Center for Clean Air Policy
Dialogue. Insight. Solutions.

750 First Street, NE
Suite 940
Washington, DC 20002
(202) 408-9260 *Phone*
(202) 408-8896 *Fax*
www.ccap.org

March 19, 2007

The Honorable John D. Dingell, Chairman
Committee on Energy and Commerce
The Honorable Rick Boucher, Chairman
Subcommittee on Energy and Air Quality
Room 2125 Rayburn House Office Building
Washington, D.C. 20515

Dear Chairman Dingell and Chairman Boucher:

Thank you for the invitation to respond to the questions regarding climate change policy in your letter of February 27, 2007. I commend you for the leadership role you are taking in developing legislation on this critical issue.

The Center for Clean Air Policy is an environmental think tank committed to developing pragmatic and cost effective solutions to climate, air quality, energy, and transportation problems. We began working on climate change before the adoption of the United Nations Framework Convention on Climate Change in Rio de Janeiro in 1992. Today, we have active on-the-ground policy and research activities in the U.S. nationally and in states and cities, in Europe and, and in the key developing countries of Brazil, China, India, and Mexico. Our experience is broad and deep.

Analysis and Program Design
For example, we have developed emissions trading programs for a variety of U.S. states and eastern European nations; served as the principal consultant to the European Commission for the original design of the EU's Emissions Trading System (EUETS) and its monitoring, reporting and verification system; and released a path-breaking report outlining the significant unilateral greenhouse gas (GHG) emission reductions underway in Brazil and China at the UNFCC Conference of Parties meeting in Nairobi last fall. Internationally, we are now working closely with expert teams in the Brazil, China, India and Mexico to develop country-specific programs for further reducing GHG emissions.

Dialogue and Education
CCAP also specializes in hosting dialogues on climate and energy policy that bring together high-level government, industry, and environmental experts. We currently are hosting three parallel efforts for stakeholders in

the United States, Europe, and in the international UN negotiating process (roughly 30 nations participate in the latter):

- Our Domestic Dialogue brings together senior leaders in the environmental community and in business (representing oil, gas, nuclear power, electric utilities, technology companies and auto manufacturing) to develop agreement on the design details of a comprehensive climate policy strategy for the U.S;

- Our European Dialogue brings together for the first time energy and environmental ministers as well as key representatives from the private sector to reconcile the divergent goals of energy security and climate change and develop elements of a coordinated EU energy, climate, and finance strategy; and

- Our International Dialogue, in its fourth year, brings together senior climate policymakers from around 30 developed and developing countries to serve as a "shadow process" to the formal international climate negotiations by providing a forum to informally discuss specific approaches to the international post-2012 climate change response. We are well on our way to developing an international post-2012 climate package.

Our responses to your questions about domestic climate policy reflect the current range of thinking in our U.S. domestic dialogue process. Where that process has not yet addressed some of your questions, I will make clear that the basis for our response is CCAP's field experience rather than the dialogue discussions.

Thank you again for the invitation to respond to your questions on designing a U.S. national climate policy. We are happy to provide any additional assistance that you may need.

Sincerely,

Edward A. Helme

President

Attachment

As you design a national climate change policy, we offer five key principles that shape our view of a U.S. domestic climate policy. Specifically, U.S. climate policy should:

1) be economy-wide in nature and involve as many sectors of the economy as possible in the climate solution,
2) insure credible progress toward holding global temperature increases to a maximum of 2 to 3 degrees Celsius. The domestic GHG emission caps for 2020 should be stringent enough to keep in play the potential to achieve stabilization of global atmospheric concentrations in the range of 400 to 550 ppm CO2e,
3) establish an economy-wide carbon price and include sector-specific policies and measures that address market imperfections and barriers which could prevent the economy-wide carbon price signals from effectively driving change and technological transformation,
4) encourage investments in advanced "step change" technologies that will be needed to achieve longer-term emission reduction targets, and
5) permit effective engagement in and appropriate linkage with the international climate policy process and with existing GHG reduction programs in other nations.

