EPA’s Recent Advance Notice on Greenhouse Gases

2008 DEER Conference

Bill Charmley
EPA/Office of Transportation and Air Quality

August 4, 2008
How it all began - The ICTA Petition & Supreme Court Decision

October 1999-- International Center for Technology Assessment and 18 other groups file petition with EPA
- Request that EPA regulate 4 GHGs from new motor vehicles under Clean Air Act Section 202(a) as air pollutants

August 2003-- EPA denies petitioners’ request

April 2007 – Supreme Ct. rules EPA improperly denied ICTA’s petition
- GHGs are air pollutants under CAA and EPA must decide whether to regulate using permissible criteria
The Administration Response to the Supreme Court, and the Passage of EISA

May 2007 -- President issues Executive Order 13432
- Directs EPA, DOE, DOT and USDA to take first steps toward regulations that cut GHG emissions from motor vehicles and their fuels

December 2007 -- Passage of Energy Independence and Security Act
- Requires EPA promulgate new Renewable Fuels Standards (RFSII)
- Amends DOT’s authority to set CAFE standards for vehicles
  - Requires a fleet-wide average FE of at least 35mpg by 2020 for light-duty vehicles
- Requires DOT to address fuel efficiency from highway HD vehicles
EPA Receives Additional GHG Petitions for Mobile Sources

October 2007 to January 2008

- EPA receives 7 additional petitions requesting EPA propose and adopt GHG standards for:
  - Aircraft
  - Ocean-going marine vessels
  - Nonroad engines and equipment
March 27, 2008 - EPA Administrator’s letter to Congress announces EPA’s first step in responding to Supreme Court Ruling – will issue ANPR

- Goes beyond Supreme Court’s mandate
- Allows for broader perspective
- Explores many relevant sections of the CAA and implications of possible regulations of stationary and mobile sources
- Will solicit public input and relevant information regarding interconnections and
  - Best available science relevant to making an endangerment finding
  - EPA’s first responses to mobile source petitions and various stationary source rulemakings

July 11, 2008 – ANPR Signed by Administrator

- Published in the Federal Register on July 29
GHG ANPR - Scope

- GHG contributions from all US Sectors
- Public health & welfare impacts from climate change
- Detailed discussion of Clean Air Act authorities
- Implications and approaches for CAA GHG regulation for stationary sources and mobile sources & mobile source fuels
- Does NOT propose any actual standards or recommend specific approaches, and does not make a formal GHG endangerment finding
- Request public input on comment through out Notice on every topic discussed
Mobile Source Overview
Title II of the Clean Air Act

- Provides statutory authority for EPA to address air pollution from mobile sources and mobile source fuels

- Title II provides significant discretion in how EPA can reduce air pollution from mobile sources

- Has been used successfully over past 30+ years on criteria pollutants (e.g., NOx, VOC, CO, PM)

- ANPR request input on how Title II could be used to address the significant, long-term challenges of GHGs from mobile sources
U.S. Transportation GHG Emissions Projections and Illustrative Targets Based on Proportional Reductions

Transportation = 28% of US GHGs

- Cars/Light Trucks: 54%
- Heavy-duty Trucks: 18%
- Aviation: 11%
- Nonroad: 8%
- Marine: 5%
- Rail: 3%
- Pipelines: 1%
Light-Duty Vehicles
54% of mobile source GHGs

ANPR discusses and request input on:
- Appropriate approaches under CAA Title II
  - Time frames for standard setting (5yr, 10-15yrs, or longer)
  - Standard metrics (e.g., grams/mile)
  - Which GHGs should be addressed, and how (CO2, N2O, HFC, CH4)
  - Test procedures
  - Compliance and enforcement programs
- How to coordinate with NHTSA CAFE program

Several hundred pages of technical support material
Includes detailed analysis of specific standards
### Analyzed LDVs GHG Stds.

