BEFORE THE
CLEAN AIR SUBCOMMITTEE OF
THE ENVIRONMENT AND PUBLIC WORKS COMMITTEE
UNITED STATES SENATE

BLACK CARBON – A GLOBAL HEALTH PROBLEM WITH LOW-COST SOLUTIONS

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Summary of Testimony

Mr. Chairman, ranking member Sessions, members of the Clean Air Subcommittee of the Senate Environment and Public Works Committee, good morning. My name is Conrad Schneider, Advocacy Director of the Clean Air Task Force. I appreciate the opportunity to speak to you today. Based in Boston, the Clean Air Task Force is a national non-profit, environmental advocacy organization whose mission includes reducing the adverse health and environmental impacts of diesel engines. Our staff and consultants include scientists, economists, MBA's, engineers, and attorneys dedicated to reducing atmospheric pollution through research, advocacy, and private sector collaboration.

Today I would like to talk about the public health and environmental threats posed by Black Carbon emissions and two cost-effective ways the federal government can reduce the threats posed by black carbon in diesel exhaust: (1) fund the Diesel Emission Reduction Act (DERA); and (2) enact Senator Carper's Clean Construction Act as part of the next Transportation reauthorization bill. DERA is a highly successful program and enjoys broad bi-partisan support. Clean Construction, which has been endorsed in principle by the Clean Air Task Force and Associated General Contractors, provides a unique opportunity to integrate and streamline clean air measures into the project delivery process while providing support for contractors to clean up dirty equipment and protect public health.

The Threats Posed By Diesel Pollution

Fine particle pollution produced by diesel engines, the majority of which is made up of black carbon, causes 21,000 premature deaths a year, according to our 2005 report *Diesel and Health in America: The Lingering Threat.* While that number has undoubtedly fallen in the intervening years as a result of fleet turnover to new engines meeting EPA's fine particle standards for truck and heavy equipment engines, the rate of turnover was slowed by the recession. That means we still have the opportunity to avoid thousands of preventable deaths by accelerating the replacement of older diesel engines and retrofitting them with emission controls.

Diesel engines are known for their durability, but older engines emit a toxic mixture of particles, metals, and gases, including over 40 "hazardous air pollutants" as classified by EPA. Diesel exhaust is a toxic mixture of tiny black carbon soot particles and gases from the burning of diesel fuel and lubricating oil. These microscopic carbon particles absorb metals and toxic gases in the exhaust and deliver them to your lungs. At highest risk are commuters and people living or working in proximity to truck traffic, construction and other heavy equipment.

Nationally, diesel exhaust poses a cancer risk that is 3 times higher than the risk from all other air toxics tracked by EPA *combined*. Premature death, lung cancer, heart attack, stroke, diabetes, respiratory distress and lost days from school and work have all been tied to diesel pollution, and reducing this risk is a win for everyone. Estimates show that for every dollar spent on reducing black carbon from diesel engines, $13 would be avoided in health damages.

Moreover, black carbon is a potent global warming agent. Black carbon warms the atmosphere by absorbing sunlight and radiating heat into the air (like a blacktop road). Black carbon can darken snow and ice directly accelerating melting. Black carbon is one of the largest contributing pollutants to global warming. As a warming pollutant, black carbon is about 2000 times more potent than the equivalent amount of CO2 over a 20-year period. The United States has the highest per-capita emissions in the world for black carbon. 57% of U.S black carbon comes from diesels; 41% from on-road diesels and another 16% from off-road diesels.

In January 2013, a team of 31 world-renown experts released *Bounding the role of black carbon in the climate system: A scientific assessment*. This comprehensive assessment confirmed the importance of combating global warming by reducing black carbon from targeted pollution sources and concluded that black carbon is the second-most-damaging greenhouse agent after carbon dioxide finding that it is twice as bad for the climate as previously believed.

The study found the measures with highest climate payback to be those that reduced emissions from uncontrolled diesel engines. This is due to the relatively high concentration of black carbon to other pollutants in diesel exhaust. In diesel engines, without a diesel particulate filter (DPF), black carbon accounts for about 50 to 80 percent of diesel particles emitted. Diesel engine emissions, especially emissions from engines without DPFs, have been specifically identified in other studies as well as a significant driver of short-term climate change. Retrofitting diesel engines with filters and accelerating the turnover of the diesel fleet to new engines equipped with filters offers one of the few actions that will have immediate climate benefits, complementing long-term efforts to reduce CO_2 emissions.

