

The Intergovernmental Panel on Climate Change and Methods for Measuring SF₆ Emissions

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Co-Chair, IPCC Good Practice Report



Emission Inventories??

- An *emission inventory* is an estimate of the level of emissions from a particular source or group of sources
- Emission inventories are used for:
 - ◆ atmospheric science
 - ◆ evaluating progress toward national & international goals
 - ◆ participating in emission markets

Greenhouse Gas Inventories: The International Context

- Some background...
 - ◆ Framework Convention on Climate Change (FCCC)
 - ◆ Intergovernmental Panel on Climate Change (IPCC)
 - ◆ Conference of Parties (COP)
 - ◆ IPCC Good Practice Guidance

UN Framework Convention on Climate Change

- Adopted at the 1992 Rio Earth Summit
- Ratified by 142 countries (now called the “Conference of Parties” or “COP”)
- Voluntarily reduce GHG emissions to 1990 levels by 2000
- “Inventory” and report annual GHG emissions

Intergovernmental Panel on Climate Change (IPCC)

- Organized by WMO & UNEP in 1988
- International scientific body that assesses:
 - ◆ state-of-science on climate change
 - ◆ environmental & socio-economic impacts
 - ◆ response strategies & costs
 - ◆ emission inventory methodologies
- Advisory body to COP

IPCC Inventory Guidance

- IPCC role is to develop source category estimation methods
 - ◆ that can be used by countries with different capabilities & resources
 - ◆ that result in transparent, high-quality estimates
 - ◆ that address uncertainties

IPCC Guidelines -- Timeline

- 1993: 1st version of IPCC Inventory Guidelines issued
- 1996: Revised IPCC Guidelines Issued
 - ◆ included High GWP Gases
 - ◆ referenced in Kyoto Protocol (Article 5.2)
- 1999: Issued Report on Good Practice Guidance

Basic Principle: All Countries Should Be Able to Estimate

- Tier 1:
 - ◆ simple to use
 - ◆ requires less data
 - ◆ less accurate, less specific
- Tier 2 (or Tier 3):
 - ◆ more complex
 - ◆ requires more data
 - ◆ often plant- or process-specific
 - ◆ more accurate, more specific

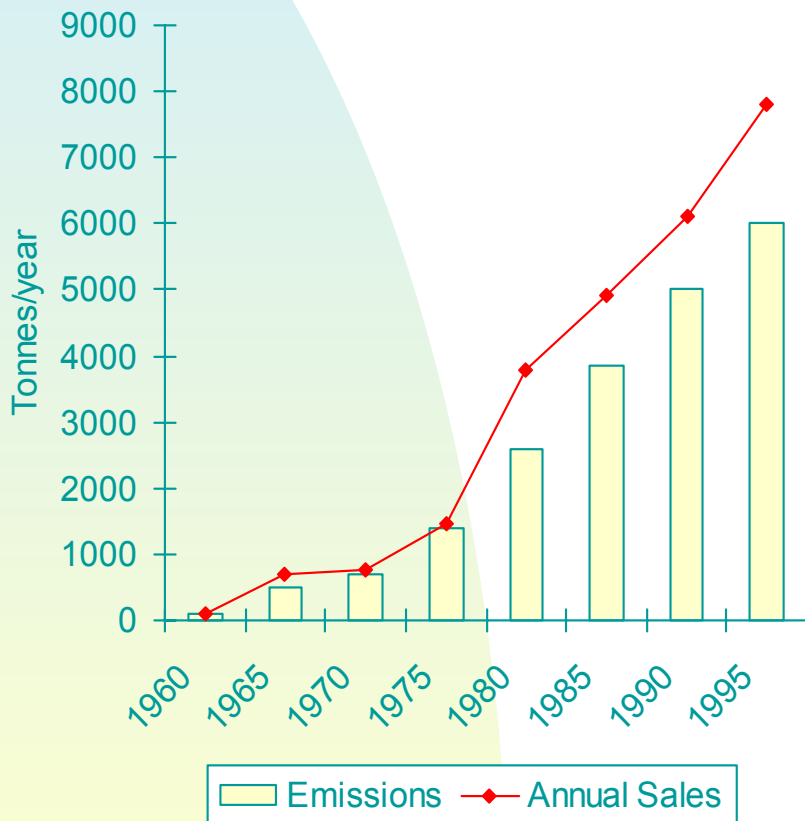
Choice of Methods

- National circumstances
 - ◆ each country chooses its methods based on
 - ☞ availability of data
 - ☞ significance to domestic policies
 - ◆ all countries should use “good practice”
- Tier 2 methods are generally preferred for “key” sources

Good Practice Guidance

- What it covers:
 - ◆ how to choose among and implement methods
 - ◆ how to collect required data
 - ◆ how to conduct QA/QC
 - ◆ how to assess uncertainty
 - ◆ how to document estimates
- www.ipcc-nggip.iges.or.jp/public

