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

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Full Presentation
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Overview

- What is an ANPR?
- GHG ANPR timeline
- What does this GHG ANPR do and NOT do?
- Structure of the GHG ANPR
- Key Issues for GHG Regulation
- Endangerment Analysis
- Legal Interconnections
- Mobile Sources
- Stationary Sources
- Stratospheric Ozone Authorities
- Benefits Analysis

What is an ANPR?

- Advance Notice of Proposed Rulemaking (ANPR or ANPRM)
- An ANPR is an informal action sometimes taken by agencies prior to proposing a rule
- An ANPR is used when an agency believes it would be appropriate to obtain more information and solicit public input on possible regulatory approaches before deciding what to propose

This GHG ANPR:

- Represents EPA's next step in responding to the Supreme Court case finding that GHGs are air pollutants under the Clean Air Act (CAA)
- Reviews and summarizes available science on climate change and its effects
- Reviews EPA's work to date on potential motor vehicle GHG standards under the CAA
- Examines interconnections among CAA provisions -- regulation of GHGs under one provision could or would lead to regulation under other provisions
- Comprehensively examines CAA provisions potentially applicable to GHGs, and opportunities and challenges that application of provisions would present
  - Provides information and seeks public comment on wide range of potential regulatory approaches and technologies for reducing GHGs
- Summarizes and seeks comment on 7 petitions to set GHG standards for wide array of other transportation sources
- Identifies and discusses key overarching issues for GHG regulation

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

GHG ANPR Timeline: The ICTA Petition & Supreme Court Decision

- October 1999-- International Center for Technology Assessment and 18 other groups file petition with EPA
  - Petition requests that EPA regulate 4 GHGs from new motor vehicles (on-highway vehicles - passenger vehicles, trucks and buses) under Clean Air Act section 202(a)
- August 2003-- EPA denies petitioners' request
- April 2007 – Supreme Court rules EPA improperly denied ICTA's petition (Massachusetts v. EPA)
  - GHGs are air pollutants under the Clean Air Act, and EPA must decide whether to regulate under section 202 of the Act using permissible criteria

The Administration Response and Passage of EISA

- May 2007-- President directs EPA, DOE and DOT to take the first steps toward regulations to cut gasoline consumption and GHG emissions from motor vehicles, using his "20-in-10" plan as a starting point
  - On same day, President issues Executive Order 13432 to ensure coordinated and effective exercise of authorities of the President and heads of EPA, DOE and DOT to address GHGs from highway and nonroad vehicles and engines
- December 2007-- Energy Independence and Security Act is enacted
  - Requires EPA to promulgate new Renewable Fuels Standards (RFS2)
  - Amends DOT's authority to set CAFE standards for vehicles
    - Requires a fleet-wide average fuel economy of at least 35 mpg by 2020 for passenger vehicles
  - Requires DOT to address fuel efficiency of trucks and buses

GHG ANPR

- Late 2007-early 2008 – EPA receives seven more petitions to set GHG standards from states, localities, environmental groups and others
  - Petitions seek GHG emission reductions from wide array of other transportation sources including fuels, ships, locomotives, construction and farm equipment, lawn and garden equipment, aircraft and rebuilt heavy-duty engines
- 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
  - Published in the Federal Register on July 30
  - Public comment period open until November 28