The Solution to Diesel Black Carbon Pollution: The Diesel Particulate Filter

Diesel particulate filters (DPFs) are the only emissions control technology that can virtually eliminate black carbon particles with a 90+ percent effectiveness. Installing a diesel particulate filter on a Class 8 truck (e.g. tractor-trailer truck) provides the equivalent climate benefits to eliminating the carbon dioxide emissions of 6 passenger cars.

The Diesel Emissions Reduction Act

While the U.S. EPA has mandated tighter emissions rules on new diesel engines, emissions from most of the current fleet of 11 million heavy-duty diesel engines remain uncontrolled. CATF's diesel advocacy focuses on cleaning up this existing fleet of diesel engines, which are expected to remain in operation for decades to come. Unfortunately, the rate of turnover of the fleet to new, cleaner engines slowed during the recession as sales of new diesels plummeted. As a result, older, dirtier diesels likely will be with us for even longer than expected. More years and more miles by older, dirtier trucks will mean more pollution, so we need to deal with pollution from the existing fleet.

In 2005, Congress and the Administration sought to provide states and localities with new tools for meeting National Ambient Air Quality Standards (NAAQS) and reducing human exposure to harmful diesel emissions. Passed with overwhelming support from government, industry and environmental organizations as part of the Energy Policy Act of 2005, the Diesel Emissions Reduction Act (DERA) established a federally sponsored voluntary retrofit initiative to reduce emissions generated by America's aging diesel fleet.

The program was originally authorized for $200 million/year for 5 years or $1 billion. Since that time, over $500 million has been appropriated to the Diesel Emissions Reduction Program (DERP), $300 million through the American Recovery and Reinvestment Act. Throughout the program's history, DERA has enjoyed strong bipartisan support most recently demonstrated in December 2010 when Congress took the extraordinary step of reauthorizing DERA during the "lame duck" session. The reauthorization bill authorized funding at the level of $100 million and the program was funded in FY09 and FY10 at $60 million and $50 million in FY11. Unfortunately, funding in FY12 and 13 declined to $30 million and $20 million, respectively, as a sign of the current budgetary situation. The current House and Senate Interior appropriations bills include even less. We are missing an enormous opportunity for improving public health and the environment by failing to fully fund DERA.

Since its inception, EPA estimates that DERA has cleaned up more than 50,000 diesel vehicles, resulted in the reduction of thousands of tons of fine particles and black carbon, and created over 10,000 jobs.

DERA is backed by a uniquely broad coalition of environmental, science-based, public health, industry, labor and state and local government groups. States and localities and environmental, health, user and industry groups all support funding for diesel retrofits and clean air agencies because it is sound environmental, health and budgetary policy. It is our hope that Congress will continue to provide leadership on this issue and we urge you to support greater funding for DERA this year. However, CATF believes that this funding should not come at the expense of other priorities within EPA's budget, which is already strained to the limit.

Clean Construction in the Transportation Bill

One sector that has been underserved by DERA and other existing programs is Construction. Construction contractors are not always well-positioned to take advantage of these programs, which have required a competitive grant application process. There is a better way: Clean Construction as part of project delivery in the Transportation Bill.

Modern pollution control equipment is being used across the country in building clean transportation projects to ensure that no harm is done to the air quality in communities during infrastructure projects. Originating with the "Big Dig" and the Lower Manhattan Reconstruction after 9/11, today Clean Construction contract specifications have been adopted by New York City and New York State, Illinois and Rhode Island, and most recently by the City of Chicago and by Governor Christie in New Jersey.

Taking the lead from these states and working with the contractors and environmental community, Senator Carper crafted the Clean Construction Act of 2011, introduced in the 112th Congress. Clean Construction provisions were included in the Senate version of last year's MAP-21 Transportation Bill reauthorization, but unfortunately did not survive the Committee of Conference and were not included in the final version of MAP-21 as enacted.

That is regrettable. This type of program if enacted as part of the reauthorization when MAP-21 expires next year, would reduce the amount of harmful black carbon emissions emitted by older diesel on- and off-road construction equipment working on federally-funded transportation infrastructure projects located in areas with poor air quality. The Carper approach would accomplish this by ensuring that diesel construction equipment employs modern engine and pollution reduction technology through a requirement and funding.

Specifically, it would provide funding to retrofit, repower and upgrade equipment to provide the maximum achievable reduction of diesel particulate emissions as an eligible project expense. The bill would achieve this through a funded requirement for the installation of emission control technology in PM2.5 designated non-attainment and maintenance areas an eligible project expense through a change order, a process that both State DOT's and contractors are familiar with and utilize. The goal is to streamline a process that integrates clean air benefits into project delivery.

