



Highlights of [GAO-423T](#), a testimony to the Subcommittee on Energy and Environment, Committee on Science and Technology, House of Representatives

Why GAO Did This Study

Elevated levels of greenhouse gases in the atmosphere and the resulting effects on the earth's climate could have significant impacts in the United States and internationally. Potential impacts include a change in sea levels, ecosystems, and ice cover. The United States Congress is considering proposals to limit greenhouse gas emissions using market-based mechanisms that would place a price on emissions. Such programs would create an economic incentive for regulated entities to limit their emissions.

Limiting greenhouse gas emissions requires an understanding of existing emissions as well as the development of a program to monitor, report, and verify emissions from entities that might be affected by a future regulatory program. A greenhouse gas mitigation program also requires an understanding of the numerous emissions sources and methods for calculating emissions of six major greenhouse gases—carbon dioxide, methane, nitrous oxide, and several synthetic gases.

This testimony focuses on (1) the importance of quality data on emissions in the context of a program intended to limit greenhouse gas emissions, and (2) key considerations in developing reliable data on greenhouse gas emissions. This testimony is based on several prior GAO reports and a review of related literature.

View [GAO-423T](#) or key components. For more information, contact John Stephenson, (202) 512-3841, stephensoj@gao.gov.

CLIMATE CHANGE SCIENCE

High Quality Greenhouse Gas Emissions Data are a Cornerstone of Programs to Address Climate Change

What GAO Found

Quality data on emissions are essential to the development and implementation of a system intended to limit greenhouse gas emissions. Domestic and international experiences with cap-and-trade programs, which place a price on emissions, demonstrate the importance of data quality in establishing baselines, monitoring results, and maintaining the integrity of a program. Existing cap-and-trade programs establish an overall allowable level of emissions and distribute allowances to regulated entities, which in turn are able to buy or sell excess allowances. The United States has operated a cap-and-trade program to limit emissions of sulfur dioxide—a pollutant that contributes to acid rain—from electric utilities since 1995. Based on prior GAO work and independent studies, the program has benefited from the development of an accurate emissions baseline for regulated entities as well as strong monitoring, verification, and reporting requirements. The European Union has also employed a cap-and-trade system to limit emissions of carbon dioxide—the most prevalent greenhouse gas—from electricity generators and certain industrial sectors since 2005. In November 2008, GAO reported that the program has faced challenges because of a lack of facility-specific data on baseline emissions. While the program has addressed many of these challenges, the European Union's experience demonstrates the importance of data quality in establishing a market-based program to limit greenhouse gas emissions.

Key considerations in developing reliable data on greenhouse gas emissions revolve primarily around the purpose and intended use of the data. In cases where the data are used to develop or implement a program to limit emissions, key considerations include (1) the scope of the program across emissions sources, such as whether it affects all emission-producing activities or a specified subgroup, and (2) the program's coverage across the six primary greenhouse gases. These considerations depend on the point of regulation—namely, whether the program affects a small number of “upstream” emitters such as fossil fuel producers and importers or instead affects smaller “downstream” emitters such as individual industrial facilities. Overall, the challenges in establishing baseline emissions data, as well as in monitoring, reporting, and verifying ongoing emissions will increase as the number of regulated entities, activities, and greenhouse gases increase. In some cases, existing emissions inventories (typically at the national, state, or industrial sector level) and registries (typically at the facility or project level) provide a starting point for understanding the challenges in establishing baselines and tracking emissions over time. For example, the United States Environmental Protection Agency maintains an official U.S. emissions inventory that provides national-level emissions data and background on methods to calculate emissions. In addition, several inventories and registries maintained at the regional level or by private and nonprofit entities provide a useful starting point for understanding data needs and developing standards for monitoring, reporting, and verification.