

What is a hybrid electric vehicle?

A hybrid electric vehicle is powered by both an internal combustion engine and an electric motor driven by an energy storage device. The benefits of hybrids include lower emissions and significantly higher fuel economy than a conventional vehicle. The combination of conventional and electric propulsion systems provides the extended range and rapid refueling characteristics of a standard engine and the fuel efficiency and lower emissions of an electric motor.

Hybrid vehicles never need to be plugged in. The energy storage device is recharged directly by the engine and by “regenerative” braking, during which energy normally lost to friction during braking is captured and stored. Primary choices for energy storage include batteries and ultracapacitors. Both the engine and the electric motor can provide power to the drivetrain: A sophisticated energy-management system selects the most efficient mode of operation. While hybrid electric vehicles can come in many different configurations, the following list of advantages takes into consideration the most common hybrid truck designs.

Advantages of hybrid electric vehicles

- The electric motor provides some of the power for the vehicle, permitting a smaller and more efficient internal combustion engine without a loss in performance.
- A hybrid vehicle can turn its engine off when sitting in traffic or at stoplights and use the electric motor to restart without driver intervention or reduced acceleration. This idle-off capability saves fuel otherwise wasted during idling and reduces emissions.
- The regenerative braking system reduces wear and tear on the brakes and decreases maintenance costs. The energy captured by the system helps power the vehicle, reducing fuel use.
- The diesel engine works less, reducing emissions of smog-forming pollutants, soot and other harmful pollutants. Proven after-treatment systems, such as particulate filters, can reduce emissions even more.
- Hybrid vehicles provide improved acceleration at lower speeds (e.g., from 0 to 30 mph) because they are able to draw power from the electric motor.
- Hybrid vehicles are quieter than conventional trucks as a result of reduced noise and vibration when the internal combustion engine is turned off.
- Hybrid vehicles can be designed to provide a clean, quiet and portable source of on-board power for electrical equipment, an advantage for certain applications (e.g., utilities and telecommunications) and where an electric infrastructure is not available.
- Hybrid vehicles will help pave the way for future technologies such as fuel cells by bringing down the costs and demonstrating the reliability of the component technologies they share, such as motors, energy storage and power electronics.



ENVIRONMENTAL DEFENSE

finding the ways that work

For more information, please contact Environmental Defense, 257 Park Avenue South, New York, NY 10010
866-812-6456 • partnerships@environmentaldefense.org • environmentaldefense.org/go/fedex
Austin • Boston • Boulder • Los Angeles • New York • Oakland • Raleigh • Washington