To maintain strict cost controls, the bill required that no more than one percent of a transportation project's cost must be used by States to upgrade dirty equipment. In MAP-21, the program was expected to allocate approximately $200 million per year for clean equipment. CATF estimates that the bill will

eliminate 9,000 tons of soot emissions and avoid nearly 1,000 premature deaths and other adverse health effects.

As a policy roadmap, the Clean Air Task Force (CATF) and the Associated General Contractors (AGC) distilled a set of Clean Construction Principles based on our experiences with state efforts that are embodied in the Clean Construction Act of 2011. Both our organizations endorsed the bill when it was introduced.

Thank you for the opportunity to testify in support of two important federal policies that can help reduce the threats posed by black carbon pollution. I look forward to working with the subcommittee in securing funding for DERA and including Clean Construction in our nation's next Transportation Reauthorization Bill.

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Mr. Chairman, ranking member Sessions, members of the Clean Air Subcommittee of the Senate Environment and Public Works Committee, good morning. My name is Conrad Schneider, Advocacy Director of the Clean Air Task Force. I appreciate the opportunity to speak to you today. Based in Boston, the Clean Air Task Force is a national non-profit, environmental advocacy organization whose mission includes reducing the adverse health and environmental impacts of diesel engines. Our staff and consultants include scientists, economists, MBA's, engineers, and attorneys dedicated to reducing atmospheric pollution through research, advocacy, and private sector collaboration.

Today I would like to talk about the public health and environmental threats posed by Black Carbon emissions and two cost-effective ways the federal government can reduce the threats posed by black carbon in diesel exhaust: (1) fund the Diesel Emission Reduction Act (DERA); and (2) enact Senator Carper's Clean Construction Act as part of the next Transportation reauthorization bill. DERA is a successful program and enjoys broad bi-partisan support. Clean Construction, which has been endorsed in principle by the Clean Air Task Force and Associated General Contractors, provides a unique opportunity to integrate and streamline clean air measures into the project delivery process while providing support for contractors to clean up dirty equipment and protect public health. We believe that devoting up to one percent of the cost of transportation projects to clean air is not too much to help protect the health of our citizens.

1. The Risk Posed by Diesel Exhaust

Black carbon soot produced by diesel engines causes 21,000 deaths a year, according to our 2005 report *Diesel and Health in America: The Lingering Threat.* While that number has undoubtedly fallen in the intervening years as a result of fleet turnover to new engines meeting EPA's fine particle standards for new trucks and heavy equipment engines, the rate of turnover was slowed by the recession. We still have the opportunity to avoid thousands of preventable deaths by accelerating the replacement of older diesel engines and retrofitting them with emission controls.

Diesel engines are known for their durability, but older engines emit a toxic mixture of particles, metals, and gases, including over 40 "hazardous air pollutants" as classified by EPA. Diesel exhaust is a toxic mixture of tiny carbon soot particles and gases from the burning of diesel fuel and lubricating oil. These microscopic carbon soot particles absorb metals and toxic gases in the exhaust and deliver them to your lungs. At highest risk are commuters and people living or working in proximity to truck traffic, construction and other heavy equipment.

Nationally, diesel exhaust poses a cancer risk that is 3 times higher than the risk from all other air toxics tracked by EPA *combined*. Premature death, lung cancer, heart attack, stroke, diabetes, respiratory distress and lost days from school and

work have all been tied to diesel pollution, and reducing this risk is a win for everyone. Estimates show that for every dollar spent on reducing particulate matter pollution from diesel engines, $13 would be avoided in health damages. Moreover, as a global warming pollutant, black carbon in diesel pollution is about 2000 times more potent than carbon dioxide (CO2). Diesels account for over half of the US black carbon emissions. Retrofitting diesel engines with filters and accelerating the turnover of the fleet to new engines equipped with filters offers one of the few actions that will have immediate climate benefits, complementing long-term efforts to reduce CO_2 emissions.

What is Diesel Exhaust?

Diesel exhaust is a toxic mixture of tiny fine and ultrafine carbon soot particles and gases from the burning of diesel fuel and lubricating oil. These microscopic carbon soot particles absorb metals and toxic gases in the exhaust and deliver them to your lungs. At highest risk are commuters and people living or working in proximity to truck traffic, construction and other heavy equipment.

Diesel Pollution Kills

Using EPA's approved methodology, my organization has estimated that diesel particulate matter soot kills an estimated 21,000 Americans every year.[1] Medical researchers are just beginning to understand how combustion particles can cause fatal diseases such as cancer, stroke, and heart attacks. When inhaled, these tiny, poison-laden particles may be capable of directly triggering a response from the cardiovascular system or crossing the blood-barrier from lungs into the bloodstream, delivering them to internal organs.

