

Hybrid And Alternative Fuel Vehicles 3rd Edition

Hybrid electric vehicle

gasoline-electric hybrids, plug-in hybrids, electric vehicles as well as fuel-cell hybrid vehicles planned for mass production. The following table shows the fuel economy

A hybrid electric vehicle (HEV) is a type of hybrid vehicle that couples a conventional internal combustion engine (ICE) with one or more electric engines into a combined propulsion system. The presence of the electric powertrain, which has inherently better energy conversion efficiency, is intended to achieve either better fuel economy or better acceleration performance than a conventional vehicle. There is a variety of HEV types and the degree to which each functions as an electric vehicle (EV) also varies. The most common form of HEV is hybrid electric passenger cars, although hybrid electric trucks (pickups, tow trucks and tractors), buses, motorboats, and aircraft also exist.

Modern HEVs use energy recovery technologies such as motor-generator units and regenerative braking to recycle...

Green vehicle

alternative fuels and advanced vehicle technologies and include hybrid electric vehicles, plug-in hybrid electric vehicles, battery electric vehicles

A green vehicle, clean vehicle, eco-friendly vehicle or environmentally friendly vehicle is a road motor vehicle that produces less harmful impacts to the environment than comparable conventional internal combustion engine vehicles running on gasoline or diesel, or one that uses certain alternative fuels. Presently, in some countries the term is used for any vehicle complying or surpassing the more stringent European emission standards (such as Euro6), or California's zero-emissions vehicle standards (such as ZEV, ULEV, SULEV, PZEV), or the low-carbon fuel standards enacted in several countries.

Green vehicles can be powered by alternative fuels and advanced vehicle technologies and include hybrid electric vehicles, plug-in hybrid electric vehicles, battery electric vehicles, compressed...

Fuel cell

Diesel-SOFC-Hybrid and Battery Electric Vehicles"; (PDF). 15 July 2003. Archived from the original (PDF) on 21 October 2006. Retrieved 23 May 2007. "Fuel Cell

A fuel cell is an electrochemical cell that converts the chemical energy of a fuel (often hydrogen) and an oxidizing agent (often oxygen) into electricity through a pair of redox reactions. Fuel cells are different from most batteries in requiring a continuous source of fuel and oxygen (usually from air) to sustain the chemical reaction, whereas in a battery the chemical energy usually comes from substances that are already present in the battery. Fuel cells can produce electricity continuously for as long as fuel and oxygen are supplied.

The first fuel cells were invented by Sir William Grove in 1838. The first commercial use of fuel cells came almost a century later following the invention of the hydrogen-oxygen fuel cell by Francis Thomas Bacon in 1932. The alkaline fuel cell, also known...

Plug-in electric vehicles in China

vehicles

battery electric vehicles (BEVs), and plug-in hybrid electric vehicles (PHEVs), including extended-range electric vehicles (EREVs) - and fuel - In China (including Hong Kong and Macau), the term new energy vehicle (NEV) is used to designate automobiles that are fully or predominantly powered by electric energy, which include plug-in electric vehicles - battery electric vehicles (BEVs), and plug-in hybrid electric vehicles (PHEVs), including extended-range electric vehicles (EREVs) - and fuel cell electric vehicles (FCEV). The Chinese government began implementation of its NEV program in 2009 to foster the development and introduction of new energy vehicles, and electric car buyers are eligible for public subsidies.

The stock of new energy passenger vehicles in Hong Kong is the largest in the world, with 20.41 million plug-in cars in use at the end of 2023, accounting for 91% of all vehicles in circulation in China. All-electric cars...

Diesel fuel

applications, such as fuel for tractors, recreational and utility vehicles or other noncommercial vehicles that do not use public roads. This fuel may have sulfur

Diesel fuel, also called diesel oil, heavy oil (historically) or simply diesel, is any liquid fuel specifically designed for use in a diesel engine, a type of internal combustion engine in which fuel ignition takes place without a spark as a result of compression of the inlet air and then injection of fuel. Therefore, diesel fuel needs good compression ignition characteristics.

The most common type of diesel fuel is a specific fractional distillate of petroleum fuel oil, but alternatives that are not derived from petroleum, such as biodiesel, biomass to liquid (BTL) or gas to liquid (GTL) diesel are increasingly being

developed and adopted. To distinguish these types, petroleum-derived diesel is sometimes called petrodiesel in some academic circles. Diesel is a high-volume product of oil refineries...

