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BY EMAIL TRANSMISSION

U.S. Environmental Protection Agency
EPA Docket Center,
Air and Radiation Docket, **Mailcode: 2822T**
Attention Docket ID No. EPA-HQ-OAR-2009-0472 and NHTSA 2009-0059
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Washington, D.C. 20460

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Re: ATTENTION DOCKET ID No. EPA-HQ-OAR-2009-0472; “Proposed Rulemaking to Establish Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards” 74 Fed. Reg. 49,454 (Sept. 28, 2009)

Environmental Defense Fund respectfully submits these comments on behalf of its more than 700,000 members that are adversely impacted by greenhouse gas emissions including the extensive volumes of greenhouse gases released from the U.S. light-duty vehicle sector. EDF also testified at each of the three public hearings on the proposed rule and that testimony is part of the administrative record for this rulemaking proceeding. We also incorporate by reference, as part of the administrative record for this rulemaking proceeding, all documents and studies cited to herein.

Environmental Defense Fund’s comments on this rulemaking proceeding also include written comments on the social cost of carbon jointly submitted with the NYU School of Law Institute for Policy Integrity to Administrator Jackson and several administration officials on September 11, 2009. Those September comments are attached here for administrative ease. EDF and the NYU School of Law Institute for Policy Integrity are also submitting additional, detailed public comments on the social cost of carbon in response to the September 28, 2009 notice of proposed rulemaking. Those comments are being transmitted on November 27, 2009 under a separate, joint submittal.

The proposal for model year 2012-2016 light-duty vehicles promises to achieve significant benefits in strengthening energy security, consistent with the statutory imperatives of the Energy Policy and Conservation Act as amended by the Energy Independence and Security Act, and to reduce heat-trapping greenhouse gases in accordance with the protections of the federal Clean

Air Act. To secure these benefits, the final standards must be rigorous, well-designed and transparent.

EDF recognizes the complex, calibrated policy-making involved in designing a program to achieve the outcomes in greenhouse gas reductions and fuel efficiency improvements provided for under the proposal while providing the flexibility for a smooth, cost-effective transition. In finalizing this proposal, we ask that the agencies examine the collective implications of multi-layered flexibilities and the potential to erode the program's performance. While the comments below examine these issues in more detail, we respectfully offer two overarching recommendations.

- ❖ Transparency and Accountability through Annual Compliance Reports. The Obama Administration and EPA Administrator Lisa Jackson have provided vital leadership in reclaiming transparency and accountability in government policy-making. The dual public policy import and complexity of this program warrant bringing to bear the rigorous transparency that is the hallmark of government accountability. Pursuant to 5 U.S.C. §553(e), EDF formally and respectfully petitions the U.S. Environmental Protection Agency and the U.S. Department of Transportation to finalize as part of this proposed rulemaking a commitment to provide an annual public compliance report examining the program's performance. The report should be publicly announced and accessible March of each year following the completion of the preceding calendar year. The compliance report should include any recommended adjustments to the program, enforcement actions, or prospective policy action to ensure the policy objectives are achieved.
- ❖ Enhanced Resources for Program Accountability. Under the Administrations of Presidents William Clinton, George W. Bush and Barack Obama, the U.S. Environmental Protection Agency has provided leadership in crafting policies to reduce a suite of airborne contaminants from the transportation sector. These initiatives, addressing a number of major source categories and a variety of pollutants, provide for considerable human health and environmental benefits. We respectfully ask that the Agency seek expansive compliance and enforcement resources to ensure that these initiatives are durable in achieving the emission reductions that will provide healthier air and a safer environment for millions of Americans.

President Obama's May 19th accord on greenhouse gas and fuel economy standards for the nation's model year 2012-2016 passenger vehicles ended years of polarization and litigation – ushering in pivotal Executive Branch leadership in forging common cause to address the pressing challenges of global warming, energy security and economic recovery. EDF respectfully submits these comments to encourage final agency action that realizes these benefits and to help build a foundation for lasting progress in the prospective standards governing model years after 2016.

I. THE PROPOSED STANDARDS ARE A VITAL STEP IN FORGING COMMON GROUND AMONG DIVERSE INTERESTS AND MOVING THE NATION FORWARD TO ADDRESS GREENHOUSE GASES AND IMPROVE FUEL ECONOMY.

On May 19th, the President of the United States charted a path forward for our nation that ended years of discord and division. The President forged an accord on cleaner cars to start reducing the global warming pollution that imperils our planet, to begin breaking our addiction to foreign oil, and to pioneer the clean energy technologies that will lead the way in the 21st Century global marketplace. The expert Agency officials, the leaders in labor, business and state government who worked together to break this logjam – the nation’s automobile manufacturers, the United Auto Workers, and the numerous states involved from California to Maine – have brought to bear decades of expertise to address complex legal, scientific and policy issues.

The potential benefits of the joint proposed U.S. Environmental Protection Agency and Department of Transportation standards are substantial.

Consistent with the Energy Policy and Conservation Act as amended by the Energy Independence and Security Act of 2007, the proposed standards conserve the nation’s energy and strengthen our national security. The vehicles subject to these proposed standards are responsible for about 40 percent of all U.S. oil consumption. The standards would reduce U.S. consumption of oil by 1.8 billion barrels while achieving a 5 percent annual improvement in fuel efficiency for the nation’s passenger vehicle fleet.

In accordance with the federal Clean Air Act, the proposed standards reduce global warming pollution from a significant and rapidly rising sector. The vehicles covered by the proposed standards account for 60 percent of heat-trapping emissions from the transportation sector and about 20 percent of all U.S. heat-trapping gases. These emissions have steadily increased, by more than one percent annually. The Environmental Protection Agency estimates the proposed standards would cut carbon dioxide pollution from passenger vehicles approximately 21 percent by 2030, reducing emissions by 950 million tons.

The proposed standards will also provide dividends in fuel savings at the pump for America’s families. The estimated overall cost savings over the life of the vehicle are more than \$3,000. See 74 Fed. Reg. at 49,460.

There are dual national security benefits from EPA’s proposed action: reducing America’s reliance on foreign oil and beginning to address climate-disrupting emissions that will exacerbate geopolitical instability. Military experts have pointedly recognized these dual policy imperatives. A report commissioned by the Pentagon states that “It is quite plausible that within a decade the evidence of an imminent abrupt climate shift may become clear and reliable. . . . Disruption and conflict will be endemic features of life.”¹ Commander Jeffrey W. Eggers, former director for combating terrorism at the National Security Council, stated that “the

¹ Peter Schwartz and Doug Randall, *An Abrupt Climate Change Scenario and Its Implications for United States National Security* (Oct. 2003) (Commissioned by the Department of Defense).

seemingly intractable problem of U.S. dependence on foreign oil is a pre-eminent national security threat”² A CNA Military Advisory Board report came to a similar conclusion, finding that “[o]ur dependence on foreign oil reduces our international leverage, places our troops in dangerous global regions, funds nations and individuals who wish us harm, and weakens our economy; our dependency and inefficient use of oil also puts our troops at risk.”³ The Government Accountability Office has also sounded the alarm, warning that “without dramatic change, the nation will become ever more reliant on imported oil and natural gas with attendant threats to national security.”⁴

The national security risks created by heavy dependence on foreign oil require broadscale changes throughout the economy. Speaking before the Senate Foreign Relations Committee, Retired Vice Admiral Dennis McGinn declared:

Energy security and a sound response to climate change cannot be achieved by pursuing more fossil fuels. Our nation requires diversification of energy sources and a serious commitment to renewable energy. Not simply for environmental reasons—for national security reasons.⁵

As our military leaders have noted, “[o]ur only choice is whether we’re going to make the decisions [on reducing our dependence on oil] forcefully and in a timely manner. We could lag and then we’ll find ourselves in a much more serious situation, when all of these other costs come on us.”⁶

The cost of delaying action is high: “We will pay to reduce greenhouse gas emissions today . . . [o]r we will pay the price later in military terms. And that will involve human lives.”⁷ The proposed regulations are an important part of necessary, immediate action to reduce emissions. “Each of us can help end America’s addiction to oil. Using less fuel in our cars and trucks reduces overall demand These steps, taken individually, may seem small. Collectively, they can make us more secure.”⁸

² Cmdr. Jeffrey W. Eggers, *The Fuel Gage of National Security*, Armed Forces Journal (2008); available at <http://www.armedforcesjournal.com/2008/05/3434573>.