ANPR Structure

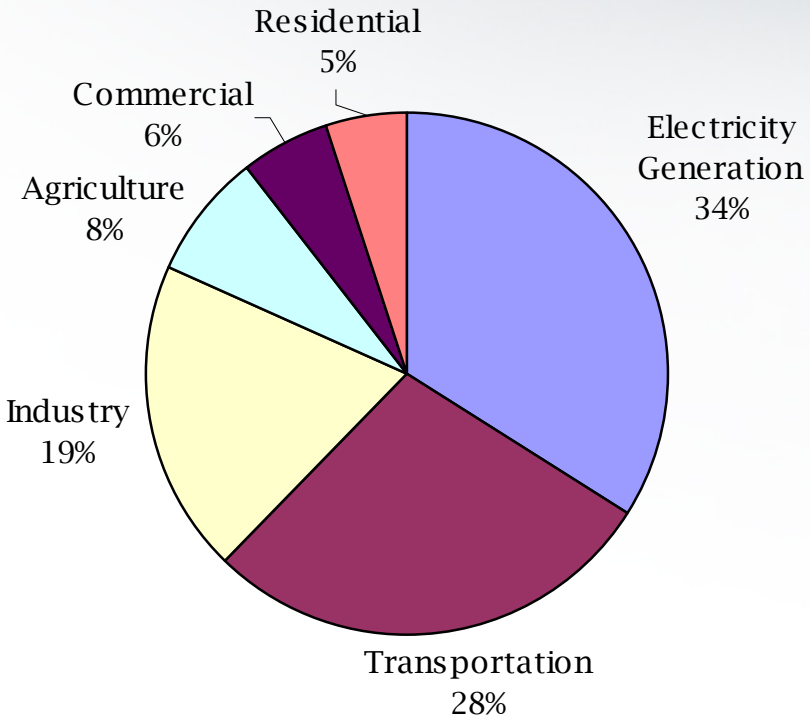
- Preface by Administrator Johnson
- First section: Other agencies' comments
- Preamble Sections
  - I &II Introduction and Background Information
  - III Nature of Climate Change and GHGs, Related Issues for Regulation
  - IV CAA Authorities and Programs
  - V Endangerment Analysis and Issues
  - VI Mobile Sources Authorities, Petitions, and Potential Regulation
  - VII Stationary Source Authorities and Potential Regulation
  - VIII Stratospheric Ozone Protection Authorities, Background, and Potential Regulation
- Technical Support Documents
  1. Endangerment Analysis
  2. GHG Emissions from Section 202 Mobile Source Categories
  3. Potential GHG Reduction Programs for Passenger Vehicles
  4. Stationary Sources
  5. Benefits of Reducing GHG Emissions

Key Overarching Issues for Potential GHG Regulation

Nature of GHGs and Climate Change

- GHGs are significantly different from most traditional air pollutants in ways that have important implications for designing effective controls
  - Six key GHGs – CO2, CH4, N2O, HFCs, PFCs, and SF6
  - Global emissions of these GHGs have increased by 70% between 1970 and 2004
  - U.S. GHG emissions were 21% of global total in 2000. Other major emitters include China, Russian Federation, Japan, Germany, India and Brazil
  - GHGs are very long-lived (decades to centuries) with following consequences -
    - 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
    - Stabilization of atmospheric concentrations will occur only after emissions peak and then decline
  - As result of large temporal and spatial scales of climate change, many uncertainties for predicting rate, magnitude and effects of climate change and designing regulations
    - Overall risk increases with increases in both the rate and magnitude of climate change

GHG Emissions Sources



Total U.S. Emissions
Percent emissions by sector

Sector/Source	2006 Emissions ($MMTCO_2e$)
Electricity Generation	2,377.8
Transportation	1,969.5
Industry	1,371.5
Agriculture	533.6
Commercial	394.6
Residential	344.8

Other overarching considerations

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

Endangerment Analysis

Endangerment section of ANPR

- Endangerment language under CAA Section 202:

  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 in Massachusetts v. EPA, 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

- In the ANPR, EPA does not propose or make an endangerment finding, but rather summarizes the available science and describes the applicable law
  - Agency seeks comments on issues concerning an endangerment finding and implications of making an endangerment finding

Definition Issues

- For GHGs, the "air pollution" that may reasonably be anticipated to endanger public health or welfare needs to be defined
  - ANPR: "EPA is considering defining the air pollution…as the elevated combined current and projected atmospheric concentration of the six GHGs."
  - EPA seeks comment on how other gases and aerosols with warming effects should be treated (e.g., CFCs, tropospheric ozone, black carbon).
- For GHGs, the "air pollutant" that may cause or contribute to "air pollution" must also be defined
  - EPA seeks comment on 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