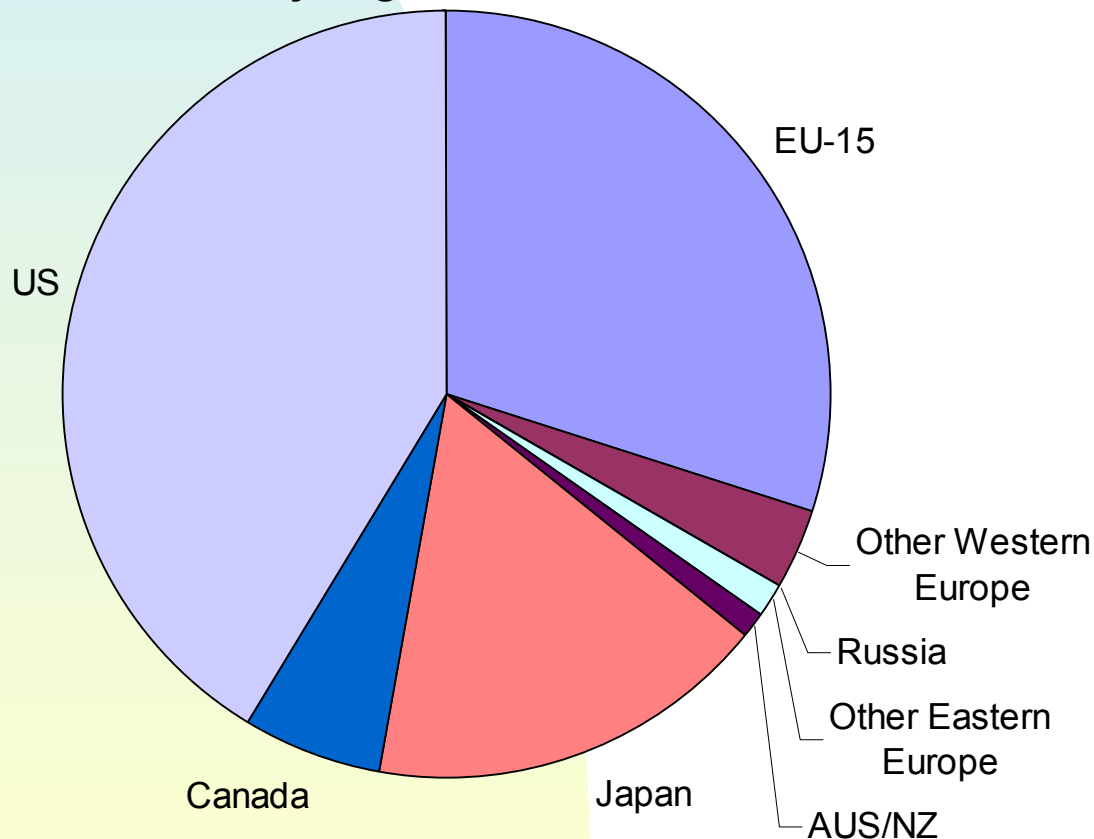
Global SF₆ Emissions Are Growing Fast



- Global emissions are well-characterized based on atmospheric concentrations
- Data indicate major growth in SF₆ use in electrical applications
- Annual SF₆ consumption exceeds emissions

