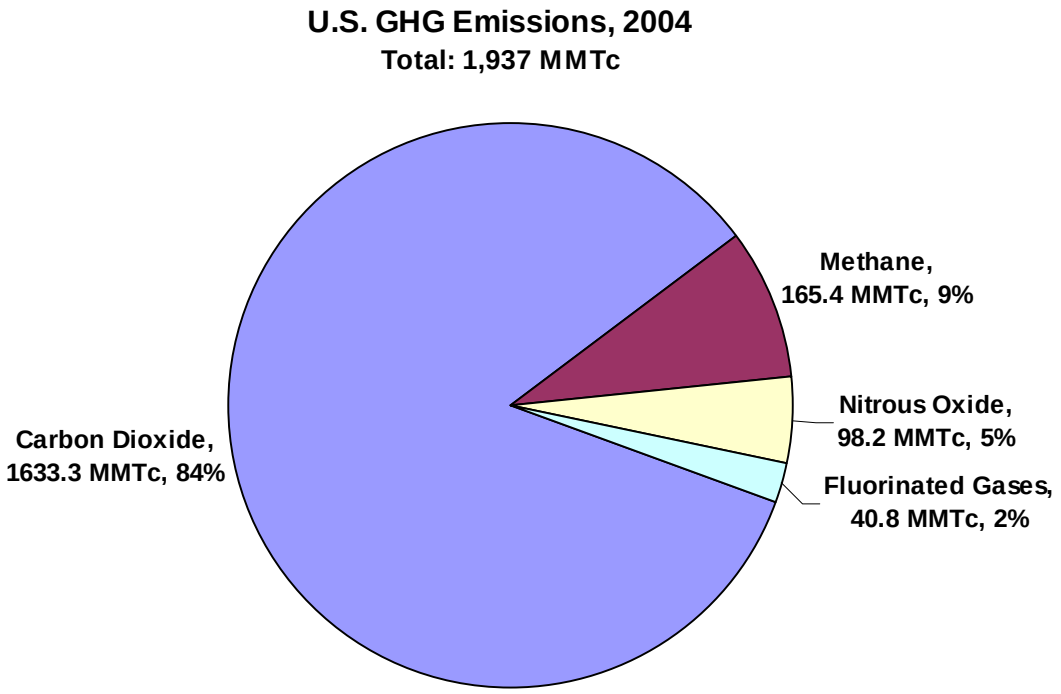
Year:	Cap relative to current levels:
5 years from enactment	100%
10 years from enactment	90%
15 years from enactment	70%
2050	20%

2(g) Which greenhouse gases should be covered?

Six gases have been identified by the International Panel on Climate Change as GHGs, and are most commonly included in climate change policy: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and the fluorinated gases hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). While CO_2 represents the vast majority of U.S. GHG emissions (84% or 1,663 million metric tons of carbon equivalent), the global warming potential for the other gases is significant (see table and figure below). Small emission reductions in these gases can have a positive impact on the environment, and therefore should be included in any policy designed to reduce GHG emissions.

Global Warming Potential (GWP) of Primary Greenhouse Gases	
GHG	**GWP**
Carbon Dioxide (CO2)	1
Methane (CH4)	23
Nitrous Oxide (N2O)	296
Hydrofluorocarbons (HFCs)	120-12,000
Perfluorocarbons (PFCs)	5,700-11,900

Sulfur Hexafluoride (SF6)	22,200
Intergovernmental Panel on Climate Change, Climate Change 2001: The Scientific Basis, 2001 (www.eia.doe.gov/oiaf/1605/gwp.html).	



Note: Emissions levels are weighted by GWP and given in million metric tons carbon-equivalent.
Source: Energy Information Administration, Emissions of Greenhouse Gases in the United States 2005

2(h) Should early reductions be credited? If so, what criteria should be used to determine what is an early reduction?

Yes, there is a role in for early reduction credits; instances of real, verifiable net GHG emission reductions in advance of the first binding date of the cap will help address the urgent need to reduce emissions and should be encouraged.

That said, Congress faces a potentially dizzying array of claims for early reduction credit from an enormous range of sources employing vastly different methods to account for credits claimed. The task of sorting out which projects have resulted in real net emissions reductions over time is best performed by an agency or inter-agency process and is not a reasonable expectation for Congress. However, Congress should make some critical, high-level decisions to guide procedures for awarding early action credits:

- Any credits for early action should be awarded in the form of allowances taken from the total pool available under the emissions cap. In other words, credit for early action cannot, in the

end, represent emissions that may be emitted in excess of the mandated cap. Credit given to one party must be deducted from the total number of tons available under a cap, not added to it. This requirement is necessary for the environmental integrity of the program. It also serves as an indirect check on the total number of tons awarded for early action.