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 issues

- In making endangerment finding, Administrator must exercise judgment on whether the air pollution (elevated concentrations of GHGs) may be reasonably anticipated to endanger public health, public welfare, or both
  - According to legislative history, precautionary nature of statutory language means Administrator does not have to wait for proof of actual harm; Administrator can consider future possibilities, uncertainties, and extrapolate from limited data
  - ANPR raises issue that human health effects associated with GHG emissions occur "indirectly" as a result of climate change rather than directly through inhalation or other exposure, and asks how this issue bears on making a public health vs. public welfare finding

- If Administrator finds the air pollution (elevated concentrations of GHGs) may reasonably be anticipated to endanger, he must then determine whether emissions of air pollutants (GHGs) from the source category in question (for ANPR, motor vehicles) "cause or contribute to" the air pollution
  - ANPR uses emissions from motor vehicles to illustrate two general approaches:
    - Define the air pollutants individually on a gas-by-gas basis
    - Define the air pollutants collectively (e.g., all 6 GHGs, or all 4 from motor vehicles)

Supporting information in the ANPR docket

- Technical Support Document for Endangerment Analysis
  - Is the basis of the scientific discussion in the ANPR
  - Relies heavily on IPCC Fourth Assessment and available Climate Change Science Program (CCSP) reports
  - Underwent peer review by federal scientific experts (all of whom were IPCC and/or CCSP authors)
  - Does not contain policy/legal endangerment discussion, nor does it convey any judgment regarding endangerment
  - Provides GHG emission data from all sectors
  - Shows observed and projected climate change for the US and globally
  - Describes evidence for current and projected effects in all climate-sensitive systems and sectors

  Full title: *Draft Technical Support Document - Endangerment Analysis for Greenhouse Gas Emissions under the Clean Air Act* (www.regulations.gov; document ID: EPA-HQ-OAR-2008-0318-0082)

- Technical Support Document for Section 202 GHG emissions
  - Compares GHG emissions from section 202 mobile sources -- including cars, light-duty trucks, medium & heavy-duty trucks, buses, motorcycles, and vehicle air conditioning and refrigeration systems -- with data on other global and domestic emissions
  - Includes CO2, CH4, N2O, and HFCs
  - Data drawn from Inventory of U.S. Greenhouse Gases and Sinks: 1990-2006

Clean Air Act Interconnections

Broader ramifications of decision to regulate GHGs

- Many sections of the CAA have similar, although not identical, endangerment language
  - Several CAA provisions authorize or require action if EPA finds that air pollutants from a specific type or category of sources cause or contribute to air pollution that "may reasonably be anticipated to endanger public health or welfare"
  - 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

Other interconnections

- What GHGs might be defined as an "air pollutant" in an endangerment analysis, and whether those GHGs are treated individually or as a group, could impact EPA's flexibility to define the GHGs as air pollutants elsewhere in the CAA

