Proposed Endangerment Finding for GHGs in Response to Mass. v. EPA

Guidance-Option Selection Briefing

March 6, 2009

Overview

- EPA's charge to make an endangerment finding
- Elements of an endangerment finding
- EPA's actions to date
- Guidance elements and working proposal
- Schedule

Timeline Leading up to Now

- 1999: EPA received a petition to regulate greenhouse gas (GHG) emissions from new motor vehicles and engines under section 202(a) of the Clean Air Act (CAA).
- 2003: EPA denied the petition. In 2005, a split panel of the D.C. Circuit upheld EPA's denial.
- April 2007: In *Mass. v. EPA*, Supreme Court rejected EPA's reasons for denying the petition, stating that CO_2 meets the CAA definition of air pollutant and that EPA must base its decision on the statutory criteria of Section 202 (e.g., whether there is endangerment or not, or whether scientific uncertainty precludes EPA from making a reasoned judgment)
- December 2007: EPA prepared a proposal to a make a positive endangerment finding (in conjunction with a proposed GHG transportation rulemaking), submitted this to OMB, but subsequently withdrew the proposal following passage of the Energy Independence and Security Act
- July 2008: EPA published the Advance Notice of Proposed Rulemaking (ANPR), which made no proposal regarding endangerment, but rather sought comments on implications of making an endangerment finding, and the underlying science

EPA's Charge to Make an Endangerment Finding

- According to *Mass v. EPA* decision of April 2007, EPA must find that GHGs from new motor vehicles:
  - cause or contribute to air pollution that endangers, or
  - do not cause or contribute to air pollution that endangers, or
  - that the science is too uncertain to make a reasoned judgment
- Language under Sec. 202 of the CAA:
  - The Administrator shall by regulation prescribe…standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.
  - Other sections of the CAA have nearly identical endangerment language

Elements of an Endangerment Finding

4 "**Cause or contribute"** test for air pollutants must be analyzed in context of prior determinations and unique attributes of GHGs

3 **"Air pollutants"** that cause or contribute to air pollution (and thus subject to control) must be identified

The Administrator shall by regulation prescribe… standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.

1 Scope and definition of **"air pollution"** that endangers needs to be defined

2 Is there endangerment to **public health, welfare, or both**?

General Considerations for an Endangerment Finding

- Precautionary nature of CAA endangerment finding based on 1977 legislative history
- Administrator advised to:
  - Take action to prevent harm before it occurs
  - Assess risks, reasonably project into the future
  - Consider the limitations and difficulties inherent in information on public health and welfare
  - In the endangerment analysis, consider air pollution collectively and in the context of all sources of the contaminant (e.g., not a single source or category of sources, or single media)

EPA's December 2007 Endangerment Proposal That Was Withdrawn

- EPA was responding to the President's directive from May 2007 (consistent with Executive Order 13432) to initiate GHG regulations for new motor vehicles under the CAA, which was in response to *Mass. v. EPA*

- Administrator Johnson was proposing:

  - Positive endangerment finding for public welfare
  - GHG impacts on human health were considered "indirect" (i.e., via climate change); no endangerment proposal for public health was made either way
  - "Air pollution" defined as the elevated atmospheric concentrations of the 6 collective key GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6)
  - Of the 4 GHGs from transportation, only CO_2 was proposed as the "air pollutant" that "causes or contributes" to the air pollution; comment was invited whether the other 3 GHGs cause or contribute

Guidance Towards Option Selection

The Endangerment Determination will respond to the Supreme Court decision:

- Guided by the Section 202 language
- Consider relevant legal precedent and any distinct attributes of GHGs
- Provide data on all U.S. sources, including all U.S. on-road transportation GHG emissions (Section 202)
- Be based on the totality of the scientific evidence
- Consider nature of the effects and key uncertainties
- Address key comments received on the ANPR

Guidance - - Approach on Supporting Science

The Technical Support Document (TSD):

- Focuses on climate change impacts on the U.S. with additional key global perspectives
- Relies on consensus-based, peer-reviewed scientific literature
  - IPCC
  - CCSP
  - National Research Council
  - Other more recent *significant* peer reviewed studies
- Does not confine analysis to observed and projected effects attributable only to U.S. transportation GHG emissions
- Communicates confidence levels and uncertainties
- Includes negative and positive effects across all elements of human health, society and natural environment
- Considers time frame consistent with GHG effects on climate

Proposing Endangerment Finding as a "stand-alone" action

- EPA proposes to address all elements of the endangerment finding [for Sec. 202] without simultaneously proposing GHG standards
  - Propose definition and scope of "air pollution"
  - Propose positive finding for public health and welfare
  - Propose definition of "air pollutant(s)"
  - Propose criteria and test for "cause or contribute" for Section 202
- Represents complete response to Mass. v. EPA

Contents/Outline of Endangerment Proposal

I. Introduction, Purpose and Scope
   - Background on ICTA petition and Mass v. EPA
   - CAA language

II. Legal background on endangerment, cause and contribute

III. Science summary

IV. Is air pollution reasonably anticipated to endanger public health or welfare?
   - Administrator's proposal on air pollution and scope of endangerment

V. Do emissions of GHGs from new motor vehicles and engines cause or contribute to that air pollution?
   - Emission sources and data
   - Administrator's preference on cause and contribute, soliciting comments

VI. Summary of Proposal

VII. Statutory/Executive orders

Proposed Definition of "Air Pollution"
(same as December '07 proposal)

- **Total collective elevated concentrations of 6 GHGs* (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6) in the atmosphere**

  - Consistent with cumulative approach underlying the statutory language
  - "Air pollution " is not defined under the CAA. Thus, we have discretion to adopt any reasonable/permissible interpretation, whether it be a definition of "air pollution" as a class of GHGs, or as several individual GHGs
  - Preserves option of treating gases separately at the "cause or contribute" stage
  - Risks associated with climate change (i.e., the endangerment) are not evaluated on a gas-by-gas basis in the scientific literature
  - UNFCCC ultimate objective is for stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system
  - Addresses key driver of human-induced climate change: climate change research and policy community focus on the 6 GHGs not controlled by the Montreal Protocol