- Exposure to particles is a well-known cause of premature death as documented in the two largest long-term air pollution studies ever conducted, the Harvard Six Cities Study and the 150-city American Cancer Society study.[2]
- The 90-city National Morbidity and Mortality Air Pollution Study associated daily exposures of particles with premature death.[3]

Heart Disease

The largest fraction of particulate matter-related premature deaths in the U.S. are believed to be from heart disease. Doctors have long known the relationship of inflammation and heart disease and particles may have a fatal inflammatory effect on the heart. Other factors include atherosclerosis (hardening of the arteries) and cardiac arrhythmias that may be precursors to sudden death or stroke. Research also suggests that particles have the ability to directly alter heart rate function and cause myocardio infarction or "MI"-- a potentially fatal blockage of blood supply to the heart.

- A 2007 Harvard study of 54,000 workers in the trucking industry found a higher risk in heart disease in the trucking industry compared to the general U.S. population: a 49 % higher risk in drivers, a 32% higher risk in dock workers, and a 34% higher risk in shop workers.[4]
- A 2004 study of highway patrolmen exposed over a shift, particulate matter was linked to irregular heartbeats and increases in blood inflammatory markers.[5]
- A 2004 study found that heavy equipment operators exposed to diesel exhaust have a 47 percent increased risk of death due to ischemic heart disease (congestive heart failure/heart attacks).[6]
- Researchers documented a 24% increase in risk of women having a cardiovascular event and an overall 76% increase in risk of death from cardiovascular disease for each 10 ug/m3 of PM2.5 in the ambient air. Within-city risks were higher than the risk between cities suggesting the importance of local sources of particles, such as diesel vehicles.[7]
- Ultrafine particles in fresh diesel exhaust (tiny particles under 0.1 micros in size), can lead to systemic acute inflammation and exacerbation of cardiovascular disease and atherosclerosis according to recent studies.[8,9]
- A 2007 study of 700 heart attack survivors shows that they were most likely to have been in heavy traffic the hour before they suffered the heart attack, whether in cars, streetcars or buses. [10] Studies find that traffic-related health risks are better correlated to truck rather than car volume and therefore may be more strongly related to diesel engine exhaust.
- A link between exposure to particles and vascular inflammation/atherosclerosis is suggested by animal studies and could explain how particles are linked to heart attacks.[11]

Cancer

Researchers repeatedly find associations between exposure to diesel exhaust and cancers. Approximately three-dozen occupational studies conducted over the past three decades link diesel exhaust exposure to lung cancer, posing an increased cancer mortality risk of 10-40%. In the laboratory, scientists have observed DNA damage and cell mutations that could be an indicator of the ability of particles to trigger cancer.

Based on EPA's 2005 National Air Toxic Assessment released in 2011, CATF estimates that the lung cancer risk from particles is approximately three times the combined risk of the 80 air toxics modeled by EPA.

- Over 30 epidemiological studies link diesel particulate matter to lung cancers.[12,13 ,14, 15,16,17,18]
- Risk of lung cancer death was linked to fine particles in a study that tracked a million people over a decade and a half in 150 U.S. metropolitan areas[19]
- Diesel soot is identified as a carcinogen U.S. EPA, the State of California and the International Agency for Research on Cancer (IARC).[20, 21, 22] Other compounds in diesel exhaust, other than soot are also known carcinogens

such as polycyclic aromatic hydrocarbons, and formaldehyde.

- Operators of heavy machines in ground and road construction exposed to diesel exhaust are at risk of death from cancers of the digestive system, intestines, lung, liver, bladder and stomach. [23]
- CATF estimates that, based on EPA's 2005 NATA data released in 2011, the lung cancer risk from exposure to diesel particles is 159 times greater than the EPA's "acceptable" risk of 1 cancer in a million.
- In a study of 55,000 railroad workers over 38 years, Harvard researchers found an overall 40% increased risk of lung cancer for workers in 30 job categories.[24,25]
- The NIOSH Teamsters (truckers) study concluded that the lifetime excess risk for truckers was 10 times higher than the 1/1000 excess risk allowed by OSHA in occupational settings.[26]
- A 2007 Harvard study of 54,000 truckers from 1985-2000 found a 10 % higher risk for lung cancer in drivers and dock workers compared to the general U.S. population.
- Recent studies link particulate matter exposure to DNA damage. [27]

Respiratory Health Impacts

Researchers have long associated diesel exhaust, particulate matter and traffic with reduced lung function and lung growth, asthma attacks, asthma sensitization, and in one study, emphysema.