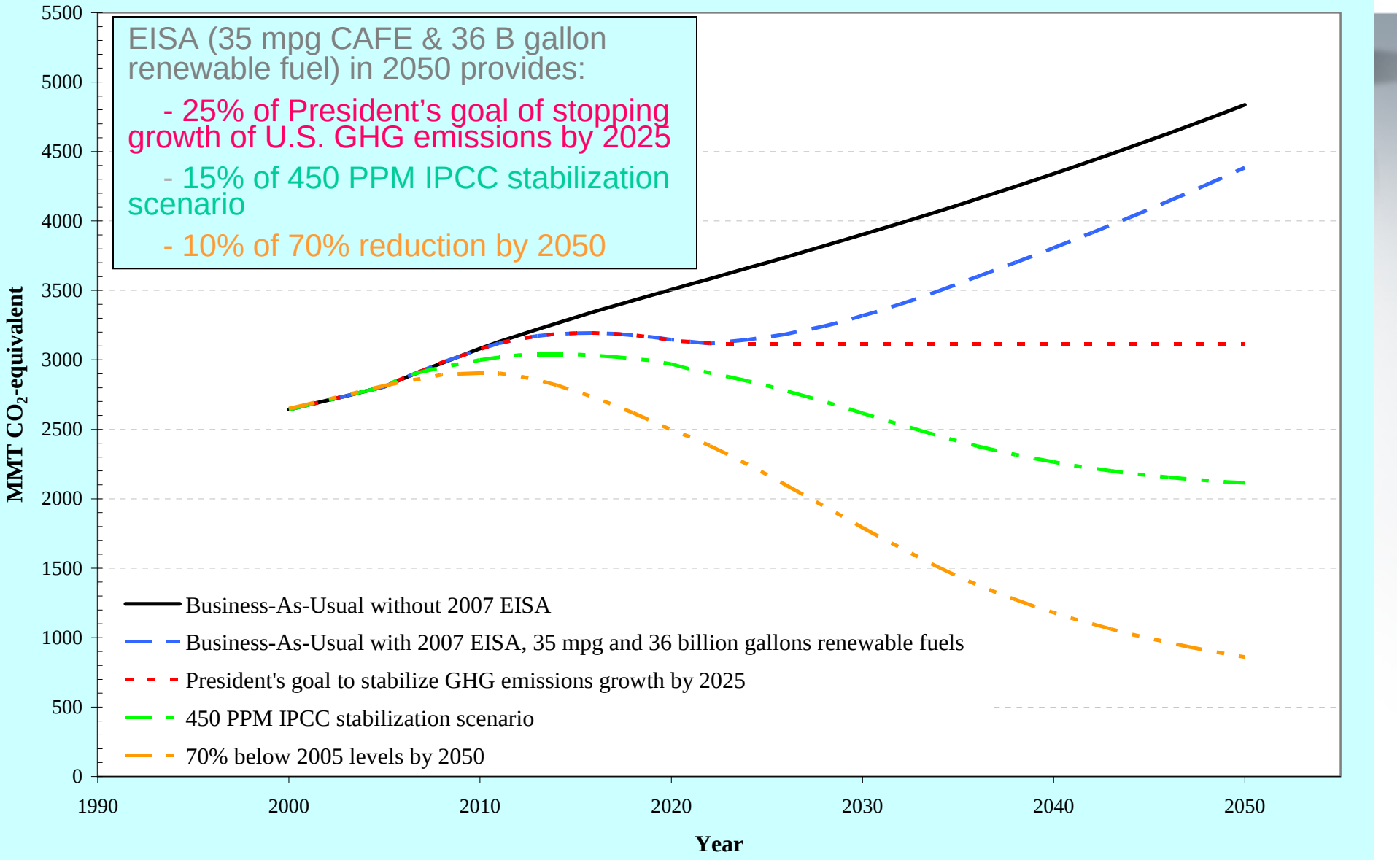
- Several CAA provisions have preclusive effects, such that regulation under one section of the Act precludes regulation under another section (e.g., listing a pollutant under section 108(a) generally precludes listing the pollutant as a HAP under section 112)