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. For any policy recommendations, please address the impacts you believe the relevant policy would have on:

a) emissions of greenhouse gases and the rate and consequences of climate change; and

b) the effects on the U.S. economy, consumer prices, and jobs.

Discussions within our *Climate Policy Initiative* have strongly underlined that the U.S. strategy needs to send a comprehensive economy-wide carbon price signal coupled with additional policies and measures (as discussed in greater detail under question 2). Within this framework, the discussions have centered around the need for an approach that puts U.S. emissions on a path in the near-term (e.g., 2020 timeframe) that, when coupled with aggressive efforts in other developed countries and reduced emissions growth in key developing countries, will put global emissions on a path to hold greenhouse gas concentrations at relatively low levels—e.g., 400-550 parts per million (ppm) CO_2 equivalent (CO_2e).[1]

There are a number of possible global mitigation scenarios that can achieve these aggressive atmospheric stabilization levels, but all likely require the following core elements: (1) aggressive efforts by developed countries; (2) reduced emissions growth in developing countries; and (3) development of technology to allow for cost-effective and technologically feasible rapid reductions after 2020. One example pathway in 2020 for getting there is as follows:

- EU and other developed countries cut emissions to 30 percent below 1990 levels—similar to what the EU has recently put forward;
- U.S. cuts emissions to at least 1990 levels; and

[1] Stabilization at 450 ppm CO_2e is roughly equivalent to 400 ppm CO_2-only, while 550 ppm CO_2e is roughly equivalent to 450 ppm CO_2-only.

- Major developing countries cut emissions in electricity and two key industrial sectors by an average of 22 percent below business as usual levels—e.g., through a Sectoral Approach (as discussed in 2.m).[2]

The effects of such a strategy on the U.S. economy, consumer, prices, and jobs is the subject of further evaluation under the CCAP domestic dialogue called the *Climate Policy Initiative*, but some initial indications can be gleaned from recent analysis at the global level. The Stern Review found that the global cost could be around 1% of GDP by 2100—equivalent to the growth rate of annual GDP over the period dropping from 2.5% to 2.49%.[3, 4] Recent analysis conducted for the EU found that investment in a low-carbon economy will require around 0.5 % of total global GDP over the period 2013–2030. This would reduce global GDP growth by only 0.19 % per year up to 2030, a fraction of the expected annual GDP growth rate of 2.8 %.[5, 6]

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:

Although our dialogue participants agree that an economy-wide carbon price is needed to drive GHG reductions across the economy, they have not taken a position yet on whether cap-and-trade is the best mechanism to provide this price signal. Our answers to the questions below provide CCAP's current thinking on the issues and tradeoffs associated with alternative cap-and-trade design parameters. We expect that our Climate Policy Dialogue will be looking into most of these issues in some depth over the coming months and we may have more definitive answers to some of these questions later this year.

a. Which sectors should it cover? Should some sectors be phased-in over time?
Based on input from participants in our Climate Policy Dialogue, we believe that a carbon-equivalent price in some form, via either a fee or a cap-and-trade program, should be applied to the entire economy. (A carbon-equivalent price is meant to be inclusive of the six main greenhouse gases, not just CO_2.)

It is CCAP's sense that reductions from all sectors of the economy will ultimately be needed to achieve the atmospheric stabilization targets that will prevent the most significant impacts of climate change. The sooner the full range of sectors and sources can begin to react to a carbon price, the sooner they will start to look for solutions and move off of the business-as-usual emissions growth curve. Therefore, as a matter of

[2] More information on the global efforts in 2020 for various GHG stabilization levels and combinations of efforts by key countries is available in a soon to be published CCAP paper. Draft copies of this paper are available upon request.
[3] This is based upon meeting a stabilization target of 500-550 ppm CO_2e.
[4] Stern Review on the Economics of Climate Change (2006), Chapter 10: Macroeconomic Models of Costs, available at: http://www.hm-treasury.gov.uk/media/8A7/95/Chapter_10_Macroeconomic_models_of_cost.pdf
[5] European Commission (2007), Communication from the Commission: Limiting Global Climate Change to 2 degrees Celsius The way ahead for 2020 and beyond. Available at: http://ec.europa.eu/environment/climat/pdf/future_action/com_2007_2_en.pdf
[6] This is based upon a stabilization scenario of 450 ppm CO_2e.

principle, we recommend applying a carbon-equivalent price to all sources from the beginning unless there is a good reason for them not to be included.

