

Greenhouse Gas Monitoring Needs for Policies and Programs

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General Observations

- Greenhouse gas data needs depend on the purpose of the program or policy, e.g:
 - Scientific assessments (i.e., of carbon cycle)
 - Implementation of international agreements
 - Cap and trade
 - Offsets
 - Avoided deforestation
- GHG policy and programs will require many different approaches and technologies
 - No single approach will work for everything
- The ability to monitor GHGs should inform the choice of policies and programs

National GHG inventories

- Fundamental data set for assessing national progress on GHG emissions
- Core principles
 - Completeness: Covers all **anthropogenic** sources and sinks of GHGs
 - Consistency: The same methods are used for each year so that trends reflect activities and not different calculation approaches
 - Comparability: Adherence to international standards, conventions and approaches
 - Accuracy: Estimates are systematically neither over nor under true emissions or removals, as far as can be judged, and that uncertainties are reduced as far as practicable.
 - Transparency: Assumptions and methodologies should be clearly explained to facilitate replication and assessment

Figure ES-1

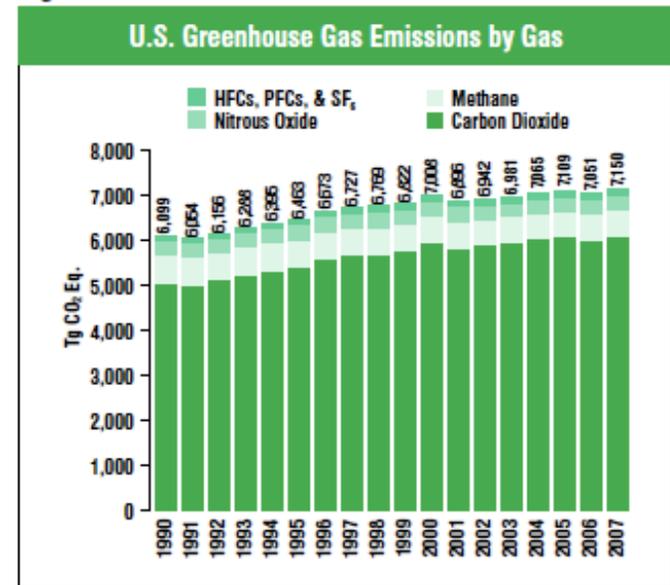
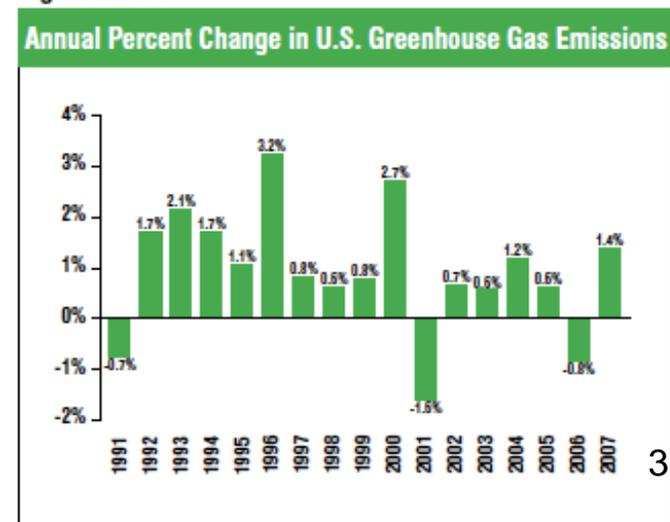


Figure ES-2



GHG Inventories in other countries

- International acceptance of IPCC standards as a basis for UNFCCC reporting
- Inventories in developed countries
 - Annual reporting of emissions and supporting data (1990 – present year),
 - Submissions reviewed annually by accredited international specialists
 - Europe, Japan, Canada, Australia have strong systems;
- Inventories in developing countries
 - No requirement for annual submission of inventories
 - Most countries have qualified technical expertise, and could – with additional support – produce better and regular inventories
 - Challenges
 - Infrequent reporting results in lack of institutional capacity.
 - In some cases, improvements needed in key economic (e.g., agricultural)
 - Limited resources for basic research (e.g., emission factors, national models)
 - Deforestation and agriculture represent a greater share of emissions in many developing countries, and they are the most challenging to monitor