History of plug-in hybrids

The history of plug-in hybrid electric vehicles (PHEVs) spans a little more than a century, but most of the significant commercial developments have taken

The history of plug-in hybrid electric vehicles (PHEVs) spans a little more than a century, but most of the significant commercial developments have taken place after 2002. The revival of interest in this automotive technology together with all-electric cars is due to advances in battery and power management technologies, and concerns about increasingly volatile oil prices and supply disruption, and also the need to reduce greenhouse gas emissions. Between 2003 and 2010 most PHEVs were conversions of production hybrid electric vehicles, and the most prominent PHEVs were aftermarket conversions of 2004 or later Toyota Prius, which have had plug-in charging and more lead-acid batteries added and their electric-only range extended.

Global sales of plug-in hybrids grew from over 300 units in 2010...

Electric car use by country

electric vehicles (PEVs) are generally divided into all-electric or battery electric vehicles (BEVs), that run only on batteries, and plug-in hybrids (PHEVs)

Electric car use by country varies worldwide, as the adoption of plug-in electric vehicles is affected by consumer demand, market prices, availability of charging infrastructure, and government policies, such as purchase incentives and long term regulatory signals (ZEV mandates, CO2 emissions regulations, fuel economy standards, and phase-out of fossil fuel vehicles).

Plug-in electric vehicles (PEVs) are generally divided into all-electric or battery electric vehicles (BEVs), that run only on batteries, and plug-in hybrids (PHEVs), that combine battery power with internal combustion engines. The popularity of electric vehicles has been expanding rapidly due to government subsidies, improving charging infrastructure, their increasing range and lower battery costs, and environmental sensitivity...

HEVT

operable fuel cell vehicles in the world (Lypen 1999). The fuel cell used in the vehicle was provided by the U. S. Department of Defense and carried a

The Hokie Electric Vehicle Team of Virginia Tech, better known as HEVT, is a nationally recognized undergraduate student design team in the Department of Mechanical Engineering at Virginia Tech. HEVT was formed in 1994 to compete in the 1995 Hybrid Electric Vehicle (HEV) Challenge, one of the many competitions organized by the Argonne National Laboratory through the United States Department of Energy. HEVT has been involved in the Department of Energy Advanced Vehicle Technology Competitions (AVTCs) ever since. HEVT attributes a significant amount of its success to their Advisor, Professor Doug Nelson in Mechanical Engineering. Dr. Nelson has received the Outstanding Faculty Advisor award at competition 3 times. He has greatly aided the education of students at Virginia Tech and helped...

Zinc-air battery

for 180 cycles at 2 mA/cm3. Metallic zinc could be used as an alternative fuel for vehicles, either in a zinc-air battery or to generate hydrogen near the

A zinc-air battery is a metal-air electrochemical cell powered by the oxidation of zinc with oxygen from the air. During discharge, a mass of zinc particles forms a porous anode, which is saturated with an electrolyte. Oxygen from the air reacts at the cathode and forms hydroxyl ions which migrate into the zinc paste and form zincate (Zn(OH)2–4), releasing electrons to travel to the cathode. The zincate decays into zinc oxide and water returns to the electrolyte. The water and hydroxyl from the anode are recycled at the cathode, so the water is not consumed. The reactions produce a theoretical voltage of 1.65 Volts, but is reduced to 1.35–1.4 V in available cells.

These batteries have high energy densities and are relatively inexpensive to produce. Zinc-air batteries have some properties of...

Toyota Prius

December And 2009 Sales". Toyota. Archived from the original on 22 February 2012. Retrieved 5 January 2010. "Alternative Fuel Vehicles (AFVs) and Hybrid Electric

The Toyota Prius (PREE-æss) (Japanese: プリウス, Hepburn: Toyota Puriusu) is a compact/small family liftback (supermini/subcompact sedan until 2003) produced by Toyota. The Prius has a hybrid drivetrain, which combines an internal combustion engine and an electric motor. Initially offered as a four-door sedan, it has been produced only as a five-door liftback since 2003.

The Prius was developed by Toyota to be the "car for the 21st century"; it was the first mass-produced hybrid vehicle, first going on sale in Japan in 1997 at all four Toyota Japan dealership chains, and subsequently introduced worldwide in 2000.

In 2011, Toyota expanded the Prius family to include the Prius v, an MPV, and the Prius c, a subcompact hatchback. The production version of the Prius plug-in hybrid was released...

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