  *This would not preclude EPA from considering an endangerment finding for additional, but less certain climate forcers such as black carbon and aviation contrails (raised by ANPR comments and petitions)

  - Science and policy rationale would be provided for not including other climate forcers now, but possibly at another date

Proposed Positive Endangerment Finding

- December, 2007 draft proposed a positive endangerment finding for public welfare but was silent on public health
- This Finding will propose positive finding for public health and welfare

- Argument for health and welfare:
  - Addresses all effects associated with elevated concentrations of GHGs and climate change
  - Solid legal defensibility
  - Excluding public health would raise perception that Agency is ignoring health risks associated with climate change

Health Effects Associated with Elevated GHG Concentrations

(In approximate order of our level of understanding)

- Direct effects
  - The range of projected ambient concentrations of CO_2 and other GHGs will remain well below published thresholds for any direct adverse health effects, such as respiratory or toxic effects
- Temperature effects
  - Severe heat waves are projected to intensify in magnitude and duration over the portions of the U.S. where these events already occur, with likely increases in mortality and morbidity, especially among the elderly, young and frail.
  - Climate change is projected to bring some benefits, such as fewer deaths from cold exposure.
- Air quality changes
  - Climate change is expected to lead to increases in regional ozone pollution, with associated risks in respiratory infection, aggravation of asthma, and premature death.
  - Directional impact on PM remains uncertain
- Extreme events
  - Storm impacts are likely to be more severe, especially along the Gulf and Atlantic coasts.
  - Intensity of precipitation events is projected to increase in the U.S. and other regions of the world, increasing the risk of flooding, greater runoff and erosion, and thus the potential for adverse water quality effects
  - Projected trends will increase the number of people suffering from disease and injury due to floods, storms, droughts and fires
- Climate-sensitive diseases
  - Expanded ranges of vector-borne and tick-borne diseases are expected but with modulation by public health measures and other factors.
- Aeroallergens
  - No definitive conclusions on how climate change might impact aeroallergens and subsequently the prevalence of allergenic illnesses

Sources: EPA's Tech Support Doc. 2008, IPCC 2007, CCSP SAP 4.6 2008

Climate Change Impacts and Environmental Justice Considerations

- Climate change scientific literature already draws attention to environmental justice considerations
  - "Climate change is very likely to accentuate the disparities already evident in the American health care systems as many of the expected health effects are likely to fall disproportionately on the poor, the elderly, the disabled, and the uninsured." *Draft TSD, CCSP 4.6*
- Proposal is to elevate discussion of these considerations, as part of rationale for a positive endangerment finding for both public health and welfare

For "Air Pollutant(s)" that "Cause or Contribute" What Does "Contribute" Mean?

- The "cause or contribute" decision is part of the "judgment" that the Administrator exercises in the endangerment finding
- Administrator may exercise discretion when deciding whether an air pollutant contributes to air pollution (e.g., it is not a "one molecule" test)
- Relationship between air pollution and air pollutants
  - Endangerment determination deals with whether GHG *concentrations (air pollution)* are a problem (i.e., the cumulative stock of GHGs)
  - The cause & contribute determination deals with which *emissions (air pollutants)* will be controlled (i.e., how to control the flow of GHGs)
- In her judgment, the Administrator may decide that emissions from the relevant source(s) do not contribute if they are *de minimis* or miniscule or insignificant

Proposed Options for Defining “Air Pollutant(s)” that “Cause or Contribute”

- What is/are the “air pollutant(s)”?
  - Option 1 - Collective group of 6 GHGs
  - Option 2 - Each individual GHG
- Does the “air pollutant(s)” cause or contribute?
  - Yes or No
- To retain flexibility, we propose to take comment on both options while expressing EPA preference for option 1 (group of GHGs)

Summary of Past Approaches for Defining "Air Pollutant(s)"

- EPA precedent regarding treatment of other pollutants as a group (e.g., VOCs, ODSs)

- Precedents for contribution:
  - Snowmobile rule: less than 1% of total CO inventory in CO non-attainment area
  - 2002 recreational engines rule: 13% of national *mobile* source HC emissions, 6% of *mobile* source CO emissions, 3% of *mobile* source NOx emissions, and 1% of *mobile* source PM emissions
  - 2001 highway heavy duty diesel engine and diesel sulfur rule: HDE contributed 29% of *mobile* NOx emissions, and 14% of *mobile* PM emissions
  - 1996 Large MSW NSPS -- MSW landfills emitted roughly 1% of NMOC from stationary sources
  - 1994 new non-road compression-ignition engines: 9.2% of *national* NOx inventory was considered "significant" contribution

Preferred Approach: Option 1 (Group)

- Provides a "common currency" to discuss GHG emissions from a variety of sources
  - CO_2e used by IPCC, UNFCC, scientists, policymakers, and other stakeholders worldwide
- Basing contribution finding on all 6 GHGs that make up the "air pollution" basket, including CO_2, would eliminate concern about setting contribution precedents for the lower levels for non-CO_2 GHG
- Every US domestic program that includes reporting of multiple GHGs references a CO_2e metric (e.g., MRR, DOE's 1605(b), Climate Leaders, CARB, WRI, The Climate Registry, etc.).

