

Self-driving trucks cut fuel consumption by 10%

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TuSimple/UC San Diego study finds significant fuel savings in heavy-duty trucks employing the company's autonomous technology, especially at lower speeds.

Enhancing safety and helping combat driver shortages are two benefits that heavy-duty autonomous-truck proponents have preached during development. You can now add significant fuel savings to the list. Results of a new study from the University of California San Diego's Jacobs School of Engineering and TuSimple show that the San Diego-based company's autonomous technology reduces fuel consumption of heavy-duty trucks by at least 10%.

"We wanted to address how the introduction of autonomy impacts fuel consumption and the environment, and in every case, TuSimple's autonomous mode performed better than the manual mode in terms of efficiency," Henrik Christensen, director of Robotics and Professor at UC San Diego who led the study, said in a statement.

Researchers fitted TuSimple Level-4 autonomous trucks with "black box technology" to extract driving data over a six-month period that included 122 autonomous missions totaling nearly 6,700 miles. Manually driven trucks were fitted with the same data-recording technology. Based on the available data,

researchers used the Virginia Tech Comprehensive Power-based Fuel Consumption model to estimate fuel consumption as a function of speed, location, acceleration and braking.

Fuel consumption was analyzed across different ranges of speed: 0-30 mph, 30-40 mph, 40-50 mph, 50-60 mph, and 60+ mph. TuSimple reports that at highway speeds, the difference in fuel consumption between autonomous and manual modes is negligible. Greater fuel savings come at lower-speed driving conditions that are more complex and benefit more from the autonomous control system.

TuSimple expects to gain even more efficiencies as it continues to optimize the decision-making ability of its software. "We plan to optimize our technology for fuel and emissions savings in the future, meaning these numbers will be even more significant as we further develop our technology," Arda Kurt, director of motion planning and control at TuSimple and former research assistant professor at The Ohio State University College of Engineering, said in the release.

CO₂ emissions would be cut by 42 million metric tons per year, according to TuSimple, if all medium- and heavy-duty trucks adopted its self-driving technology, based on calculations using the EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks report that outlines transportation emissions. Applying TuSimple's 10% average to all U.S. diesel trucks would result in an estimated savings of 4 billion gallons of fuel totaling \$10 billion per year, according to calculations based on American Trucking Associations fuel consumption reports. TuSimple has 18 contracted customers and makes between 13 and 19 autonomous trips per day in Arizona.