

Hybrid Electric Vehicles



At the start of the 20th century, electric-powered vehicles and gasoline-powered vehicles were competing for dominance in the emerging automobile industry. Electric cars were considered more reliable, and certainly quieter and less polluting, than gasoline-powered cars. However, they could go only a few miles before they needed recharging, so they were only suitable for use over short distances. A few inventors developed hybrid cars that used both electricity and gasoline engines for power, but these never caught on. As more roads were paved and as more people wanted to travel farther, electric cars were abandoned in favor of cars that burned gasoline in *internal combustion engines* (ICEs).

Problems in the Gasoline Era

As the 20th century progressed, industry spread and the number of cars on the road increased. The air in North America became more polluted, and people searched for ways to reduce the pollution and its harmful effects on human health. ICEs emit nitrogen oxides, carbon monoxide, and unburned hydrocarbons—all of which, along with ozone, make up a major part of urban air pollution. In addition, ICEs give off large quantities of carbon dioxide, which contributes to Earth's greenhouse effect and increases the threat of global warming.

In recent decades, federal and state laws have required industries and businesses—from steelmakers to dry cleaners—to limit polluting emissions. Regulations and incentives have also been put in place

to increase the fuel-efficiency and reduce the emissions of passenger cars. Although overall air quality has improved as a result of these efforts, air pollution is still a serious problem, largely due to emissions from vehicles with ICEs.

In the 1970s, a global energy crisis emerged as several oil-exporting countries cut off their oil exports for political and economic reasons. Oil and gas prices rose dramatically, and many people suddenly had no access to gasoline or could no longer afford it. Although the crisis subsided, worldwide economic and political instability, and a growing awareness that global oil supplies are finite, has kept oil and gas prices uncertain ever since. The United States currently imports more than half of the oil it uses. As a result, access to oil resources plays a key role in U.S. foreign policy.

A Return to Electric Cars?

As the problems with air pollution and rising oil prices have become more apparent, people have started to reexamine alternatives to gasoline-powered ICEs. In the 1990s, several *electric vehicles* (EVs), which run solely on electricity, were developed for passenger use. While the performance of these EVs was comparable to gasoline-powered cars, they typically had driving ranges of only 80–240 km (50–150 miles), and were more expensive than gasoline-powered models.

In the mid to late 1990's, several automakers designed and developed *hybrid electric vehicles* (HEVs),