³ General Charles F. “Chuck” Wald et al., CNA Military Advisory Board, *Powering America’s Defense: Energy and the Risks to National Security*, at i (2009), available at <http://www.cna.org/documents/PoweringAmericasDefense.pdf>.

⁴ US Government Accountability Office, *Key Challenges Remain for Developing and Deploying Advanced Energy Technologies to Meet Future Needs* (2006); available at <http://www.gao.gov/new.items/d07106.pdf>

⁵ Statement of Vice Admiral Dennis McGinn USN, Retired, Member of CNA Military Advisory Board, before the Senate Foreign Relations Committee, July 21, 2009, at 4, available at <http://foreign.senate.gov/testimony/2009/McGinnTestimony090721p.pdf>.

⁶ Statement by General Robert Magnus, former assistant commandant for the Marine Corp. *Video: Top Military Leaders Discuss Serious Threats to National Security Posed by U.S. Energy & Climate Policy*, PRNewswire, June 16, 2009.

⁷ Statement by Marine Corps General Anthony Zinni, former commander of U.S. Central Command. John M. Broder, *Climate Change Seen as Threat to U.S. Security*, N.Y. Times, Aug. 9, 2009.

⁸ CNA Military Advisory Board Report—*Powering America’s Defense: Energy and the Risks to National Security*, at note 14.

II. EPA'S PROPOSAL TO ADDRESS GREENHOUSE GASES FROM LIGHT-DUTY VEHICLES IS AN IMPORTANT STEP TO BEGIN STABILIZING AND REDUCING HEAT-TRAPPING GREENHOUSE GASES.

A. Numerous governmental and scientific bodies have concluded that climate change is a serious threat to public health and the environment.

The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report, a comprehensive review of the state-of-the-knowledge on climate change, highlights the overwhelming scientific consensus that human activities are contributing to changes in the climate system. This report reinforces the conclusions outlined in existing consensus statements by respected scientific organizations, such as the statement on climate change from 11 different national scientific academies, including the United States,⁹ the official position statement by the American Geophysical Union,¹⁰ and the official position statement by the American Meteorological Society.¹¹

The IPCC's Summaries for Policymakers from each of its three working groups outline the scientific aspects of climate change, the ongoing and predicted impacts, and opportunities for mitigation and adaptation. These summaries state that:

- "Warming of the climate system is unequivocal, as is now evident from observation of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level."¹²
- "Most of the observed increase in global average temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic [human-produced] greenhouse gas concentrations."¹³
- "At continental, regional, and ocean basin scales, numerous long-term changes in climate have been observed. These include changes in arctic temperatures and ice, widespread changes in precipitation amounts, ocean salinity, wind patterns and aspects of extreme weather including droughts, heavy precipitation, heat waves and the intensity of tropical cyclones."¹⁴

⁹ See Joint Science Academies' Statement: Global Response to Climate Change (June 2005), *available at* <http://www.royalsoc.ac.uk/displaypagedoc.asp?id=20742>.

¹⁰ Position Statement, American Geophysical Union Council, Human Impacts on Climate (Dec. 2003), *available at* http://www.agu.org/sci_soc/policy/positions/climate_change.shtml.

¹¹ Information Statement, American Meteorological Soc'y, Climate Change (Feb. 1, 2007), *available at* <http://www.ametsoc.org/POLICY/2007climatechange.html>.

¹² INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Summary for Policymakers, in CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS 5* (2007), *available at* http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_SPM.pdf.

¹³ *Id.* at 10. According to the Summary for Policymakers: "...the following terms have been used to indicate the assessed likelihood, using expert judgment, of an outcome or result...*Very likely* >90%, *Likely* >66%." *Id.* at 3 n.6.

¹⁴ *Id.* at 7.

- "Impacts of climate change will vary regionally but, aggregated and discounted to the present, they are *very likely* to impose net annual costs which will increase over time as global temperatures increase."¹⁵
- "The most vulnerable industries, settlements and societies are generally those in coastal river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanization is occurring."¹⁶
- "Both bottom-up and top-down studies indicate that there is substantial economic potential for the mitigation of global GHG emissions over the coming decades, that could offset the projected growth of global emissions or reduce emissions below current levels."¹⁷

The IPCC is "the leading body for the assessment of climate change, established by the United Nations to provide the world with a clear, balanced view of the present state of understanding of climate change."¹⁸ IPCC reports are written by teams of authors nominated by governments and international organizations. Over 800 contributing authors and 450 lead authors were involved in the writing of the Fourth Assessment, and more than 2,500 scientific expert reviewers were involved in the review process. Each Summary for Policymakers is approved line by line by relevant experts and government officials.¹⁹

Multiple and severe effects of climate change on human health and the environment have been documented by numerous governmental and scientific bodies, including the IPCC²⁰, the US

¹⁵ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Summary for Policymakers*, in CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY 17 (2007), available at <http://www.ipcc-wg2.org/index.html>.

¹⁶ *Id.* at 12.

¹⁷ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Summary for Policymakers*, in CLIMATE CHANGE 2007: MITIGATION 9 (2007), available at <http://arch.rivm.nl/env/int/ipcc/>.

¹⁸ Fact Sheet, Intergovernmental Panel on Climate Change, <http://www.ipcc.ch/press/factsheet.htm>.

¹⁹ *Id.*

²⁰ Confalonieri, U., B. Menne, R. Akhtar, K.L. Ebi, M. Hauengue, R.S. Kovats, B. Revich and A. Woodward, 2007: Human health. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 391-431.

Climate Change Science Program (CCSP)²¹, the World Health Organization (WHO)²², and the American Public Health Association (APHA).²³

The IPCC has concluded with medium confidence that serious public health impacts are already occurring as the result of present levels of climate change. These include an increase in heatwave mortality, changes in the seasonal distribution of aeroallergens, and changes in the ranges of vector borne diseases. The World Health Organization has estimated that 150,000 deaths occurred in the year 2000 that were attributable to climate change.²⁴ The 2003 heat wave in Europe, which killed as many as 70,000 individuals²⁵, was deemed twice as likely to occur because of present accumulations of greenhouse gases in the atmosphere compared to a pre-industrial baseline.²⁶

These experts also concur that the health impacts are highly likely to worsen over time as greenhouse gases emitted in the future continue to accumulate and cause increasingly severe disruption of the earth's climate systems. The future health impacts of climate change deemed by these experts to be likely include:

- Increased heat stress and heat-related mortality; in some areas, there will be partially offsetting reductions in cold-related mortality
- Injuries, illnesses and fatalities resulting from extreme weather events, including floods, fires, droughts, and storms
- Malnutrition from food shortages related to reductions in crop productivity
- Increased respiratory diseases related to climate-induced changes in aeroallergens
- Increased cardio-respiratory diseases and premature death associated with increases in air pollutants
- Increased risk of waterborne and foodborne infectious diseases
- Changes in the range and, potentially in some areas, severity of vector-borne diseases, including malaria and dengue

²¹ Ebi, K.L., J. Balbus, P.L. Kinney, E. Lipp, D. Mills, M.S. O'Neill, and M. Wilson, 2008: Effects of Global Change on Human Health. In: *Analyses of the effects of global change on human health and welfare and human systems*. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. [Gamble, J.L. (ed.), K.L. Ebi, F.G. Sussman, T.J. Wilbanks, (Authors)].

²² WHO, Protecting health from climate change - World Health Day 2008. Accessed May 27, 2009 at: http://www.who.int/world-health-day/toolkit/report_web.pdf; McMichael A.J., D.H. Campbell-Lendrum, C.F. Corvalán, K.L. Ebi, A. Githeko, J.D. Scheraga and A. Woodward. Climate Change and Human Health- Risks and Responses. WHO. Geneva, 2003.

²³ APHA Policy Statement 2007-8, Addressing the Urgent Threat of Global Climate Change to Human Health and the Environment, accessed May 27, 2009 at <http://www.apha.org/advocacy/policy/policysearch/default.htm?id=1351>

²⁴ McMichael A, et al. Climate change. In: Ezzati M et al., eds. Comparative quantification of health risks: global and regional burden of disease due to selected major risk factors. Geneva, World Health Organization, 2004.