Implications of Approach for "Air Pollutant(s)"

- Transportation
  - Group approach appears to offer greatest flexibility in standard setting
- PSD
  - Group approach may offer greatest flexibility (e.g., netting and offsetting among GHGs)
  - However OAR/OGC currently evaluating permitting implications of both options (e.g., potential administrative burden of permitting as group and individual)
- NSPS
  - Group approach appears to offer greatest flexibility in standard setting
- Mandatory GHG Reporting
  - Threshold was established on a CO_2e basis
  - Facility level emissions data being collected on CO_2e basis and by individual gas to provide flexibility

Endangerment Finding Workplan/Timeline

Task	Milestone
Draft science TSD to internal EPA review (and external expert review) Draft Endangerment Finding to internal EPA review	3/9/09 3/10/09
Internal Agency review complete	3/16/09
Final Agency Review (FAR)	**3/18/09**
Submit for Formal Interagency Review	3/20/09
Complete Interagency Review	4/10/09
Proposal signed by Administrator	**4/16/09**
Proposal published in Federal Register: - 60-day comment period, 2 public hearings	4/30/09

For Final Endangerment Finding, need to consider coordination of timing with OTAQ's GHG NPRM

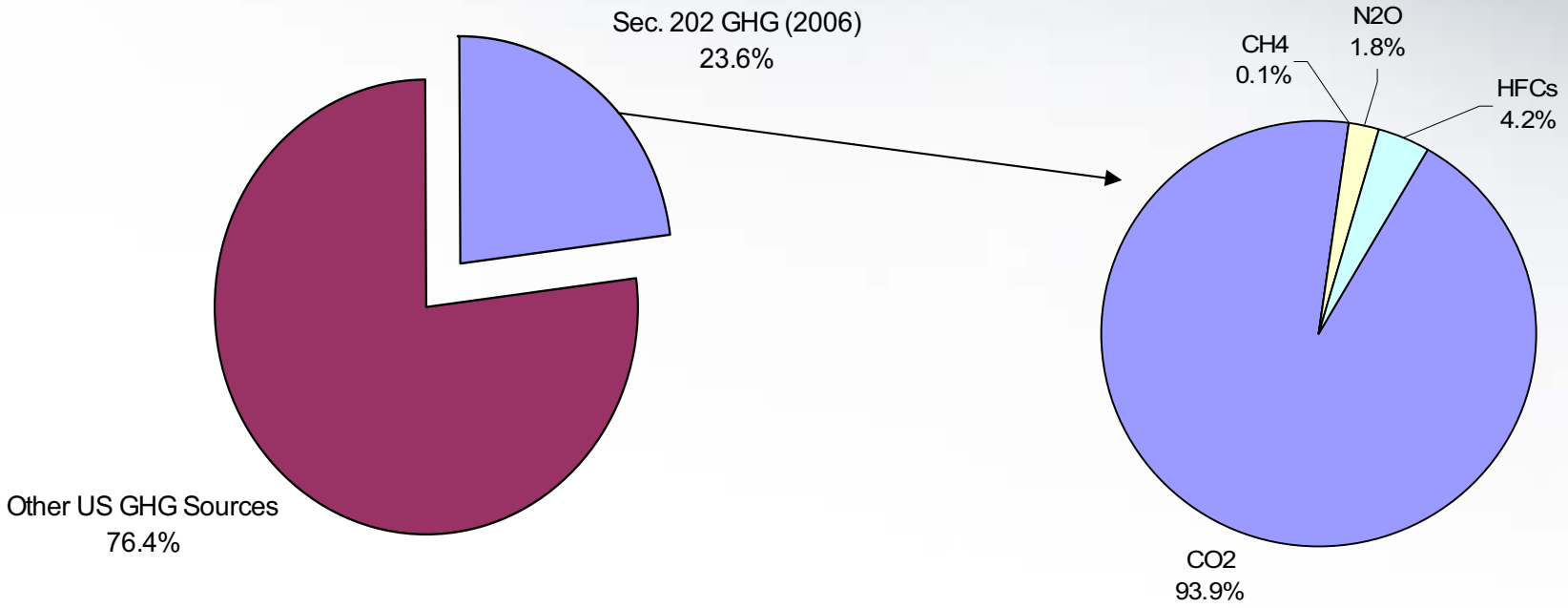
Appendix

Emissions Contribution Data

- Contribution charts for each transportation GHG (CO_2, CH_4, N_2O, HFCs), and for the group of transportation GHGs
  - % total US emissions of individual gas
  - % total US GHG emissions
  - % global emissions of individual gas
  - % global GHG emissions
- Contributions are the same for the group of 4 and group of 6 GHGs.
- Data for Sec 202 sources
  - Use of 2006/2005 data is a good surrogate for current and future contribution

Sec 202 Transportation GHG Emissions

Total U.S. GHG Emissions (2006) = 7,054 MMT CO_2 Eq.

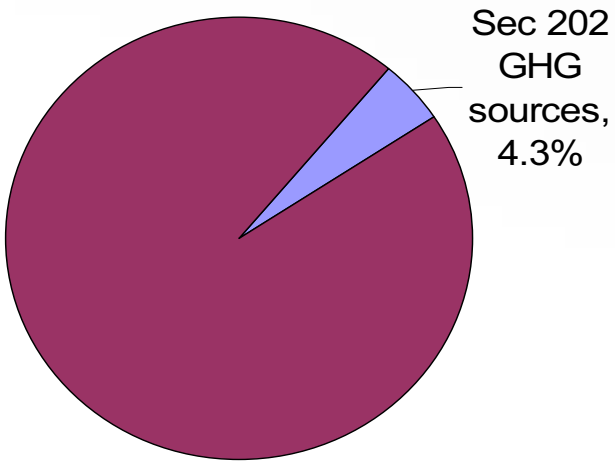


202: passenger cars, light duty trucks, other trucks and buses, motorcycles, cooling

Data for 2006

Contribution of 202 GHGs as a Group*

Total Global GHG Emissions (2005) = 38,726 MMT CO_2 Eq.