“Nationally Appropriate Mitigation Actions (NAMAs)



- NAMAs can be broad policy changes and/or programs that aggregate (regionally, nationally) results of specific actions
- Sample NAMAs:
 - Brazil: reduced deforestation, energy efficiency, biological N fixation, no-till agriculture
 - Indonesia: sustainable peat land management, shifting to low-emission transportation modes
 - Mongolia: portable wind generation for nomadic herders, coal briquetting
- Intensity targets (e.g., NAMAs expressed as “tons of emissions per unit of economic output”) will increase complexity, because both the emissions and the economic metric should be subject MRV’d
- A quick examination of the scope and nature of possible actions proposed already indicates that MRV approaches will be diverse and difficult

Domestic Cap and Trade



- Clean Air Act experience with cap and trade since 1995 with SO₂ (Acid Rain) and NO_x (regional ozone) programs
 - Focused on largest stationary sources: electricity generating units (> 90% of SO₂ emissions)
 - Emphasis on monitoring frequency, accuracy and accountability:
 - Continuous Emissions Monitors (CEMs) required for non-homogenous fuels
 - Hourly stack-based measurements reported quarterly (along with other process related data); electronic QA/QC and verification
 - CO₂ data also reported by utilities since 1995
- Lessons for GHGs:
 - Focus on the largest sources and sources that can be monitored (not all sources are suitable for cap and trade)
 - Rigorous and transparent monitoring builds market confidence and public support
 - CEMs are relatively inexpensive for facilities; provide them with real-time information for compliance
 - Baseline historical facility-level data is critical for system design

US Mandatory Reporting Rule for GHGs



- Purpose of the rule: Reporting of greenhouse gas (GHG) emissions from all sectors of the economy in the United States, to inform future climate policies and programs
 - Monitoring began January 1, 2010
 - Reporting for 2010 by March 31, 2011
- Coverage: “Upstream” suppliers and “downstream emitters”
 - The most comprehensive GHG reporting program in the world
- Threshold: 25,000 metric tons CO₂e per year, equivalent to burning 131 rail cars of coal
 - Estimated 10,000 facilities (85% of US emissions coverage)
- Monitoring and reporting requirements:
 - Annual reporting
 - Combination of CEMs and rigorous calculation approaches
 - EPA will conduct verification of the emissions data
- Direct reporting to EPA electronically, system will be web-based

Offsets



- Offsets could be appropriate for source categories that are not candidates for cap and trade:
 - Methane capture (landfills, manure, coal mines)
 - Agriculture and Forestry
 - Other (boiler upgrades, bus fleet upgrades)
- Focus of MRV approaches:
 - Transparency in the quantification of project results, with supporting data
 - Rigorous assurance that project is “additional” (would not have happened anyway)
 - Ongoing verification of project status
- Opportunities for “top-down” approaches to support such verification, especially agriculture and forestry projects

Lessons Learned (I)



- Effective monitoring, reporting and verification (MRV) depends on the fundamentals:
 - What type of change will result from the policy
 - How will that change be monitored
 - What reporting will provide transparency in results
 - What verification will confirm the reported claims and/or the overall efficacy of the policy or program
- MRV must work within the appropriate compliance model
 - For domestic programs, compliance obligation resides with facility/company. Compliance assessed against the requirements specified in regulation.
 - International framework for climate MRV is more complicated, as compliance frameworks are not well-developed.

Lessons Learned (II)



- Transparency is essential for robust MRV
- Effective MRV builds confidence in the integrity of the policy/program
 - Such confidence need not depend on achieving a particular level of accuracy
 - Demonstrating that “evasion” or “gaming” will be detected is critical
- Given scope of climate policies and programs, prioritizing resource to most important issues and sources will be critical