²⁵ EU Directorate General for Health and Consumers. The 2003 European Heat Wave. Web page accessed at http://ec.europa.eu/health/ph_information/dissemination/unexpected/unexpected_1_en.htm. June 20, 2009

²⁶ Stott PA, Stone DA, Allen MR. 2004. Human contribution to the European heatwave of 2003. *Nature*. 432(7017):610-614.

Additional potentially severe, but less certain, health impacts of climate change, include increases in mental illness, harmful algal blooms and the suite of diseases associated with increased refugeeism.

In preparation for the upcoming negotiations in Copenhagen on an international climate change treaty, many of the world's preeminent climate scientists gathered at Copenhagen in March to assess and report on the progress of climate science in the past two years. The report of that gathering concluded that "[r]ecent observations show that greenhouse gas emissions and many aspects of the climate are changing near the upper boundary of the IPCC range of projections." Put simply, "the worst-case IPCC scenario trajectories (or even worse) are being realised."²⁷

The U.S. Global Change Research Program coordinates and integrates federal research on changes in the global environment and their implications for society. Its report published this June, *Global Climate Change Impacts in the United States*,²⁸ examined both observed and predicted physical impacts of climate change in the U.S. including increases in air and water temperature, reduced frost days, increased frequency and intensity of heavy downpours, and rising sea levels.

Along with these serious physical impacts, the Global Climate Change Impacts report identified substantial economic risks associated with climate change, including the following:

- Agriculture: "higher levels of warming often negatively effect growth and yields . . . pos[ing] adaptation challenges for crop and livestock production."²⁹
- Coastal infrastructure: Sea level rise and associated storm surge risk threatens "[s]ix of the nation's top 10 freight gateways . . . [s]even of the 10 largest ports . . . [and] the U.S. oil and gas industry."³⁰ Approximately two-thirds of all U.S. oil imports are transported through this region, and sea-level rise could affect this and other commercial activity "valued in the hundreds of billions of dollars annually through inundation of area roads, railroads, airports, seaports, and pipelines."³¹
- Airline traffic: Increases in heat result in payload restrictions, flight cancellations, service disruptions and economic loss at affected airports.³²

²⁷ Press Release, Climate Change Congress, Key Messages, Mar. 12, 2009, *available at*

http://climatecongress.ku.dk/newsroom/congress_key_messages/; www.climatecongress.ku.dk/pdf/synthesisreport/

²⁸ GLOBAL CLIMATE CHANGE IMPACTS IN THE UNITED STATES, Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson (eds.). Cambridge University Press, 2009 [hereinafter GLOBAL CLIMATE CHANGE IMPACTS].

²⁹ *Id.* at 72.

³⁰ *Id.* at 66.

³¹ *Id.*

³² A recent illustrative analysis projects a 17 percent reduction in freight carrying capacity for a single Boeing 747 at the Denver airport by 2030 and a 9 percent reduction at the Phoenix airport due to increased temperature and water vapor.

- Insurance: Insured losses from catastrophes have increased dramatically between 1980 and 2005,³³ and the report projects that climate change-related insurance losses will grow in the future.

EPA's April 2009 proposed "endangerment finding" was accompanied by an extensive Technical Support Document³⁴ containing an extensive analysis of the effects of greenhouse gas emissions. We incorporate by reference the EPA TSD, in its entirety, as part of these comments.

The scientific consensus is overwhelming that greenhouse gas emissions have observed and predicted adverse impacts harm human health and welfare.

B. U.S. Light-Duty Vehicles Emit an "enormous quantity" of Greenhouse Gases and EPA's Statutory Responsibility to Reduce These Emissions Reflects A "meaningful step" in Stabilizing and Reducing Greenhouse Gases.

The U.S. transportation sector is a major and accelerating contributor to domestic and worldwide greenhouse gas emissions:

Transportation sources represent a large and growing share of United States greenhouse gases and include automobiles, highway heavy duty trucks, airplanes, railroads, marine vessels and a variety of other sources. In 2006, all transportation sources emitted 31.5% of all U.S. greenhouse gases, and were the fastest-growing source of greenhouse gases in the U.S., accounting for 47% of the net increase in total U.S. greenhouse gas emissions from 1990–2006. The only sector with larger greenhouse gas emissions was electricity generation which emitted 33.7% of all U.S. greenhouse gases.

74 Fed. Reg. at 49,508 (citation to *Inventory of U.S. Greenhouse Gases and Sinks: 1990-2006*).

Light duty vehicles account for a significant portion of greenhouse gas emissions and therefore create a compelling opportunity for greenhouse gas reductions. Cars and light trucks alone account for 1.2 billion tons greenhouse gas emissions, which represent 17.3 percent of overall GHG emissions in the U.S.³⁵ Furthermore, cars and light trucks are the largest contributors of transportation-related emissions, representing 61.3 percent of such emissions.³⁶

³³ In 1980, catastrophe losses were less than 5 billion (in 2005 dollars), while in 2005, catastrophe losses were roughly 80 billion (in 2005 dollars).

³⁴ ENVIRONMENTAL PROTECTION AGENCY, TECHNICAL SUPPORT DOCUMENT: ENDANGERMENT AND CAUSE OR CONTRIBUTE FINDINGS FOR GREENHOUSE GASES UNDER SECTION 202(a) OF THE CLEAN AIR ACT, April 17, 2009 available at http://epa.gov/climatechange/endangerment/downloads/TSD_Endangerment.pdf; see also 74 Fed. Reg. 18,886 (April 24, 2009) ("Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act.").

³⁵ JOHN DAVIES, U.S. TRANSPORTATION GREENHOUSE GAS EMISSIONS: TRENDS, UNCERTAINTIES AND METHODOLOGICAL IMPROVEMENTS 10 (2007) [hereinafter U.S. TRANSPORTATION GREENHOUSE GAS EMISSIONS.].

³⁶ *Id.*

The growth trend in light-duty emissions will make them an even more significant contributor to U.S. GHG emissions in the future. Between 1990 and 2004, GHG emissions from passenger vehicles rose 23 percent, compared to a 9.5 percent rise in non-transportation sector emissions during the same period.³⁷ The proposal to reduce light-duty vehicle emissions is thus both critically important to achieving short term GHG reductions and is an essential element of any long term GHG reduction strategy.

In rejecting the U.S. Environmental Protection Agency's claim that it lacked the authority to address greenhouse gases under the federal Clean Air Act, the U.S. Supreme Court recognized both the "enormous quantity" of carbon dioxide discharged by the U.S. transportation sector and the practical necessity of Agency policy-making to "whittle away" through "incremental" progress at massive complex problems.

But EPA overstates its case. Its argument rests on the erroneous assumption that a small incremental step, because it is incremental, can never be attacked in a federal judicial forum. Yet accepting that premise would doom most challenges to regulatory action. Agencies, like legislatures, do not generally resolve massive problems in one fell regulatory swoop. See *Williamson v. Lee Optical of Okla., Inc.*, 348 U. S. 483, 489 (1955) ("[A] reform may take one step at a time, addressing itself to the phase of the problem which seems most acute to the legislative mind"). They instead whittle away at them over time, refining their preferred approach as circumstances change and as they develop a more-nuanced understanding of how best to proceed. Cf. *SEC v. Chenery Corp.*, 332 U. S. 194, 202 (1947) (.Some principles must await their own development, while others must be adjusted to meet particular, unforeseeable situations.). That a first step might be tentative does not by itself support the notion that federal courts lack jurisdiction to determine whether that step conforms to law.

And reducing domestic automobile emissions is hardly a tentative step. Even leaving aside the other greenhouse gases, the United States transportation sector emits an enormous quantity of carbon dioxide into the atmosphere .according to the MacCracken affidavit, more than 1.7 billion metric tons in 1999 alone. ¶30, Stdg. App. 219. That accounts for more than 6% of worldwide carbon dioxide emissions. *Id.*, at 232 (Oppenheimer Decl. ¶3); see also MacCracken Decl. ¶31, at 220. To put this in perspective: Considering just emissions from the transportation sector, which represent less than one-third of this country's total carbon dioxide emissions, the United States would still rank as the third-largest emitter of carbon dioxide in the world, outpaced only by the European Union and China. Judged by any standard, U. S. motor-vehicle emissions make a meaningful contribution to greenhouse gas concentrations and hence, according to petitioners, to global warming.