There are some special difficulties in bringing the transportation sector into a GHG trading system because no one individual or organization can e held responsible for sector wide emissions. For example, neither vehicle manufacturers nor fuel providers have control over consumer driving behavior and the public and private infrastructure and development decisions that shape travel patterns.[7] For these reasons, it may be more viable to address the transportation sector "upstream" by imposing a carbon price through fuels, coupled with other policies and measures as discussed below.

Further, while a trading system that includes all sectors is critical to ensuring that all sectors of the economy are treated consistently, just because a sector is "covered" or "addressed" through a carbon price mechanism such as cap-and-trade does not mean that the carbon price alone will induce cost-effective mitigation actions. In some cases, other policies and measures may be needed to address specific market imperfections or other barriers to GHG reductions.

For example, there are many building efficiency measures that are not implemented even though fuel cost savings are greater than implementation cost. One explanation for this cost/benefit disconnect is that it is typically the builder or developer who makes the capital decision on efficiency, but it is the owner or tenant who incurs the operating costs and the savings from an efficiency measure. Building buyers usually have limited ability to pick buildings based on efficiency—as other factors such as location preference and building availability limit their choices. Incentives, consumer information and regulation are all options for fostering implementation of building efficiency measures. For example, building efficiency standards could bridge the gap between the capital decision and the operating cost exposure.

For passenger vehicles, the consumer makes both the capital decision about what car to buy and incurs the operating costs. But research shows that consumers place little value on fuel economy at the time of vehicle purchase (although fuel use is one of the top complaints after purchase). Vehicle manufacturers, therefore, cannot pass on the full costs of fuel economy improvements because consumers put a higher value on other vehicle amenities. The policy design challenge is whether incentives, price signals and information can be provided to encourage consumers to place a higher value on fuel economy and to enable manufacturers to produce highly efficient vehicles that consumers will buy. An allowance auction could be an important source of revenue for such incentives (see 'd' below).

A GHG price signal alone also does not provide a sufficient incentive to increase the availability of low-GHG travel options such as transit and walkable communities.[8] Instead, a package of policies and measures are likely to be needed to increase use and availability of low-GHG travel modes and supportive land use patterns.

[7] See, for example, Winkelman et. al, "Transportation and Domestic Greenhouse Gas Emissions Trading," CCAP 2000. http://www.ccap.org/pdf/TGHG.pdf

[8] Winkelman et. al, *op cit.*

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

Based on CCAP's prior experience, we believe that at a minimum, an emissions target and fixed timeline need to be set by statute. However, because the efficiency, effectiveness, and equity of a cap & trade program are intimately tied to the specific policy design, the more that can be done by statute to lock in a sound policy design, the better. Moreover, upfront answers on allowance allocations and auction revenues can save substantial amounts of time later.

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

Based on preliminary input from members of our *Climate Policy Initiative*, we recommend selecting a point of regulation that will cover the entire economy under a price signal. One option, an upstream program that regulates carbon content in fuels at the producer or supplier level, has the advantage of covering most of the economy with a price signal with the fewest number of regulated sources. On the other hand, it may not be politically easy to set a tight upstream limit to the degree it is portrayed as a tax. Further, a policy that relies on a price signal is more susceptible to market imperfections that may inhibit downstream action.

In contrast, a hybrid system in which large stationary sources are covered downstream but small sources are covered through upstream regulation of oil refineries, oil importers, natural gas distribution companies, and processing plants may have the best potential for reducing emissions due both to broad-based coverage and direct regulation of large stationary sources. At the same time, the larger number of sources and dual points of regulation will make implementation more challenging. Specific design issues related to this hybrid approach are explained in more detail in our paper, *An Upstream/Downstream Hybrid Approach to Greenhouse Gas Emissions Trading.*[9]

We believe that both an upstream and a hybrid approach are preferable to the European model in which downstream caps are applied to large stationary sources and other sectors of the economy are addressed only with policies and measures (e.g., no cap). This downstream scenario loses efficiency and effectiveness through only partial coverage of the economy.

