

# **Greenhouse Gas (GHG) Advanced Notice of Proposed Rulemaking (ANPR)**

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Abridged Presentation  
September 18, 2008

# GHG ANPR Timeline



- **October 1999 – ICTA and others petition for regulation of 4 GHGs from new motor vehicles under CAA section 202(a)**
- **August 2003—EPA denies ICTA petition**
- **April 2007 – Supreme Court rules EPA improperly denied ICTA petition**
- **May 2007— President directs EPA, other agencies to develop regulations to cut gasoline consumption and GHG emissions from motor vehicles, issues Executive Order 13432**

## **Timeline (continued)**



- **December 2007 – Energy Independence and Security Act is enacted**
- **Late 2007-early 2008 – EPA receives seven more petitions to set GHG standards for other mobile source categories**
- **March 27, 2008 - EPA Administrator sends letter to Congress announcing that EPA will issue an ANPR as next step in responding to Supreme Court ruling**
- **July 11, 2008 – Administrator signs ANPR**
  - **Public comment period open until November 28**

## **This GHG ANPR:**



- Summarizes available science on climate change and its effects as relevant to endangerment test under CAA section 202
- Reviews EPA's work to date on potential motor vehicle GHG standards
- Examines interconnections among CAA provisions
- Examines CAA provisions potentially applicable to GHGs, and opportunities and challenges that each would present
  - Provides information and seeks public comment on range of potential regulatory approaches and technologies
- Seeks comment on 7 petitions to set GHG standards for other types of mobile sources

## **This GHG ANPR Does NOT:**



- Propose or recommend use of any particular Clean Air Act authority
- Make judgments about a preferred pathway
- Regulate any emissions
- Commit to specific next steps

# ANPR Structure



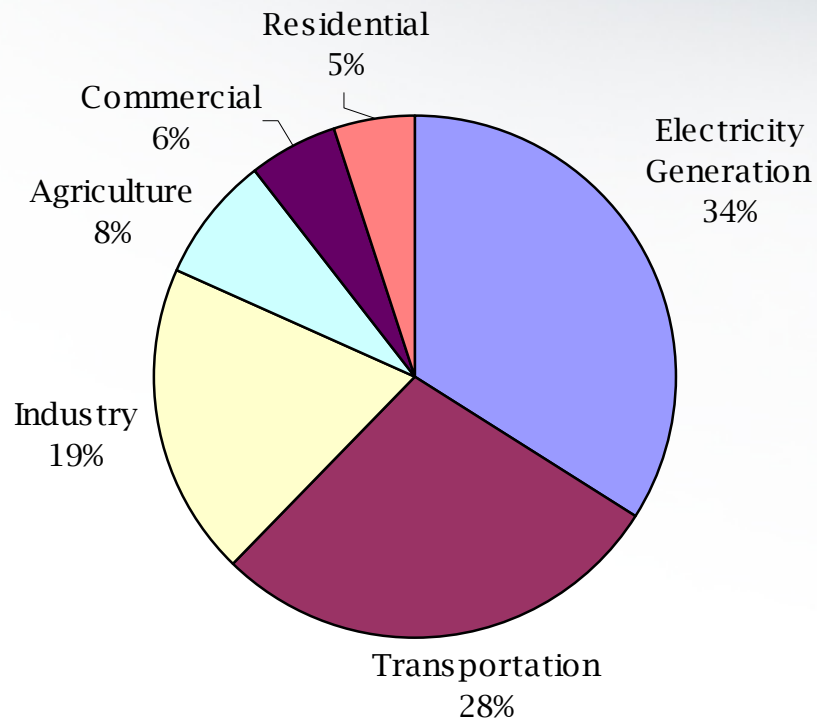
- Preface by Administrator Johnson
- First section: Other agencies' comments
- Preamble Sections
  - I & II Introduction and Background Information
  - III Nature of Climate Change and GHGs, Related Issues for Regulation
  - IV CAA Authorities and Programs
  - V Endangerment Analysis and Issues
  - VI Mobile Sources Authorities, Petitions, and Potential Regulation
  - VII Stationary Source Authorities and Potential Regulation
  - VIII Stratospheric Ozone Protection Authorities, Background, and Potential Regulation
- 5 Technical Support Documents