Massachusetts v. EPA, 549 U.S. 497 (2007) (citations omitted).

Just as important as EPA's choice to regulate light-duty vehicles is EPA's decision to include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and hydrofluorocarbons (HFCs) as

³⁷ *Id.* at 6, 11.

regulated GHGs under the proposal rule which account for the preponderance of light-duty GHG emissions when weighted by global warming potential.³⁸ Whether these compounds are considered individually or collectively, EPA has a statutory duty to establish “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.”³⁹ See 42 U.S.C. §7521(a)(1).

EPA’s duty to take action is underscored by the statute’s precautionary protection of human health and the environment, and the expansive textual language governing EPA’s delegated regulatory responsibilities.

Congress enacted the federal Clean Air Act in order to provide comprehensive, and dynamic, protections to human health and the environment from the perils posed by multiple types of air pollution. This protective purpose is reflected in the text of Section 202. Section 202(a) of the Clean Air Act requires the EPA Administrator to promulgate standards for the emission of air pollutants from new motor vehicles “which in his [her] judgment cause, or contribute to, air pollution which *may reasonably be anticipated to endanger* public health or welfare.” 42 U.S.C. § 7521(a) (*emphasis added*). Both the “may reasonably be anticipated” and “endanger” language reflect Congress’ intent for EPA to act in a manner that prevents, rather than merely responds to, harm.

³⁸ *Id.* See Environmental Protection Agency, Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 18886, 18895 (April 24, 2009) (describing global warming potential as a measure that allows comparison among different greenhouse gases in terms of those gases heating potential).

³⁹ Examples of EPA’s past practice in considering groups of compounds as the air pollution at issue include the Agency’s long-standing treatments of volatile organic compounds (VOCs), particulate matter (PM), “smoke”, and oxides of nitrogen (NO_x) as air pollutants under sections 202, 213, and other Clean Air Act provisions. For example, in the non-road compression-ignition engine rules promulgated in 1994, EPA issued standards for smoke under section 213, after finding “smoke significantly contributes to air pollution that may reasonably be anticipated to endanger public health or welfare.” 59 FR 31318 (June 17, 1994). Smoke is a complex mixture of solid and liquid substances that is measured by opacity, which in turn is the fraction of a beam of light that fails to penetrate a plume of smoke. Similarly, in the proposal for the heavy-duty engine standards it promulgated in 1997, EPA based its section 202 endangerment finding for VOCs on consideration of VOCs “as a class” with respect to their effect on ozone, stating that “... effects of individual compounds are not discussed.” 61 FR 33421, 33423 (June 27, 1996). Volatile organic compounds are operationally defined by their chemical nature, (containing carbon), their vapor pressure, a physical property, and by their similar effects on the environment (principally as precursors to ozone formation). As with the greenhouse gases in the current regulatory proposal, motor vehicles emit only a subset of the VOCs found in the atmosphere. As a final example, in the heavy-duty engine and vehicle standards promulgated in 2001, EPA issued standards for particulate matter (PM), recognizing PM as representing “a broad class of chemically and physically diverse substances ...[that] can be principally characterized as discrete particles that exist in the condensed (liquid or solid phase) spanning several orders of magnitude in size.” 65 FR 35430, 35445 (June 2, 2000); 66 FR 5002, 5017 (Jan. 18, 2001). As with VOCs, the PM air pollution found in the atmosphere is comprised of many hundreds of substances, of which only a subset are emitted from motor vehicles. And as with the greenhouse gases EPA proposes to regulate, much of the scientific research and assessment effort devoted to understanding and characterizing the effects of PM air pollution on human health and the environment treated this class of substances collectively. EPA found that this collective treatment of PM in the scientific literature justified the collective treatment of PM for regulatory purposes. 65 FR 35445.

The landmark case of *Ethyl Corp. v. EPA* crystallized the meaning of the word “endanger” in the Clean Air Act. In this landmark opinion affirming EPA’s regulations removing lead from gasoline, Judge Skelly Wright held that “[E]ndangers means something less than actual harm. When one is endangered, harm is threatened; no actual injury need ever occur.” *Ethyl Corp. v. EPA*, 541 F.2d 1, 12 (D.C. Cir. 1976). Rejecting industry’s arguments that proof of actual harm, and certainty with respect to the cause of the harm, are required before EPA can act, the *Ethyl Corp.* court propounded a guiding principle of the Clean Air Act: the precautionary principle:

A statute allowing for regulation in the face of danger is, necessarily, a precautionary statute. Regulatory action may be taken before the threatened harm occurs; indeed, the very existence of such precautionary legislation would seem to demand that regulatory action precede, and, optimally, prevent, the perceived threat.

Id. at 12-13.

Congress was fully aware of the *Ethyl* decision when it added the “*may reasonably be anticipated*” language to section 202(a) in the 1977 Clean Air Act Amendments:

In order to emphasize the precautionary or preventive purpose of the act (and, therefore, the Administrator’s duty to assess risks rather than wait for proof of actual harm), the committee not only retained the concept of endangerment of health; the committee also added the words “may reasonably be anticipated”. In evaluating what “may reasonably be anticipated”, the limitations and difficulties inherent in environmental medical research referred to above must be considered.

This interpretation has been affirmed by the U.S. Court of Appeals for the Ninth Circuit, in a case construing provisions of the Clean Air Act’s visibility protection program:

Congress mandated an extremely low triggering threshold, requiring the installment of stringent [BART] emission controls when an individual source “emits any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility.” 42 U.S.C. §7491(b)(2)(A). The National Academy of Sciences correctly noted that Congress has not required ironclad scientific certainty establishing the precise relationship between a source’s emissions and resulting visibility impairment.

See *Central Arizona Water Conservation District, et al. v. EPA*, 990 F.2d 1531, 1541 (9th Cir. 1993).

Accordingly, section 202 directs EPA to act in the face of threats, rather than known, actual harms. 74 Fed. Reg. 18,886, 18,890 (April 24, 2009) (“[T]he Administrator is required to protect public health and welfare. She is not asked to wait until the harm has occurred but instead must be ready to take regulatory action to prevent harm before it occurs.”).

Section 202(a) of the Clean Air Act compels EPA to act in the face of scientific uncertainty—either in the likelihood of the harm or its severity. Conversely, delaying action necessary to protect human health and welfare risks eviscerates the very protections such actions are intended to secure. As the *Ethyl* court determined:

A statute allowing for regulation in the face of danger is, necessarily, a precautionary statute. Regulatory action may be taken before the threatened harm occurs; indeed, the very existence of such precautionary legislation would seem to demand that regulatory action precede, and, optimally, prevent, the perceived threat. . . . We believe the precautionary language of the Act indicates quite plainly Congress' intent that regulation should precede any threatened, albeit unprecedented, disaster. . . . [T]he statutes—and common sense—demand regulatory action to prevent harm, even if the regulator is less than certain that the harm is otherwise inevitable.

Ethyl Corp., 541 F.2d at 13 & n.18, 25.

Congress pointedly used expansive language in delineating EPA's responsibilities under section 202(a), instructing the Agency to prescribe standards applicable to the emission of "any" air pollutant from "any" class or classes of new motor vehicles or new motor vehicle engines. 42 U.S.C. 7521(a). The D.C. Circuit judiciously relied on the customary – and expansive – meaning of the term "any" to reject EPA's claims that it could rollback the scope of Clean Air Act protections:

In a series of cases, the Supreme Court has drawn upon the word "any" to give the word it modifies an "expansive meaning" when there is "no reason to contravene the clause's obvious meaning." *Norfolk S. Rwy. Co. v. Kirby*, 543 U.S. 14, 31-32, 125 S.Ct. 385, 160 L.Ed.2d 283 (2004); *see also Dep't of Hous. and Urban Dev. v. Rucker*, 535 U.S. 125, 130-31, 122 S.Ct. 1230, 152 L.Ed.2d 258 (2002); *Gonzales*, 520 U.S. at 5, 117 S.Ct. 1032. Indeed, the Court has read the word "any" to signal expansive reach when construing the Clean Air Act. In *Harrison v. PPG Industries, Inc.*, 446 U.S. 578, 100 S.Ct. 1889, 64 L.Ed.2d 525 (1980), the Court resolved a jurisdictional dispute under section 307(b)(1) by interpreting the phrase "any other final action," which the Court "discern[ed to have] no uncertainty." *Id.* at 588, 100 S.Ct. 1889. The Court never suggested that the term "final action" was itself devoid of multiple meanings depending on the context, but rather stated that when Congress amended the Act in 1977, "it expanded its ambit to include not simply 'other final action,' but rather 'any other final action.'" *Id.* at 589, 100 S.Ct. 1889. "[I]n the absence of legislative history to the contrary," the Court held that the statutory phrase "must be construed to mean exactly what it says, namely, *any other* final action." *Id.*

