Emission monitoring, reporting, and verification (MRV) for U.S. cap and trade programs
Principles of MRV for cap and trade programs

• Cap & trade requires a complete record of total emissions from each affected source
  – Environmental integrity: Achievement of the environmental goal is based on total emissions from all affected sources
  – Equity: Each source must pay, through the surrender of allowances, for each ton of reported emissions
  – Comprehensiveness: Substitute data procedures are used to account for missing or invalid data
Principles of MRV for cap and trade programs

• Cap and trade requires *frequent and timely emission reporting* to instill confidence in the market and to facilitate compliance assessment
  – **Market stability**: Lack of timely emission and compliance information can increase uncertainty and market volatility
  – **Data accuracy**: Frequent reporting allows for reporting errors to be found and corrected early before they affect compliance
Principles of MRV for cap and trade programs

- Measurement methods should create **incentives for greater accuracy**, but provide flexibility (e.g., allowing simplified measurement approaches for low emitters) when appropriate
  - Uncertainty is addressed through the use of conservative estimation methods to ensure that emissions are not underreported
  - Substitute data procedures become more conservative (i.e., overestimate emissions) as the period(s) of missing or invalid data increases
- Reporting requirements should be **standardized to facilitate consistency, comparability, and automation**
Emission monitoring for U.S. cap and trade programs
Monitoring process

- EPA specifies measurement methodologies and QA/QC requirements
- Sources develop and submit a monitoring plan consistent with selected measurement methodology
- Sources install, certify, & maintain measurement equipment
- Sources perform QA/QC testing for measurement equipment at prescribed intervals
- Sources report emission and activity data to EPA
- EPA audits and verifies all emission data
Reporting requirements

- Hourly data
  - \( \text{SO}_2 \), \( \text{NO}_x \), \( \text{CO}_2 \) emissions
  - Heat input
  - Operating load (MWh or 1,000 pounds steam)
  - Oil and gas fuel flow
  - Moisture data
- Quality assurance test data
- Monitoring system re-certification and maintenance event data
- Unit fuel type data
- Control equipment data
- Facility information (industry codes, boiler types)
- Monitoring plans
Data standardization

- Data reported electronically to EPA in standard format
  - Emissions
  - Operations
  - Quality assurance / testing
- Plant operators and EPA quality assure data with standardized data checking software
Quality assurance and evaluation

- Monitoring certification and recertification
- Regular quality assurance checks and tests
  - Daily calibration error test
  - Quarterly linearity check
  - Bi-annual relative accuracy test audit (RATA)
  - Bias test (uses RATA data)
- On-site audits of monitors and equipment tests
Evaluation program

- A systematic, thorough, and uniformly applied approach to ensure high-quality, accurate, timely, transparent, and complete data
  - Equipment performance standards
  - Quality assurance tests
  - Documented procedures and methodologies
  - Comprehensive electronic auditing
  - Independent field audits (random and targeted)
  - Mechanism to solve unique monitoring and reporting issues
Electronic audit and analysis of emission reports

- Compare monitoring plans, QA test history, and emissions data to rule requirements
- Look for mathematical and methodological errors
- Look for statistical anomalies

Out of control measurements
Compliance assistance

An EPA analyst is responsible for each Region

- Calls and emails from sources, States personnel, EPA regional staff, and the public
- Answer questions, provide guidance, and supply information
- Point of contact
Compliance assistance: services and tools

- Petitions: EPA can approve alternatives for situations where a facility can’t follow the regulations
- Regulatory guidance
- Quality assurance and reporting software
- Informational materials published on EPA’s web site
  - Applicable regulations
  - “Plain English Guide”
  - Policy manual
  - Field audit manual and checklists
Audits and problem prevention

• Electronic Audits
  – Emissions data
  – Facility information
  – Ad hoc or “spot check”

• Field Audits
  – Identify “suspect” facilities
  – Invite local, State, or EPA regional personnel for audit participation
  – Opportunity for sources to gain knowledge and ask questions

• Compliance Check
  – Before “true-up”, we run a hypothetical compliance check and notify sources if there are any problems
Lessons learned from U.S. emission MRV programs
Lesson: Measurement flexibility can reduce costs, but it is not appropriate for all sources or sectors

Use direct emission measurement when the sector or source is responsible for a large share of emissions and:

- Fuel sulfur or carbon content is variable
- Fuel use is difficult to measure accurately
- Pollution controls are used to capture emissions
- Process emissions are emitted through a stack or other easily monitored point
- Oxidation rates vary from source to source
Lesson: Properly designed incentives can improve emission data accuracy

- Incomplete or inaccurate data has consequences
  - More frequent quality assurance tests
  - Progressively stringent substitute data requirements
- Missing data substitution procedures reward high monitor data availability
- Automatic statutory penalties that are greater than cost of allowances

Sources have a financial incentive, in the form of allowances, to “get it right”
Other lessons

- Frequent reporting (e.g., quarterly) provides opportunities for government and industry to correct problems before the problems affect compliance.
- Clear, consistent, and prescriptive rules for addressing missing or invalid data reduce underreporting.
- Measurement programs must adapt to new information, instrumentation, and science.
- Measurement programs must have mechanisms to deal with unusual or unique situations.
- Electronic reporting reduces burden on industry and government, increases timeliness of data, and facilitates electronic QA/QC and auditing.
For More Information

Visit the clean air markets web site to view

– Emission data and allowance information
– Cap and trade program information
– Program rules and guidelines
– Studies and reports
– International cooperation activities

http://www.epa.gov/airmarkets/