Mobile Sources

Title II of the Clean Air Act

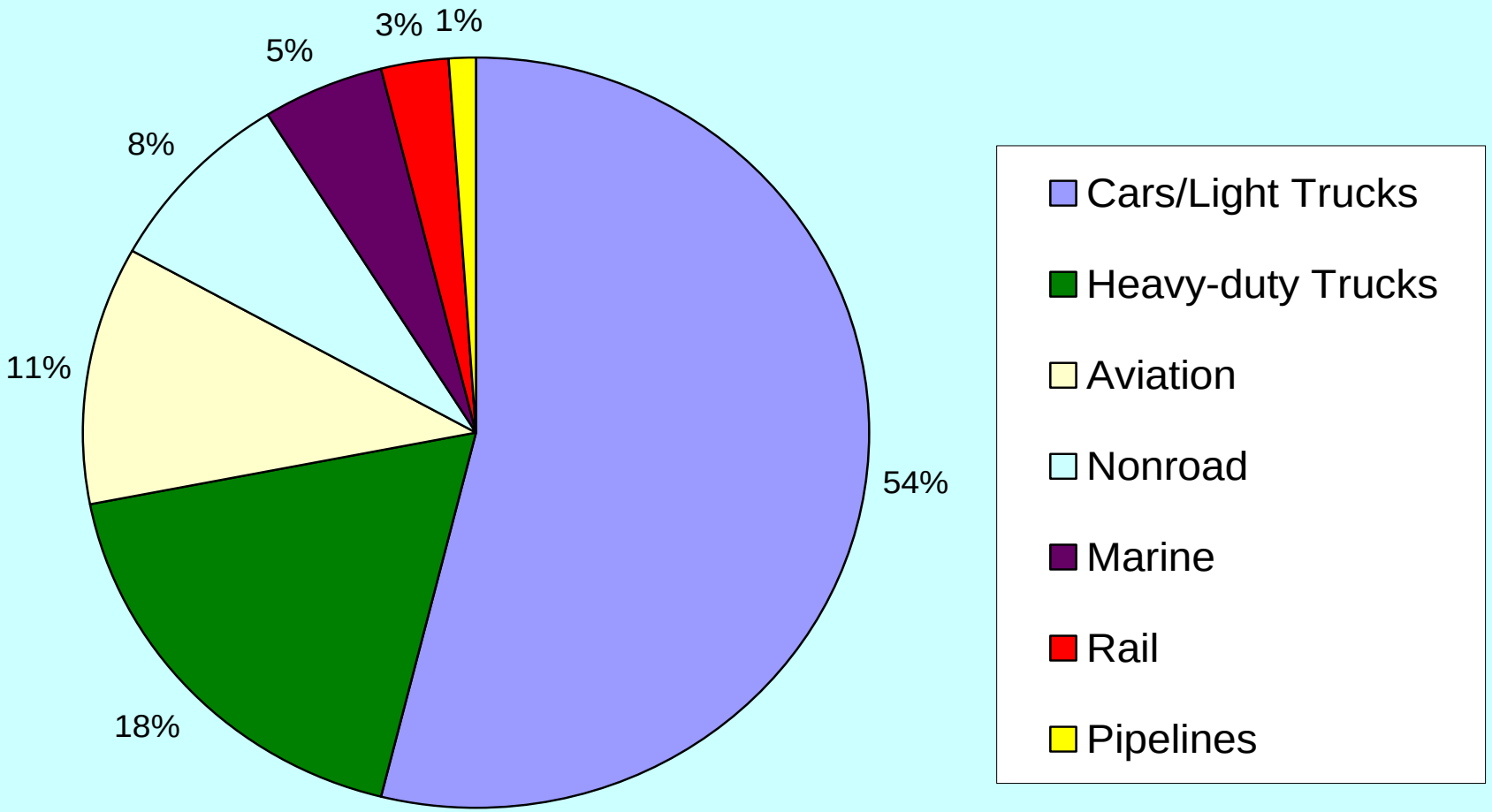
- Provides broad statutory authority for EPA to address air pollution from mobile sources and mobile source fuels
- Provides significant discretion for EPA to consider costs, safety and other factors in setting emission and other standards
- Has been successfully used over past 30+ years to significantly reduce emissions of criteria pollutants (e.g., NOx, VOC, CO, PM) from passenger vehicles, trucks and nonroad engines, and the fuels that power them
- ANPR requests input on how Title II could be used to address the significant, long-term challenges of GHG emissions from the transportation sector

U.S. Transportation GHG Emissions Projections and Illustrative Targets Based on Proportional Reductions



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

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



Light-Duty Vehicles

US Light-Duty Vehicles (LDVs)

- 54% of US mobile source GHGs
- 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
    - Different approaches to standard-setting, including approaches used to date in developing possible GHG standards
    - Time frames for standard setting (5 yrs, 10-15 yrs, or longer)
    - Standard metrics (e.g., grams/mile)
    - Which GHGs should be addressed and how (ICTA Petition: CO2, N2O, HFC, CH4)
    - Test procedures
    - Compliance and enforcement programs
  - 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