While some complementary policies and measures will be desirable under upstream and hybrid systems to overcome market imperfections, policies and measures are not a replacement for the comprehensive price signal supplied by an across-the-board price for greenhouse gas emissions.

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?

[9] http://www.ccap.org/pdf/Hybrid1.PDF

While participants in our Climate Policy Initiative have expressed views on many of these alternatives, the Climate Policy Initiative has not agreed on a firm set of approaches for allocating allowances and has not begun to discuss the relative importance of the different alternatives. Therefore, this section largely derives from CCAP's own experience.

Greenhouse gas allowances are expected to have significant economic value. The Energy Information Administration estimated the greenhouse gas allowances under the relatively modest mitigation program proposed by Senator Bingaman are projected to range in value from roughly $25 billion in 2012 to $50 billion in 2020 and $106 billion in 2030. More aggressive targets that put the U.S. on a path to contribute to global atmospheric concentration targets of 550 ppmv CO_2e or better are expected to result in even higher total allowance values. How the value of these allowances is allocated, whether free distribution of allowances or via auction and revenue recycling, will be key to the distributional impacts of a cap-and-trade program as well as to finding a "winning" policy solution that can advance through the Congress. Either allocation approach—free or auction—could be used to distribute the total value of carbon allowances to any number of sources, ranging from affected industry to consumers to advanced technology.

Allocations to Minimize Costs

From a purely economic standpoint, the preferred allocation method is an auction in which revenues are recycled to lower other taxes. This is the only method that actually reduces the overall costs to the economy (as opposed to distributing it in different ways). It could help in winning support from members seeking to lower taxes. Recycling a portion of auction revenues in this way would provide net societal benefits while the remainder of allowances or auction revenues could be used for a variety of other purposes discussed below (transition assistance, advanced technology incentives, low income energy assistance, etc.).

Allocations to Industry and Transition Assistance

Many within industry will be advocating for significant free allowance allocations similar to the approach used in the Acid Rain Trading Program. The decision on how to allocate allowances significantly affects shareholder equity across companies but does not affect the marginal cost of compliance. Therefore, the decision is primarily political. While under the Acid Rain Trading Program a decision was made to allocate allowances to historical emitters largely on the basis of relative heat input, a similar decision in the case of greenhouse gas emissions could overcompensate regulated entities.

Within our Climate Policy Initiative, there is a range of opinion on allowance allocation, ranging from supporters of mostly free allocations to industry with some auction, to distributing all allowances via auction.

One rationale for giving free allocations to industry is to provide "transition assistance" that will assist the most affected industry sources for a limited period of time to adapt to the new regulatory regime.

In contrast, others argue that it is not desirable to mute the carbon price signal via free allocations to emitters as it is this very signal that encourages behavioral changes in downstream consumers and energy users. Moreover, to the degree that coal producers and generators benefit from direct allocations, this creates an uneven playing field vis-à-vis cleaner energy sources. Similarly, direct allocations to coal generators reward energy consumers in states that have some of the lowest electricity prices while consumers in states with cleaner electric generation are paying the full costs for climate mitigation.

Some points of compromise might lie in the length of time transition assistance is provided, and whether transition assistance is provided via free allocation or through an auction and revenue recycling.

In terms of the amount of transition assistance that might be provided to industry, one metric is the total dollars needed to maintain shareholder value. A February 2002 study conducted by the Charles River Associates for the Center for Clean Air Policy, "Who Wins and Loses under a Carbon Dioxide Control Program" (see www.ccap.org/pdf/ccap_cra_report.pdf), estimates that compensating shareholders of all energy industries (including downstream sectors) for their losses would on average require about 9 percent of total auctioned allowances.[10] Allocating more than the allowances required to compensate shareholders for losses would lead to new profits for affected corporations.