# Overarching considerations for GHG regulatory design



- Key GHGs (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, and SF<sub>6</sub>) are significantly different from most traditional air pollutants in ways that have important implications for designing effective controls
  - E.g., GHGs are very long-lived (decades to centuries) and as a result --
    - Globally well-mixed, so atmospheric concentrations are relatively uniform around the world
    - Emissions anywhere in the world affect climate everywhere in the world
    - Past, present and future emissions contribute to atmospheric concentrations
    - Long-term impacts

# GHG Emissions Sources



Total U.S. Emissions  
Percent emissions by sector

Sector/Source	2006 Emissions (MMTCO <sub>2</sub> e)
Electricity Generation	2,377.8
Transportation	1,969.5
Industry	1,371.5
Agriculture	533.6
Commercial	394.6
Residential	344.8



# **Other key considerations discussed in ANPR**



- The role of existing and new technology
- Relationships between climate change and air quality, between GHG and traditional air pollution control
- Relationship of GHG control to other environmental media (e.g., water quality)
- Other key policy and economic considerations for selecting regulatory approaches
- Analytical challenges for economic analysis

# Endangerment -- Summary of climate change science



- **Risks and impacts of climate change (driven by elevated GHG concentrations)**
  - Current and projected (out to ~100 years)
  - Primarily within U.S. but international impacts also described
  - All climate-sensitive sectors
    - Human health & air quality
    - Agriculture & forestry
    - Water resources
    - Coastal areas
    - Energy & infrastructure
    - Ecosystems & wildlife



# Endangerment Test

- CAA Section 202 endangerment language:  
The Administrator shall by regulation prescribe...standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles . . . which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.
- According to the Supreme Court, EPA must make one of the following determinations for motor vehicle GHG emissions based on the available science:
  - there is endangerment, or
  - there is no endangerment, or
  - the science is too uncertain to make a reasoned judgment

# Endangerment Issues



- Whether the “air pollutant” should be defined as each individual GHG or as a group or groups of GHGs
  - Different definitions could have important implications for how GHGs are treated under other CAA provisions
- Whether the “air pollution” (elevated concentrations of GHGs) may be reasonably anticipated to endanger public health, public welfare, or both

# Clean Air Act Interconnections



- Many sections of the CAA have similar, although not identical, endangerment language
  - A positive or negative endangerment finding for GHG emissions under one provision of the Act could have a significant and direct impact on decisions under other CAA sections containing similar endangerment language
- If EPA sets standards for GHG emissions under section 202 (motor vehicles) or most of the other provisions of the CAA, then the Prevention of Significant Deterioration (PSD) permitting program would apply to the regulated GHGs