- Multiple studies link asthma and allergic sensitization and particles.[28, 29,30,31,32,33] An East Bronx NY study suggests children exposed to higher levels of heavy-duty diesel exhaust have higher incidences of asthma.[34]
- A 2009 field study found that short-term exposure of asthmatics to urban roadside diesel traffic led to consistent and significant reductions in lung function, airway acidification and inflammation. A study from the Netherlands links asthma diagnosed before 1 year of age to traffic.[35] In a California study, asthma and bronchitis was found to be 7 percent higher among children attending school in high-traffic areas, compared with schools along quieter streets.[36]
- Heavy equipment operators exposed to diesel exhaust have a significantly elevated risk of death from emphysema.[37]
- Deficits in lung function growth were found in southern California 18 year olds exposed to PM2.5 and black carbon. [38] The number of children with lung function deficits was 5 times greater in communities with the highest levels of PM2.5 compared to communities with the lowest levels of PM2.5.

Exposure to diesel exhaust, and proximity to traffic poses a risk of other serious disease including stroke, diabetes, slowed fetal growth, infant mortality and possibly autism.

- Diabetes: A 2010 study links particulate matter air pollution to diabetes in the U.S. (http://care.diabetesjournals.org/content/33/10/2196). The study found

that counties with higher levels of particulate matter had increased prevalence of diabetes, even where counties were in attainment with the EPA's National Ambient Air Quality Standard for fine particles ($PM_{2.5}$). Elevated circulatory and cardiovascular disease risk was found in another study based on 24-hour exposures to particles.[39]

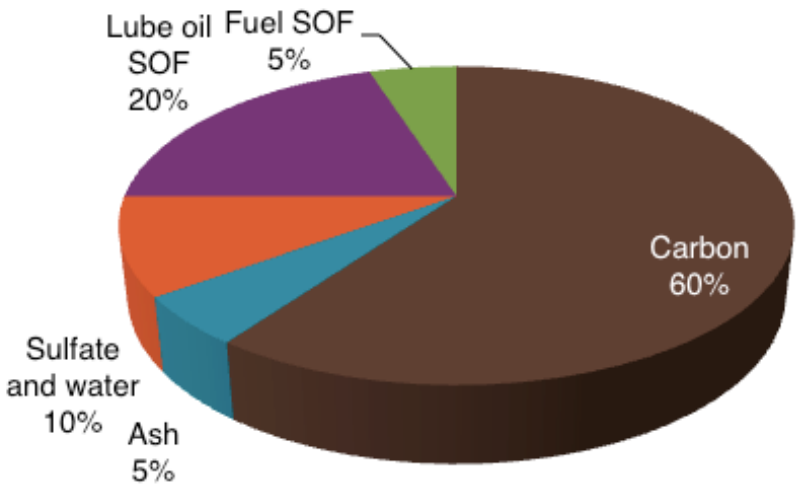
- Nervous system impairment. A study of railroad workers exposed to diesel exhaust concluded: "crews may be unable to operate trains safely."[40]
- Stroke. Diesel exhaust particles may raise the risk of blood clots and stroke.[41] Risk more than doubled within 2 hours of exposure to high levels of fine particles in a Japanese study.[42] Formation of blood clots (thromboses), have been documented in laboratory animals exposed to diesel particles.[43]
- Autism A 2010 study correlates prenatal freeway traffic proximity in California and incidence of autism. The risk of autism is nearly double (86% increase) inside 1,000 feet. Diesel exhaust could be a risk factor.[44]
- Slowed fetal growth as a result of maternal exposure during pregnancy[45] and infant mortality.[46, 47]

Climate Change

Black carbon warms the atmosphere by absorbing sunlight and radiating heat into the air (like a blacktop road). Black carbon can darken snow and ice, and directly accelerate melting.[48] Black carbon is one of the largest contributing pollutants to global warming.[49] [50] As a warming pollutant, black carbon is about 2000 times more potent than the equivalent amount of CO2 over a 20-year period.[51] The United States has the highest per-capita emissions in the world for black carbon.[52] 57% of U.S black carbon comes from diesels; 41% from on-road diesels and another 16% from off-road diesels.[53]

In January 2013, a team of 31 world-wide experts released *Bounding the role of black carbon in the climate system: A scientific assessment* (Bond, et. al. 2013).[54] This comprehensive assessment confirmed the importance of combating global warming by reducing black carbon from targeted pollution sources and concluded that black carbon is the second-most-damaging greenhouse agent after carbon dioxide, by finding that it is twice as bad for the climate as previously believed. It derived a best estimate of total radiative forcing in the industrial period – accounting for all forcing pathways including interaction with clouds and on the cryosphere – of +1.1 Wm^{-2} with a 90 percent uncertainty. This is 0.88 °C or two-thirds of the warming to date from CO_2.