Beyond providing transition assistance to industry, the Committee might also consider providing transition assistance to cover losses to adversely affected workers and communities and promote redevelopment and job training.

Allocations to Advanced Technology

The Center for Clean Air Policy's earlier work suggests that another potentially worthy use of allowances or revenues involves support for advanced climate mitigation and sequestration technology. Whatever cap level is chosen for the 2020 timeframe, it is not likely to be enough to induce the high carbon prices needed to encourage development of the full range of technology solutions that will need to be in the pipeline to ensure timely achievement of longer-term GHG reduction goals. An advanced technology program can help to both 1) spark new technological innovations and support the necessary research, development and deployment that bring such technologies to market, and 2) lower the costs of known technologies with the goal of making them economically competitive at future projected carbon prices. To the extent possible, any allocations made to support advanced technology should avoid picking winners.

Allocations to Support Complementary Policies and Measures

As was mentioned earlier, there are some mitigation activities that might be cost effective but are not encouraged by a carbon price due to market imperfections. As noted in 'a' above, incentives may be required to increase consumer interest in buying high efficiency vehicles and to boost manufacturers' ability to produce and sell them. A portion of GHG allowance auction revenues could therefore be targeted to helping manufacturers with

[10] This 9 percent figure assumes a cap at 7 percent below 1990 levels.

research, development and retooling and to encourage customers to purchase more efficient vehicles.

Allocations to Low Income Consumers

Low income consumers will be among the first to feel the pinch of a carbon price. And climate mitigation, like other policies that increase the costs of energy, could lead low income consumers to trade off against other necessities. To address this issue, a portion of the available allowances or revenues could be devoted to low income consumers. One way to do this while preserving the basic price incentive would be to channel low income support to technology programs such as LIHEAP.

Allocations to Adaptation

Past releases of greenhouse gas emissions have led to warming and associated changes in climate conditions that are already being felt in many parts of the United States. Localities across the United States are on the front lines of efforts to adapt to these projected changes as hurricanes Katrina and Rita so painfully demonstrated.

To address adaptation concerns, a portion of the allowance pool could be dedicated to adaptation research or strategies. Research could be done on the impacts of climate change in the most vulnerable areas, and on specific infrastructure vulnerabilities that could be mitigated through adaptation. This information would then allow for more informed decision making on the prioritization of resources between mitigation and adaptation, and on the split among federal, regional, state and local initiatives.

Separate from allowance allocations, it may be worth creating a framework to help guide local infrastructure planning funded with federal monies. Infrastructure decisions made today that will be around for decades are likely to be affected by a changing climate. It only seems prudent to begin anticipating these future effects into today's planning decisions. For example, federal highways funds could require that permitting and/or environmental impact studies consider climate change. This may prevent, for example, a highway from being built in what is expected to be a new or expanded flood plan due to induced changes. Through careful planning and investment in "climate-proof" infrastructure, it may be possible to reduce or eliminate excessive expenditures for mitigation activities in the future. CCAP's Urban Leaders Initiative on Infrastructure, Land Use & Climate Change provides a forum for leading local government officials to ensure that infrastructure and land use decisions bolster the resilience of their communities to climate change impacts.[11]

e. Should there be an absolute cap or an intensity cap?

The limit should be set as an absolute cap, not an intensity cap. In contrast to an intensity cap, which does not limit growth in emissions, an absolute cap ensures the achievement of a prescribed level of emissions reductions in the U.S. Further, an absolute cap enhances program transparency and supports linkages with other systems. If specific intensity goals are desired, they could be converted to tons and inform absolute emissions limits.

[11] See: http://www.ccap.org/domestic/ULI.htm

f. Where should the cap be set for different years?

Based on our dialogue discussions, we are not in a position to recommend a specific cap level at this time, but we can provide some important global context for your decision. The U.S. cap needs to be decided within the context of what we can expect in terms of reductions by other developed countries and by leading developing countries in the 2020 timeframe and what this adds up to in terms of impact on global concentrations of carbon dioxide equivalent emissions.

