



Diesel Particulate Matter: A Toxic Threat



Each year 70,000 Americans and 900 Texans, die prematurely from exposure to diesel particulate matter (DPM).

Source: Clean Air Task Force, CATF

Texas can take two simple measures to reduce diesel pollution and start saving lives:

1. Amend the Texas Emissions Reduction Plan (TERP) to include funding for diesel particulate filters that are proven to work in conjunction with ultra-low sulfur diesel (ULSD) fuel to reduce diesel particulate emissions by up to 90%
2. Take local actions to retrofit school and city bus fleets to provide children as well as all citizens with clean forms of transportation

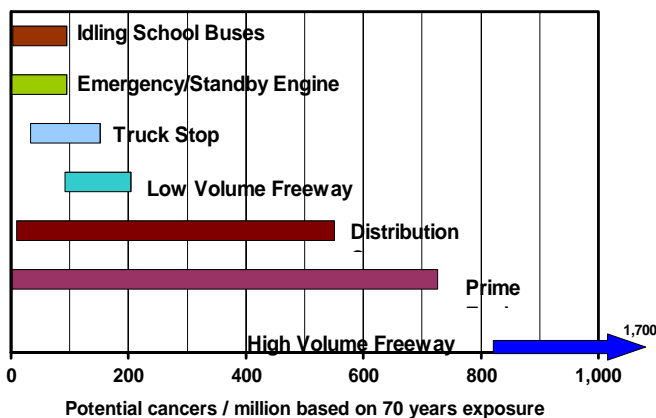
Texas metro areas rank among the highest in the country for adverse health effects from DPM. People living in Beaumont, TX suffer the greatest health risk from diesel pollution for any metro area in the U.S. Their average lifetime cancer risk from diesel soot exposure is 1 in 1,157. This is 865 times the U.S. Environmental Protection Agency's (EPA) acceptable level of 1 in a million.

Source above & below: CATF

How TX Counties Rank Statewide & Nationally in Health Impacts from Diesel Fine Particles in 1999

| DPM Risk Rank out of 254 TX counties | DPM Risk Rank out of 3,109 U.S. counties | County | Deaths | Non-Fatal Heart Attacks | Asthma Attacks | Chronic Bronchitis | Work Loss Days | Times Above EPA's Acceptable Cancer Level |
|--------------------------------------|--|-----------|--------|-------------------------|----------------|--------------------|----------------|---|
| 1 | 14 | Jefferson | 59 | 58 | 1,029 | 29 | 5,863 | 865 X |
| 2 | 17 | Harris | 295 | 368 | 9,791 | 250 | 57,645 | 742 X |
| 5 | 102 | Dallas | 106 | 130 | 3,263 | 85 | 19,550 | 398 X |
| 12 | 249 | Travis | 22 | 32 | 868 | 23 | 5,620 | 299 X |
| 16 | 431 | Bexar | 50 | 62 | 1,313 | 35 | 7,467 | 257 X |
| 51 | 1,382 | El Paso | 11 | 16 | 374 | 9 | 2,007 | 143 X |

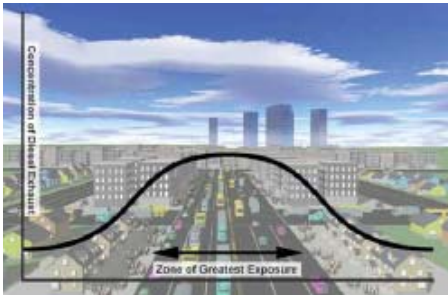
Increased Cancer Risks for Diesel-Related Activities



Most people are unaware of the health dangers associated with riding in a school bus or waiting at a bus stop. The graph on the left shows how the probability of developing lung cancer is greater in urban areas where people are exposed to higher concentrations of diesel exhaust, such as on high volume freeways. Children, the elderly, workers who are occupationally exposed to diesel—such as border patrol officers—and people living next to diesel hot spots are the ones most likely to suffer from irreversible lung damage.