LDV Standard-Setting Analyses

- ANPR contains several analyses of potential GHG standards
- 2007 Analysis
  - Conducted in response to Supreme Court case and President's directive under Executive Order 13432 with NHTSA
  - Two potential standard scenarios analyzed
    - 4% per year increase in mpg – from President's "20-in-10" plan
    - Model -optimized – a method for estimating mpg at point of maximum net societal benefits
  - 2007 analysis did not reflect several differences between EPA and NHTSA statutory authorities
    - E.g., did not consider longer time frames, car-truck credit trading or multi-year planning by auto companies that EPA may consider under CAA
- 2008 Analysis
  - Updated the 4%/year scenario
  - More consistent with CAA provisions and flexibilities
    - E.g., considers longer time frames, car-truck trading within a company, multi-year planning, requirement that all companies comply with std. rather than pay a penalty

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 CO2 [38.3 mpg]
GHG reduced in 2040	635 MMT CO2 equivalent
NPV of Net Social Benefits through 2040 (w/o CO2 valuation)	$830 Billion
NPV of CO2 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

Heavy-Duty and Nonroad Engines

Heavy-Duty Highway

- Trucks and buses also subject of ICTA petition, Supreme Court case
- ANPR asks for comment on applying CAA section 202 to GHG emissions from trucks and buses
- ANPR requests comment on GHG reduction strategies
  - ANPR requests comment on vehicle-based controls through setting of "grams/ton-mile" standards
  - Comment also requested on a number of GHG reduction strategies
    - Engine-based – combustion improvements, waste heat recovery …
    - Vehicle-based – aerodynamics, tires, weight reduction, hybrids …
    - Operations-based -- idling, speeds, tire inflation …
- Potential for up to 40% GHG reduction for typical truck by 2015

Nonroad Engines and Equipment

- EPA received 2 petitions in January 2008 to control GHG emissions from nonroad engines and vehicles
- Existing standards under the CAA section 213 require significant reductions in emissions of criteria pollutants from nonroad engines and equipment
  - Cover wide range of applications and engine sizes
  - Provide flexibility and gradual phase-in
  - Tier 4 phase-in started this year → advanced Clean Diesel technology
- ANPR asks for comment on applying section 213 to nonroad GHGs
- ANPR requests comment on GHG reduction strategies
  - Large potential to apply current and future highway engine technology
    - Especially where fuel economy has not been a high priority in the past
      - farm, construction, industrial …
  - Where fuel economy has been a priority (railroads), other approaches could further reduce GHGs
    - Some examples in ANPR: GPS-based automated throttling, track lubrication, hybrid, targeted electrification, cross-RR dispatching/tracking of railcars and locomotives

Marine Vessels

- EPA received 3 petitions in late 2007 and early 2008 to control GHG emissions from ocean-going vessels
- Existing standards under CAA section 213 require reductions in emissions of criteria pollutants from ships
- ANPR asks for comment on applying same authority to GHG control
- ANPR requests comment on a number of methods to reduce ship GHGs:
  - Engine-based – higher efficiency engines, waste heat recovery …
  - Vessel-based – hull shapes and coatings, propeller designs …
  - Operations-based -- reduced speeds, shoreside power …
- EPA has been working with IMO to explore ways to reduce GHGs from ocean-going vessels
  - Important due to global nature and rapid growth of shipping business

Aircraft

- EPA received two petitions in December 2007 to control GHG emissions from aircraft
- Existing standards under CAA section 231 require reductions in emissions of criteria pollutants from aircraft engines
- ANPR asks for comment on applying same authority to GHG control
- ANPR requests comment on a number of methods to reduce aircraft GHGs:
  - More efficient engines
  - Airframe changes to reduce drag and weight
  - Operations changes, such as route and speed optimization, single-engine taxiing
  - Airline fleet-based approach (declining average GHG)
- FAA and ICAO play important roles in EPA standard-setting for aircraft
  - Safety is always an important issue
  - International nature of air traffic raises need for coordinated programs
    - ANPR requests comment on proposed European Community program: A CO2 cap covering all flights in and out of European Union

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
  - For an effective GHG fuels program, important to thoroughly explore total life-cycle emissions of CO2, methane, and other GHGs
- 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

