5.6 MM FOR OTHER GHG

Technology Description

Introduction

Other GHG (e.g., N_2O, CH_4, PFCs, HFCs, SF_6) are emitted from both point sources (industrial plants) and diffuse sources (open pit coal mines, landfills, rice paddies, and wastewater treatment lagoons) and offer unique challenges due to spatial and temporal variations. Measuring and monitoring(MM) technologies for both sources must include direct measurement of emissions as well as accurate reporting that is based on inventory accounting procedures or rules-of-thumb for activities or processes. Reporting methods are available and being improved.

System Concepts

- Continuous Emission Monitoring (CEM) for point sources with data transmission and archiving complemented by improved inventory-based reporting, and remotely sensed measurements.
- For diffuse sources, the system will include (1) rules-of-thumb for emissions based on known processes (e.g., agricultural practices related to N_2O emissions), (2) area-scale sensors that function autonomously with data transmission, and (3) remote sensing methods for local-to-regional scale estimation.

Representative Technologies

- CEM for a wide variety of other GHG.
- Direct measurement over landscapes.
- Indirect measurement via tracer studies.

Technology Status/Applications

- Diffuse emissions; Current technology (labor intensive) can estimate area-averaged atmospheric concentrations from diffuse emissions. New approaches are needed to quantify source and sink rates for other GHG. A more simple, reliable, and low-cost (meaning, presumably, unattended) method of measuring area-source emissions would be very helpful in producing both more accurate inventories and improving prospects for identifying low-cost reduction opportunities.
- Point sources: CEMs and inventory-based accounting and reporting provide elementary capability for estimating point sources of GHG emissions.

Current Research, Development, and Demonstration

RD&D Goals

- Point sources: Inexpensive CEM, instruments to measure from stand-off distances, satellite-based sensors capable of point-source estimation, and improved understanding of process chemistry so that accounting-based estimates are more accurate.
- Diffuse sources: New analytical tools for autonomous measurement, improved scientific understanding of processes to develop accurate rules-of-thumb, and remote sensors to quantify other GHG at multiple scales and in the vertical atmospheric profile.

RD&D Challenges

- Modeling activities that increase the accuracy of spatial estimates of N_2O and CH_4 from land management activities (e.g., nitrogen fertilizer, manure management, rice production, etc.).
- CEM systems for industrial emissions that are robust and inexpensive that are linked to data collection, distribution, and analysis systems.

RD&D Activities

- Limited scientific studies to measure or estimate emissions in systems such as landfills or agricultural practices are ongoing.

Recent Progress

- One approach involves tracer technique with Fourier transform measurement of sulfur hexafluoride tracer gas placed with emission sources. As a proxy, the tracer observations infer annual emissions, and while this procedure works, there are presently cost and logistical limitations.
- Airborne platforms effectively monitor aerial concentrations of GHGs, and have some capability with identifying emissions sources; new detection and measurement systems are being evaluated.

Commercialization and Deployment Activities
• Point source CEM methods and area-averaged concentration of GHGs can be obtained in limited applications; improved spatial resolution of measurements is needed before approaches are accepted by commerce and industry. • Methods do not exist for remote sensing of diffuse GHG emissions.