Statement of Dina Kruger
Director, Climate Change Division
Office of Atmospheric Programs, Environmental Protection Agency
Hearing on Monitoring, Measurement and Verification of Greenhouse Gas Emissions II:
The Role of Federal and Academic Research and Monitoring Programs
Committee on Science and Technology
United States House of Representatives
April 22, 2009

Introduction

Chairman Gordon, Ranking Member Hall, and members of the Committee, thank you for inviting me to testify about monitoring, measurement and verification of greenhouse gas emissions. I am Dina Kruger, Director of EPA's Climate Change Division. Today my testimony will focus on what data EPA already collects under existing regulatory programs; EPA's proposed Mandatory Greenhouse Gas Reporting Rule; as well as international reporting programs. Accurate data on greenhouse gas emissions are an essential component for climate change research and the foundation for implementing and assessing programs to reduce emissions. EPA looks forward to continued opportunities to work with the Committee in this area.

Existing Data

I would like to begin by offering some background about programs EPA implements that are relevant to today's topic. We implement two successful cap and trade programs: the Acid Rain Trading Program and the NOx Budget Trading Program. These two programs have served as models for greenhouse gas cap and trade programs such as the Regional Greenhouse Gas Initiative (RGGI), the Western Climate Initiative (WCI), and the European Union Emissions Trading System (EUETS). In order to fulfill reporting obligations under the United Nations Framework Convention on Climate Change (UNFCCC), ratified by the United States in 1992, EPA leads an annual interagency effort to develop and publish a national inventory of human-caused greenhouse gas emissions, the most recent of which was submitted last week on April 13. We also implement a number of partnership programs targeting non-CO2 greenhouse gases such

as methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. And, just last month, EPA issued a proposed rule to establish an economy-wide mandatory reporting system for greenhouse gas emissions. This Reporting Rule was discussed during your first hearing on this topic in February, and will be the focus of part of my testimony today.

Mr. Chairman, what is common to all of the work we do across the entire suite of EPA air programs, is the emphasis on accurate, comprehensive, transparent and timely monitoring. Simply put, you cannot manage what you cannot measure. Moreover, we recognize that effective greenhouse gas monitoring is inextricably linked to the specific policies being considered, and the types of emission sources we are addressing. One size does not fit all. The best methods and systems for obtaining high quality greenhouse gas data must be customized to suit our specific policies and purposes.

The monitoring equipment and systems required to establish baselines and assess progress under a facility-based regulatory program, for example, need to provide timely and accurate data of emissions from each affected facility. We collect this type of data under EPA's Acid Rain Cap and Trade Program, which covers electricity generating units. These units are required to install and operate continuous sulfur dioxide emission monitors in their stacks, or for smaller or low emitting units a continuous fuel monitor of comparable accuracy. Each facility measures hourly and reports to EPA on a quarterly basis. All of these measurements are uploaded to EPA's database automatically through secure internet connections, where the data are then checked and checked again by sophisticated software routines. The end result is emissions data that provide empirical support for the trading program and assurance that each facility is operating on a fair and level playing field. Importantly, since the program began in 1995, each electricity generating unit also has reported carbon dioxide emissions data through the same procedures, as required under Section 821 of the 1990 Clean Air Act Amendments. With the electricity sector representing over one-third of the nation's CO2 emissions, we already have a head start on the monitoring program for greenhouse gas emissions.

Proposed Greenhouse Gas Reporting Rule

Other large stationary sources could also potentially monitor greenhouse gas (GHG) emissions. These additional sources are the primary focus of EPA's proposed Greenhouse Gas Reporting Rule, signed by Administrator Lisa Jackson on March 10th and published in the Federal Register on April 10th. Pursuant to the direction of Congress, EPA's proposed GHG Reporting Rule focuses on emissions from sources above appropriate thresholds in all sectors of the economy. The proposed Reporting Rule has not been designed to track project-based offsets, such as carbon sequestration from agricultural or forest lands, or to create a comprehensive national inventory - both of which I will discuss later.

In this rule, EPA proposes to collect greenhouse gas emissions data from about 13,000 entities that emit more than 25,000 metric tons of CO2 equivalent per year, or produce or import fuel or industrial gases. In total, the proposed rule is estimated to cover 85 to 90% of U.S. greenhouse gas emissions. The 25,000 ton threshold is roughly equivalent to the amount of CO2 that would be produced by burning 131 rail cars of coal. The proposed rule attempts to mitigate any impacts on small businesses by including the 25,000 metric tons of CO2 equivalent per year threshold. As a result, this rule would affect larger industrial facilities, such as refineries, iron and steel mills, cement and petrochemical plants.