- Congress should require that any credit awarded for early action represent actual benefits to the atmosphere. Intensity or rate-based reductions, or other relative measures of performance, do not necessarily result in total emission reductions and should not be eligible. Project-based reductions cannot be credited without complete accounting following principles similar to those for offsets [see 2(j), below]. In short, early action credit should be awarded only for actions that yield a net atmospheric benefit.

2(i) Should the program employ a safety valve? If so, at what level?

If the question refers to a "price cap" form of a safety valve – where for a specified price emitters can purchase additional emissions allowances in excess of those that would be allowed under a cap – no, that should not be allowed. Such a safety valve would damage both the environmental integrity of the cap and retard the investment necessary to develop technology and create jobs.

Indeed, a price cap form of safety valve could undercut the development of the very technologies that some high-emitting industries will need in the future to meet their emissions targets. Thus it not only threatens to undermine the environmental benefits of a cap-and-trade program in the near term, it sows the seeds of the program's failure over the longer term as well.

In contrast, costs can be controlled with a well-designed market-based approach, with the trading mechanism being one key strategy for managing costs while maintaining environmental integrity. A good example is given by the acid rain cap-and-trade program established by the 1990 CAAA, which is an outstanding model of success that provides a true cap on emissions while coming in with costs that were 40% below even the most optimistic projections.

If, instead of being a simplistic price cap, a policy's "safety valve" refers to a collection of provisions for managing the costs of compliance, then yes, Environmental Defense believes that such cost-control mechanisms can be beneficial while preserving the integrity of the cap. Examples of such provisions include:

- The ability to borrow allowances (with payback and "atmospheric interest") from future time periods
- The ability to bank excess emissions reductions in the current year to be used in future years
- The ability to purchase emissions reductions from farmers undertaking agricultural practices that store carbon in the soil
- The ability to purchase emissions credits from international markets

Moreover, additional approaches can be developed to tailor economic support for individual firms, communities, or regions of the country that might be disproportionately impacted by aspects of climate policy implementation (see 2(d), "Allowances as a cost-management device,"

for examples). All of these tools can provide the cost management results we desire without the innovation dampening effects of a price cap and its inherent damage to the emissions cap.

2(j) Should offsets be allowed? If so, what types of offsets? What criteria should govern the types of offsets that would be allowed?

Yes, offsets should be permitted, provided they meet high standards of integrity. In short, offsets are net decreases of GHGs released to the atmosphere that are achieved by entities operating outside of a cap (either uncapped sectors or countries not yet capped). They may be obtained through GHG "sinks" or through emissions reductions. Offsets are a means for enhancing the economic efficiency of climate policy. They can reduce the cost of compliance and broaden the carbon market by enlisting more actors in the hunt for low-carbon alternatives.

One example of an offset would be GHG emissions reduction achieved by a small firm that does not meet the threshold for regulation under the cap. Another might be a reduction made by an agricultural operation not otherwise required to reduce its GHG emissions. Capturing methane from landfills, both avoiding its release and replacing fossil fuel use, is another example of emissions reduction that could be used as an offset. These often smaller-scale projects offer substantial opportunity for cost-effective reductions in places that would otherwise be untouched by a cap and trade market, and Environmental Defense endorses their use.

It is critically important to note that offsets are only valuable if they meet high standards of integrity in terms of representing a verifiable net reduction or sequestration of GHGs. Climate legislation must therefore ensure that the use of offsets (the "offset market") is governed by rules that guarantee an atmospheric benefit. Key criteria include the following:

- Offsets must be *real,* that is, they must result in a measurable net atmospheric benefit achieved through an action that yields a well-defined reduction or sequestration of GHGs that would not have otherwise occurred.
- Offsets must be *verifiable,* that is, subject to verification through measurement, observation, or other reliable form of assessment.
- Offsets must be *enforceable,* that is, governed by mechanisms that render them invalid or otherwise sanctioned if the claimed quantity of offset is not verified.
- Offsets must be *maintained* in an accountable manner, either permanently or with mechanisms that account for any change in the quantity of emissions offset, for example, by requiring replacement or payback if the emissions reduction or sink is not maintained.