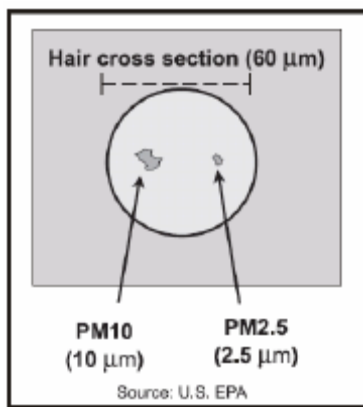
Diesel-Related Deaths: Texas Ranks 5th in the Nation

Source above & below: Clean Air Task Force

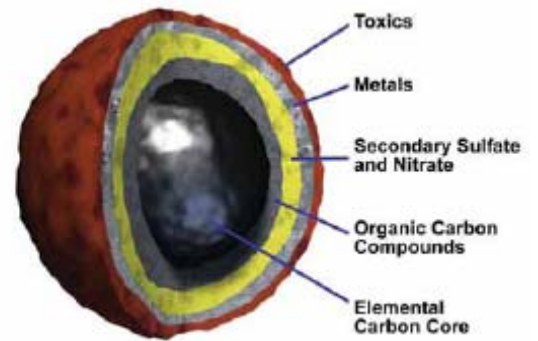


Diesel particulate matter (soot & ash) is the most deadly component of diesel exhaust and is primarily emitted in densely populated areas –contaminating the air where people live, work and attend school. This is a problem because entire populations regularly and unknowingly inhale tiny, toxic particles during everyday activities.

Particle Size and Composition: Nitrates, sulfates, organic chemicals, metals, soil, and dust make up the diverse mixture of small particles and liquid droplets found in particulate matter. DPM is categorized by its size: ultra fine particles <0.1 μm, fine particles <2.5 μm, and coarse particles 2.5 μm -10 μm.



The average human hair is 30 times larger than the largest fine particle, PM 2.5. Fine and ultra-fine particles peak during rush hour. These small particles easily pass through the throat and nose and into the lung tissue, carrying toxic substances with them.



A Diesel Particle, CATF

Diesel particles create obstructions that slow the diffusion of oxygen into the bloodstream

This strain on the lungs and heart damages the respiratory and cardiovascular systems and can be linked to premature death • cancer • asthma • breathing difficulty • Sudden Infant Death Syndrome (SIDS) • chronic obstructive pulmonary disease (COPD) • coughing • pneumonia • chronic bronchitis • stroke

What are the sources of diesel soot in Texas?

Texas Consumes More Diesel Fuel Than Any Other State to Power:

On-Road Diesel Engines

- Light & Heavy Duty Trucks
- City Transit Buses
- Passenger Cars
- School Buses



Off-Road Diesel Engines

- Construction & Farm Equipment
- Prime & Standby Engines
- Marine Vessels
- Trains

For the same load and engine conditions, diesel engines spew out 100 times more sooty particles than gasoline engines. Source: Natural Resources Defense Council



Two Solutions that Work in Conjunction to Reduce DPM: Ultra-Low Sulfur Diesel & Diesel Particulate Filters

What is Ultra-Low Sulfur Diesel (ULSD)?

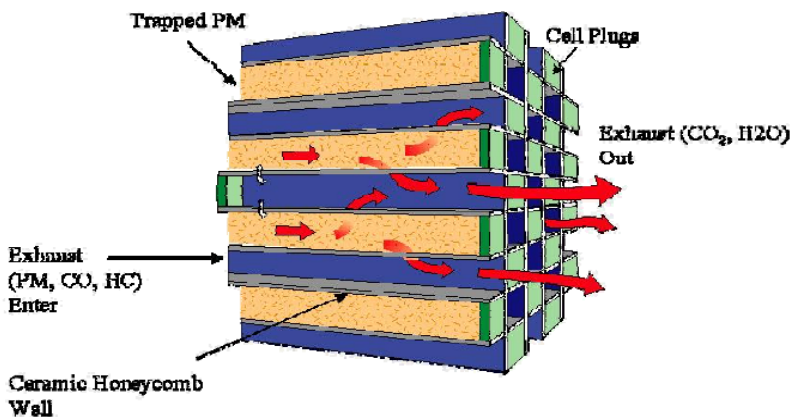
As of October 15, 2006, most diesel fuel sold at retail locations in the U.S. is ultra-low sulfur diesel. The allowable sulfur content for ULSD, 15 ppm, is considerably lower than the previous U.S. on-highway standard for Low Sulfur Diesel (LSD) of 500 ppm. ULSD not only reduces emissions of sulfur compounds that cause acid rain but also allows for the application of newer emission control technologies, such as diesel particulate filters, that would have otherwise been unusable by the higher concentrated sulfur compounds.

What is a Diesel Particulate Filter (DPF)?