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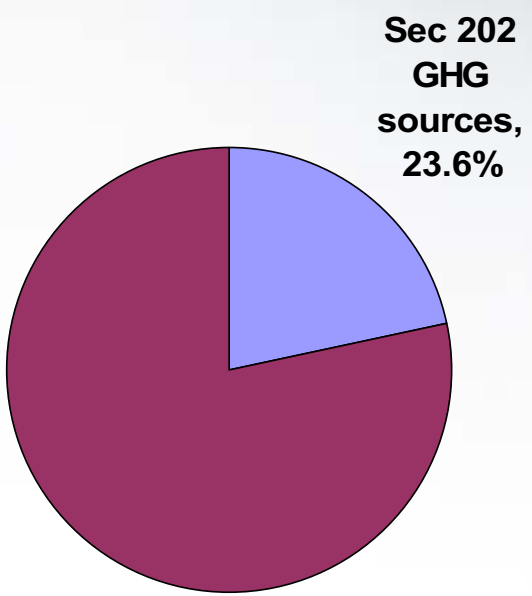
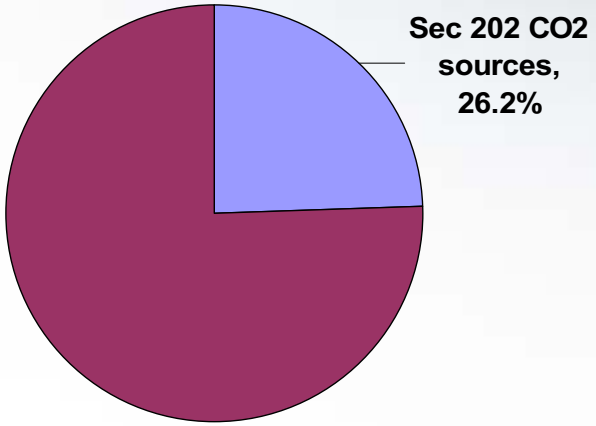


*Consideration of 4 or 6 GHGs as a group provides same result under 202

CO_2

Total U.S. CO_2 Emissions (2006) = 5,983 MMT CO_2 Eq.



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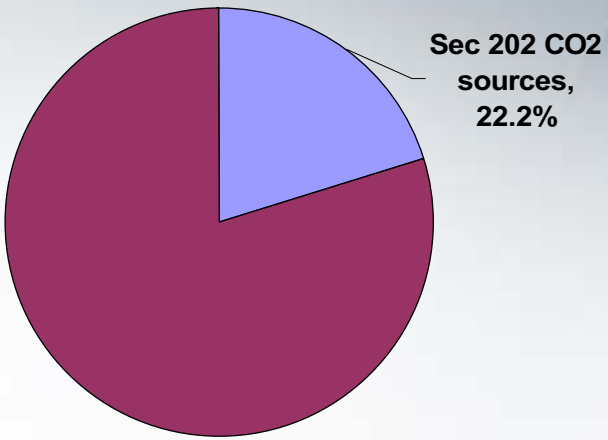
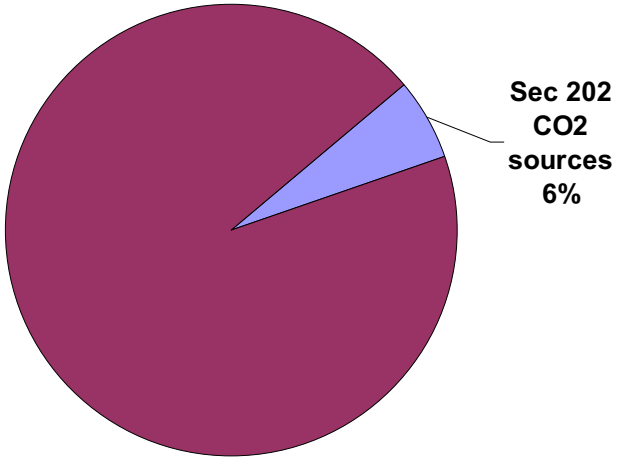


Total Global CO_2 Emissions (2005) = 27,526 MMT CO_2 Eq.



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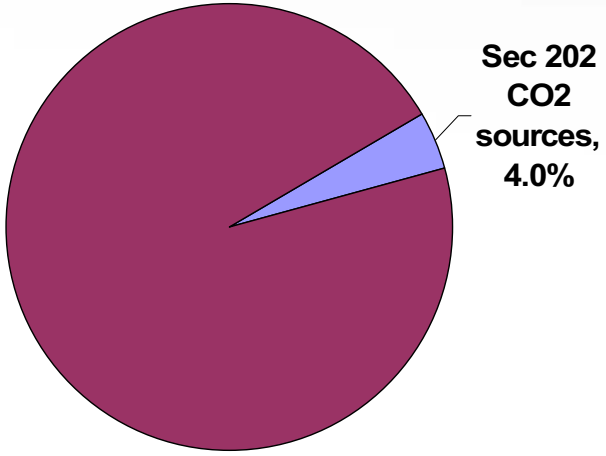
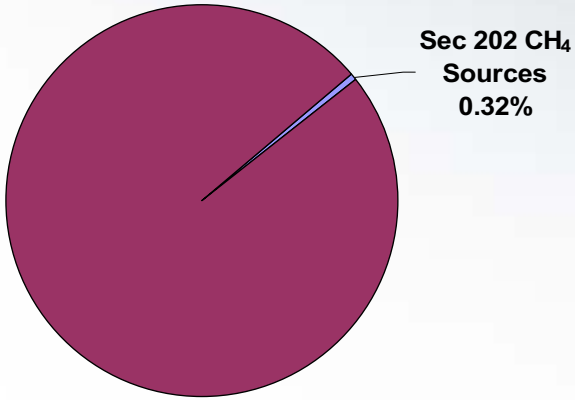
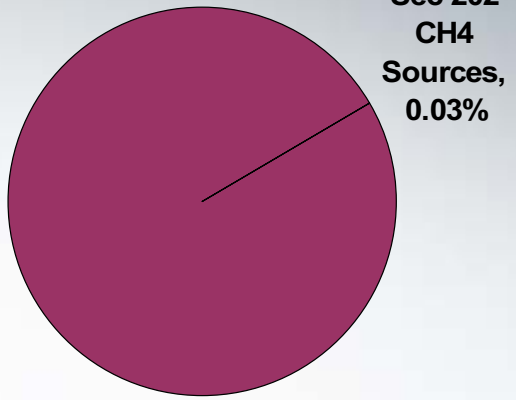


CH_4

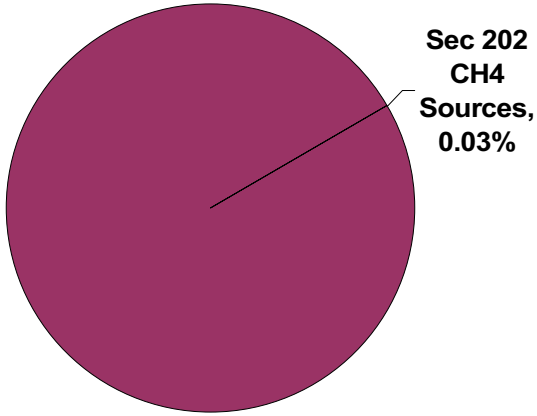
Total U.S. CH_4 Emissions (2006) = 555.3 MMT CO_2 Eq.