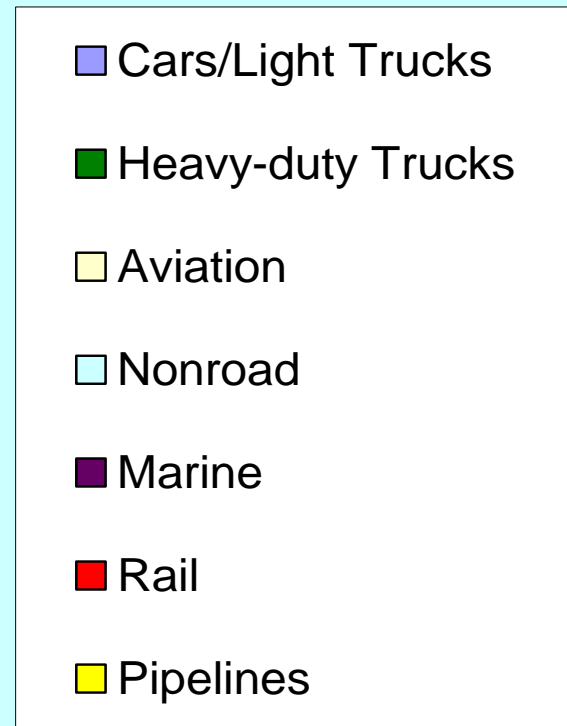
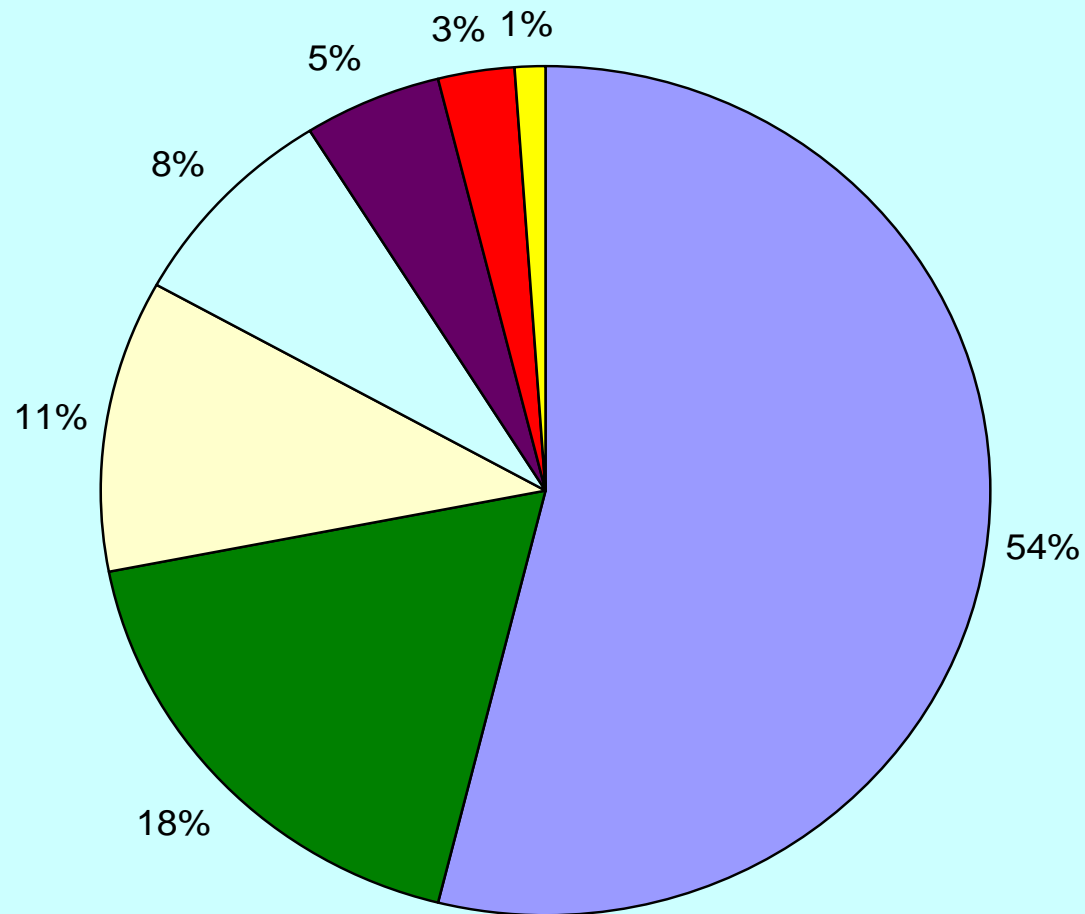
# **Clean Air Act Title II – Mobile Sources**



- Provides broad statutory authority for EPA to address air pollution from mobile sources and mobile source fuels
- Provides significant discretion for EPA to consider costs, safety and other factors in setting emission and other standards
- Has been successfully used over past 30+ years to significantly reduce emissions of criteria pollutants (e.g., NO<sub>x</sub>, VOC, CO, PM) from passenger vehicles, trucks and nonroad engines, and the fuels that power them

# U.S. Mobile Source GHG Emissions by Sub-sector (2006)

- Data from Inventory of U.S. Greenhouse Gases and Sinks: 1990- 2006



# US Light-Duty Vehicles (LDVs)



- Focus of EPA's work to date in response to Supreme Court case remanding ICTA petition, President's directive
- ANPR discusses and requests comment on --
  - Appropriate approaches to GHG control under CAA Title II
  - How to coordinate with NHTSA CAFE program
- ANPR provides extensive information on current and future technologies and GHG emission reduction potential
- ANPR includes detailed analysis of specific standards



# 2007 and 2008 Standard Scenarios



Year	2007 Analysis (g/mile)		2008 Analysis (g/mile)
	4% per year	Model-optimized	4% per year
2011	338	334	335
2012	323	317	321
2013	309	295	307
2014	296	287	293
2015	285	281	283
2016	274	275	272
2017	263	270	261
2018	243 [35.1 mpg]	266 [33.4 mpg]	251
2019	n/a	n/a	241
2020	n/a	n/a	232 [38.3 mpg]

