

**Statement of Reid P. Harvey
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To the
Committee on Energy and Natural Resources
United States Senate**

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Mr. Chairman, Ranking Member Murkowski, and Members of the Committee, thank you for the opportunity to testify today about EPA's analysis of H.R. 2454, the American Clean Energy and Security Act.

EPA's overall cost estimates of the bill are similar in many respects to those of the Congressional Budget Office (CBO) and the Energy Information Administration (EIA). In view of those similarities, I will focus on several policy implications of our analyses that may be useful as the Senate continues its deliberations. The details of our analyses, along with the underlying data and spreadsheets, are available on EPA's website (www.epa.gov/climatechange/economics/economicanalyses.html).

It is important to note at the outset that EPA's analysis did not attempt to assess the costs if we don't act to reduce greenhouse gases; to weigh the costs of action against the costs of inaction; or to compare the costs of H.R. 2454 with other policy approaches to address GHG emissions. The U.S. Global Change Research Program (in its June 2009 report, "Global Climate Change Impacts in the United States") described the impacts that we are already seeing and that are likely to dramatically increase this century if we allow global warming to continue unchecked. In the report, it documents how communities throughout America would experience increased costs, including from more sustained droughts, increased heat stress on

livestock, more frequent and intense spring floods, and more frequent and intense forest wildfires.

Over the last several years, EPA's analyses of cap-and-trade approaches in climate change legislation have shed light on three key factors that are important to the costs of a cap-and-trade program:

1. the coverage and cumulative reductions of the cap;
2. the type and availability of offsets; and
3. the penetration of new and existing technologies.

I'll describe the implications of each of these factors in turn.

First, our analysis of H.R. 2454 and related Senate bills tells us that what affects overall costs are the cumulative emissions reductions the bills would achieve over decades, rather than the cap level they set for any particular year. Because H.R. 2454 (like several recent Senate bills) allows emission allowances to be banked over time, its 2050 cap (an 83% reduction from 2005 levels by 2050) drives overall behavior and encourages banking in the early years of the cap-and-trade program. In other words, just changing the 2020 cap alone does not have a significant effect on total costs if all else stays the same. Costs will be lower the sooner we start acting but a national commitment to meeting these long-run emission reduction targets is key.

Second, allowing capped sources to meet some of their obligation through offsets -- emission reductions achieved by non-capped sources -- lowers costs significantly. Our analysis of offsets was aided by EPA's experience managing and analyzing emissions trading and voluntary programs, such as our methane programs. We found through several scenario analyses that delaying or eliminating the ability to use low-cost international or domestic

offsets to meet compliance obligations increased costs substantially compared to the core case with full availability of offsets. For example, if no international offsets were allowed, allowance prices would be 89 percent higher than the core case. Moreover, we found that the number of international offsets purchased is sensitive to other policy provisions in the bill. For example, we conducted sensitivities with respect to the energy efficiency provisions of H.R. 2454 that we modeled for the core case. Without the energy efficiency provisions, we found that the allowance price increased by about two percent, but the number of international offsets purchased under that scenario rose by 11 percent to compensate. It is important to note that the cost and availability of international offsets will be influenced by factors beyond U.S. policy choices, including the efforts of other nations to mitigate emissions, and that there will always be some uncertainty about the future cost and availability of offsets.

Third, penetration of low or no-carbon technologies, such as renewable technologies, nuclear power, and carbon capture and storage (CCS), increases substantially by 2050 under H.R. 2454 and similar Senate bills in the 110th Congress that we have analyzed. For H.R. 2454, we estimated that these technologies would grow, as a share of primary energy, to 18 percent by 2020, to 26 percent by 2030, and to 38 percent by 2050, compared to a steady share of 14 percent in the business-as-usual case. These results demonstrate the key importance of placing a price on carbon emissions to incentivize the deployment of low and no-carbon technologies. However, there is much uncertainty about the rate at which various technologies will penetrate. For example, the availability of nuclear power has a significant impact on our results. We used estimates of the cost of nuclear power from EIA, and constrained the growth of nuclear power generation using the same assumptions as used by the U.S. Climate Change Science Program in developing their *Scenarios of Greenhouse Gas Emissions and*

Atmospheric Concentrations report ,which assumes that nuclear generation could increase by 150 percent by 2050. We also conducted sensitivity analyses holding nuclear power growth to reference levels and found that, if the additional nuclear capacity were not available, allowance prices would increase by 15 percent. We also saw in the short-term that H.R. 2454 would reduce overall electricity demand. Furthermore, financial incentives, such as bonus allowances for early deployment of carbon capture and sequestration were found to increase deployment of cleaner technology in the near term. Overall, our analysis of H.R. 2454 highlights some of the factors that will affect the costs of meeting particular emission targets that are inherently uncertain, such as the availability of offsets or the potential for technological advances. How these underlying uncertainties translate into uncertainty about the cost of a cap-and-trade program depends on the kinds of cost-containment provisions that are incorporated in the program.

In conclusion, these three factors and their effects on costs are among the most important to consider when crafting climate change legislation. Our work, along with those of the other agencies represented on this panel, hopefully will provide some guidance on likely outcomes of different policy choices. Thank you again for this opportunity to discuss EPA's analyses and I look forward to any questions you may have.