Total U.S. GHG Emissions (2006) = 7,054 MMT CO_2 Eq.



Total Global CH_4 Emissions (2005) = 6,407 MMT CO_2 Eq.



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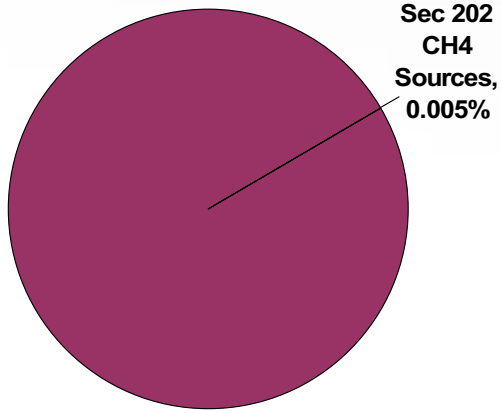
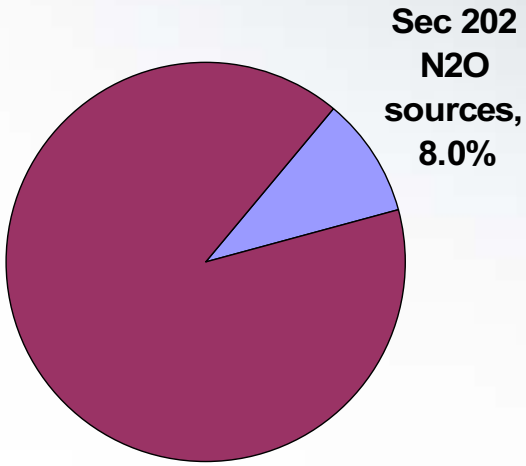


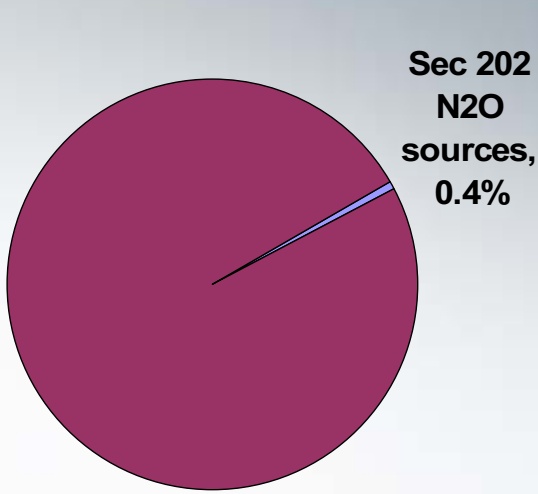
NOTE: Comments on proposed refinery NSPS argued that EPA should regulate CO_2 and CH_4 and cited 0.6 MMT CO_2e emissions of CH_4

N_2O

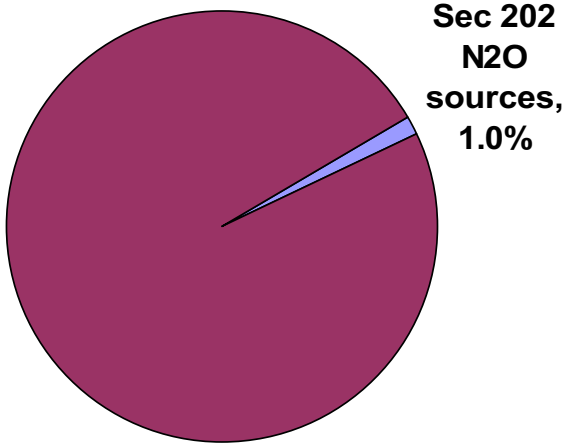
Total U.S. N_2O Emissions (2006) = 368 MMT CO_2 Eq.



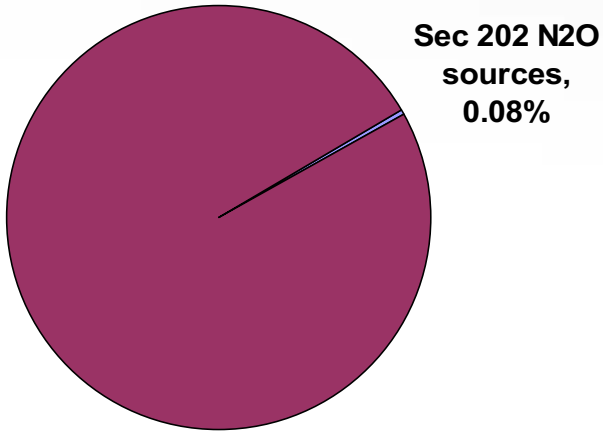
Total U.S. GHG Emissions (2006) = 7,054 MMT CO_2 Eq.



Total Global N_2O Emissions (2005) = 3,286 MMT CO_2 Eq.

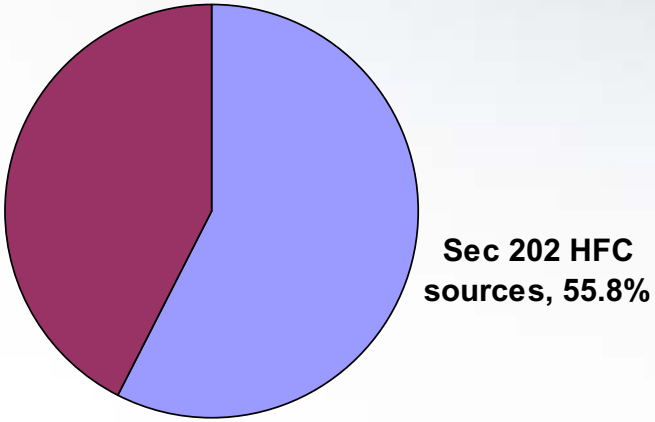


Total Global GHG Emissions (2005) = 38,726 MMT CO_2 Eq.