# Updated 2008 LDV GHG Analysis

## (4%/year increase)



New Vehicle Fleet Standard in 2020	232 g/mile CO <sub>2</sub> [38.3 mpg]
GHG reduced in 2040	635 MMT CO <sub>2</sub> equivalent
NPV of Net Social Benefits through 2040 (w/o CO <sub>2</sub> valuation)	\$830 Billion
NPV of CO <sub>2</sub> valuation through 2040	\$10 to \$680 Billion
Per-vehicle cost	\$1,920
Per-vehicle Lifetime Monetary Impact	\$1,630

### Key notes regarding 2008 Analysis:

- 4%/yr rate of increase based on President's 2007 "20 in 10" plan
- Based on 2005-2007 vehicle product plans/projections (e.g., 54% light-trucks in 2020, and fleet is large truck/large SUV "heavy")
- Several advanced technologies not considered (e.g., wide-spread weight reduction)
- Utilized AEO2007 fuel price projections (~\$2.10/gallon gasoline)
- Baseline does not include EISA CAFE standards
- Net present values (NPVs) calculated using a 3% discount rate

# Other mobile sources



ANPR also discusses Title II authorities for and potential GHG emission reductions from:

- Heavy-duty highway vehicles
- Nonroad engines and equipment
- Marine vessels
- Aircraft

EPA has received petitions to regulate GHGs from each of these categories

# Fuels



- The ANPR requests comment on whether the Clean Air Act provides EPA authority to regulate GHGs from all fuels
- ANPR also requests comment on whether the CAA would allow EPA to establish a low carbon fuel standard
- EPA is developing new Renewable Fuels Standards (RFS2) under EISA
  - While the program will require some reductions in GHG emissions, RFS is primarily focused on energy security

# Stationary Source Authorities and Potential Regulation



- **Potential Regulatory Approaches Under CAA**
  - CAA Sections 108 -110: National Ambient Air Quality Standards (NAAQS)
  - CAA Section 111: Standards of Performance for New Sources (NSPS)
  - CAA Section 112: National Emission Standards for Hazardous Air Pollutants (NESHAP)
  - CAA Section 129: Special Regulatory Authority for Solid Waste Combustion
- **CAA Permit Programs**
  - Prevention of Significant Deterioration (PSD)
  - Title V Operating Permits

# NAAQS Approach



- **ANPR discusses:**
  - Process for establishing a GHG NAAQS and basis for determining appropriate standards
  - Implementation requirements that would differ depending on:
    - Whether EPA sets a primary standard or only a secondary standard
    - Whether nonattainment or attainment requirements would apply
- **Major observations, questions and issues include:**
  - Meeting a NAAQS would depend on emissions worldwide, but the NAAQS system only controls GHG emissions within the U.S.
  - Since atmospheric concentrations of GHGs are relatively uniform, entire U.S. would be in either attainment or nonattainment with a GHG NAAQS
  - Could EPA be required to issue a NAAQS for GHGs if an endangerment finding was made elsewhere under the Act?

# Section 111 Basic Information



- Section 111 of the CAA requires EPA to establish pollution control performance standards for new and modified stationary sources of air pollutants
- These new source performance standards (NSPS) are set for groups of similar emission sources, known as source categories
- Although the level of allowable emissions is based on the performance of available technologies, EPA does not mandate any particular technology
- When EPA establishes a NSPS for a source category, section 111 calls upon states to issue a standard for *existing* sources in the regulated source category - if the pollutant is not identified as a NAAQS or regulated as a hazardous air pollutant under the CAA



# Section 111 Approach



## Implementation flexibilities

- EPA can decide:
  - which source categories should be regulated
  - what size sources should be regulated
- Takes into account cost, health and environmental impacts, and energy requirements

## Issues discussed in the ANPR include:

- Could EPA implement industry-specific or broader cap-and-trade programs under section 111?
- Can section 111 spur technology innovation when standards must be tied to available technology?
- How would EPA select or prioritize source categories and sizes for NSPS regulation of GHGs?