Mobile Source Supporting Information in the ANPR Docket

- Light-duty Vehicles
  - Light-duty Vehicle Technical Support Document
  - EPA Staff Report on Light-duty Technologies
  - Light-Duty vehicle GHG certification and compliance program options memo
  - Non-CO2 Light-duty GHGs control options memo
  - Light-duty vehicle GHG updated 4% per year control scenario, costs and benefits memo
- Technology memorandum for other mobile sources
  - Highway heavy-duty truck GHG technologies
  - Application-specific nonroad GHG technology pathways
  - Commercial marine GHG control technologies

Stationary Sources

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

Key questions

For each stationary source authority, ANPR addresses:

- What does this part of the CAA require?
- What sources would be affected if GHGs were regulated under this authority?
- What would be the key milestones and implementation timeline?
- What are key considerations regarding use of this authority for GHGs and how could potential issues be addressed?
- What possible implications would use of this authority for GHGs have for other CAA programs?

Analytical framework for examining use of stationary source authorities

- Implementation flexibility
- Ability to consider costs and economic impacts
- Ability, if any, to address potential international effects, including international pollutant transport and emissions leakage
- Technology availability and ability to spur technology advancement and innovation
- Ability, if any, to prioritize regulation of significant emitting sectors and sources
- Ability, if any, to coordinate GHG regulation with traditional air pollutant regulation

NAAQS Basic Information

- EPA has authority to establish ambient air quality standards for certain pollutants
  - ***Primary standards*** set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly, with an adequate margin of safety
  - ***Secondary standards*** set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings
- NAAQS levels are measured as a concentration of pollutants in the atmosphere
- NAAQS are currently set for six pollutants (ozone, particulate matter, nitrogen dioxide, sulfur dioxide, lead, carbon monoxide)
- EPA has authority to list and set NAAQS for additional pollutants that meet a 3-part test, including endangerment to public health or welfare

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?
  - How would EPA determine the appropriate level of the NAAQS considering the delayed nature of effects and complex feedback loops associated with climate change?
  - Although a NAAQS approach might allow states and EPA to establish a cap-and-trade program for GHGs under certain circumstances, a NAAQS approach would also entail other non-market-oriented requirements.

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 generally established as a maximum amount of allowable emissions and 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
- EPA may set NSPS for air pollutants whether or not they are subject to a NAAQS

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 cap-and-trade programs, or a broader stationary source cap-and-trade program, 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 Basic Information

- Section 112 of the CAA requires EPA to establish and implement national emission standards for hazardous air pollutants (NESHAPS), also known as maximum achievable control technology (MACT) standards

- Hazardous air pollutants (HAPs) are pollutants that cause or may cause cancer or other serious health effects, such as birth defects, or negative environmental and ecological effects
  - Section 112 lists over 180 HAPs and allows EPA to list other air pollutants that meet the criteria for HAPS
  - An air pollutant listed for the NAAQS generally may not be listed as a HAP

- EPA must develop section 112 standards for all major sources of listed HAPs
  - MACT standards are required for both new and existing major stationary sources

- Regulating an air pollutant under section 112 precludes regulation of that pollutant under Prevention of Significant Deterioration (PSD) permitting programs

Section 112 Approach

- The ANPR asks whether it would be appropriate to identify GHGs as HAPs and, if so, discusses how these pollutants could be regulated under section 112

- Section 112 major source thresholds are low
  - 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
  - Low major source thresholds tailored to air toxics rather than GHGs
  - Little flexibility for market-oriented approaches

Section 129 Basic Information

- CAA Sec. 129 requires EPA to set standards, consistent with section 111 requirements, for new solid waste combustion units and emission guidelines for States to regulate existing units
- Uses a hybrid approach that takes elements from section 111 and section 112 to regulate at least 9 specific pollutants
  - Establishes MACT-like standards for HAPs and additional pollutants such as PM and SO2
- The emission guidelines for existing units do not directly regulate solid waste combustion units, but rather establish requirements for states to implement
  - The state plans must be "at least as protective as" the EPA guidelines
- Categories of Solid Waste Combustion Units
  - Large Municipal Waste Combustors (MWCs)
  - Hospital/Medical/Infectious Waste Incinerators (HMIWI)
  - Small Municipal Waste Combustors (MWC)
  - Commercial and Industrial Solid Waste Incinerators (CISWI).
  - "Other" Solid Waste Incinerators (OSWI)