In addition to these general criteria, regulations governing offsets will need to address measurement and calculation methodologies, transparent accounting practices, provisions for addressing uncertainties and avoiding other adverse health and environmental impacts from the actions providing the offset. Inattention to these criteria may result in offsets entering the market that do not represent net atmospheric benefits and thus undermine the integrity of the market and compromise the environmental goal.

America's agricultural sector offers many economically attractive opportunities for GHG emissions offsets, in addition to the sector's potential contributions to sectoral emissions reductions (e.g. through the supply of low-carbon fuels). Many offset opportunities exist through farming products and practices that can actually take GHGs out of the atmosphere, or avoid emissions that would otherwise be released. The United States has both the land area and the climate to provide substantial, near-term emissions reductions and carbon sequestration through climate-friendly land use practices.

Examples include:

- Soil carbon sequestration -- use of farming practices like no-till or direct-seed drilling, which drill into the soil and drop in the seed to grow up through the residue of last year's crop. This is an alternative to conventional tillage and avoids the release of the carbon naturally stored in the soil.
- Methane capture from livestock operations -- technology to capture the methane bio-gas from manure and use it to replace fossil fuels offers the dual benefit of avoiding the release of the methane, which is 23 times more potent than CO_2, for global warming, and at the same time avoiding the CO_2 emissions from the displaced fossil fuel use.
- Reforestation -- planting trees on formerly forested, marginal agricultural lands can sequester large amounts of carbon while providing additional environmental benefits like improved water quality and wildlife habitat.

In addition to the climate protection benefits, recognition of such offsets in a federal carbon market will provide a needed economic benefit to the America's rural communities.

2(k) If an auction or safety valve is used, what should be done with the revenue from those features?

In the event that some (or all) allowances are auctioned, we offer some suggestions for using the revenue. Revenues could be used for the following:

- transition programs for those workers affected by the policy;
- assisting low-income families, in the event of higher energy costs or other impacts;
- adaptation assistance, particularly for states and municipalities, for unavoidable climate change impacts;
- funding of pilot projects to demonstrate geologic sequestration of CO_2;
- promoting the use of mass transit;
- and promoting energy efficiency.

Where appropriate, the revenues could also be used to support R&D, but such support should not displace private sector R&D that would have occurred anyway. In general and as we elaborate below, beyond fundamental research to enable ongoing technological progress, the

most effective R&D will be that carried out by the private sector in response to the market forces that will be unleashed under a carbon cap.

While appropriate cost-control mechanisms are an important part of climate policy, a simplistic, "cost cap" type of safety valve is an ill-considered and ineffectual approach to the issue. Such an approach puts a ceiling on the ambition of America's entrepreneurs in finding solutions to the climate problem.

2(l) Are there special features that should be added to encourage technological development?

The primary driver for the development and deployment of innovative technology should be market demand, which is created when an overall limit on GHG gases is set. Once the limit on GHG emissions is set, the market will provide strong incentives for technology development and that maximizes GHG reduction benefits.

The very nature of the above questions reflects the difficulty of administering government programs to facilitate deployment of technology. In order to prevent the confusion of goals, traditional government R&D programs should continue to be authorized and appropriated in a separate process from the implementation of policies meant to reduce emissions.

Beyond the use of financial mechanisms to promote technology, there are opportunities today to develop enabling mechanisms that assist innovation. For instance, as part of the development of carbon capture and storage practices, we need to develop standards and safeguards for geologic sequestration. Congress should use its oversight authority to ensure that relevant agencies take this prudent step now.

2(m) Are there design features that would encourage high-emitting developing countries to agree to limits on their greenhouse gas emissions?

Yes. These steps can help protect America's environment from disadvantage if other nations fail to join the global effort. These measures can also avoid putting U.S. firms and workers at an economic disadvantage if other nations fail to adopt binding emissions limits.

Congress should enact a mandatory, economy-wide cap on total U.S. GHG emissions set at the levels identified by U.S. CAP. A strong cap would give America the moral and practical authority to demand comparable action by high-emitting developing nations.

Congress should offer high-emitting nations that reduce their emissions, from a historical baseline, the opportunity to be compensated through the US carbon market. For example, deforestation, primarily in the tropics, is an enormous source of carbon dioxide emissions – as much, according to some estimates, as the entire fossil fuel emissions of the United States. Yet, nations that reduce emissions from deforestation cannot earn carbon credits for these reductions in the existing global carbon markets. Congress could offer a powerful incentive for these nations to reduce

emissions by allowing emissions trading with nations that reduce their total deforestation emissions below historical baseline levels.