Although EPA is correct that the meaning of "any" can differ depending upon the statutory setting, *see Nixon v. Missouri Mun. League*, 541 U.S. 125, 132, 124 S.Ct. 1555, 158 L.Ed.2d 291 (2004), the context of the Clean Air Act warrants no departure from the word's customary effect. Unlike *Nixon*, the question of statutory interpretation here does not arise in a setting in which the Supreme Court has required heightened standards of clarity to avoid upsetting fundamental policies. *See id.* at 132-33, 140-41, 124 S.Ct. 1555 (citing *Gregory v. Ashcroft*, 501 U.S. 452, 111 S.Ct. 2395, 115 L.Ed.2d 410 (1991)). EPA points to no "strange and indeterminate results," *id.* at 133, 124 S.Ct. 1555 that would emerge from adopting the natural meaning of "any" in section 111(a)(4) of the Act. Given Congress's goal in adopting the 1977 amendments of establishing a balance between economic and environmental interests, *see Wisconsin Elec. Power Co. v. Reilly*,

893 F.2d 901, 909-10 (7th Cir.1990) (“*WEPCo* ”), it is hardly “farfetched,” *Nixon*, 541 U.S. at 138, 124 S.Ct. 1555, for Congress to have intended NSR to apply to any type of physical change that increases emissions. In this context, there is no reason the usual tools of statutory construction should not apply and hence no reason why “any” should not mean “any.” Indeed, EPA’s interpretation would produce a “strange,” if not an “indeterminate,” result: a law intended to limit increases in air pollution would allow sources operating below applicable emission limits to increase significantly the pollution they emit without government review.

New York v. EPA, 443 F.3d 880, 885-86 (D.C. Cir. 2006).

C. EPA’s Regulatory Responsibilities Under Section 202(a) of the Clean Air Act Include Addressing the Greenhouse Gases from Highway Heavy-Duty Diesel Vehicles and Engines.

Environmental Defense Fund appreciates EPA’s leadership in proposing GHG standards for light-duty vehicles. But the scope of EPA’s regulatory responsibility under section 202(a) includes highway heavy-duty vehicles and engines. EDF reiterates its request that EPA take action to address these vehicles and engines as required under section 202(a) of the Clean Air Act.

The plain language of the Clean Air Act compels EPA to prescribe emissions standards for pollutants emitted by any type of new motor vehicle, including heavy duty trucks. Section 202(a)(1) of the Act provides as follows:

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.

42 U.S.C. § 7521(a)(1). The Act in turn defines a “motor vehicle” as “any self-propelled vehicle designed for transporting persons or property on a street or highway.” 42 U.S.C. § 7550(2). *See also* section 202(j)(4) which clarifies EPA’s authority to promulgate carbon monoxide standards for heavy duty vehicles under section 202(a)(1) that is specifically tailored to operation in cold temperatures. 42 U.S.C. § 7521(j)(4). EPA has previously determined that heavy duty trucks fall within section 202(a). In 2001, EPA established emissions standards for NO_x, VOCs, SO_x, and PM emissions from these vehicles based on a finding that emissions of these pollutants from heavy duty trucks fell within the scope of that section. 66 Fed. Reg. 5008 (Jan. 18, 2001) (“EPA believes the evidence fully supports a determination under section 202(a)(1) to set standards”).

Heavy duty vehicles were the subject of the original section 202(a) rulemaking petition to address greenhouse gases. See Petition of International Center for Technology Assessment (Oct. 20, 1999). In initially denying the petition, an agency decision reversed by the U.S. Supreme Court in *Massachusetts v. EPA*, the EPA expressly found that the scope of the petition included heavy duty engines and trucks: “Although the ICTA petition focuses on passenger cars

and light duty trucks, it seeks regulation of GHG emissions generally from motor vehicles and engines, which include heavy duty engines and trucks.” See 68 Fed. Reg. 52,922, 52,929 at n. 4 (“Control of Emissions From New Highway Vehicles and Engines”).

EPA’s recent proposed endangerment finding applies to all § 202(a) motor vehicles, expressly encompassing medium and heavy duty trucks under section 202(a):

The relevant mobile sources under section 202 (a)(1) of the Clean Air Act are “*any class or classes of new motor vehicles or new motor vehicle engines, * * * .*” CAA § 202(a)(1) (emphasis added). The motor vehicles and motor vehicle engines (hereinafter “Section 202(a) source categories”) addressed are:

- Passenger cars
- Light-duty trucks
- Motorcycles
- Buses
- Medium/heavy-duty trucks

As noted earlier, in the past the requisite contribution findings have been proposed concurrently with proposing emission standards for the relevant mobile source category. Thus, the prior contribution findings often focused on a subset of the section 202(a) (or other section) source categories. Today’s proposed cause or contribute finding, however, is for all of the section 202(a) source categories and the Administrator is considering emissions from all of these source categories in the proposed determination.

74 Fed. Reg. 18886, 18905 (Apr. 24, 2009).

EPA further acknowledged that, if the Administrator completes action on the proposed endangerment determination, EPA is required to promulgate GHG standards under 202(a) of the Clean Air Act.

If the Administrator makes affirmative findings under section 202(a) on both endangerment and cause or contribute, then EPA is to issue standards “applicable to emission” of the air pollutant or pollutants that EPA finds causes or contributes to the air pollution that endangers public health and welfare.⁴⁰

In fulfilling its mandate to address GHG emissions from heavy-duty vehicles, EPA will be addressing the second largest GHG contributor from the transportation sector and the contributor

⁴⁰ 74 Fed. Reg. 49454, 49509 (Sept. 28, 2009).

to transportation emissions that is growing most quickly.⁴¹ EPA's Technical Support Document for the proposed findings indicates that buses and medium/heavy duty trucks accounted for 415 Tg CO₂e in 2006, or 25% of the total GHG emissions for the identified motor vehicle source categories. TSD, p 146. Thus even if the emissions from medium/heavy duty vehicles were considered in isolation, they would still constitute a substantial 6% share of total US greenhouse gas emissions, or 7% of global transportation sector emissions. TSD, p. 147. The TSD also shows that the share of GHG emissions from buses and medium/heavy duty trucks in the U.S. is briskly increasing. The TSD indicates that greenhouse gas emissions from buses and medium/heavy duty trucks increased by 75% from 1990 to 2006. TSD, p 146. The current and growing share of emissions contributed by onroad heavy-duty engines makes it critical for EPA to address this class of vehicles, consistent with its statutory obligations.

A variety of technologies are available to significantly and cost-effectively reduce greenhouse gas emissions from heavy duty vehicles. Existing programs such as EPA's voluntary SmartWay Transport Partnership show the feasibility and societal benefits of requiring greenhouse gas emissions reductions from heavy-duty vehicles. In a December 2008 letter to the Obama Administration's transition team, the Engine Manufacturers Association has expressed its readiness to begin working with EPA on a national program to reduce greenhouse gas emissions.

Finally, the EPA's merits brief in *Massachusetts v. EPA* erroneously argued that its authority to regulate greenhouse gas emissions from light-duty vehicles was preempted by DOT's fuel economy regulations. The high Court squarely rejected that claim finding that EPA's responsibility under section 202(a)(1) of the Clean Air Act to protect public health and welfare is "wholly independent":

EPA finally argues that it cannot regulate carbon dioxide emissions from motor vehicles because doing so would require it to tighten mileage standards, a job (according to EPA) that Congress has assigned to DOT. See 68 Fed. Reg. 52929. But that DOT sets mileage standards in no way licenses EPA to shirk its environmental responsibilities. EPA has been charged with protecting the public's "health" and "welfare," 42 U. S. C. §7521(a)(1), a statutory obligation wholly independent of DOT's mandate to promote energy efficiency. See Energy Policy and Conservation Act, §2(5), 89 Stat. 874, 42 U. S. C. §6201(5). The two obligations may overlap, but there is no reason to think the two agencies cannot both administer their obligations and yet avoid inconsistency.

