

Environmental Simulation Model Using System Dynamics and Systemic Analysis to Estimate Air Pollutant Emissions from Transport Sector to 2030

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Abstract

The Valley of Mexico Metropolitan Area (ZMVM) faces serious environmental problems, with emissions from the transport sector being one of the main causes. Historically, air pollution in the ZMVM has been a severe public health and environmental problem. Hence, reducing the emission of these pollutants is a priority in an attempt to mitigate their effects. Therefore, the purpose of this research is to estimate, through the design of an environmental simulation model, the dynamics of air pollutant emissions from the transport sector that will be emitted in the ZMVM by 2030 from a holistic perspective based on the region DESTEP analysis factors (Demographic, Economic, Social, Technological, Ecological and Political), and thus be able to foresee the evolution of air quality up to year 2030. Results estimate a greater reduction than predicted by the local government, this emission reduction would be up to 106% lower for PM₁₀, 176% for PM_{2.5}, 34% for NO_x, and 17% for VOC. The conclusion demonstrated that one of the main factors with the greatest impact on the control and reduction of emissions is the use and promotion of public transportation, as well as the improvement of its road infrastructure.

Keywords

Simulation model, system dynamics, air pollutant emissions, transport sector