We know from the Stern Report and the recent Intergovernmental Panel on Climate Change (IPCC) report that quite severe adverse impacts of climate change will occur if temperatures are allowed to increase by more than 2 to 3 degrees Celsius. In order to keep such increases below 3 degrees Celsius, global atmospheric concentrations of carbon dioxide equivalents need to stabilize between 400 ppm CO_2e and 550 CO_2e in the 2050 – 2100 period. Thus, the key question for the setting of global greenhouse gas emissions caps is **what range of caps in 2020 will keep in play the potential to reach stabilization in the 400 to 550 ppm CO2e range**? As the Stern Report and the IPCC report show, the less we limit GHG emissions globally in the near-term, the harder it is to bring emissions down enough to stabilize at the desired concentrations later. For each 5 years we delay the peak in global emissions beyond 2015, we increase the annual rate by which emissions must decline by an additional 1%. One percent per year is a substantial level of effort, comparable to the reduction the United Kingdom achieved nationally after it switched all of its coal-fired power plants to natural gas in the 1990's.

In practical terms, if the European Union and other developed nations average a reduction of 30 percent below 1990 levels in 2020 and if the six largest emitting developing countries take action to reduce the GHG emissions of their three major industrial sectors by 22 percent below business as usual levels by 2020, we would need the U.S. to set an **economy-wide cap level at 1990 levels in 2020** to keep in play achievement of a global atmospheric concentration target of CO_2e in the 450 -550 ppm range.

Keeping 450 ppm CO_2e in play is a significant challenge already. According to projections, it requires a very substantial 4 percent annual global emission reduction on average for all countries after 2020, even if the U.S. cuts its emissions to 1990 levels by 2020.

g. Which greenhouse gases should be covered?

The full basket of greenhouse gases should be covered, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), HFCs and HCFCs.

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

Based on the Center's experience in different countries and states, it is difficult to estimate baselines and determine which early reductions deserve credit. As with other allocations to industry, the decision on whether and how to credit early actions is fundamentally a political process. Our dialogue hasn't discussed this issue at length.

Rather than arguing that early actions should receive some sort of special credit, one easy way to handle this question is to say that early actions should not be penalized. And ideally, early actors would be rewarded through the fundamental policy design structure rather than through a separate mechanism that requires that each early action be reviewed for legitimacy. For example, if all sources are required to purchase allowances via auction, early actors benefit by not having to purchase as many allowances as they would have had they not acted early to reduce emissions.

i. Should the program employ a safety valve? If so, at what level?

A safety valve can serve several important purposes: 1) minimize the maximum price that allowances can reach to hold down the total cost of a GHG control program, 2) provide protection against price spikes and price volatility, and 3) offer predictability for the market and investors about the long-term costs of compliance. The most common concern with the safety valve arises when the safety valve price is set too low. Although a low fixed price for the safety valve will create certainty about the total program costs, it is likely to prevent the program from reaching the desired reduction level set under the cap. (Once the prevailing market price for allowances exceeds the safety valve price, companies pay the escape valve price in lieu of making the reductions necessary to comply with the cap.)

We have begun serious discussions of this issue in our dialogue but have not yet reached a conclusion. However, we have found a strong interest in balancing all of these objectives. With a balancing perspective in mind, the goal of the safety valve is to set a price that is reasonably likely to meet the cap level, prevent price spikes, avoid great price volatility and create certainty for investors. One way to do this analytically would be first to calculate the expected market price of allowances for a desired cap level. Then one would set the safety valve price significantly higher than the expected market price of allowances–high enough not to be triggered immediately, but low enough to create reasonable price certainty. For example, if the GHG emissions cap level set for 2020 is projected to result in a carbon allowance marginal cost of \$20/ton CO_2, the safety valve price could be set at \$30/ton CO_2 which would guard against any short term price spikes and send a long term signal about what technologies could be worth investing in over time. Equally important, a safety valve price set this way should reduce the risk of missing the targeted cap level. There may be other ways of accomplishing the same objectives, such as setting aside allowances at a guaranteed higher price as was done in the Acid Rain Trading Program to insure liquidity of the market. Since prices never rose to the expected high levels and liquidity was more than adequate, this set aside was eliminated early in the acid rain program. There are clearly differences between the acid raid program and a potential GHG cap and trade program that might not make the Acid Rain allowance set aside a viable approach here. Regardless, meeting the balanced objectives for a safety valve should be a primary concern in your legislative deliberations.

