**Improving Air Quality through Stringent Motor Vehicle Emission Standards in the Philippines**

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***Abstract*** - The Republic Act No. 8749, also known as the Philippine Clean Air Act of 1999, is designed to enhance air quality through the regulation of emissions from vehicles, industries, and other sources. The Department of Environment and Natural Resources (DENR) – Environmental Management Bureau (EMB) is the principal agency overseeing this initiative. As stipulated in Article 4, Section 21 of the Act, titled "Pollution from Motor Vehicles," the Department is tasked with reviewing, revising, and publishing emission standards biennially, or as needed, to ensure notable advancements in public health and safety. In alignment with the updated Clean Air Action Plan and stricter Ambient Air Quality Guideline Values, the EMB plans to transition vehicular emission limits from EURO 4/IV to EURO 5/V standards. This upgrade is set to be fully implemented by January 2027, contingent upon the availability of EURO 5/V fuel in the country. According to the 2021 Emission Inventory, mobile sources, predominantly combustion engines, contributed 61% to total national emissions, followed by stationary sources at 33% and area sources at 6%. The shift from EURO 4/IV to EURO 5/V standards is projected to significantly cut Particulate Matter (PM) emissions by an average of 95.5%. Additionally, it is expected to reduce Sulfur Dioxide (SO2) emissions from diesel vehicles by 80%, and Nitrogen Dioxide (NO2) emissions by 25% and 28% for M1 and N1 vehicle categories, respectively.

Using emission data from Certificates of Conformity (COCs) submitted to the DENR-EMB under UN Regulation No. 83 for light-duty vehicles and UN Regulation No. 49 for heavy-duty vehicles, statistical and modeling tools , projection of PM10 reductions associated with tighter tailpipe emissions and the transition from Euro 4 to Euro 5 emission and fuel standards from Euro 2 fuels containing 500 ppm sulfur (prior to 2016), to Euro 4 fuels with 50 ppm and eventually to Euro 5 fuels with only 10 ppm sulfur, shows a general downward trend in PM10 concentrations. Between 2016 and 2024, PM10 levels decreased from 41 µg/m³ to 28 µg/m³. Considering other economic and meteorological factors affecting the ambient air quality, the observed average PM10 annual decrease from 2016 to 2024 is approximately 7.29%. Considering the rate of reduction projections suggest continued improvement in air quality. Based on a baseline of 28 µg/m³ in 2025, PM10 levels are expected to drop 14.78 µg/m³ 2032 approaching WHO guideline of 15 µg/m³ for PM10 while 4.48 µg/m³ for Pm 2.5 by 2038, thus surpassing the WHO annual guideline for PM2.5 of 5 µg/m³.

These projections demonstrate the role of vehicle emission control in achieving objectives of the national air quality action plan of the Philippines. With continued implementation and compliance, the Philippines is on track to meet the WHO’s recommended guideline values, thereby delivering measurable public health and environmental benefits. This initiative aims to enhance air quality, mitigate respiratory health issues, and improve the overall environmental conditions.