Approaches to avoid

Congress should avoid the following design features in seeking to encourage other nations to join an international framework:

- *Intensity targets.* A U.S. program based on reducing America's GHG emissions *intensity*, that is, emissions per unit of economic growth, is not likely to encourage high-emitting developing countries to cap and cut their own total emissions.
- *Carbon taxes, including border taxes, on imported goods.* While some world leaders have proposed such taxes, Congress should not enact them. In and of themselves, such taxes lead to no necessary environmental benefit. Moreover, they are at high risk of challenge in the WTO, as they may be considered "discriminatory." A tax set at a level high enough to be effective against a wealthier nation can impose a crushing burden on a poorer nation, a key criteria for such a determination.

In addition, if the US moves forward with a cap on carbon, Congress should consider whether or not trade issues should be differentiated between countries which have also taken a cap and countries which have not.

3. EXPERIENCE WITH EXISTING VOLUNTARY AND MANDATORY APPROACHES

How well do you believe existing authorities permitting or compelling voluntary or mandatory actions are functioning? What lessons do you think can be learned from existing voluntary or mandatory programs?

Voluntary programs

Experience has shown that a strategy based on voluntary approaches to climate protection does not work. Through the 1990s, the United States adopted over 80 voluntary initiatives aimed at reducing GHGs. During this time, U.S. GHG emissions rose by more than 12 percent. The now more than decade's worth of experience with voluntary measures clearly shows that they are ineffective in even beginning to approach the level of emissions reduction needed for a meaningful climate policy.

A recent Government Accounting Office report (GAO-06-97, April 2006) assessed voluntary programs, including the Bush Administration's Climate Leaders and Climate VISION initiatives. The GAO found that participants used a variety of different metrics and time periods to measure emissions reductions, making it difficult for agencies to ensure that the programs contributed to the Administration's emissions intensity reduction goal. The report also found that some program participants had not reported their GHG emissions or reduction goals and that the coordinating agencies (EPA and DOE) lack effective policies to remedy faltering participation. In describing the status of voluntary approaches as of 2003, a GAO spokesperson testified that, "there's no downturn, there's no reduction of greenhouse gas emissions."

While voluntary approaches are ineffective as a primary climate protection strategy, well-targeted voluntary programs can play a supporting role within the broader framework of a comprehensive mandatory GHG control policy. For example, consumer product oriented initiatives such as EPA's Energy Star™ program have proven to be a useful supplement to efficiency standards as a way to foster the market for advanced energy-saving products.

Mandatory systems

While the United States does not have experience with a mandatory GHG control program, Europe does. The pilot phase of the European Union Emissions Trading System (EU-ETS) is operating over the 2005-2007 period. The EU will impose tighter targets for 2008-2012. In the pilot phase, the caps are loose, and allowances cannot be saved (banked) for use in the 2008-2012 phase. Consequently, there is little incentive to "overcomply" and save surplus allowances "for a rainy day." Given these features, one might expect that the pilot EU-ETS would result in few if any emission reductions and that the innovation stimulated would be modest, if it occurred at all. In fact, experience has shown that the program is exceeding expectations.

EU policymakers distributed pilot-phase allowances on the basis of projected emissions trends. These projections appear to have been overstated, resulting in the distribution of an inflated number of allowances. Yet it turned out that verified of participating facility emissions averaged 200 million metric tons of CO_2-equivalent (MMT_{CO2e}) less than the annual average allocation. While it is not possible to say what actual emissions would have been in the absence of the ETS, recent analysis has concluded that at least some portion--perhaps half--of the 200 MMT_{CO2e} gap is attributable to real emissions reductions. For a program that had a loose emissions target and no provision for banking emissions credits, these findings indicate that the combination of a market price for emission reductions, and the anticipation of tighter caps in the future, spurred emissions reductions even during the pilot phase.

Other studies of the EU-ETS experience reveal that this mandatory GHG reduction program is spurring emissions reductions and innovations across large, medium and small enterprises in Europe. Power companies were found to have switched from coal to natural gas not only because of relatively low gas prices, but also because of the higher carbon cost for coal use. A number of examples of innovative GHG reducing strategies have been reported, including:

- A major oil refinery in Rotterdam has been capturing waste CO_2 and piping it to large horticulture farms which use the CO_2 as a fertilizer, displacing natural gas for fertilizer production and avoiding 170,000 metric tons of CO_2 emissions.
- Hog farmers in Brabant are fermenting manure, capturing the resulting methane and using it to co-generate heat and power; the electricity is sold as renewable because it does not use fossil fuel and the avoided methane emissions will generate GHG offsets.