The study found the measures with highest climate payback to be those that reduced emissions from uncontrolled diesel engines. This is due to the relatively high concentration of black carbon to other pollutants from uncontrolled diesel. In diesel engines, without a diesel particulate filter (DPF), black carbon accounts for about 50 to 80 percent of diesel particles emitted.



Composition of PM mass emissions from a conventional heavy-duty diesel engine without a particle filter. SOF stands for soluble organic fraction (CARB, 2011)[55]

Diesel engine emissions, especially emissions from engines without DPFs, have been specifically identified in other studies as well as a significant driver of short-term climate change[56] (Jacobson, 2010, Tanaka et al, 2012, US EPA, 2012).

2. The Solution to Diesel Black Carbon Pollution: The Diesel Particulate Filter

Diesel particulate filters (DPFs) are the only retrofit technology that can virtually eliminate black carbon particles (90+ percent effectiveness).[57] Retrofitting diesel engines with filters is one of the few actions that will have immediate climate benefits, complementing long-term efforts to reduce CO_2 emissions.[58] Despite clean diesel regulations for new engines there are 11 million old diesels in the U.S. that may be in use for decades and should be retrofit with the same filter technology required under U.S. EPA rules for new on-road and off-road diesels.[59] Installing a diesel particulate filter on a Class 8 truck (e.g. tractor-trailer truck) provides the same climate benefits as eliminating the carbon dioxide emissions of 6 passenger cars.[60]

A. Diesel Emissions Reduction Act (DERA)

CATF's diesel advocacy focuses on cleaning up this existing fleet of diesel engines, which are expected to remain in operation for decades to come. The rate of turnover of the fleet to new, cleaner engines has been slowed during the recession as sales of new diesels plummeted. As a result, older, dirtier diesels will be with us for even longer than expected. More years and more miles by

older, dirtier trucks will mean more pollution, so we need tools to deal with pollution from the existing fleet.

In 2005, Congress and the Administration sought to provide states and localities with new tools for meeting National Ambient Air Quality Standards (NAAQS) and reducing human exposure to harmful diesel emissions. Passed with overwhelming support from government, industry and environmental organizations as part of the Energy Policy Act of 2005, the Diesel Emissions Reduction Act (DERA) established a federally sponsored voluntary retrofit initiative to reduce emissions generated by America's aging diesel fleet.

The program was originally authorized for $200 million/year for 5 years or $1 billion. Since that time, over $500 million has been appropriated to the Diesel Emissions Reduction Program (DERP), $300 million through the American Recovery and Reinvestment Act. Throughout the program's history, DERA has enjoyed strong bipartisan support most recently demonstrated in December 2010 when Congress took the extraordinary step of reauthorizing DERA during the "lame duck" session. The reauthorization bill authorized funding at the level of $100 million and the program was funded in FY09 and FY10 at $60 million and $50 million in FY11. Unfortunately, funding in FY12 and 13 declined to $30 million and $20 million, respectively, as a sign of the current budgetary situation. The current House and Senate Interior appropriations bills include even less. We are missing an enormous opportunity for improving public health and the environment by failing to fully fund DERA.

DERA is now authorized from FY2012 through FY2016 at $100M per year. It authorizes the use of grant, rebates and loans to achieve significant reductions in diesel emissions and improves upon the original authorization by focusing the program on the most beneficial solutions and streamlining implementation. The program now also makes it easier for EPA to leverage DERA funds through loans and by soliciting larger project proposals. DERA provides that 70 percent of funds are distributed by EPA (with 5% for emerging technologies); allocates 30 percent of funds to states and but will now require that only EPA or CARB verified and certified technologies be funded. DERA includes an incentive for states to partially match federal funding to increase overall size of funds and now requires that EPA give the highest priority to projects that meet the Congressional established criteria for ranking and evaluating projects, which emphasize cost-effectiveness and health benefits.