Many emission sources would not be subject to monitoring and reporting requirements under the thresholds proposed in the proposed Reporting Rule because of their small size or the complexity or cost of accurately monitoring their emissions. This includes many agricultural sources as well as emissions from individual cars and trucks, homes, and small businesses. Instead, emissions from the use of fossil fuels in smaller sources is covered "upstream", by which we mean that coal mines, petroleum refineries, natural gas processing facilities, and natural gas distribution companies would report on the carbon contained in fuel they supply to the economy. While there are tens of millions of cars and houses, there are approximately 3,500 suppliers of fossil fuel in the economy, representing approximately 30-35% of U.S. greenhouse gas emissions, and the estimation of emissions from these sources is both manageable and accurate.

EPA estimates that with the 25,000 ton annual threshold and the inclusion of "upstream" providers of fossil fuels and industrial gases, the greenhouse gas reporting program could provide baseline emissions data for facilities representing between 85% and 90% of national greenhouse gas emissions. We are working hard to complete the Reporting Rule this fall, and are proposing that the first reports will be due in March of 2011 and cover year 2010 emissions.

At this point, let me say a few words about verification in the proposed reporting program, as this issue has been the subject of discussions in this Committee and in other venues. EPA is proposing a centralized verification program modeled on our experience in the Acid Rain program, which I just summarized. EPA has successfully verified data across its Clean Air Act programs for decades. The northeast states through the Regional Greenhouse Gas Initiative chose to run their greenhouse gas cap and trade program using the CO2 data that EPA collects and verifies through the Acid Rain Program rather than reinvent the wheel. We are confident that this system currently applied to the Acid Rain program can be extended to the verification of all emissions data reported under EPA's greenhouse gas reporting program (i.e., 85-90% of U.S. greenhouse gas emissions).

Effective monitoring tools and protocols for offset projects must also be customized to the specific emission sources and project categories under consideration. In our experience, methane capture projects, such as landfill gas or coal mine methane, can be monitored effectively using off-the-shelf technology. EPA has experience with these technologies by virtue of having implemented partnership programs with these industries for more than fifteen years. Other offset projects, particularly in the agriculture and forestry sectors, pose unique monitoring challenges. While data may meet national inventory needs, project-level estimates can be more challenging in these sectors due in part to the variability of the emission reductions or sequestration levels. In the case of sequestered carbon specifically, there is also the risk of reversals back to the atmosphere, through natural disturbances like forest fires or changes in management practices, like tilling soil.

U.S. National Greenhouse Gas Inventory

The second greenhouse gas monitoring program that I would like to highlight is the U.S. National Greenhouse Gas Inventory which is an annual accounting of human-caused emissions and sequestration across all sectors. This inventory provides the means of measuring progress against national goals, including President Obama's goal to reduce emissions by 14% from 2005 levels by the year 2020 and by 83% by the year 2050, and will be the metric by which success is judged. EPA has coordinated our Nation's annual greenhouse gas inventory since 1993, in cooperation with numerous other federal agencies. The Department of Energy provides essential data on the national fossil energy accounts. The Department of Agriculture (USDA) provides data and methodological support for land-based emissions and sequestration. The Department of Defense has proactively taken the lead on improving our understanding of emissions from their aircraft and ship operations. And the State Department, as the lead agency for United Nations (UN) treaties, submits the inventory each year to the UN Framework Convention on Climate Change.

As I indicated, the national greenhouse gas inventory includes all sources and sinks, from the burning of fossil fuels for transportation, to methane generated from decomposing organic wastes, to sequestration of CO2 in our forests and soils. Such a wide-ranging effort necessarily requires a variety of methodological approaches and technologies, and the quality of the data varies across source categories. Fossil fuel combustion is the source of approximately 80% of our national greenhouse gas emissions – and our colleagues at the Energy Information Administration take great effort to ensure that the national energy snapshot is accurate and up to date. Our own studies and independent reviews confirm that this largest component of our national inventory is accurate to within a few percentage points, and because EPA and the Department of Energy (DOE) have "piggy-backed" on existing government systems, the American taxpayer has not needed to fund redundant projects..

Other sources are considerably more challenging. For example, nitrous oxide, a very potent greenhouse gas, is emitted primarily from highly variable biological process in soils, lakes and streams. These biological processes can be accelerated by the application of fertilizer, or

through deposition of industrial pollutants, but our scientific understanding and our ability to predict emissions are incomplete.