Section 129 Approach – Incinerators only

- Under CAA section 129, EPA has authority to adopt standards for pollutants in addition to those listed in section 129

- The ANPR requests comment on the availability of authority:
  - to establish requirements for controlling GHG emissions from subcategories of incineration units
  - to establish alternative compliance approaches, such as emissions trading or averaging across sources within a category

- Major issues include
  - Can the CAA be interpreted to grant flexibility to consider alternative implementation mechanisms?
  - How would EPA incorporate new requirements for those categories for which standards have already been established?

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

- ANPR takes comment on 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 though 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
  - If the 100-ton major source threshold were applied 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.
  - Would the Title V permit fees structure need to be modified if GHGs were regulated?

Stationary Source Supporting Information in the ANPR Docket

- Technical Support Document for stationary sources
  - Contains additional discussion of possible regulatory concepts under section 111
  - Describes potential GHG control measures and emissions reductions for eight categories of stationary sources: power plants, industrial boilers, petroleum refining, cement manufacturing, iron & steel, petroleum production and natural gas systems, municipal solid waste landfills, and agriculture and forestry
  - Provides additional information and references on NAAQS standard-setting and implementation
  - Lists other ANPR docket items that provide information and data on stationary sources

Stratospheric Ozone Protection Authorities

CAA Title VI

- Provides authority and establishes cap and trade along with complementary regulatory programs to protect stratospheric ozone
  - Most Title VI provisions apply to substances that are listed for their potential to deplete stratospheric ozone, or their substitutes
- Many ozone-depleting substances (ODS) and some substitutes for ODS are also potent GHGs
  - ODS not among key GHGs addressed by ANPR or UN Framework Convention on Climate Change, because already controlled by national (CAA) and international (Montreal Protocol) requirements to protect stratospheric ozone
- Title VI programs have already achieved significant reductions in ODS and thus in GHG emissions
  - By 2010, ozone layer protection will have avoided emissions of 11 billion metric tons of CO2-equivalent emissions per year

Applicability of Title VI to GHGs

- ANPR describes:
  - Title VI programs for 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
- Section 615 provides general authority to protect the stratosphere from any substance, practice, process or activity that meets applicable endangerment test
  - Two-part test: If the Administrator finds, in his judgment, that the substance, practice, process or activity may reasonably be anticipated to affect the stratosphere, especially ozone in the stratosphere, and such effect may reasonably be anticipated to endanger health or welfare
  - Effect on stratosphere of GHGs and climate change a topic of ongoing scientific study

Economic Analysis of GHG Regulation

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
  - International effects of climate change may also affect domestic benefits
    - National security
    - Economic and social disruption
    - Concern for species and ecosystems
    - Ecosystem disruption
    - Tourism

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

Benefits of Reducing GHG Emissions

- Given large unquantified GHG benefit uncertainties and potential threshold impacts, it is difficult to apply economic efficiency or net benefit criteria
  - Estimates are likely to be underestimated, since significant potential impacts have not yet been monetized (e.g. risks of extreme weather or catastrophic events)
  - A risk management framework would be appropriate in this context
  - For non-marginal emissions changes, more structured modeling is needed than what is currently used for marginal benefits calculations – important biophysical and economic feedbacks
  - Even small reductions in global GHG emissions are expected to reduce climate change risks, including catastrophic risks
- Technical Resource:
  EPA's *Technical Support Document on the Benefits of Reducing GHG Emissions* (www.regulations.gov; search on "Technical Support Document – Benefits")

Additional Information -- Summary

- Five major Technical Support Documents (TSD) are available in docket
  - EPA-HQ-OAR-2008-0318
  - www.regulations.gov
  - 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
    - Includes extensive summary of science on climate change impacts
  - TSD - Section 202 GHG Emissions
  - TSD - Mobile Source
    - Additional detail and analysis concerning potential mobile source GHG controls
- 120-day public comment period ends November 28,2008
- All ANPR documents available at http://www.epa.gov/climatechange/anpr.html