Since its enactment, the Diesel Emissions Reduction Act (DERA) has been successful in addressing the problem of diesel emissions from an economic, environmental and public health perspective. The DERA program has been responsible for the creation and retention of local U.S. jobs that involve manufacturing, installation and servicing of emissions related technologies. In its statutorily mandated report to Congress on the performance of the FY2008 program, EPA estimated that for every dollar spent on the DERA program, an

average of more than $13 in health benefits are generated. The program is oversubscribed; EPA has received as much as $5 in applications for every $1 appropriated for awards. EPA found that for that one fiscal year DERA had funded 119 projects affecting more than 14,000 diesel-powered vehicles/equipment across the country. It created new state clean diesel grant programs in all 50 states and attracted $61.4 million in matching funds. That first-year investment resulted in the elimination of 46,000 tons of NOx and 2,200 tons of PM emissions. EPA estimated that this resulted in $580 million to $1.4 billion in public health benefits. In addition, fuel saving measures resulted in 464,400 tons of CO2 emission reductions, which meant 3.2 million gallons of fuel saved per year for a cost savings of more than $8 million per year. The federal investment in DERA that year generated more than $61M in matching or leveraged funds. Since its inception, EPA estimates that DERA has cleaned up more than 50,000 diesel vehicles, resulted in the reduction of thousands of tons of fine particles and black carbon, and created over 10,000 jobs.

As part of the American Recovery and Reinvestment Act (ARRA), DERA was funded at the $300 million level. EPA received more than 600 applications amounting to $2 billion in project proposal requests were received in 2008 and more than $2 billion in matching funds offered. Nearly 400 applications were received in 2009 for the $84 million available in FY2009 and FY2010 (not including $36 million for state programs). Approximately $570 million in funding was requested and more than $1 billion in matching funds offered. EPA estimates that more than $1 billion in qualified, unfunded project proposals were received.

DERA is backed by a uniquely broad coalition of environmental, science-based, public health, industry, labor and state and local government groups. States and localities and environmental, health, user and industry groups all support funding for diesel retrofits and clean air agencies because it is sound environmental, health and budgetary policy. It is our hope that Congress will continue to provide leadership on this issue and we urge you to support greater funding for DERA this year. However, CATF believes that this funding should not come at the expense of other priorities within EPA's budget, which is already strained to the limit.

B. Clean Construction in the Transportation Bill

One sector that has been underserved by DERA and other existing programs (like the Congestion Mitigation Air Quality program under the current Transportation Bill) is Construction. Construction contractors are not always well positioned to take advantage of these programs, which have required a competitive grant application process. There is a better way: Clean Construction.

What is Clean Construction?

Taking the lead from several states and municipalities around the country that have adopted Clean Construction specifications and working with the contractors and the environmental community, in the last Congress, Senator Carper along with six original co-sponsors introduced the Clean Construction Act, designed to reduce the amount of harmful particulate matter emissions emitted by older diesel on- and off-road construction vehicles working on federally-funded transportation infrastructure projects located in areas with poor air quality. Under the bill's approach, this would be accomplished by ensuring that diesel construction equipment employs modern engine and pollution reduction technology through a requirement and funding. As a policy roadmap, the Clean Air Task Force (CATF) and the Associated General Contractors (AGC) negotiated a set of Clean Construction Principles that are embodied in the Clean Construction Act.

The bill spelled out a process for cleaning up construction equipment and vehicles used on a federally funded transportation infrastructure projects located in PM2.5 designated non-attainment and maintenance areas. These engines can be retrofitted cost effectively with best available emission control technologies that can reduce harmful emissions of PM2.5 by up to 85 percent and black carbon by more than 90 percent.

The funding to purchase and install the emission control technology would come directly from the project costs as an eligible project expense through the change order process. The cost of the diesel emissions control technologies is capped at no more than one percent of project cost.

Why We Need Clean Construction

The Clean Air Act Advisory Committee (CAAAC) estimates that over 37 percent of land-based particulate matter comes from construction equipment.[61] Nationwide, there are over 2 million pieces of construction equipment and most lack modern particulate pollution controls. Pollution from diesel equipment has the potential to affect citizens in all parts of the country. Over 88 million Americans live in counties that violate federal health standards for particulate pollution.

The equipment that would utilize emission control technology are strong, well-built machines that last upwards of thirty years. While recognizing the important function and the positive work these vehicles provide to owners and communities alike, technology is available to make these vehicles cleaner and the communities in which they operate healthier.

Technology is Available

Fortunately, affordable emission control technology is available to address emissions from construction equipment. This technology is feasible to install and installation is accessible throughout the country. The U.S. EPA estimates that retrofitting 10,000 engines would eliminate roughly 15,000 tons of harmful pollution each year. Achieving emissions reductions from in-use diesels is needed because older engines pollute at much higher rates than newer ones and remain on the road for decades. The U.S. EPA believes that in-use diesel emission control programs can help states meet their immediate nonattainment goals and other Clean Air Act requirements such as conformity, as well as address ongoing public complaints and concerns about dirty diesels.