For heavy- as well as light-duty vehicles, EPA's authority, and imperative, to protect human health and the environment through rigorous emission standards is more far-reaching and effective than DOT's authority to set standards for fuel economy, because of EPA's ability to address all greenhouse gases, to efficiently and effectively address the interactions between engines and fuels, and due to the flexible mechanisms inherent in the Clean Air Act.

⁴¹ U.S. TRANSPORTATION GREENHOUSE GAS EMISSIONS, at 9, 11. Heavy duty vehicles represent 18.6 percent of transportation-related emissions and grew at a rate of 62 percent between 1990 and 2004. *id.*

D. EDF Respectfully Reiterates its Request that the U.S. Environmental Protection Agency Address Black Carbon Emissions, an Essential Element in a Comprehensive Program to Address Greenhouse Gases.

While EPA's proposed regulatory action for light-duty vehicles under section 202(a) should address the four greenhouse gases identified in the proposal, the Agency's responsibilities under section 202 do not end there. Section 202(a) also requires the Agency to address other global warming pollutants attributable to motor vehicles. Foremost among these other pollutants is black carbon, to which the US transportation sector contributes significant emissions. Scientists now estimate that black carbon could have as much as 60% of the current global warming effect of carbon dioxide, more than any other global warming agent besides CO₂.⁴²

In addition to its atmospheric impacts, deposition of black carbon on snow and ice surfaces darkens these surfaces, contributing to melting. This may be especially deleterious for the Arctic sea ice. Finally, the fact that black carbon has a short lifetime (~ 1 week) makes it an especially favorable target for promptly reducing global warming impacts.⁴³

As with the greenhouse gases regulated under EPA's proposal, black carbon satisfies the two-pronged test under section 202(a), as it endangers public health and welfare and because emissions from new motor vehicles or engines cause or contribute to black carbon air pollution. EPA must move expeditiously to include black carbon in the emissions from motor vehicles addressed under section 202.(a)

III. THE PROPOSED STANDARDS CAN BE ACHIEVED THROUGH COST-EFFECTIVE, AVAILABLE TECHNOLOGIES THAT WILL PRESERVE CONSUMER CHOICE AND SAVE CONSUMERS MONEY.

Light-duty vehicle manufacturers can achieve the proposed standards through a variety of cost-effective and readily-available technologies. EPA's staff produced a report for the National Research Council identifying over two dozen technologies in production or impending that can be deployed to cut greenhouse gases and improve fuel economy.⁴⁴ These include, among others, technological innovations in engine manufacture like engine friction reduction and cylinder deactivation, transmission advances, hybrid drive train utilization, mitigation of air conditioning emissions, aerodynamic improvements, and low-rolling resistance tires.⁴⁵ Individually, each one of these technologies can reduce CO₂ emissions by as much as 15 percent from a baseline vehicle's emissions.⁴⁶ EPA's staff concluded that the synergistic impacts of including multiple

⁴² See Ramanathan, V., Carmichael, G. (2008) Global and regional climate changes due to black carbon, *Nature Geoscience*, 1:221-227.

⁴³ See Jacobson, M.Z. (2002) Control of fossil fuel particulate black carbon plus organic matter, possibly the most effective method of slowing global warming, *J. Geophys. Res.* 107 (D19), 410.

⁴⁴ Proposal; *EPA Staff Technical Report: Cost and Effectiveness Estimates of Technologies Used to Reduce Light-duty Vehicle Carbon Dioxide Emissions*, EPA420-R-08-008, March 2008 [hereinafter *EPA Staff Technical Report*].

⁴⁵ *Id.* at 6-7.

⁴⁶ *Id.*

GHG reduction technologies in a single vehicle are often less than the sum total of each technology’s individual impact.⁴⁷

The attached table summarizes some of these available technologies.

Source: EPA Staff Technical Report: Cost and Effectiveness Estimates of Technologies Used to Reduce Light-duty Vehicle Carbon Dioxide Emissions, EPA420-R-08-008, March 2008

“EPA technical staff concludes there are a large number of technologies which can be applied to cars and trucks that are capable of achieving significant reductions in greenhouse gas emissions, and improve vehicle fuel economy, at reasonable costs.” ES -1.

SUMMARY TABLE

TECHNOLOGY	EFFECTIVENESS		COST		AVAILABILITY
	CO ₂ Reductions (% from baseline vehicle) ⁴⁸		Incremental Compliance Costs (above baseline) ⁴⁹ in 2006 \$ per vehicle		
	Small Car	Large Car	Small Car	Large Car	
Engine Technologies					
Low friction lubricants	0.5	0.5	3	3	Commonly available - now with improved performance (wider temperature band, better lubricating properties)
Engine friction reduction	1-3	1-3	0-84	0-126	Commonly available
Variable Valve Timing - Intake Camshaft Phasing (ICP)	2	1	59	119	Commonly available

⁴⁷ EPA Staff Technical Report, at 33.

⁴⁸ Synergistic effects of combining multiple CO₂ emissions reduction technologies are not additive. See discussion on synergy modeling in Section 3, pp. 33-45.

⁴⁹ Cost estimates account for both the direct manufacturing costs as well as indirect costs (production-related costs such as research, development, and other engineering, business-related costs such as salaries and pensions, retail-sales-related costs such as dealer support and marketing, and profits). Data sources from EPA’s staff technical report included: the 2002 NAS report on the effectiveness and impact of CAFE standards; the 2004 study done by NESCCAF; the recent California Air Resources Board (CARB) Initial Statement of Reasons in support of their carbon rulemaking; a 2006 study done by Energy and Environmental Analysis (EEA) for the Department of Energy; and EPA’s vehicle fuel economy certification data. EPA also considered confidential data submitted by vehicle manufacturers in response to NHTSA’s request for product plan information, and confidential information shared by automotive industry component suppliers in meetings with EPA and NHTSA staff held during the second half of the 2007 calendar year.

TECHNOLOGY	EFFECTIVENESS		COST		AVAILABILITY
	CO ₂ Reductions (% from baseline vehicle) ⁴⁸		Incremental Compliance Costs (above baseline) ⁴⁹ in 2006 \$ per vehicle		
	Small Car	Large Car	Small Car	Large Car	
Variable Valve Timing - Coupled Camshaft Phasing (CCP)	3	4	59	119	Commonly available
Variable Valve Timing - Dual Camshaft Phasing (DCP)	3	4	89	209	Commonly available
Engine Cylinder Deactivation	n/a	6	n/a	203	Commonly available – GM, Chrysler Group and Honda currently employ this technology. Expect advances in the amount of time that part-cylinder mode might be used.
Variable Valve Lift – Discrete	4	3	169	246	Commonly available – Toyota, Honda BMW currently employ this technology.
Variable Valve Lift – Continuous	5	6	254	466	
Camless Valve Actuation Systems	5-15	5-15	336-637	336-637	Not currently in production - EPA projects the camless valve systems will not be widely available in high volume light-duty vehicles within the next 10 years
Gasoline Direct Injection Stoichiometric (GDI- S)	1-2	1-2	122-420	204-525	Recently introduced – Audi, VW, BMW have already introduced models with this technology and Toyota and GM have plans to soon.
Gasoline Direct Injection - Lean- Burn (incremental to	8-10	9-12	750	750	Not currently in production due to cost/technical issues

TECHNOLOGY	EFFECTIVENESS		COST		AVAILABILITY
	CO ₂ Reductions (% from baseline vehicle) ⁴⁸		Incremental Compliance Costs (above baseline) ⁴⁹ in 2006 \$ per vehicle		
	Small Car	Large Car	Small Car	Large Car	
GDI-S)					however several suppliers are optimistic about the potential in the near future.
Gasoline Homogeneous Charge Compression Ignition (incremental to GDI-S)	10-12	10-12	263	390	Not currently in production – a dual-mode strategy has been employed in Europe and Asia. Most manufacturers have made public statements about the viability of incorporating HCCI into light-duty passenger vehicles, and have significant vehicle demonstration programs aimed at producing a viable product within the next 5-10 years.
Gasoline Turbocharging (incremental to GDI-S)	5-7	5-7	690 (from baseline)	120 (from baseline)	Commonly available - Almost every major manufacturer currently markets a vehicle with some form of boosting.
Diesel Engines - Lean NOx Trap Catalyst aftertreatment	15-26	21-32	2,790		Not currently in production - EPA projects that T2B5 LNT-based diesel engines will be available in the US within the next year or two, based on announcements from Mercedes, Volkswagen, and Honda.
Diesel Engine -	15-26	21-32		3,045	Not currently in