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

On the basis of discussions within our domestic dialogue, CCAP's recommendation is to include as many sources as possible under an economy-wide carbon price. Ideally, all sources would be covered by the carbon price. Including all sectors in the cap-and-trade program, eliminates the need for domestic offsets. If sources are excluded from the cap for one reason or another, offsets are one of many choices for encouraging additional emissions reductions from uncapped sectors within the U.S.

While many uncapped sources will ask to be treated as a pure offset (with no discounting), allowing them to be paid for emissions reductions that meet the offset criteria, this policy decision essentially puts more of the responsibility for meeting any overall U.S. emissions goal on capped sectors. Moreover, in granting offset status to a given source or sector, it becomes even harder later to bring it under the cap or impose other regulatory approaches.

There may be cases where treating a source or sector as an offset is the most politically feasible approach. However, keep in mind there are a full range of options short of a cap that would put some emissions reduction responsibility on the affected sector, including "command-and-control" style regulations and offset rules that require an independent contribution towards a U.S. target before the source or sector can sell into the carbon market.

k. What should be done with auction or safety valve revenues?

As expressed earlier in item d, the allowances created in a cap & trade system have substantial value. The value of these allowances could be distributed to society in two main ways: the allowances could be given away for free; or revenues received from sale of auctioned allowances could be distributed. Either way, the same allowance value is available to distribute to a range of causes. Our thoughts on how these monies might be spent are expressed in our answer to question d.

l. **Are there special features that should be used to encourage technological development?**

An economy-wide price signal combined with policies and measures geared towards overcoming market imperfections will together encourage deployment of existing technologies to meet near-term climate mitigation targets. It will not be sufficient to drive the development and commercialization of the advanced technologies required to meet longer-term goals.

There is broad recognition that the technologies available today will only get us only part of the way to the longer term mitigation targets that are needed to meet global atmospheric concentration goals. And while many argue for a weaker cap in the near-term predicated on the availability of more advanced technologies in future years, absent a concerted effort to drive the needed technology advancements, there is no certainty that the technologies will be there when they are needed. The price incentive likely to come from a near-term carbon cap is likely to be insufficient to drive the investments needed to achieve new "breakthrough" technologies capable of meeting our energy needs under tight future emission limits.

As noted earlier, a key part of the solution is funding. Some allowances or auction revenues might be used to support advanced technologies. There may also be other policy tools that can support new technology investments. The Center for Clean Air Policy's Climate Policy Initiative just established a working group that will consider the full range of policies needed to drive investments in advanced climate technologies sufficient to achieve the needed step changes in development and deployment.

m. How might high-emitting developing countries be encouraged to limit their greenhouse gas emissions?

In the final analysis, the decision to participate in international agreements rests with the individual nation and its assessment of the relative benefits and costs of participation. This is certainly the case with the United Nations Framework Convention on Climate Change and the Kyoto Protocol. Any international agreement rests on the decisions of individual sovereign nations.

One of the critical issues in efforts to address climate change will be efforts to slow (and ultimately reverse) the growth of greenhouse gas emissions in developing countries. Three elements are central to encouraging further developing country action: leadership by developed countries, unilateral actions by developing countries, and incentives for further action.

First, the leadership role and actions taken by developed countries send critical signals to developing countries**.** The more stringent and clear cut the actions, the better. For example, the recent EU commitment to cut unilaterally its emissions to 20% below 1990 levels by 2020, and to go to -30% if other major nations follow suit has sent a strong signal in this regard. Strong legislative action in the U.S. to reduce our domestic GHGs would further motivate action by key developing countries.

