Interim Project Results: United Parcel Service’s Second-Generation Hybrid-Electric Delivery Vans

As part of its commitment to reducing fuel use and emissions, the United Parcel Service (UPS) operates more than 2,500 natural gas, propane, electric, and hybrid-electric vehicles worldwide. The company uses these advanced vehicles as a “rolling laboratory” to learn how such technologies can best serve its large delivery fleet.

The U.S. Department of Energy’s National Renewable Energy Laboratory (NREL) has a long history of helping UPS determine the impact of hybrid technology on fuel use, emissions, and operating costs. In 2008, NREL’s Fleet Test and Evaluation Team evaluated the first generation of UPS’ hybrid delivery vans, which demonstrated 29%–37% higher fuel economy than comparable conventional diesel vans.¹

Encouraged by this success, UPS added 200 second-generation hybrid vans to its delivery fleet in 2010. These second-generation vehicles feature a new “engine off at idle” capability to further boost fuel economy. NREL’s Fleet Test and Evaluation Team is in the process of evaluating the 18-month, in-service performance of 11 of these second-generation hybrid vans along with 11 comparable conventional diesel vans operating in Minneapolis, Minnesota.

As a complement to the ongoing field study, the team recently completed fuel economy and emissions testing at NREL’s Renewable Fuels and Lubricants (ReFUEL) Laboratory.

Vehicle Specifications

The following table provides a side-by-side comparison of the second-generation hybrid vans and their conventional counterparts.


![Image of UPS delivery van](https://example.com/ups_delivery_van.jpg)
Vehicle Testing in Laboratory

Using the dynamometer at the ReFUEL Laboratory, the team tested one hybrid van and one conventional van on three standard drive cycles, selected based on in-use data collected by NREL.

Test Results

Depending on the drive cycle, the hybrid van demonstrated a 21%–45% improvement in ton-mile/gallon fuel economy compared to the conventional van. These dynamometer test results represent statistically significant improvements at the 95% confidence level.

Fuel Savings

Extrapolating on these fuel economy results, the hybrid vans could save 0.7–2.4 gallons per day per van (or 176–610 gallons per year per van), depending on drive cycles and daily mileage. With the 11 hybrid vans in Minneapolis alone, UPS could reduce its diesel use by 1,900–6,700 gallons a year and save up to $23,000 (at $3.43/gallon) in fuel costs.

More Results to Come

Results-to-date are based on dynamometer testing at NREL’s ReFUEL Laboratory. The ongoing field study will offer additional results, with a focus on in-use fuel economy, maintenance costs, operating costs, diesel particulate filter regeneration, and reliability of the hybrid vans compared to their conventional counterparts. These results will be detailed in an upcoming project report. For more information about this and other evaluation projects, visit NREL’s Fleet Test and Evaluation website at www.nrel.gov/vehiclesandfuels/fleettest.

Advanced Vehicle Testing

This evaluation is part of a series of evaluations performed by NREL’s Fleet Test and Evaluation Team with funding from the Advanced Vehicle Testing Activity (AVTA), which is managed by the U.S. Department of Energy’s Office of Energy Efficiency and Renewable Energy (EERE). AVTA projects provide comprehensive, unbiased evaluations of advanced vehicle technologies in commercial use, enabling fleet owners and operators to make informed vehicle-purchasing decisions. All publications regarding the UPS hybrid delivery van evaluation are posted in the medium- and heavy-duty vehicles section of the EERE website at www.eere.energy.gov/vehiclesandfuels/avta.

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