TECHNOLOGY	EFFECTIVENESS		COST		AVAILABILITY
	CO ₂ Reductions (% from baseline vehicle) ⁴⁸		Incremental Compliance Costs (above baseline) ⁴⁹ in 2006 \$ per vehicle		
	Small Car	Large Car	Small Car	Large Car	
Selective Catalytic Reduction NOx Aftertreatment					production - Based on public announcements from several companies, EPA expects a large number of product offerings from multiple companies over the next few years.
Transmission Technologies					
Automatic 5-speed Transmissions (from 4-speed automatic)	2.5	2.5	76-167	76-167	Commonly available and applicable to all vehicle types
Aggressive Shift Logic	1-2	1-2	38	38	Not in production but applicable to all vehicle types with automatic transmissions and requires no significant hardware modifications and verification.
Early Torque Converter Lockup	0.5	0.5	30	30	Not in production but applicable to all vehicle types with automatic transmissions and requires minimal hardware modification and verification.
Automatic 6-, 7- and 8-speed Transmissions (from 4-speed auto)	4.5-6.5	4.5-6.5	76-167	76-167	Not in production but applicable to all vehicle types.
6-speed Automated (shift) Manual Transmissions (AMT) (from 4- speed auto)	9.5-14.5	9.5-14.5	76-167	76-167	In production and can be used in all vehicle types.

TECHNOLOGY	EFFECTIVENESS		COST		AVAILABILITY
	CO ₂ Reductions (% from baseline vehicle) ⁴⁸		Incremental Compliance Costs (above baseline) ⁴⁹ in 2006 \$ per vehicle		
	Small Car	Large Car	Small Car	Large Car	
Continuously Variable Transmissions (CVT) (from 4-speed auto)	6	6	231	270	Commonly available and applicable to small and large cars.
Manual (clutch shifted) 6-, 7- and 8- speed Transmissions (from 5-speed manual)	0.5	0.5	107	107	Commonly available and applicable to all vehicle types.
Hybrid Technologies					
Integrated Starter Generator (ISG) w/ Idle-Off	7.5	7.5	563	600	In production (Saturn Vue and Aura)
Integrated Motor Assist (IMA)/ Integrated Starter- Alternator- Dampener (ISAD) Hybrid	30	25	2,477	3,153	In production - developed and marketed by Honda (IMA) and Continental (ISAD)
Power-Split Hybrids	35	35	3,754		In production – marketed by Toyota, Ford and Nissan.
Accessory Technologies					
Electric Accessories and High Efficiency Alternator	1-2	1-2	89-119	89-119	Commonly available
Electric Power Steering for 12V and 42V systems	1.5	1.5-2	118-197	118-197	Commonly available

Incremental costs are negligible for many technologies like low-friction lubricants and still modest for more comprehensive technologies like hybrid drive trains.⁵⁰ Furthermore, EPA predicts many technology cost will benefit from the learning curve phenomenon, a decrease in

⁵⁰ *Id.* at 48.

unit cost as cumulative production increases.⁵¹ On average, EPA and NHTSA estimate that these new technologies will increase the cost of model year 2016 vehicle by less than 1,100 dollars but, as a result of fuel savings, the average consumer will save 3,000 dollars over the life of the vehicle.⁵² Moreover, consumers who finance their new-car purchase with a loan will save \$12–\$14 per month throughout the duration of the loan.⁵³ These statistics underscore EPA technical staffs’ conclusion that “there a large number of technologies which can be applied to cars and trucks that are capable of achieving significant reductions in greenhouse gas emissions, and improve vehicle fuel economy, at reasonable costs.”⁵⁴

Manufacturers can also incorporate new, light-weight materials into vehicle design as a means of producing more fuel-efficient, safe vehicles.⁵⁵ The proposed rule also contains compliance flexibilities like fleet averaging and other measures to provide cost savings, broad consumer choice and flexibility in meeting compliance obligations.⁵⁶ As examined below, compliance flexibilities must be rigorous and well-designed to achieve light-duty emissions requirements.

IV. THE AGENCIES SHOULD CAREFULLY ASSESS THE PROPOSED COMPLIANCE FLEXIBILITY MECHANISMS TO ENSURE THE PROGRAM’S PROPOSED ENVIRONMENTAL AND ENERGY PERFORMANCE IS IN FACT ACHIEVED WHILE PROVIDING A SMOOTH, COST-EFFECTIVE TRANSITION.

EDF recognizes the complex, calibrated policy-making involved in designing a program to achieve the outcomes in greenhouse gas reductions and fuel efficiency improvements provided for under the proposal while providing the flexibility for a smooth, cost-effective transition. In finalizing this proposal, we ask that the agencies examine the collective implications of multi-faceted flexibilities and the potential to erode the program’s performance. For illustration, we analyze two proposed policy approaches that provide programmatic flexibility and find that they have comparatively divergent merits.

⁵¹ *Id.* at 49.

⁵² Proposed Light-Duty Vehicle Emission Standards, *supra note* **Error! Bookmark not defined.**, at 49460.

⁵³ *Id.* The fuel savings outweigh the increase in loan payments by \$12–\$14 per month.

⁵⁴ *EPA Staff Technical Report*, *supra note* 44, at 33

⁵⁵ A recent NHTSA memo, based on researched conducted several years ago concluded that light-weighting could potentially increase traffic fatalities. *See* Charles J. Kahane, Vehicle Weight, Fatality Risk and Crash Compatibility of Model Year 1991-99 Passenger Cars and Light Trucks, National Highway Traffic Safety Administration, Department of Transportation 11-13 (2003) *available at* <http://www.nhtsa.dot.gov/cars/rules/regrev/evaluate/pdf/809662.pdf>. The NHTSA study, however, does not disaggregate the effects of size and weight. Subsequent studies conclude that vehicle size is strongly correlated with safety and that maintaining vehicle size while reducing weight can preserve a vehicle’s safety attributes while reducing vehicle fuel consumption. *See* DRI Study (concluding that lightening an SUV without reducing its footprint reduced injuries by 15 percent). EPA’s Proposed Rule reflects this understanding by creating performance standards for different vehicle footprints, thereby incentivizing weight reduction without encouraging manufactures to reduce vehicle size. *See* EPA & NHTSA, Draft Joint Technical Support Document Proposed Rulemaking to Establish Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards 2-4 (2009).

⁵⁶ Proposed Light-Duty Vehicle Emission Standards, *supra note* **Error! Bookmark not defined.**, at 49481.

A. The Final Standards Should Be Designed to Account for the Real-World Greenhouse Gas Emissions Associated with Electric Vehicles.

EPA’s proposed treatment of emissions from electric vehicles profoundly undercounts the actual global warming emissions that will occur. The Agency has proposed to include electric vehicles (“EVs”) in each manufacturer’s fleet-wide standard and to treat EVs as if they had emissions of zero grams per mile of CO₂. As EPA notes, “in reality, the total emissions off-set ... is not zero, as there is a corresponding increase in upstream CO₂ emissions due to an increase in the requirements for electric utility generation.”⁵⁷

While we appreciate the agency’s interest in promoting advanced technologies such as EVs, there are a host of policies to support the advancement of EVs and the zero grams per mile standard is plainly unrepresentative of the environmental realities of using EVs. A recent National Research Council study concluded that the health and non-climate related environmental impacts of traditional pollutants associated with EVs are comparable to, and in some cases higher than, those associated with conventional gasoline and diesel engines, on a life-cycle basis.⁵⁸ When considering greenhouse gas emissions of different types of vehicles, the same report concluded that EVs caused lower CO₂ emissions than conventionally-fueled vehicles, but higher emissions than vehicles fueled by hydrogen or certain types of E85 fuel.⁵⁹ Furthermore, when the California Air Resources Board (“CARB”) considered the same question, CARB determined that EVs account for 130 grams per mile of upstream emissions.⁶⁰ CARB built flexibility into the analysis by allowing manufacturers to lower the 130 grams per mile number by demonstrating, among other things, the percentage of electricity generated in California by renewable sources.⁶¹

The greenhouse gas emissions profile of the nation’s electricity generating portfolio varies considerably from state-to-state and across regional electricity grids. Further, the greenhouse gas burden of EVs will depend not only on the emissions profile of the grid but the volume and time of use. While EDF supports commercialization of these advanced technologies, we also strongly request that Agencies ensure analytical rigor in their deployment. Accordingly, we ask that EPA, with its considerable institutional expertise at the convergence of electricity and the environment, develop a rigorously tailored emissions rate associated with upstream electricity generation that is properly applied to EVs.