Second, any response to developing countries needs to **recognize and encourage "unilateral actions" by developing countries.** We have found that Brazil, China, India and Mexico are taking action through practical policies and programs that provide important benefits in their countries in addition to greenhouse gas reductions. For example, recent CCAP analysis with research teams in China, India, Brazil, and Mexico found that between 2000 and the end of 2005, China and Brazil have implemented policies and programs that when fully implemented are projected to lead to greater emissions reductions than those to be achieved by the U.S. voluntary carbon intensity reduction goal and around 40% of what the EU will do domestically under its Kyoto target.[12] For example, China has adopted vehicle efficiency standards with an estimated equivalent vehicle efficiency of 34 miles per gallon (MPG) in 2005 and 37 MPG in 2008[13]. These actions are often being driven for non-climate reasons (e.g., energy security, local air quality, etc.), but have climate change co-benefits. In addition, many of these reductions are being financed domestically (e.g., not paid through carbon credit

[12] More information on this analysis is available at: http://www.ccap.org/international/Conclusions-Developing%20Country.pdf

[13] Based upon: An and Sauer (2004), available at: http://www.pewclimate.org/docUploads/Fuel%20Economy%20and%20GHG%20Standards%5F010605%5F110719%2Epdf

purchases from developed countries), in some cases are occurring in key sectors (e.g., cement and iron/steel) where competition has been a concern, and many of which are not "low hanging fruit" (i.e., have a positive cost). And, more recent developing country programs—such as the Chinese efforts to cut their energy per GDP intensity by 20% between 2005 and 2010—could further reduce the growth in emissions.

Lastly, in addition to encouraging "unilateral" actions, the system needs to **provide incentives for more expensive emissions reduction opportunities** that are not likely to be pursued unilaterally by developing countries. It needs to provide "carrots and sticks" to create incentives for new technology deployment. Our research in China, India, Brazil, and Mexico has found that there are a number of emissions reduction opportunities available in these countries, but some of the options—e.g., carbon capture and storage in China and India—have relatively high cost. These more expensive options are less likely to be undertaken unilaterally since other pressing domestic needs (e.g., poverty alleviation, etc.) will push investment away from these options. Given the vast pace of new investment in these countries (e.g., China's growth in new power plants), a potential large business opportunity exists for U.S. companies that can develop and bring down the cost of advanced technologies to the point where they are more attractive in key developing countries. For example, the EU's commitment to build a demonstration zero emissions coal-fired power plant in China and more recent commitment to build 12-15 demonstration carbon capture and storage plants are partly driven by this objective.[14]

In our international work, CCAP has developed a proposal—***the Sector-Based Approach***—that encapsulates each of these points by encouraging developing countries to adopt carbon intensity reduction targets in key sectors (e.g., electricity and major industrial sectors) and provides incentives through a technology investment package to make more progress.[15] This approach has garnered significant interest among senior climate negotiators from developing and developed countries.

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?

CCAP is not responding to this question.

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?

[14] There is an ongoing debate within the EU about whether or not the EU should increase its commitment to build demonstration carbon capture and storage plants in developing countries as a part of this new commitment.
[15] For more information on the proposal, see: http://www.ccap.org/international/Sector%20Straw%20Proposal%20-%20FINAL%20for%20FAD%20Working%20Paper%20%7E%208%2025%2006.pdf

Our domestic dialogue process has not addressed this issue in any detail. Based on our experience with the international process, we would recommend that any U.S. domestic program be designed to allow the U.S. to re-engage in the international negotiations and potentially link to international structures post 2012. The critical element is to insure that any potential mandatory U.S. domestic requirement is set within the context of achieving U.S. emissions reductions by 2020 sufficient to do our part to address the climate change challenge (as discussed under question 1 above). At some point in the future, integrating this effort into future obligations under the United Nations Framework Convention would be beneficial for a variety of reasons, including providing stronger access to the international carbon markets, signaling U.S. leadership to developing countries, and creating business opportunities for U.S. companies. As noted above, the most effective U.S. strategy to encourage developing countries to expand their unilateral efforts to reduce the growth in their emissions in the near-term lies in setting an aggressive U.S. domestic GHG reduction goal and in providing incentives for technological innovation in developing countries. It is CCAP's view that conditioning U.S. actions upon assumption of specific responsibilities by developing nations will be counterproductive to the global effort.