As I indicated earlier, sequestration of CO2 in soils and forests is a special case. We cannot realistically measure the carbon in every acre of land, so we must use a sampling approach. The Forest Service has an extensive national system of measurement plots covering much but not all of the country's forests. The U.S. Department of Agriculture's (USDA's) National Resources Conservation Service also collects data on our agricultural soils. From EPA's perspective, the data are good but our national inventory would benefit from the development of additional monitoring and measurement approaches and continued integration of the data currently collected by land agencies such as USDA and agencies with remote sensing capabilities such as the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA).

International Reporting Programs

The third topic I would like to address is greenhouse gas monitoring in other countries. We expect the same level of effort and accuracy from other industrialized countries as we have achieved with our national inventory, and to a large extent our expectations are met. Europe, Japan, Canada, and Australia have strong greenhouse gas monitoring systems due to investments by each government and a rigorous system of international annual expert peer review. In addition to monitoring and reporting greenhouse gas emissions at the national level under the United Nations Framework Convention on Climate Change, many of these countries have developed or are developing, facility-level reporting systems, similar in scope to EPA's recent proposal for our domestic mandatory GHG reporting system. Among these countries there is a strong foundation of mutual trust in each other's data.

There is more room for improvement in the major developing countries. EPA has worked with many of these countries to build greenhouse gas monitoring capacity, and we have found that there are three main obstacles standing in the way of better data. First, the reporting requirements are inadequate for developing country parties to the UN Framework Convention on

Climate Change. Developing countries are required to submit only a summary level inventory approximately every five to six years. Modest and infrequent international reporting commitments give the wrong signal to government agencies and technical experts in these countries – they do not receive the political and financial support necessary for a strong inventory. Second, there are low-tech or "no-tech" opportunities that are being missed. In many developing countries there is a need to strengthen government and research institutions so that agencies communicate and greenhouse gas monitoring expertise is built up and retained over time. The collection and retention of basic national statistics for the energy, transportation, and waste sectors by these organizations and institutions would provide a solid first step in developing national estimates of greenhouse gas emissions, without the use of prohibitively expensive monitoring technologies or practices. Third, deforestation and the addition of new agricultural lands are the primary sources of GHG emissions in many developing countries and these are also the most technically challenging sources to monitor. Remote sensing techniques could be a cost-effective tool to improve agricultural and land-use data in these countries. Given the lack of resources and capacity in many developing countries and a range of assurances necessary with regard to competitiveness, the U.S. may benefit from a robust global atmospheric greenhouse monitoring program. Such a program could verify that efforts to reduce emissions leads to real reductions in the atmospheric concentration of greenhouse gases, and that offsets agreed to by the international community are having the intended effects. Such a system should complement ongoing programs in developed countries and a concerted effort by developing countries to improve reporting.

Conclusion

EPA also recognizes the scientific community's important role in verifying the effectiveness of our domestic and international policies. EPA's focus is primarily on the management of emissions from specific emission sources and projects, but we also need to be sure that reported and verified bottom-up emissions data are representative of atmospheric measurements and to know whether these policies are having the desired result on the climate. This is a challenging task for an issue as complex as climate change, but it is essential. Agencies including NOAA, NASA, DOE, and USDA are important players in this realm and a coordinated

effort among those agencies can achieve the necessary comprehensive "top down" understanding. In some cases, we may find that our monitoring approaches need to be modified, as we identify new information about greenhouse gas sources, sinks or processes. Moreover, as we gain better understanding of how the atmosphere is responding to our policies through these top-down measurements, we can use that information to modify our policy goals or identify additional verifiable measures that can reduce greenhouse gas emissions. To the extent that this hearing serves to advance this important discussion, it will be very useful to EPA and our partner Federal agencies.

In conclusion, I would like to emphasize that the greenhouse gas monitoring challenge is complex but solvable. We have high quality GHG emissions data for the large facilities that could be included in a future regulatory program such as cap and trade. Our national inventory is solid but could be improved in certain areas, particularly outside the energy sector. Inventories in major developing countries need to be improved through a combination of institutional and technological steps. And it is clear that collecting top-down measurement data can also play an important role in informing whether the bottom-up data being collected are comprehensive, helping policymakers further evaluate the effectiveness of any policies implemented.

Mr. Chairman, thank you for the opportunity to speak to the Committee today. I hope the information I have provided is useful, and I look forward to the answering the members' questions.