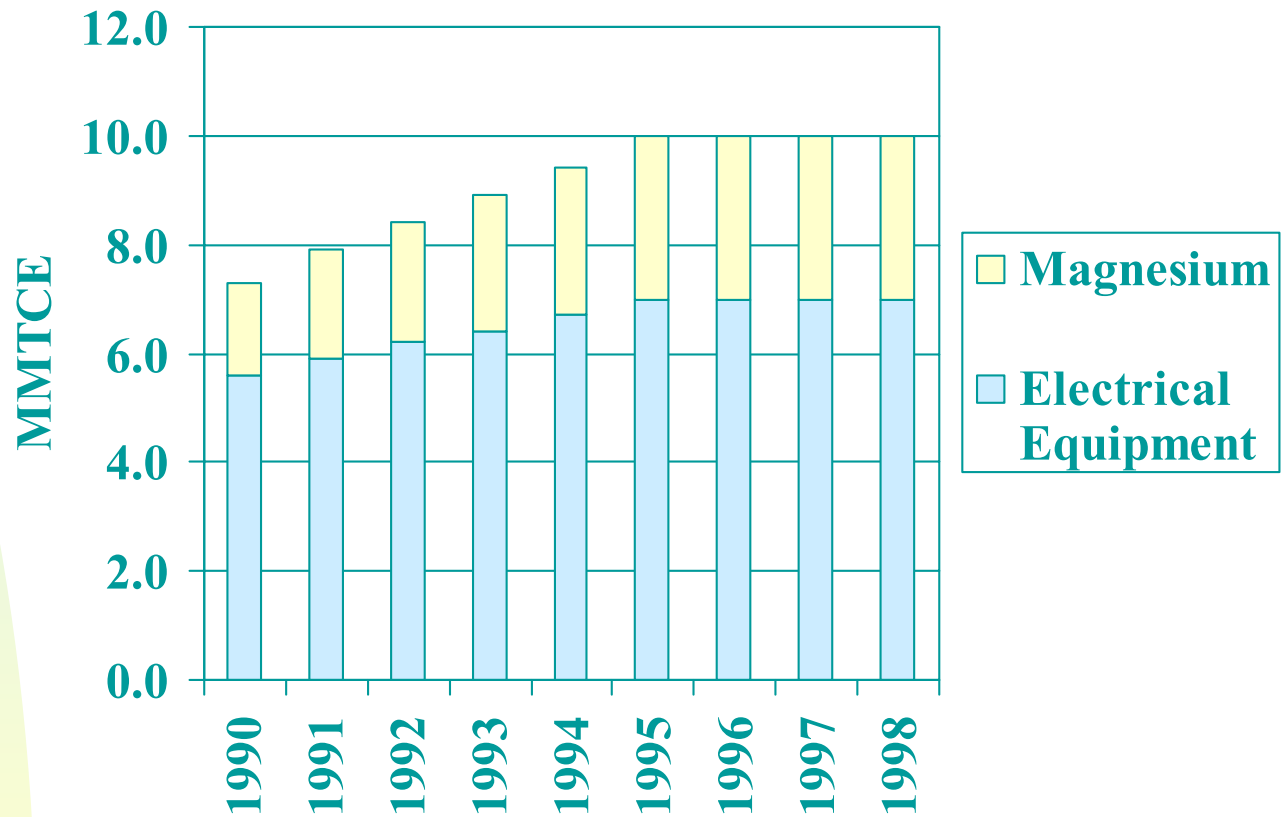
Country-Level SF₆ Emissions

SF₆ Emissions from Developed Countries
by Region for 1995



- Most SF₆ emitted by developed countries
- National emissions are less well-characterized than global estimates
- Several countries are only beginning to report

US SF₆ Emissions Estimates



IPCC Relies on Government & Industry Experts

- Magnesium Expert Group
 - Bill Palmer, Cheminfo
 - Pieter du Toit, SASTech R&D
 - Scott Bartos, USEPA
 - Lowell Brothers, Southern Co. Services
 - Kathryn Ellerton, Allied Signal
 - Bill Irving, USEPA
 - Toshiaki Ohgita, Inst. for Techno-Economics
 - Natalya Parasyuk, ARENA-Eco
 - Takuya Suizu, Fed. of Electric Power Co.
 - Tom Tripp, Magnesium Corp of America
 - Chen Zhenlin, China Meteorological Association

More IPCC Experts

- **Utility Expert Group**
- Jos Olivier, Netherlands RIVM
- Newton Paciornik, Brazil Ministry of Science & Technology
- Ranier Bitsch, Siemens
- Lowell Brothers, Southern Co. Services
- Eric Dolin, USEPA
- Kathryn Ellerton, Allied Signal
- Jochen Harnisch, Ecofys
- Petra Mahrenholtz, German EPA
- Bill Palmer, Cheminfo
- Natalya Parasyuk, ARENA-Eco
- Ewald Preisegger, Solvay
- Michael Strogies, German EPA
- Takuya Suizu, Japan Federation of Electric Power Companies
- Chen Zhenlin, China Meteorological Administration

Magnesium Methods

- Tier 1 (no direct data):
 - ◆ national sales method
 - ◆ top-down method
- Tier 2 (direct data):
 - ◆ direct reporting method
 - ◆ hybrid of direct & top-down methods

Electric Utility Methods


- Tier 1: “Potential” approach
- Tier 2: Emission factor approach
 - ◆ 2a: Life-cycle emission factors
 - ◆ 2b: IPCC default emission factors
- Tier 3: Mass-balance approach
 - ◆ 3a: Life-cycle level
 - ◆ 3b: Manufacturer & utility level
 - ◆ 3c: Country-level mass-balance

How Does Industry Support the Inventory?

- Participating in method development and refinement
 - ◆ IPCC Good Practice Project
 - ◆ Greenhouse Gases Emissions Estimating Consortium (GGEEC)
- Providing data through voluntary programs
- Reviewing the US inventory
[www.epa.gov/globalwarming/emissions]

Why Should Industry Support the Inventory?

- Sound policy requires sound data
- Emerging emission markets depend on sound data:
 - ◆ at \$10/ton-carbon equivalent, 1 pound of SF_6 *not emitted* is worth \$30
 - ◆ avoiding emissions through recycling, reduced use, etc., has economic value
- Need to overcome perceived uncertainty of “non-CO₂ greenhouse gases”

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- “Working with the government makes me nervous. Not working with the government makes me more nervous.”

☞ Industry comment overheard at an IPCC Good Practice meeting (Jan 1999)