

FUELS OF THE FUTURE FOR CARS AND TRUCKS

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The transportation sector, because of the requirement to carry its energy supply onboard so as to attain the freedom of mobility, is almost totally dependent on high energy density liquid hydrocarbon fuels, i.e., currently conventional petroleum-based gasoline and diesel fuel. This has resulted in an ever-growing reliance on imported oil as domestic sources of crude oil production have declined. The United States has begun to make use of other non-petroleum fuels, such as renewable ethanol, biodiesel, and domestically producible gaseous fuels (such as methane and hydrogen), to meet its transportation energy demand and to reduce its reliance on imported oil. For example, the Department of Energy's FreedomCAR Partnership is focused on hydrogen-powered fuel cells for light-duty vehicles. However, specific performance requirements on heavy trucks are more demanding than those of passenger vehicles. Because of the heavy loads and long distances that they travel, it does not appear likely that hydrogen or electricity will be able to provide what long-haul trucks require because of the low energy density of these energy carriers.

The important role that heavy trucks play in the transport of goods and services, which is essential to a healthy economy, coupled with a requirement for carbon neutrality in order to mitigate the impact of transportation on global climate change, may make it necessary to sustain the operation of heavy trucks with biorenewable liquid fuels. Such a scenario implies that, left with no known alternatives, heavy trucks will likely continue to be powered by high-efficiency combustion engines well into the 21st century.