Approaches to Determining Threshold Values for Snap-Shot Emissions Measurements

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Emissions from heavy-duty vehicles are a major source of criteria and PM emissions in California. In particular, the California Air Resources Board (CARB) has estimated that heavy-duty vehicles account for 58% of all on-road NOx emissions and 82% of all on-road diesel PM2.5 emissions. Furthermore, recent research has found that a small percentage of trucks contribute the majority of these emissions. Finding these high-emitting vehicles to determine the cause of these emissions is essential for meeting our air quality standards.

To find these high-emitting vehicles, CARB has developed an emissions measurement tool called the Portable Emissions AcQuisition System or PEAQs, which is a plume capture system for measuring in-use emissions of NOx, black carbon, and particle number. The objective of this works is to summarize CARB’s current efforts in calculating threshold values used for determining high-emitting vehicles from PEAQs and other on-road measurement tools (e.g. PEMs). Methods analyzed include, top percentile, correlation of plume capture measurements with opacity, and engine data approaches. The top percentile method screens vehicles with plume capture or PEMs units and a threshold is determined to capture the highest emitters. Plume capture and opacity utilizes opacity measurements of emissions in conjunction with black carbon measurements to develop a correlation between the two to determine high emitters. Finally, engine data takes advantage of broadcasted engine data via OBD or telematics to screen for high emitters.