Executive Office of the President
Council of Economic Advisers

Executive Office of the President
Office of Science and Technology Policy

July 10, 2008

The Honorable Susan E. Dudley
Administrator
Office of Information and Regulatory Affairs
Office of Management and Budget
Washington, D.C. 20503

Subject: Environmental Protection Agency's Advance Notice of Proposed Rulemaking "Regulating Greenhouse Gas Emissions under the Clear Air Act"

Dear Administrator Dudley:

The Council of Economic Advisers and Office of Science and Technology Policy would like to offer our views on the science and economics that relate to EPA's ANPR entitled "Regulating Greenhouse Gas Emissions under the Clean Air Act." Our comments are divided into two parts. In the first, we address complexities associated with the phenomenon of anthropogenic climate change that distinguish it from traditionally regulated phenomena and that significantly increase the technical difficulty of regulation. In the second, we address the likely consequences for public welfare of various proposals for mitigating greenhouse gas (GHG) emissions.

Part I: Implications of the Complex Nature of Anthropogenic Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC), "Warming of the climate system is unequivocal," "…Most of the observed increase in global average temperatures…is very likely due to the observed increase in anthropogenic greenhouse gas concentrations" and "…evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases" (IPCC Fourth Assessment). These straightforward and widely accepted scientific conclusions cover a huge range in the diversity, timing, and severity of climate change impacts on the public welfare that greatly complicate their analysis. While it is true, as the ANPR authors point out, that "The exact benefits and costs of virtually every environmental regulation are at least somewhat uncertain," (p 39) the authors nevertheless acknowledge that "In the case of climate change, the uncertainty inherent in most economic analyses of environmental regulations is magnified by the long-term and global scale of the problem and the resulting uncertainties regarding socioeconomic futures, corresponding GHG emissions, climate responses to emissions changes, the bio-physical and economic impacts associated with changes in climate, and the

costs of reducing GHG emissions." The ability to assess potential costs and benefits of a particular regulatory mechanism is critical to informed policymaking. However, the long-term nature and global scale of climate change and the nature of the associated uncertainties, such as those raised in the ANPR and listed above, is such as to overwhelm the capability of existing technical means to trace public welfare impacts to specific regulated activities.

GHG emissions, especially of CO_2, arise from a very wide variety of natural, domestic, and industrial activities, nearly all of which are beneficial to society. Because the geographical and temporal patterns of emissions vary with technology and market-driven human choices, a regulatory approach to the mitigation of GHGs that is based on an assortment of activity-specific regulatory mechanisms, such as those described in the ANPR, must necessarily be responsive on relatively short time-scales to the changing emissions picture. No reliable model of technical innovation exists to forecast how these patterns are likely to change even in the immediate future. Current rapid changes in transportation and energy production and use, for example, came as a surprise to economists and markets around the world. In the absence of much more accurate forecasting for the array of CO_2 emitting activities, the regulatory process will be continually out of step with reality unless it can be designed to adjust itself on realistic time scales. Historical time scales for environmental regulation in the U.S. suggest that this will be impossible, especially for the very large array of interconnected activities that would need to be regulated to mitigate CO_2 emissions.

This technical complexity is indeed one of the reasons why economists and policy-makers favor broad market-oriented frameworks such as carbon taxes, technology-neutral subsides, or carbon trading schemes for GHG mitigation. The widespread support for such schemes is itself evidence for the impracticality of the array of regulatory mechanisms on which the ANPR seeks comment.

The diversity and complex distribution in space and time of GHG sources combine with intrinsic features of relevant climate phenomena to multiply further the obstacles to traditional regulation. Anthropogenically driven climate impacts are in nearly every case indistinguishable from naturally occurring phenomena. The anthropogenic contribution is apparent primarily in retrospective statistical analyses, and its adverse impacts cannot be readily distinguished from impacts that would have occurred in the absence of anthropogenic warming. Although few deny that anthropogenic causes underlie much of the general observed patterns, it is not the case that all "new" impacts exceeding historical means can be attributed to anthropogenic warming. The individual phenomena causing the impacts show strong regional variation and differing sensitivity to human behavior. Hurricane impacts, for example, are linked to coastal development patterns and to long term ocean circulation trends that occur with and without anthropogenic warming. Efforts to identify and evaluate specific localized adverse impacts uniquely associated with activities that lend themselves to regulation are nearly impossible under such circumstances. Tracing climate change causes to effects invariably requires simulations of the entire climate system. Such simulations are feasible for broad measures such as global and annually averaged surface temperatures, on whose link to GHG emissions there is broad agreement among scientists. The success of these simulations depends on thorough mixing of GHGs from all sources, so the individual characteristics and global distribution of different sources can be ignored. This same feature renders attribution of public welfare impacts to