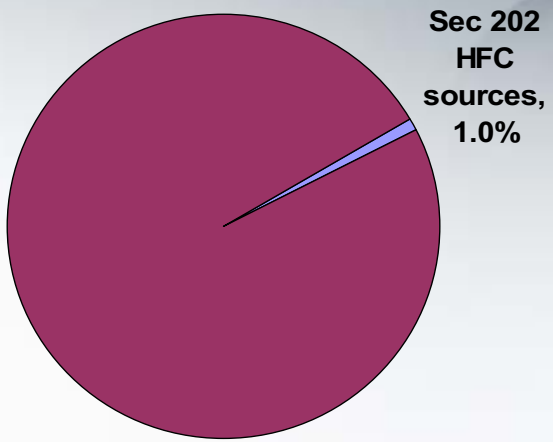


HFCs

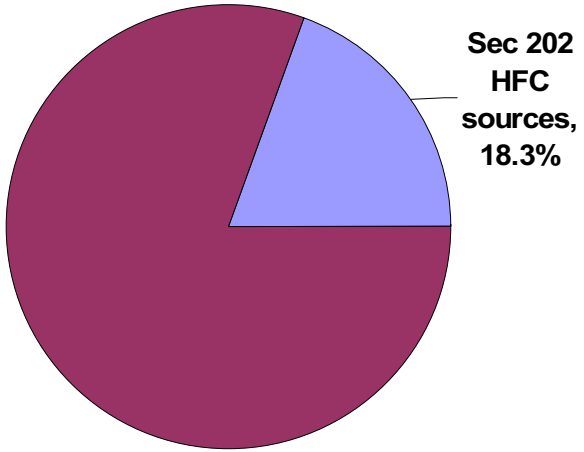
Total U.S. HFC Emissions (2006) = 124.5 MMT CO_2 Eq.



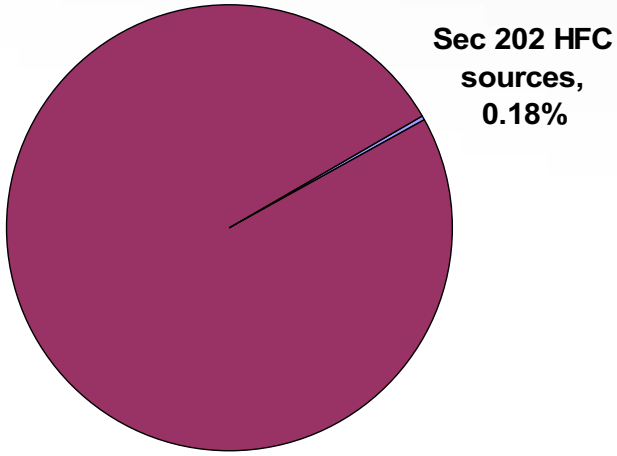
Total U.S. GHG Emissions (2006) = 7,054 MMT CO_2 Eq.



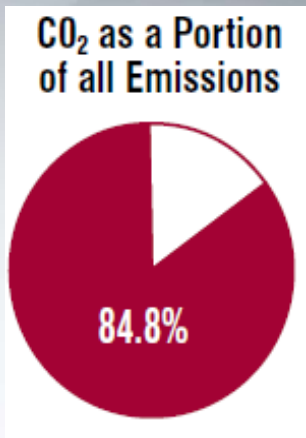
Total Global HFC Emissions (2005) = 380.6 MMT CO_2 Eq.



Total Global GHG Emissions (2005) = 38,726 MMT CO_2 Eq.



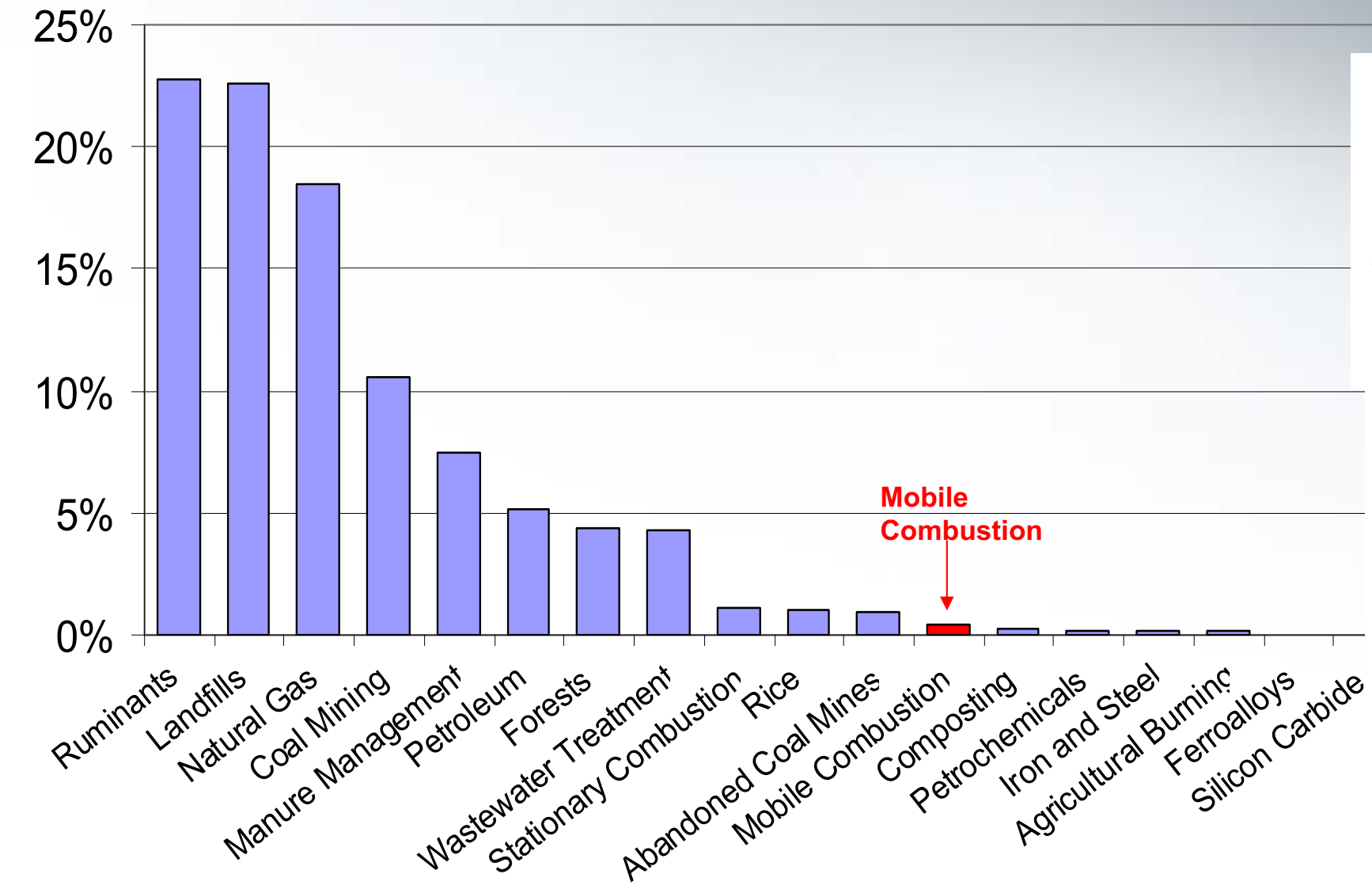
Comparison of All U.S. Transportation CO_2 Emissions to Other U.S. CO2 Sources