# Section 112 Approach



- Section 112 of the CAA requires EPA to establish and implement national emission standards for hazardous air pollutants
- The ANPR asks whether it would be appropriate to identify GHGs as HAPs
- Section 112 major source thresholds are tailored to air toxics
  - 10 tons per year (tpy) of a single HAP, 25 tpy of a combination of HAPs
- Major issues include:
  - Little flexibility regarding either the source categories to be regulated or the size of sources to regulate
  - Very low major source thresholds would capture very large number of small CO<sub>2</sub> emitters
  - Little flexibility for market-oriented approaches

# PSD Implications



- If EPA regulates GHGs under section 202 (motor vehicles) or almost any other provision of the CAA, the PSD program would apply to the regulated GHGs
- PSD requires preconstruction review and permitting for new major emitting facilities and modifications of existing major emitting facilities
  - Requires best available control technology (BACT)
  - PSD program applies to pollutants regulated under any CAA authority with the exception section 112 or section 211(o)

# PSD – Major source thresholds



- Major source thresholds for PSD program--
  - 100 tpy for categories listed in the CAA
  - 250 tpy for other categories
- Applying these thresholds to GHGs would increase the number of PSD permits by an order of magnitude -- from 200-300 per year to thousands of PSD permits each year

# PSD – Possible Tailoring for GHGs?



- ANPR takes comment on ability/options to restrict the program to larger sources and/or to streamline compliance for GHG sources added to the program, such as:
  - Set higher major source thresholds for GHGs -- or phase in the program slowly, starting with large sources -- based on specific legal theories or legislation
  - Reduce the number of additional small sources that need PSD permits through limitations on, or interpretations of, sources' "potential to emit"
  - Streamline the permitting of such sources through a range of approaches

# Title V Operating Permit Program Implications



- Title V operating permits are required for major sources of air pollution and certain other sources
  - One of the major source thresholds is 100 tons per year
  - Consolidates air pollution control requirements into one permit
  - Required for new and existing sources
- Major issues related to GHGs
  - Applying 100-ton major source threshold to GHGs this would substantially increase the number of sources required to obtain Title V permits, and many smaller sources would be required to obtain a permit for the first time
  - As with PSD, ANPR takes comment on a range of ways to avoid a large increase in the number of sources required to obtain Title V permits, and on ways to streamline compliance for sources that are covered.

# Applicability of Title VI to GHGs



- ANPR describes:
  - Title VI programs for ozone-depleting substances (ODS) because of the GHG emission reductions they achieve
  - Title VI program for ODS substitutes since some substitutes are also GHGs
  - General authority in section 615
- Since key GHGs addressed by ANPR have no ozone depletion potential, Title VI provisions authorizing regulation of listed ODS of little potential use for regulating major GHGs

# Benefits Technical Support Document



- In the event that EPA takes CAA action to reduce GHG emissions, cost and benefits of policy options must be considered in the exercise of certain authorities and as part of regulatory analysis
- Economic evaluation of GHG mitigation options is particularly challenging
  - Uncertainties are magnified by the long-term, global nature of problem
  - Costs and benefits need to be estimated over multiple generations
  - Timing and magnitude of climate change impacts are uncertain
  - Pace and form of future technological innovation and economic growth are uncertain
- Economic principles suggest global as well as domestic benefits should be considered when evaluating GHG reduction policies



# Benefits TSD



- Over the last year, EPA developed ranges of global and U.S. marginal benefits estimates
  - Based on peer reviewed estimates and models that have been published in the peer reviewed literature
  - The ranges reflect uncertainties in socioeconomic assumptions, climate responsiveness, modeling, and the choice of discount rate
- What value should be used?
  - Given uncertainties, appropriate to consider ranges
  - Given accelerating climate change and greater sensitivity to emissions changes over time, appropriate to consider marginal benefits estimates that are rising over time
  - Current estimates are likely underestimated according to the IPCC
  - Capacity to do these assessments will improve over time



# **Additional Information -- Summary**



- Five major Technical Support Documents (TSD) are available in docket
  - TSD - Benefits
  - TSD - Stationary Source
    - Contains technical information on potential ways to reduce GHGs in selected stationary source categories, and additional information on SIP process
  - Draft TSD - Endangerment Analysis for GHG Emissions under the Clean Air Act
  - TSD - Section 202 GHG Emissions
  - TSD - Mobile Source
    - Additional detail and analysis concerning potential mobile source GHG controls
- All ANPR documents available at <http://www.epa.gov/climatechange/anpr.html>