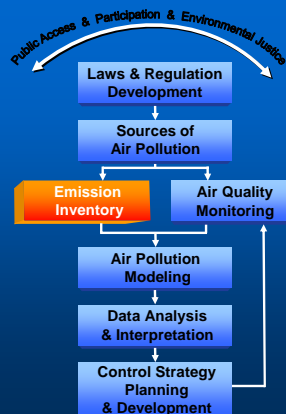


Chapter 4: Emission Inventory

Chapter Overview

- Emission inventory (EI) introduction
- Purpose of an emission inventory
- Elements of an emission inventory
- Discussion issues
 - What should an EI look like?
 - What needs to be done for a more useful EI?
- AQM Planning Tool Activity

Role of an
Emission
Inventory in an
Air Quality
Management
Program.



What is an Emission Inventory?

"...An emission inventory (EI) is a current, comprehensive listing, by source, of air pollutant emissions, and covers a specific geographic area for a specific time period."

- Comprehensive listing, by source, of the air pollutant emissions
- Specific geographic area
- Specific time period

Why Do We Need an Emission Inventory?

- The inventory is a fundamental building block in developing an air quality control and maintenance strategy
- Can be used for modeling
- Starting point for pollution control is quantifying emissions into the atmosphere

Uses of an Emission Inventory

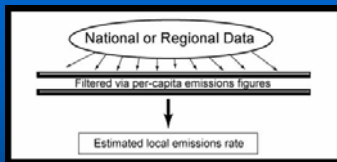
- Validation of compliance regulations
- Guide development of public policies
- Siting of ambient air monitors to assist in assuring public welfare
- Historical record of type of pollutant and quantity
- Temporal and spatial distribution of pollutant in a geographical area
- Understanding emission reactivity

Contents of an Emission Inventory

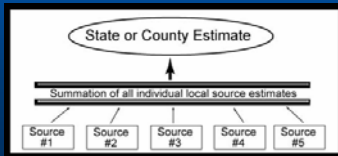
- Background information about the need for an inventory
- A tabular summary of emission estimates by source category
- A description of the geographical area covered in the inventory
- The time interval represented
- Population, employment and economic data
- Narrative of each source category describing how the data was collected, the sources, and the emission estimation methods and calculations

Emission Estimation - Two Approaches

Top-Down Approach



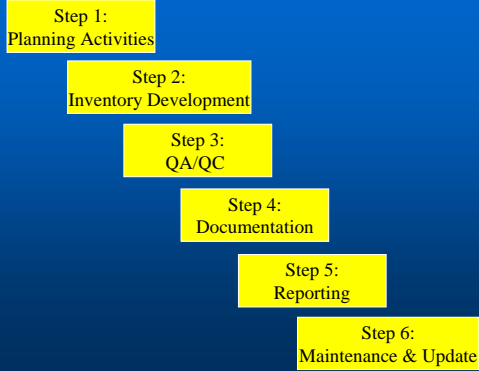
Bottom-Up Approach



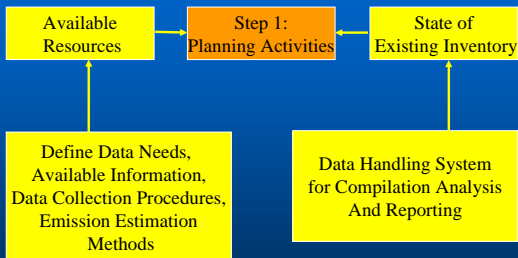
Summary of Estimating Emissions

Item	Top-Down	Bottom-Up
Type of Source	Typically Used for Nonpoint Source	Typically Used for Point Source
Resource Requirements	Minimal	More than Top-Down
Accuracy	Less Accurate; Estimates and Extrapolation	More Accurate; Source Specific Data

Components in Creating an EI



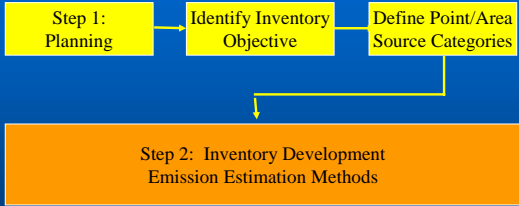
Components in Creating an EI



Planning Questions

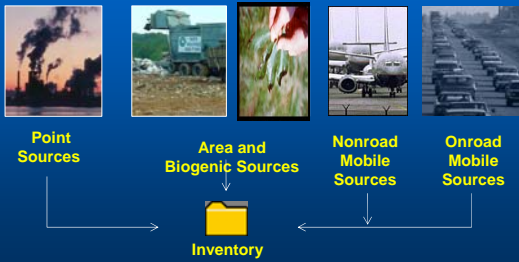
- How do I determine which pollutants to inventory?
- How do I determine sources of concern?
- How do I determine what data to report?
- What emissions are going to be inventoried?
 - Actual? Allowable? Potential?
- How do I define geographic boundaries of the inventory?

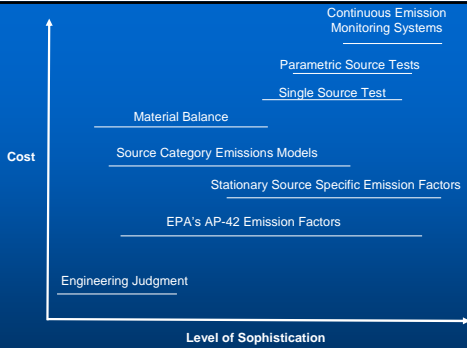
Components in Creating an EI



Building an Inventory

Compile emissions data for various sources:





This chart shows various emission estimation approaches.