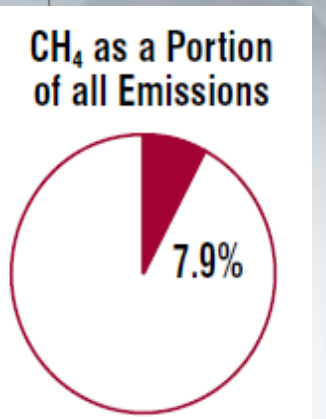


IPCC Source Categories

Data year 2006 from EPA Inventory

Comparison of All U.S. Transportation CH_4 Emissions to Other U.S. CH_4 Sources

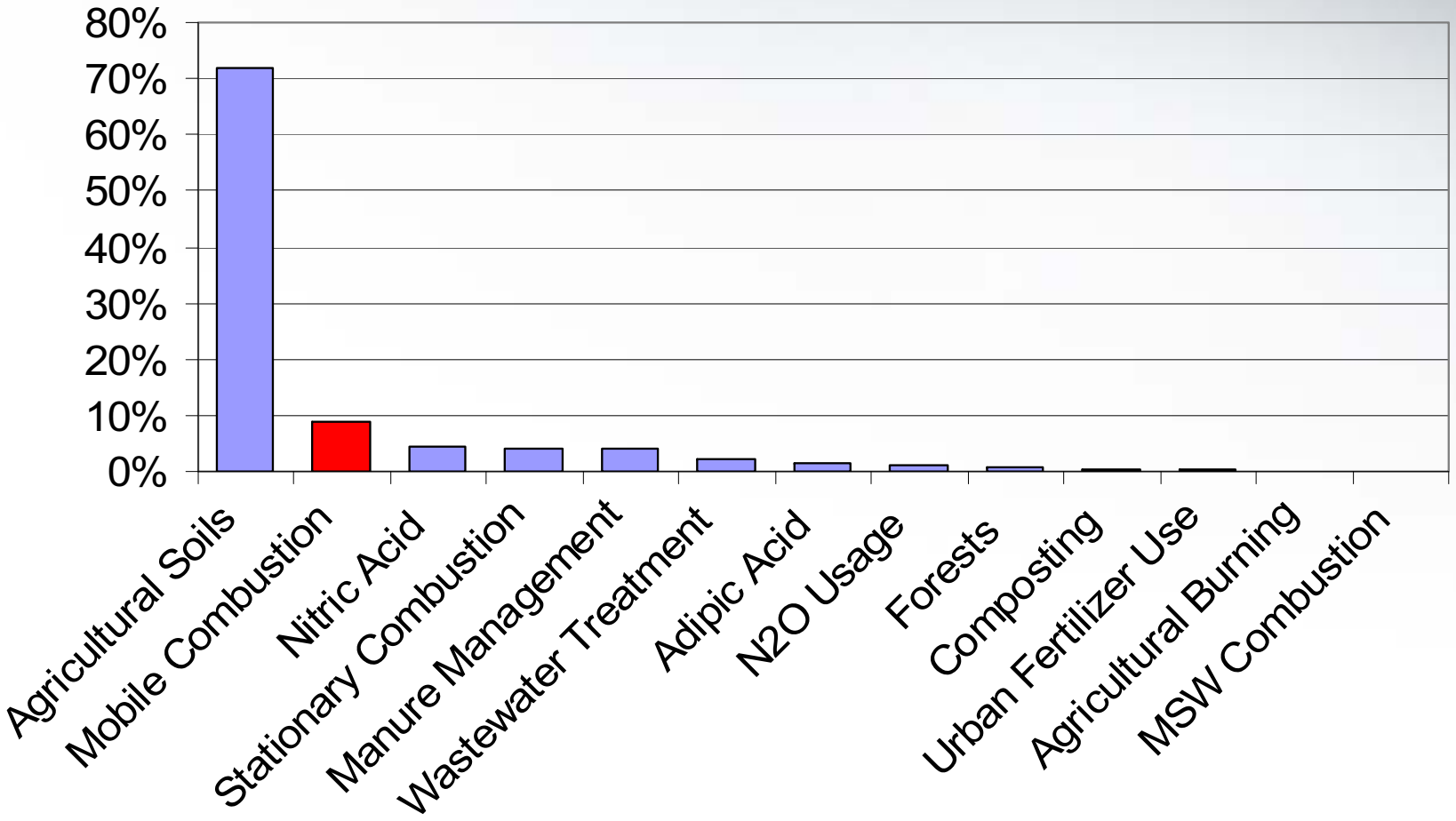


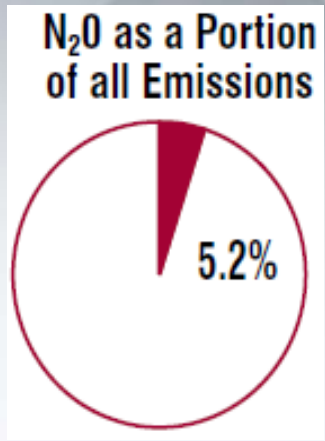


IPCC Source Categories

Data year 2006 from EPA Inventory

Comparison of All U.S. Transportation N_2O Emissions to Other U.S. N_2O Sources

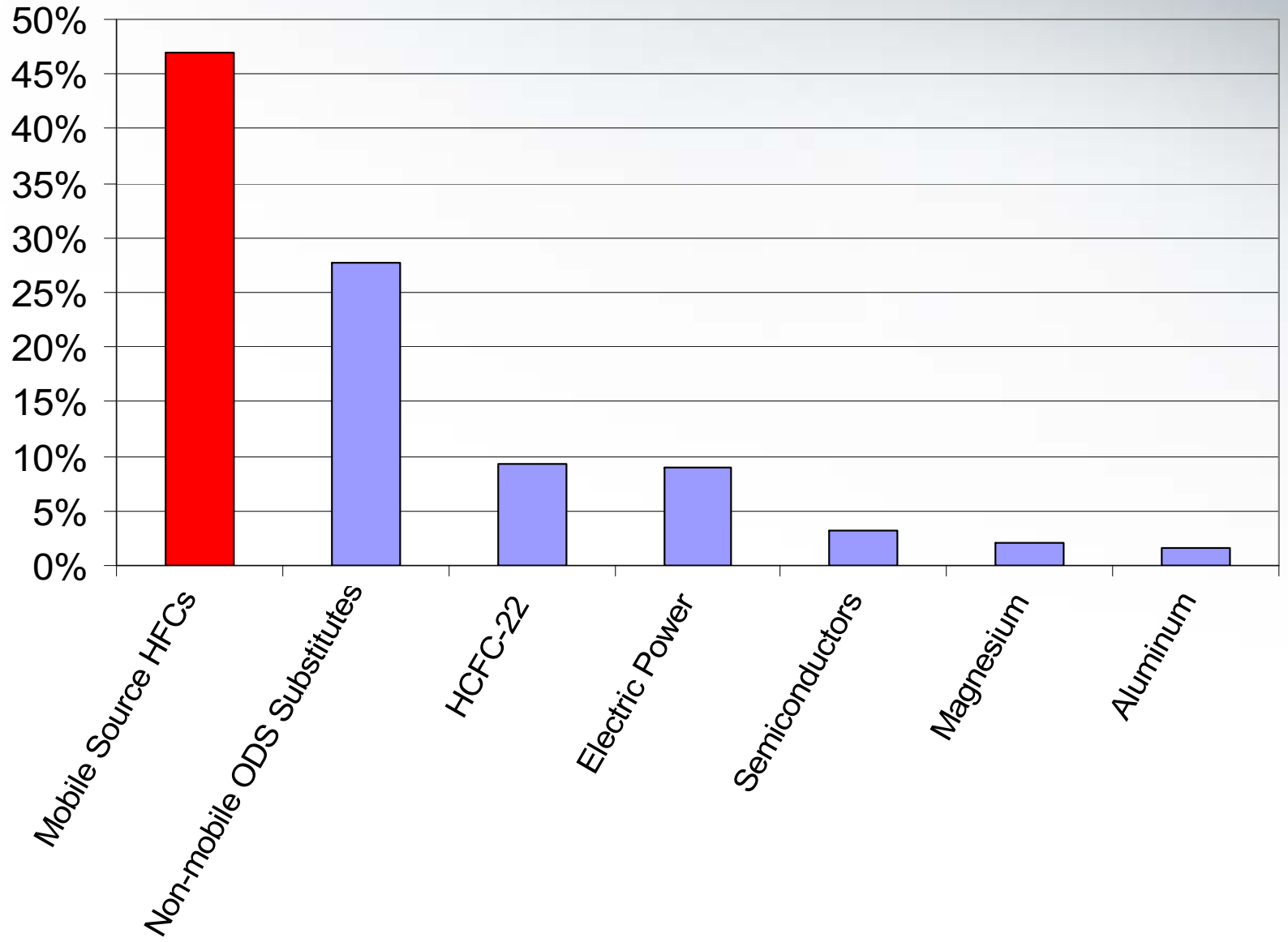


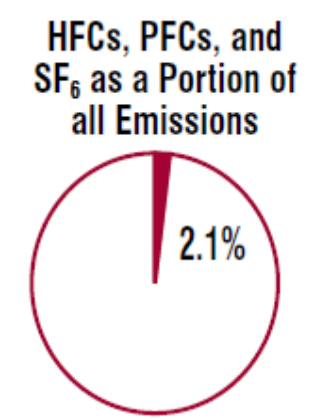


IPCC Source Categories

Data year 2006 from EPA Inventory

Comparison of All U.S. Transportation HFC Emissions to Other U.S. Fluorinated Gas Sources (HFCs, PFCs, SF_6)





IPCC Source Categories

Data year 2006 from EPA Inventory

Directly emitted, long-lived GHGs

- Halocarbons in this group are being phased out under Montreal Protocol
- Remaining are the 'basket' of 6 GHGs typically the focus of climate change science and policy (e.g., UNFCCC, Kyoto Protocol, IPCC)
- Long atmospheric lifetime means these GHGs are essentially uniformly distributed around the globe
- Greater certainty regarding global forcing effect compared to all other forcers

Precursor, short-lived gases that lead to formation/destruction of some GHGs

- These emissions are subject to air quality policies
- Short atmospheric lifetime means atmospheric concentrations are more variable over space and time
- Less certainty regarding global forcing effect

Aerosols with warming and cooling effects

- Also subject to air quality policies (SO_2, PM)
- Short atmospheric lifetime means atmospheric concentrations are more variable over space and time
- Less certainty regarding global forcing effect
- Warming effect of black carbon receives most attention
- Affect cloud reflectivity which is highly uncertain