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Alert

Alert is a monthly update on transportation and air quality planning activities in the Delaware Valley.

Air Quality and Transportation

Researchers Call for Policy Changes to Promote Heavy-Duty Vehicle Electrification

The argument surrounding the difficulties with electrifying the nation's heavy-duty long-haul fleet has centered around battery technology and the range of these vehicles. Recent research from the U.S. Department of Energy (US DOE) and University of California, Los Angeles, concludes that the lack of appropriate policies around adoption incentives, charging infrastructure, and electricity pricing are the main factors that pose barriers to widespread electrification of commercial trucking fleets.

Currently the majority of long-haul, heavy-duty vehicles are powered by diesel fuel. While these vehicles have a successful track record of reliably delivering the nation's goods, heavy-duty diesel vehicles (HDDV) are a significant contributor to the nation's air pollution problems. Electrification of this fleet will provide gains towards addressing climate change and avoiding premature deaths due to local pollution from transportation, which disproportionately affects communities of color.

"Given the massive economic and environmental benefits, the case for long-haul electric trucking is stronger than ever before," said US DOE Research Scientist Nikit Abhyankar, one of the authors of the study. "Enabling policies such as adoption and charging infrastructure incentives, sales mandates, and cost-reflective electricity pricing are crucial."

The US DOE study analyzes the total cost of ownership of an electric long-haul truck compared to a diesel long-haul truck. Using the current price of a battery pack and assuming a 375-mile range, the researchers found that an electric long-haul truck has a 13 percent per mile lower total cost of ownership, with a net savings of $200,000 over the lifetime of the electric truck. The total cost of ownership analysis takes into account the purchase price and operating costs over the lifetime of the truck.

The researchers also showed that future reductions in battery costs taken together with a more aerodynamic design and monetized benefits of reduced pollution would result in a 50 percent per mile lower total cost of ownership compared to a diesel long-haul truck by 2030. The authors claim that these statistics show that the electrification of long-haul trucks is possible and that policy makers should be taking the next steps to determine what is required to convert more of the nation's trucking fleet to electric trucks.

Shipping industry and equipment manufacturers have already begun introducing electric trucks into their fleets as demand for zero-emission vehicles grows. The biggest gains

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www.epa.gov
and search "environmental justice"

have been in electric regional delivery trucks that drive limited ranges and return to garages overnight. The duty cycle of these trucks is consistent with the capabilities of current electric truck technology, with pre-determined routes that return to a garage overnight when the trucks can be recharged. Long-haul trucks may be better suited for hydrogen fuel cell technologies that would exhibit longer ranges and shorter refueling times. Hydrogen fuel cell technologies however are not currently as far along as battery electric vehicles. The researchers stress that it will be critical that electric and fuel cell fueling infrastructure and pricing policies be in place, or at least planned for, to sustain the investment in these technologies and momentum behind converting HDDVs to electric vehicles as these trucks are being road tested and technologies improve.

For more informationon on the US DOE's research on elctric heavy-duty vehicles, please visit: https://newscenter.lbl.gov/2021/03/16/commercial-truck-electrification-is-within-reach/.

Air Quality and Health

Fine Particle Pollution Levels Found to be Two to Seven Times Higher on Subway Platforms than Outside the Stations

On February 10, 2021, researchers from the New York University Grossman School of Medicine published a study comparing indoor air quality during morning and afternoon rush hours inside 71 subway stations in Washington, D.C., Philadelphia, New York City, and Boston. The research published in the online journal *Environmental Health Perspectives,* noted that fine particulate matter ($PM_{2.5}$) levels were two to seven times higher within the subway stations than outside of the stations. The researchers conducted over 300 air quality samples through the course of the study before the onset of the COVID-19 pandemic greatly reduced transit ridership.

According to the findings, the PATH New York–New Jersey system had the highest airborne particle concentration at 392 micrograms per cubic meter, followed by the MTA New York at 251 micrograms per cubic meter. Washington had the next highest levels at 145 micrograms per cubic meter, followed by Boston at 140 micrograms per cubic meter. Philadelphia was comparatively the cleanest system at 39 micrograms per cubic meter. By comparison, aboveground air concentrations for all measured cities averaged just 16 micrograms per cubic meter.

Analysis of air samples showed that iron and organic carbon composed three quarters of the pollutants found in the underground air samples for all measured subway stations. The study authors say that although iron is largely nontoxic, some forms of organic carbon have been linked to increased risk of asthma, lung cancer, and heart disease. Since the subway systems are electrified the sources of organic carbon may be coming from decaying trash, plants, and animals and/or exhaust from diesel powered maintenance vehicles.

The US Environmental Protection Agency cautions that exposure to fine particle concentrations exceeding 35 micrograms per cubic meter over a 24-hour period may pose serious health hazards.

"Our findings add to evidence that subways expose millions of commuters and transit employees to air pollutants at levels known to pose serious health risks over time," says study lead author David Luglio.

The study authors caution that these levels do not reflect the daily exposures of typical subway riders who spend limited time within the stations but do demonstrate the need to consider public health measures, such as improved ventilation and air circulation systems to protect public and transit worker health.

For more informationon on the NYU study on subway station air quality, please visit: https://nyulangone.org/news/pre-covid-19-subway-air-polluted-dc-boston-new-york-regions-worst-study-finds.

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