B. The Proposed Air Conditioning Credits for Determining Compliance with the Clean Air Act Standards Incentivize Reductions in Hydrofluorocarbon Refrigerants, Which Are Potent Greenhouse Gases.

⁵⁷ 74 Fed. Reg at 49,533.

⁵⁸ Committee on Health, Environmental, and Other External Costs and Benefits of Energy Production and Consumption, *Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use*, pg. 152, National Research Council (2009).

⁵⁹ *Id.* at 154.

⁶⁰ Final Regulation Order, Amendments to Sections 1900 and 1961, and Adoption of new Section 1961.1, Title 13, California Code of Regulations

⁶¹ *Id.*

EPA proposes compliance credits for reducing the greenhouse gases associated with air conditioning systems, a policy approach that provides a strong incentive for mitigating hydrofluorocarbon refrigerants, which are powerful greenhouse gas pollutants, as well as the greenhouse gas emissions due to the load associated with the air conditioning operation. 74 Fed. Reg. at 49,482.

The environmental performance and economic flexibility inherent in the overarching systems-based approach under the federal Clean Air Act enable manufacturers to secure cost-effective emissions reductions in non-CO₂ greenhouse gases and to efficiently optimize CO₂ emissions reductions across the entire vehicle system including the air conditioning operations:

EPA is proposing an approach that allows manufacturers to generate credits by reducing GHG emissions related to A/C systems. Specifically, EPA is proposing a test procedure and method to calculate CO₂ equivalent reductions for the full useful life on a grams/mile basis that can be used as credits in meeting the fleet average CO₂ standards. EPA's analysis indicates this approach provides manufacturers with a highly cost effective way to achieve a portion of GHG emissions reductions under the EPA program.

74 Fed. Reg. at 49,482. Under the CAFÉ program, these reductions are disallowed for passenger cars. 74 Fed. Reg. at 49,468. EDF strongly supports the proposed EPA standards that incentivize reductions in the harmful greenhouse gases associated with air conditioning systems, an approach consonant with the provisions of the Clean Air Act and sound public policy.

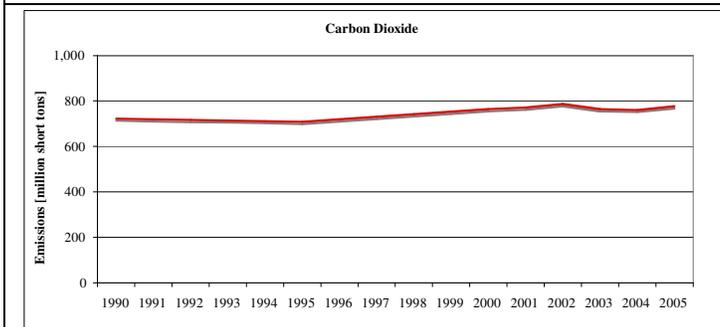
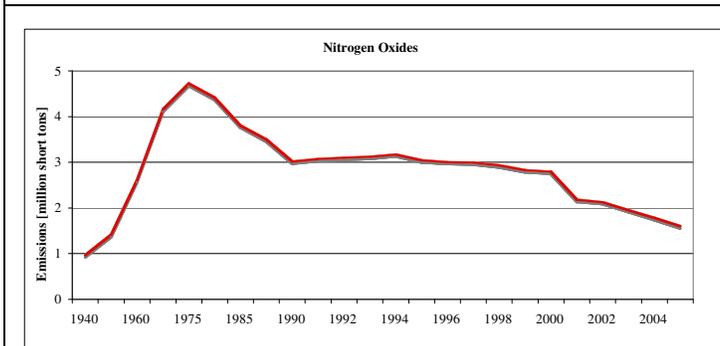
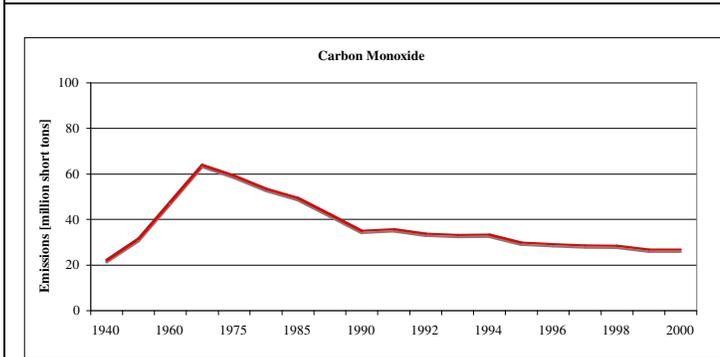
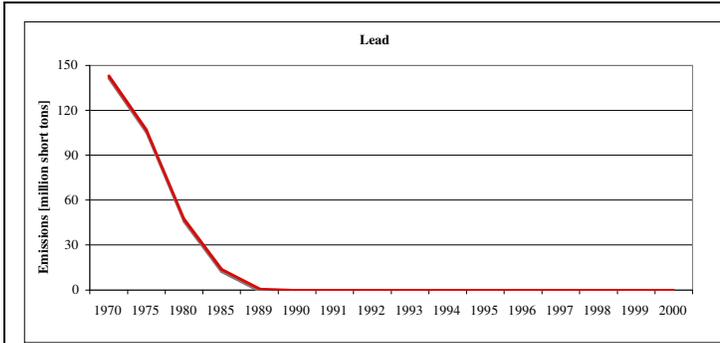
V. THE TIME TESTED HISTORY OF THE NATION'S CLEAN AIR LAWS SHOWS THAT EPA CAN DRAMATICALLY AND COST-EFFECTIVELY REDUCE EMISSIONS FROM MOTOR VEHICLES TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT.

The EPA has a long history of successfully securing protective, cost-effective emission reductions from the nation's passenger vehicles, often confronted with claims from the regulated community that the mandated reductions were impracticable. As documented in the table below, EPA achieved substantial nationwide reductions in lead, carbon monoxide, and nitrogen oxides while vehicle miles traveled has risen substantially.

Some will invariably make similar claims that reductions in heat-trapping greenhouse gas emissions are beyond the nation's reach. But the time tested history of Clean Air Act regulation and American innovation suggests that these claims are likewise misplaced.

History Shows the U.S. Can Rev Up Cleaner Cars to Cut Global Warming Pollution

- ❖ While vehicle miles traveled for passenger cars rose nationally by 20% from 1990 to 2004, some major air pollutants have been reduced substantially.
- ❖ By contrast, carbon dioxide has risen in the absence of greenhouse gas emission standards.



The United States has a long track record of reducing air-based threats to human health and the environment:

- ✓ Lead emissions from autos declined 95%, reducing exposure to a potent neurotoxin.
- ✓ Carbon monoxide emissions, a key ingredient in urban smog, have declined considerably since EPA's emission standards spurred widespread use of catalytic converters in 1975.
- ✓ Nitrogen oxides have declined as EPA strengthened emission standards to cut smog- and particulate-forming pollution.

In the past, industry vigorously opposed new clean air standards, claiming the standards were infeasible and economically unworkable. Once adopted, industry quickly developed the technology necessary to protect human health and the environment.

The U.S. can again deploy innovative solutions to meet the first nationwide greenhouse gas emission standards, measures that will reduce dangerous global warming pollution and begin breaking our addiction to foreign oil.

Data Sources: U.S. EPA, U.S. DOT, U.S. Global Change Research Program.

Thank you for considering these comments. Please contact us if you have any questions or concerns.

Respectfully submitted

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