How Do I Select a Method When Multiple Methods are Applicable?

- Consider the issues when analyzing the tradeoffs between cost and accuracy of the resulting estimates.
- Issues
 - Availability of quality data needed
 - Practicality of the method for the specific source category
 - Intended end use of the inventory
 - Pollutant and source category priority
 - Time available to prepare the inventory
 - Resources available in terms of staff and funding

Emission Factors

- Estimate the rate at which a pollutant is released to the atmosphere as a result of some process
- Provide a reasonable estimate of pollutant emissions across an entire source category

Material Balance

- Used when
 - Source test data, emission factors, or other developed methods are not available (some exceptions)
 - Where accurate measurements can be made of all process parameters
 - Okay for processes like solvent degreasing operations, and surface coating operations
 - Should not be used for processes where material reacts to form secondary products or undergoes significant chemical change

Source Testing



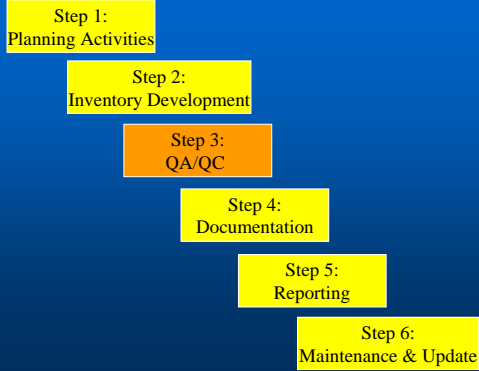
Emission Estimation Models

- Used when
 - Calculations are very complex
 - Combination of parameters has been identified that affect emissions, but individually, do not provide a direct correlation
- One example is the International Vehicle Emissions Model

Engineering Judgment

- Last resort to be used only if none of the methods described can be used to generate accurate emission estimates

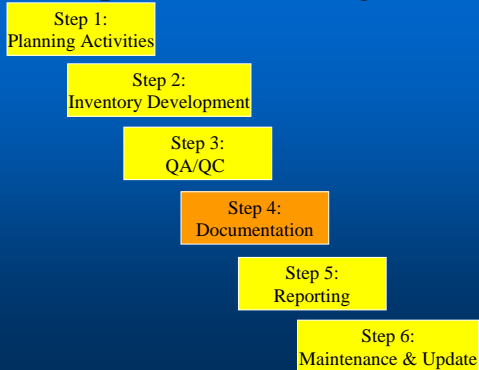
Components in Creating an EI



EI QA and QC

- QC is a system of routine technical activities implemented by the inventory development team to measure and control the quality of the inventory as it is being compiled.
- QA is a system of external review and audit procedures conducted by personnel not involved in the inventory development process.

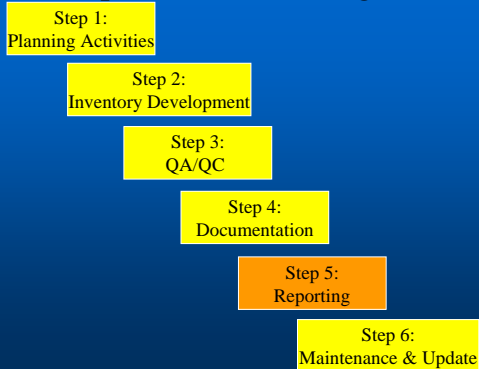
Components in Creating an EI



EI Documentation

- Support QA/QC assessments of inventory
- Ensure the reproducibility of the inventory estimates
- Enables an inventory user or reviewer to assess quality of the emission estimates and identify the data references
- Ensures that the inventory will serve as a solid foundation for future inventories compiled for that inventory area

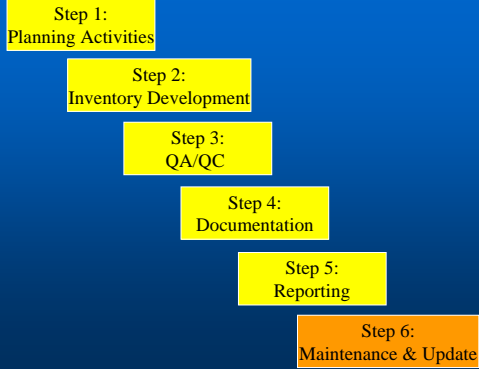
Components in Creating an EI



EI Reporting

- Reporting Forms
 - Computer printouts of raw data listings to aggregate summary reports
 - Public information pamphlets and emission control documents
 - Summary reports specific to a pollutant and industry (i.e., total toxic emissions from degreasers)
 - Tables and graphic displays

Components in Creating an EI



Why Maintain and Update EIs?

- Existing facilities could deactivate process equipment or close completely;
- New facilities and/or processes could come online;
- Existing facilities could increase or decrease production schedules;
- Existing facilities could modify their product line;
- Population changes could affect the number and type of non-point sources;
- Changes in land use patterns could affect the number and type of non-point sources;
- Changes in regulations could impact the inventory scope; and
- Updates in emission factors or other emission estimation tools could require recalculation of certain emission estimates.

Chapter Review

- Emission inventories are used to help determine significant sources of air pollutants, establish emission trends over time, target regulatory actions, and estimate air quality through computer dispersion modeling.
- Different methods for calculating the emissions inventories are available, and the choice of method depends on the availability of data, time, staff and funding.

AQM Planning Tool Activity