specific regulated activities subject entirely to elaborate schemes for accounting and allocating emissions on a global basis. Such attributions cannot be accomplished based on U.S. data alone. And the global atmospheric CO_2 budget is not simply the sum of all emissions – the Earth "breathes" seasonally in a striking pattern whose details depend on a mix of human behaviors (*e.g.* deforestation) and natural causes (*e.g.* volcanic activity). Consequently a useful model for assessing significance and attributing share of public welfare impacts will necessarily be extremely complicated. As the ANPR authors note: "Quantifying the *exact* (emphasis added) nature and timing of impacts due to climate change over the next few decades and beyond, and across all vulnerable elements of U.S. health, society and the environment, is currently not possible." Nor is it currently possible to quantify impacts even to a *less exact* standard that is needed to regulate GHGs through the Clean Air Act.

Overarching all these complexities is the unprecedented temporal quality of global climate change. Activities currently proposed for regulation will have no impact on public welfare for decades (except for possible beneficial side effects on traditional pollutants). Consequently, all approaches to the assessment of impacts necessarily involve forecasts. While the physical phenomena involved in anthropogenically induced global climate change are reasonably well understood, despite their complexity, the social phenomena that influence GHG producing activities are not at all well understood, which creates huge uncertainties in climate projections. All current forecasts of global warming that extend beyond roughly a decade are based on scenarios that assume a pattern of human behavior. These scenarios vary widely, but probably not widely enough given the very weak ability of science to predict how nations, markets, and individuals respond to their environments. Within its continually expanding limits, science can estimate the implications of social scenarios for anthropogenic global warming, but it has little power to assess the validity of the scenarios themselves.

Of all the effects that complicate the scientific analysis of GHG regulation, none is more profound and less tractable than the unpredictability of human behavior. Because the largest sources of anthropogenic CO_2 are linked to the use and production of energy, and because energy is an essential ingredient of all economically productive activity, GHG producing activities cannot be simply extracted from the tightly woven matrix of any economy. And economic globalization ensures that the matrix of anthropogenic climate influence is global. Regulation of specific GHG producing activities to achieve a specific target entails an analytical framework that gives some assurance that the targets can be reasonably met. No credible framework exists for this purpose. This fact seems to have been appreciated by political leaders who have endeavored to forge broad international agreements to reduce GHG emissions. As President Bush noted when launching a new U.S. policy for limiting emissions earlier this year, "The Clean Air Act, the Endangered Species Act, and the National Environmental Policy Act were never meant to regulate global climate." Given the long-term nature and global scale of climate change and the nature of the uncertainties inherent in its associated impacts, the machinery of the Acts' regulatory frameworks are clearly not adequate to the task.

Part II: Consequences of Proposed Remedies

Any attempt to use the Clean Air Act to regulate greenhouse gases efficiently is fraught with difficulties, for two reasons. First, the EPA, which is charged with overseeing the Clean Air Act, is unlikely to have the statutory authority to implement economically neutral approaches such as a carbon tax, a cap-and-trade with a safety valve, and/or technology-neutral subsidies. Such approaches, which are typically the centerpiece of economic mechanisms to GHG regulation, allow markets to choose the best and most cost-effective way to deal with GHGs and do the least harm to the economy. Limitations on authority are mentioned in EPA's Advanced Notice of Proposed Rule-Making (ANPR). Second, and perhaps as a consequence of such limitations, the regulations considered by the authors of the ANPR are a cumbersome set of rules and restrictions that are in some cases excessive, inadequate, redundant, inordinately burdensome to the economy, and almost certain to fail to produce the desired climate results. Because of specific limitations in the law, the Clean Air Act does not permit the EPA to attain economic efficiency while reducing GHG emissions, even in the narrow context of emissions by the United States. It is even less effective when viewed in the global context appropriate for greenhouse gases. We detail some of our concerns in what follows.

