

AIR POLLUTION DETECTION IN ROAD VEHICLES

Şükran Elçin Tekeli¹, Nilhan Duran², Anna Golovko³, Mustafa Kızıltan⁴, Deniz Oğul⁵, Ağça Gül Yılmaz⁶, Irde Çetintürk Gürtepe⁶, Canan Esin Köksal⁶, Şihomi Ara Aksoy⁷, Ahmet Burçin Yereli⁴, Merih Aydıncıalp Köksal⁸, Gülen Güllü⁸

Hacettepe University, Clean Renewable Energies, Ankara-Turkey¹ Başkent University, Industrial Engineering, Ankara-Turkey² Sosyoekonomi Journal, Economics, Ankara-Turkey³ Hacettepe University, Finance, Ankara-Turkey⁴ Middle East Technical University, Environmental Engineering, Ankara-Turkey⁵ Ministry Of Environment And Urbanization, Air Management, Ankara-Turkey⁶ Hacettepe University, Economics, Ankara-Turkey⁷ Hacettepe University, Environmental Engineering, Ankara-Turkey⁸

Emissions from road vehicles play a significant role in the deterioration of air quality in cities. NO_x and CO₂ emissions from road vehicles accounted for 16% of total emissions in 2016 for Turkey. The total number of vehicles registered in traffic is 22,865,921 and the share of vehicles over the age of 16 is 35%, which is higher than most of the European countries. Older vehicles have higher fuel consumption per km of travel, and also have higher pollutant emission per mass of fuel consumed than the newer ones. In this study, it is aimed to reduce the emissions from road vehicles by replacing older vehicles with new generation technology environmentally friendly vehicles. The vehicle sales between 2019 and 2030 have been estimated by using econometric model based on various economic and demographic parameters. The model results show that the passenger cars and light commercials sales are expected to reach 1,557,567 in 2030. Based on expected number of vehicle sent to scrappage and sales forecast, the total number of passenger cars and light commercials in the fleet is determined annually. Then, COPERT emission model is used to estimate the annual pollutant and greenhouse gas emissions associated with the road transport in Turkey based on five scenarios. Based on the results of the best environmentally scenario which assumes that the hybrid and electric vehicle share will increase drastically by 2030, a significant decrease in CO and NO_x emission are estimated. However, CO₂ emissions from this scenario are expected to decrease slightly when compared with the results of the business as usual scenario.