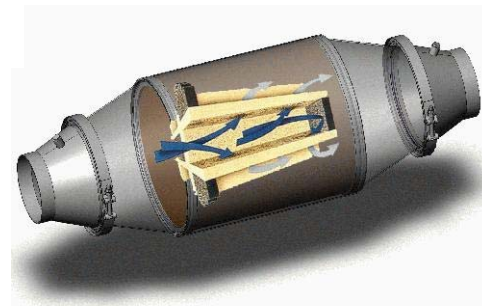
A diesel particulate filter uses physical filtration to remove diesel particulate matter from the exhaust stream before the soot is expelled into the air. The most common DPF is a ceramic honeycomb monolith that has channels blocked at alternate ends. The total efficiency for a DPF is up to 90%.

Diagram of a Diesel Particulate Filter

Source: CARB



1. PM-laden diesel exhaust enters the open channels
2. Blocked ends force exhaust through porous walls
3. DPM gets trapped on walls as gas passes through
4. Overtime, a catalyst on the filter burns away the DPM



Different sizes of the above DPF are used to retrofit off-road and on-road diesel engines. Source: DCL International



The retrofitted tractor on the left, compared to the un-retrofitted tractor on the right, illustrates the successful capture of particulate emissions by the diesel particulate filter.

Source: Clean Air Task Force

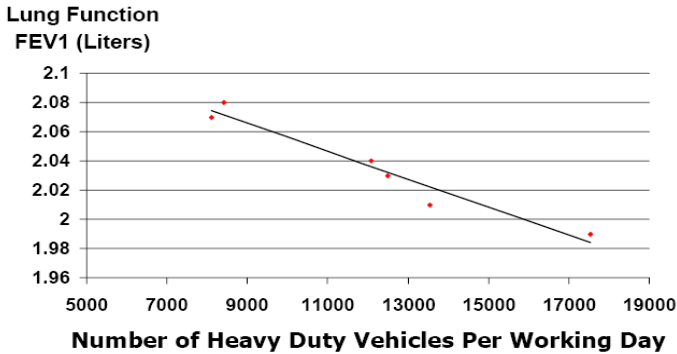


Saving lives – What you can do

Enforcing modern emission control technologies could virtually eliminate the public health risk posed by diesel exhaust.

Left Graph: Association between Lung Function of Children Living <300M of Highway and Intensity of Cargo (CARB)

Right Graph: An Aggressive Program to Reduce Diesel Particulate Emissions could Save 100,000 Lives (CATF)



Source: Brunekreef B, et al, Air Pollution from truck traffic and lung function in children living near motorways

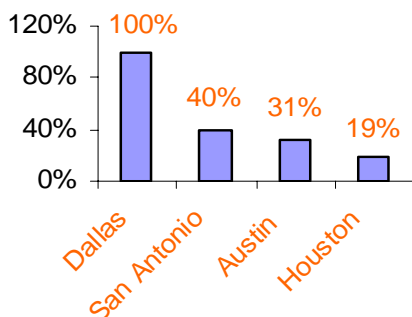


The largest obstacle to employing these technologies is a lack of federal, state, and local funding.

- **Modify the Texas Emissions Reduction Plan (TERP).** Aimed to improve air quality in Texas, TERP provides grants and rebates to purchase or lease cleaner equipment that reduces emissions of nitrogen oxides (NOx) by at least 30%. It's time for Texas to expand TERP funding to mitigate diesel particulate pollution. With new programs continually lowering prices, retrofitting a transit or school bus with a DPF typically costs around \$3,000-\$7,000.
- **Allocate funds for the Clean School Bus Program.** Children who ride diesel school buses are exposed to up to 4 times more toxic diesel exhaust than while traveling in a car, and therefore are more likely to suffer from slowed lung function growth and increased incidences of asthma and bronchitis. Allocating TERP money to the Clean School Bus program can fix this problem.
- **Update Local Bus Fleets.** The American Lung Association recently ranked the nation's 33 largest bus fleets in order of cleanest bus technology, reflecting a compilation of buses that: operate on ULSD fuel in conjunction with particulate traps, use gaseous fuels such as propane or natural gas in spark ignition engines, or are battery or trolley wire powered electric buses.



Dallas Bus Fleets are the Cleanest in TX, 2007



There are 4 Texas cities whose bus fleets are among the nation's 33 largest. In order of cleanest technology: Dallas buses ranked 100%, San Antonio—40%, Austin—31%, & Houston—19%. It's time to ask your local and state officials to work together to clean up bus fleets to reduce DPM throughout Texas.