<table>
<thead>
<tr>
<th></th>
<th>232 g/mile CO2 [38.3 mpg]</th>
<th>635 MMT CO2 equivalent</th>
<th>$830 Billion</th>
<th>$10 to $680 Billion</th>
<th>$1,920</th>
<th>$1,630</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Vehicle Fleet Standard in 2020</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GHG reduced in 2040</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPV of Net Social Benefits through 2040 (w/o CO2 valuation)</td>
<td></td>
<td></td>
<td></td>
<td>$830 Billion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPV of CO2 valuation through 2040</td>
<td></td>
<td></td>
<td></td>
<td>$10 to $680 Billion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per-vehicle cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1,920</td>
<td></td>
</tr>
<tr>
<td>Per-vehicle Lifetime Monetary Impact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1,630</td>
</tr>
</tbody>
</table>

**Key Notes:**
- Several adv. technologies not considered (e.g., wide-spread weight reduction)
- Utilized AEO2007 Fuel Price Projections (~$2.10/gallon gasoline)
- Net Present Values (NPV) and Lifetime Monetary Impact calculated using a 3% discount rate
Beyond Light-Duty Vehicles: Heavy-Duty and Nonroad Engines
Operations-based measures—
- used in voluntary EPA programs (such as Smartway)
- may provide good opportunity to gain credits
- greater human element—reductions must be verifiable
- provides many more options—
  speed reduction, idling reduction, system efficiency improvements, …

Vehicle-based measures—
- (or “equipment”-based, or “vessel”-based)
- has been EPA approach for LD highway — “g/mile”
- greatly expands the technology options --
  - transmissions, hybrids, …

Engine-based measures--
- traditional EPA standards-setting for HD highway and nonroad sectors — “g/hp-hr”
- rewards only engine design improvements --
  - electronic fuel controls, 2-stage turbos …
Each New Approach Brings Added Challenge … and Added Potential

The challenge:
*Increasing complexity*

The potential:
*Increasing flexibility and effectiveness*
Heavy-Duty Highway

- Trucks have been regulated under Clean Air Act §202 since 1974—
  - Diesels are now 98% cleaner
  - Same Clean Air Act provisions may be applied to GHG control

- ANPR requests comment on providing for vehicle-based controls through setting of “g/ton-mile” standards
A major Clean Air Act success story for criteria pollutants
- covers wide diversity in applications and engine sizes
- flexibility provisions and gradual phase-in have been key
- Tier 4 phase-in started this year → advanced Clean Diesel technology

ANPR requests comment on applying same provisions (§213) to nonroad GHGs
- 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, …
- And even where it has (railroads), much more can be done --
  - Some examples in ANPR: GPS-based automated throttling, track lubrication, hybrid, targeted electrification, cross-RR dispatching/tracking of railcars and locomotives
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.

Past EPA standard-setting under same Clean Air Act provisions as for nonroad engines (§213).

ANPR asks for comment on applying these to GHG control.

ANPR requests comment on a number of methods to reduce GHGs:
- **Engine-based** – higher efficiency engines, waste heat recovery, …
- **Vessel-based** – hull shapes and coatings, propeller designs, …
- **Operations-based** – reduced speeds, shoreside power, …
FAA and ICAO play important roles in EPA standard-setting programs
- Safety is always an important issue
- International nature of air traffic raises need for coordinated programs
  - ANPR requests comment on proposed EC program:
    - A CO2 cap covering all flights in and out of EU

ANPR also requests comment on ways 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, …

Comment requested on airline fleet-based approach (declining average GHG)
EPA is developing new Renewable Fuels Standards ("RFS2") under EISA
- While the program will consider implications for GHG emissions, RFS is primarily focused on energy security

The ANPR requests comment on whether the Clean Air Act provides EPA authority to directly regulate GHGs from all fuels

ANPR requests comment on whether the CAA would allow EPA to establish a low carbon fuel standard
- An effective GHG fuels program must thoroughly explore total life-cycle emissions of CO2, methane, and other GHGs
Conclusions

- Climate Change is a significant long-term challenge
  - Transportation sector will play a major role in any meaningful GHG reduction program
  - The Clean Air Act provides many tools for reducing mobile source GHGs

- EPA must respond to Supreme Court Decision, and recent 7 off-highway GHG petitions

- EPA would like input from all stakeholders on the important issues discussed in the recent ANPR

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

- Business-As-Usual without 2007 EISA
- Business-As-Usual with 2007 EISA, 35 mpg and 36 billion gallons renewable fuels
- President's goal to stabilize GHG emissions growth by 2025
- 450 PPM IPCC stabilization scenario
- 70% below 2005 levels by 2050

Year

1990 2000 2010 2020 2030 2040 2050

MMTCO$_2$ equivalent

0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500