Diesel Trucks: Air Pollution and Public Health

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Heavy-duty trucks are the backbone of today's freight transportation system. These vehicles consume more than 3 billion gallons of diesel fuel in California alone and are the largest source of diesel pollution in the state. Diesel trucks are also one of the last remaining sources of diesel emissions that have not been regulated under the Air Resources Board's (ARB) Diesel Risk Reduction Plan.

Described below are the health impacts caused by diesel pollution from trucks, the impact to California's economy, and the magnitude of the pollution emitted by these vehicles. Adopting and implementing a regulation to reduce diesel pollution from trucks is needed to protect public health, meet federal air quality standards, and reduce cancer risk in California.

Health Impacts
Exhaust from diesel trucks contains a toxic mixture of gases and particles that are harmful to our health.

Fine particulate matter (PM) in diesel exhaust can by pass the body's natural defenses penetrating deep into the lungs where it may cause or exacerbate respiratory and cardiovascular illnesses, and even premature death. California has identified diesel PM as a toxic air contaminant and estimates 70% of the cancer risk from the air we breathe is attributable to diesel PM.

Nitrogen oxide (NOx) emissions from diesel engines contribute to smog formation which has been linked to increases in hospital admissions for asthma and is most dangerous to children, the elderly, and those with pre-existing respiratory and cardiovascular disease. NOx emissions also react with other air pollutants to increase the level of particulates in the air.

The ARB estimates that diesel pollution from trucks alone were responsible for 2,300 premature deaths in California in 2005. When combined with estimates for hospitalizations, asthma attacks, missed work and school days from exposure to particulate matter and smog, the total economic cost to Californians in 2005 is estimated at $18 billion.

Tailpipe Emissions
Diesel trucks are the largest emitter of diesel PM in the state due to a combination of lagging emission standards, the long life of the diesel engine, and the high number of miles each truck travels. The newest diesel trucks are much cleaner than their predecessors thanks to recent EPA regulations, but trucks as new as model year 2007 are not equipped with even a basic diesel particulate filter.

The chart represents the average amount of PM and NOx released everyday by different pollution sources and the number of engines responsible for those emissions. Non-diesel

sources, such as refineries, power plants, and gasoline powered passenger cars and trucks also emit PM and NOx and are shown here for comparison. Diesel trucks number about 600,000 but produce more than double the amount of PM and NOx from all of California's 20 million passenger cars and trucks.

Retrofitting these trucks with PM and NOx controls, or upgrading to newer trucks meeting EPA's latest standards, could reduce these emissions more than 85 percent.

Cleaning Up the Trucking Fleet

The ARB has taken significant steps to clean-up diesel pollution from sources such as buses, garbage trucks, harbor craft, and construction equipment over the past eight years, but trucks remain the largest source of unregulated diesel emissions in the state. ARB is proposing to adopt a regulation in October 2008 that will require trucks to clean-up through retrofits or upgrading to newer trucks. Incentive funding is also available from the Proposition 1B funding approved by voters in 2006 to help owners retrofit or replace their trucks. This regulation is critical for public health and improving air quality in California.

SOURCE:
California Air Resources Board, Appendix A: Quantification of the Health Impacts and Economic Valuation of Air Pollution from Ports and Goods Movement in California, Goods Movement Emission Reduction Plan, March 2006 and CARB, Methodology for Estimating Premature Deaths Associated with Long-term Exposures to Fine Airborne Particulate Matter in California, May 22, 2008.

NOTE: Only premature deaths are explicitly noted in the ARB source. The fraction of premature deaths from trucks to total premature deaths was used to estimate the additional health endpoints.

Emissions Chart:
Emissions from ARB 2007 Almanac data for calendar year 2006. On-road vehicle population data from ARB EMFAC 2007 model. Construction equipment population data from ARB NONROAD model.

Other: 70% cancer risk figure from South Coast MATES II study.