First, the Clean Air Act would result in excessive regulation. Under one likely scenario, the same standard for GHG emissions would be required from each state in the country, which might force the EPA to regulate GHGs much too stringently in some situations. To obtain economic efficiency, it is necessary to equalize marginal abatement costs across sources, which is extremely unlikely to occur if states are required to meet the same standard. Consequently, some states would be required to reduce emissions in an extremely expensive manner, while others that are better able to reduce emissions cheaply would have little incentive to do so. The consequence would be higher costs to the economy than necessary, borne disproportionately by specific industries, workers and consumers. Ann Klee, former General Counsel for the EPA, stated in her Senate testimony of April 24, 2007:

> "Although the argument could be made that CO_2 meets the statutory threshold for designation and regulation as a criteria pollutant, it is evident that this would make little sense from a regulatory perspective. If the standard were set at a level intended to force reductions in emissions, i.e., at some atmospheric concentration below current levels (approximately 370-380 parts per million CO_2), then the entire country would be designated as being in nonattainment. This would trigger the regulatory mechanisms of the NAAQS program … This should be of concern to States that face potentially significant penalties for persistent nonattainment."

An alternative scenario under the Clean Air Act would regulate GHG emissions by requiring every source to meet some average emissions standard, irrespective of costs. This means that each sector would be required to reduce emissions to a point that is considered technologically achievable rather than economically efficient.

The Clean Air Act also makes it very difficult to loosen constraints, once regulations have been promulgated. Because the inherent benefits of limiting emissions remain uncertain, it is important to retain the ability to adjust stringency up or down over time.

Second, the Clean Air Act may be inadequate. The ANPR recognizes that the Clean Air Act was designed to protect local and regional air quality by controlling emissions with a limited range of impacts. GHGs however, become relatively evenly distributed through the atmosphere, irrespective of their point of origin. The specific source of emission reduction has little or no bearing on the benefit of reduction, but the cost of reductions may vary greatly by source. However, the Clean Air Act generally precludes decision makers from considering costs, and does not permit regulations to depend on mitigation actions taken by other countries. The failure to allow for contingencies of this sort removes an important tool for inducing other countries to take actions that benefit Americans and the rest of the world.

Third, regulation of GHG through the Clean Air Act will prove inordinately burdensome. For instance, one section of the Act specifies threshold levels, which, for traditional pollutants, captures only the larger polluters. The same thresholds applied to GHGs would increase the number of affected sources by an order of magnitude, implying the regulation of sources that were not previously regulated nor intended to be regulated under the Clean air Act. The statute sets a "major source" threshold value of, at most, 100 tons per year of any air pollutant (or less in non-attainment areas.)[1] Small manufacturing facilities, schools, and shopping centers have potential emissions of 100 tons per year or more. If GHGs are regulated under the Clean Air Act, those sources will become a "major sources" and must undergo full major source permitting and would be required to adhere to EPA regulations.

Fourth, the Clean Air Act entails redundancy. The ANPR acknowledges that even if an economy-wide program were legally possible under the Clean Air Act, it would have to be accompanied by source-specific or sector-based requirements as a result of other Clean Air Act provisions. This could result in multiple, overlapping and perhaps conflicting incentives to reduce GHG emissions.

Finally, any GHG regulation imposed under the Clean Air Act is almost certain to fail. Even an economy-wide system will not be effective unless it is coupled with significant GHG reductions by all major economies. The Clean Air Act is not the appropriate vehicle to accomplish worldwide reductions in GHG emissions. Furthermore, acting in a globally uncoordinated fashion will put the United States at a competitive disadvantage, will induce economic distortions and may actually be counter productive in reducing GHGs. The most obvious example of this involves "leakage," where the U.S. imposes costs on businesses that emit greenhouse gases to which other countries are not subject. If businesses in other countries do not suffer the penalty for emitting GHGs, production has an incentive to move abroad, even when producing in the U.S. would be more economically efficient.

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[1] EPA. Advanced Notice of Proposed Rulemaking. Section VII, Part E.2.

We believe that the Clean Air Act is not the appropriate statutory framework for dealing with climate change. The Clean Air Act was never intended to address issues with the global complexity of GHG emissions. Challenges in addressing climate change under the Clean Air Act are compounded by intrinsic characteristics in both its science and its economics. Instead, Congress needs to examine this issue directly, make the difficult choices that are inherent in any regulatory policy, and come up with an approach that imposes the minimum economic distortion for the maximum climate change benefit.

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