There are currently several available emission control technologies that address the emission challenges facing on- and off- road construction equipment. These technologies include: retrofitting with Diesel Particulate Filters (DPF), repowering and/or rebuilding older engines, and the use of idle reduction technologies, all of which must be verified by EPA or the California Air Resources Board to ensure their effectiveness. Especially in combination, these technologies can reduce fine particulate matter emissions from construction equipment by 85 percent and black carbon by more than 90 percent.

The tons of PM2.5 reduced by a Clean Construction approach will be available to states to help write the State Implementation Plans (SIPs) to meet National Ambient Air Quality Standards (NAAQS), as credits for transportation conformity, and/or as credits for project conformity at the discretion of the states.

State and Local Clean Construction Initiatives

Modern pollution control equipment is being used across the country to build clean transportation projects to ensure that no harm is done to the air quality in communities during infrastructure projects. Clean Construction was employed on the Big Dig project in Boston as far back as the 1990's, but most notably was used in the reconstruction of lower Manhattan after the 9/11 attacks.

After the success of the lower Manhattan project, the rest of the boroughs of New York wanted Clean Construction and the New York City Council passed Local Law 77, which requires it on all projects in the City. Soon thereafter, the New York Legislature passed the New York Diesel Emissions Reduction Act (NY DERA), which required clean diesel on all state owned fleets and on projects performed by private contractors working for the state.

Meanwhile, in Illinois, Cook County, the county comprising the City of Chicago, adopted an ordinance requiring Clean Construction. The Governor of Illinois followed suit with an Executive Order requiring Clean Construction on all state-

funded projects in nonattainment areas. And, the Chicago City Council unanimously passed a Clean Construction ordinance for the City.
In 2010, Rhode Island, following action by the City of Providence, passed legislation with the support of the contractors requiring Clean Construction. Governor Christie of New Jersey issued an Executive Order requiring Clean Construction.

History of Diesel Retrofits in the Transportation Bill

During the Reauthorization of SAFETEA-LU, a significant effort was made to include Diesel Retrofits as a priority in the Congestion Mitigation Air Quality (CMAQ) program. Securing the CMAQ priority language was successful, but the implementation of this policy was less so.

Without clear guidance, states were reluctant to utilize the diesel retrofit language. Contractors who were in most need of the funding for retrofits found the process of going through CMAQ cumbersome. In short, the CMAQ priority language did not accomplish what it had set out to do: provide a resource for contractors and states to utilize emission control technology in the areas with the most impacted air quality.

While the Clean Construction approach was adopted as part of the Senate's version of last year's MAP-21 Transportation Bill reauthorization, it did not survive the Committee of Conference and was not included in the most recent two-year Transportation Bill (MAP-21) as enacted.

A New Opportunity

We recommend that in reauthorizing MAP-21 next year, Congress adopt the approach embodied in the Clean Construction Act of 2011 and the Senate version of MAP-21. This approach would require that federally funded transportation projects in non-attainment areas phase in the use of clean construction equipment – such as front-end loaders, diggers, and earthmovers. Senator Carper's bill would provide funding to retrofit, repower and upgrade equipment to provide the maximum achievable reduction of diesel particulate emissions as an eligible project expense.

Senator Carper's approach would achieve this through a funded requirement for emission control technology in PM2.5 designated non-attainment and maintenance areas an eligible project expense through a change order, a process that both State DOT's and contractors are familiar with and utilize. The goal is to streamline a process that integrates clean air benefits into project delivery.

Also important with respect to the competitive bid process is that contract awards should be blind to whether a firm already has clean construction equipment in its

fleet. This will ensure that smaller firms that have not invested in retrofits are not shut out of the bidding for projects, thereby making sure that some of the dirtiest equipment in service is eligible for clean up.

To maintain strict cost controls, Senator Carper's bill required that no more than one percent of a transportation project's cost must be used by States to upgrade dirty equipment. We have commissioned case studies on ten projects, five that have been completed utilizing Clean Construction and five that have projected the use of Clean Construction on projects. The results have consistently shown that project equipment can be cleaned up for no more than one to one and one-half percent of project cost. This provision is expected to allocate approximately $200 million per year for clean equipment. CATF estimates that the bill will eliminate 9,000 tons of PM2.5 emissions and avoid nearly 1,000 premature deaths plus many more adverse health effects.

Thank you for the opportunity to testify in support of clean diesel in two important federal policies that can help reduce the threats posed by black carbon pollution. I look forward to working with the subcommittee in securing funding for DERA and including Clean Construction in our nation's next Surface Transportation Reauthorization Bill.

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