Further details on these examples, other innovative projects and recent findings about the EU-ETS experience can be found in a new report, *Harvesting the Low-Carbon Cornucopia,* available from Environmental Defense.

For an extremely modest program of short duration, these results are quite positive. Why? Because time horizons matter and the participating businesses began acting in anticipation of the long-term policy signal due to the upcoming full-phase mandatory EU cap-and-trade regime. Studies have identified these expectation as a key factor that has been driving serious engagement during the pilot phase. American businesses have said the same thing: a long-term policy signal is needed to influence investment decisions and encourage the innovations that yield substantial environmental benefits.

The importance of a long-term planning horizon shaped by policy is just one lesson learned from the European experience. Others include the following:

Transparency and timing are critical design features

As documented in media reports as well as academic literature, the EU market experienced a period of high volatility approximately one year ago. When the dust settled, it became clear that one reason for the volatility was that policymakers in Europe had not enacted clear rules regarding the timing and content of year-end reporting. As a result, conflicting rumors abounded about the true state of compliance with emissions targets and carbon market prices fluctuated accordingly. The United States would do well to learn from this experience and create rules and procedures for an orderly reporting system.

Volatility is a normal function of price discovery

By the same token, American policymakers should not conclude that all volatility is a negative. In any new market, participants in the marketplace will go through a period of price discovery. Even the market that drives our own U.S. Acid Rain Trading program, often cited as the "gold standard" of emissions trading programs, has experienced fluctuations from time to time. Volatility is a normal aspect of price discovery.

The rules regarding use of offsets are critically important

As originally designed, the EU-ETS did not provide much scope for European farmers to earn offsets; the program is being revised to increase opportunities for agricultural participation. The EU-ETS has allowed credits from projects in uncapped nations via the Kyoto Protocol's Clean Development Mechanism (CDM). This type of emissions trading has been criticized for many reasons, including unreliable environmental benefits. CDM credits can be considered as international offsets from nations not functioning under a cap. While businesses in developing nations have profited from European CDM investments, the accounting systems for the credits are so incomplete that it impossible to know whether real reductions were achieved. For example, businesses in uncapped nations can *decrease* emissions at one facility, earning marketable credits under the CDM, but *increase* emissions at another facility. Therefore, it is crucial for such credits and other offsets to meet stringent quality-control rules, following the criteria listed above under Question 2(j), in order to ensure an atmospheric benefit.

4. INTEGRATION WITH INTERNATIONAL CLIMATE CHANGE AGREEMENTS

How should potential mandatory domestic requirements be integrated with future obligations the United States may assume under the 1992 United Nations Framework Convention on Climate Change? In particular, how should any U.S. domestic regime be timed relative to any international obligations? Should adoption of mandatory domestic requirements be conditioned upon assumption of specific responsibilities by developing nations?

Two goals drive the timetable for U.S. action: the goal of reducing GHG emissions rapidly enough to enable the world's countries to stabilize GHG concentrations in the atmosphere at roughly 450 ppm and thus avoid an average global temperature increase of greater than 2 degrees C (as discussed above) and the goal of ensuring continuity in the international carbon market. The next two years are critical given the long atmospheric lifetime of GHGs and the rapid global growth of emissions as well as the state of negotiations aimed at continuing the global carbon markets beyond 2012.

To ensure continuity in the international carbon market, the single most important step that the 110th Congress could take would be to enact comprehensive domestic policy to achieve the targets and timetables outlined in our response to Question 2(f). Neither domestic nor global emissions can be permitted to rise unchecked, and the sooner the United States adopts enforceable domestic GHG limits, the sooner the country will be able to resume a leadership role in the international climate treaty talks and meaningfully engage other nations on the question of their own emissions limits. It is very clear that deferring U.S. action simply defers serious negotiation and resolution regarding the emissions of high-emitting developing nations.

In order to take advantage of the substantial innovation drivers inherent in a truly global carbon market – and avoid losing opportunities to reduce emissions that a lapse in the international market could otherwise produce – Congress should ensure that U.S. participation in the global market can commences no later than 2012, when the carbon market driven by the terms of the Kyoto Protocol is currently set to expire.