

Autonomous vehicle's effects on greenhouse gas emissions

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EDITORIAL

The transportation sector accounted for 27% of US Greenhouse Gas (GHG) emissions in 2010, according to the United Nations Framework Convention on Climate Change. GHGs are a major contributor to the greenhouse effect on a global scale. Within the earth's atmosphere, they act as artificial heat trapping agents. Fuel sources such as diesel, natural gas, and gasoline produce diverse GHGs as byproducts in the context of road transportation. Methane (CH₄), Carbon dioxide (CO₂), and Nitrous dioxide (N₂O) are some of the gases released by burning these energy sources, and they can stay in the atmosphere for decades, producing continual global warming. These unregulated GHG emissions disrupt the planet's natural gas cycles and represent a serious threat to a variety of flora and animals. In 2014, the transportation industry in Europe was responsible for 30.5% of GHG emissions and 12% of GHG emissions from road transport. Another study was carried out in China by Liu et al. predicted that the transport sector alone would account for 84.7% GHG emission by the year 2040. Concerns about the negative environmental externalities of road transportation activities and development have prompted governments around the world to analyze the environmental implications of transportation projects before they are implemented. The modern automobile industry is moving toward the development of self-driving vehicles. This shift is being driven by a number of factors, including improved safety, more productivity, lower fuel use, and reduced traffic congestion. Autonomous Vehicles (AVs), often known as driverless or self-driving vehicles, are vehicles that can function without the need for a driver to manage the steering, acceleration, or braking, the level of automation goes from 0-5.

The majority of the existing research on connected and autonomous vehicles focuses on its potential effects on traffic safety, travel behaviour, and congestion, as well as energy consumption. The impact of partially to fully autonomous vehicles on traffic flow and greenhouse gas emissions

is currently unknown. There are a lot of unknowns when it comes to the actual operation of fully automated vehicles. It is likely to happen by 2030, according to Information Handling Services (IHS) Automotive specialists. According to HIS projections, the number of fully autonomous vehicles in use worldwide in 2035 will be around 21 million. According to another forecast, connected vehicles would reach 250 million by 2020, accounting for a quarter of a billion vehicles on the road. A prior study predicted that completely autonomous vehicles would be auctioned off before 2020. According to one estimate, AVs will control 20%-40% of the car market by 2030. Nevertheless, the whole transition to AVs is expected to unfold in stages over the next few decades.

AVs are mostly outfitted with modern automotive technology, which allow computers to assist in various driving activities while reducing human involvement to variable degrees. With rapid advancements in communication, autonomous, and automobile technologies having far-reaching implications for the transportation sector, it's vital to understand their role in accomplishing long-term urban mobility goals. This entails the safe and efficient movement of people and products while also being environmentally sustainable. An assortment of parameters, such as the kind of fuel, vehicle type, and age, all have a substantial impact on the carbon emission rate from each method of transportation. Many research looked into the effects of extensive AV technology usage. The effects took into account contaminants in the air, as well as GHG emissions. Increased ridesharing, traffic flow smoothing, platooning, efficient driving, efficient routing, eco traffic signals, and reduced seeking for parking could all benefit from the advent of autonomous vehicles. As a result, energy usage will be reduced, which will help to reduce GHG emissions. A number of prior studies have looked into the potential of autonomous vehicles in enhancing transportation sustainability by reducing energy consumption and greenhouse gas emissions.

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