

On-Road Vehicle Emissions Forecast Using IVE Simulation Model

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ABSTRACT

During the recent decades, rapid urbanization growth has led to even faster growth of motor vehicles especially in large cities. Hence, evaluation of the actual level of traffic emissions has gained more interest. This paper, for the first time, presents a bottom-up approach for evaluation of vehicular emissions in Tehran- the capital of Iran- using the International Vehicle Emission (IVE) model. The IVE model uses local vehicle technology levels and its distributions, power based driving factors, vehicle soak distributions and meteorological parameters to tailor the model for specific evaluation of emissions.

The results of this study demonstrate that carbon monoxide (CO) emission with 244.45 ton/hr during peak traffic hour is the most abundant criteria pollutant. About 25% of this quantity is emitted during start-up periods. Other pollutants such as NO_x, VOCs, PM, VOC_{evap} and SO_x are ranked after CO accordingly. Also, carbon dioxide (CO₂) emissions of 1744.22 ton/hr during the study period indicate that light vehicles are responsible for more than 82% of this amount. Based on IVE's evaluation, about 25% of the total vehicle emissions in Tehran come from districts 2, 4 and 6 respectively. It has further been inferred that the development of public transportation systems and proper land-use and urban spatial planning for various centers in these districts are essential.

KEYWORDS: Air Pollution, Vehicular Emission Forecasting, IVE Model, Tehran.