

The Human Earth (MAE 124/ESYS 103)

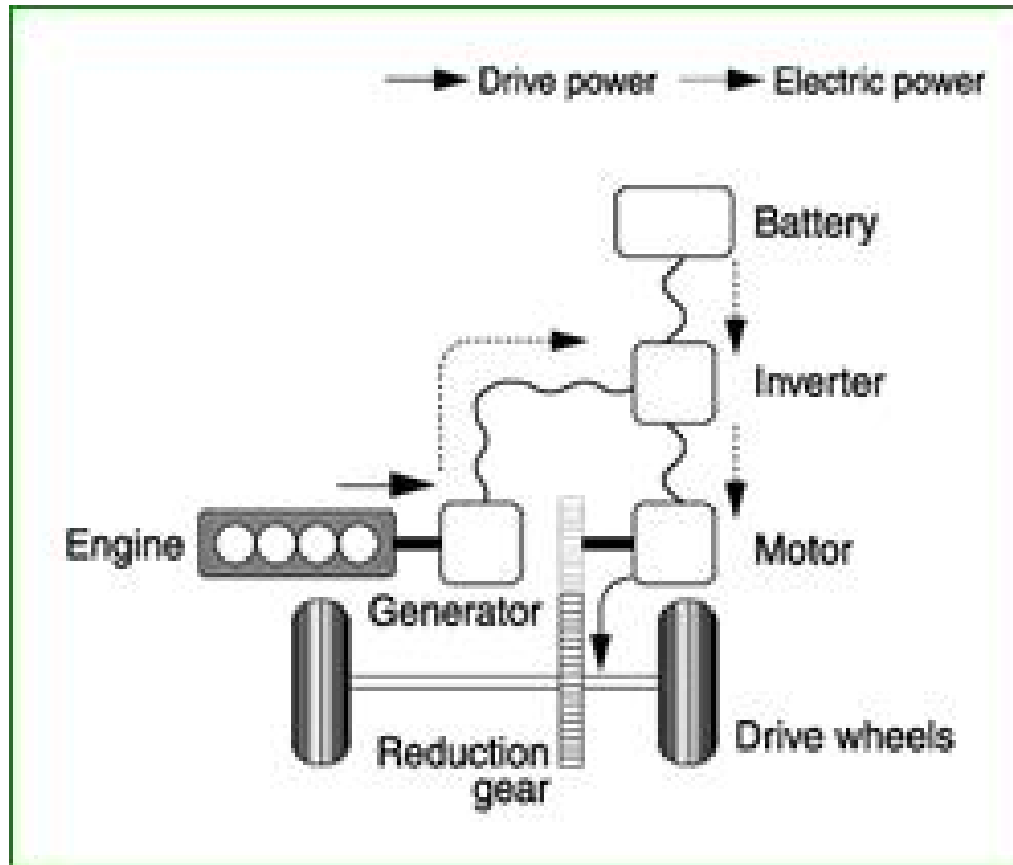
Lecture 15

Transportation: Hybrids and Hydrogen

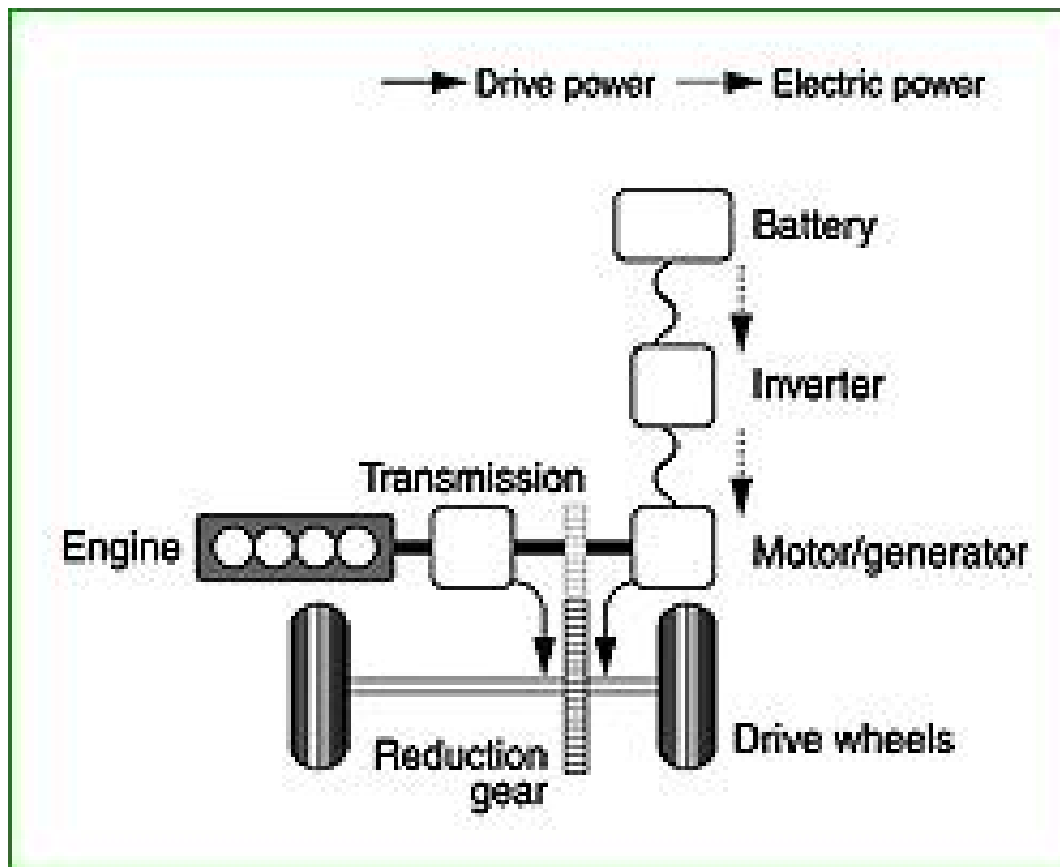
Hybrids: Expanding the Range

<http://www.cartoonistgroup.com/store/add.php?iid=6276>

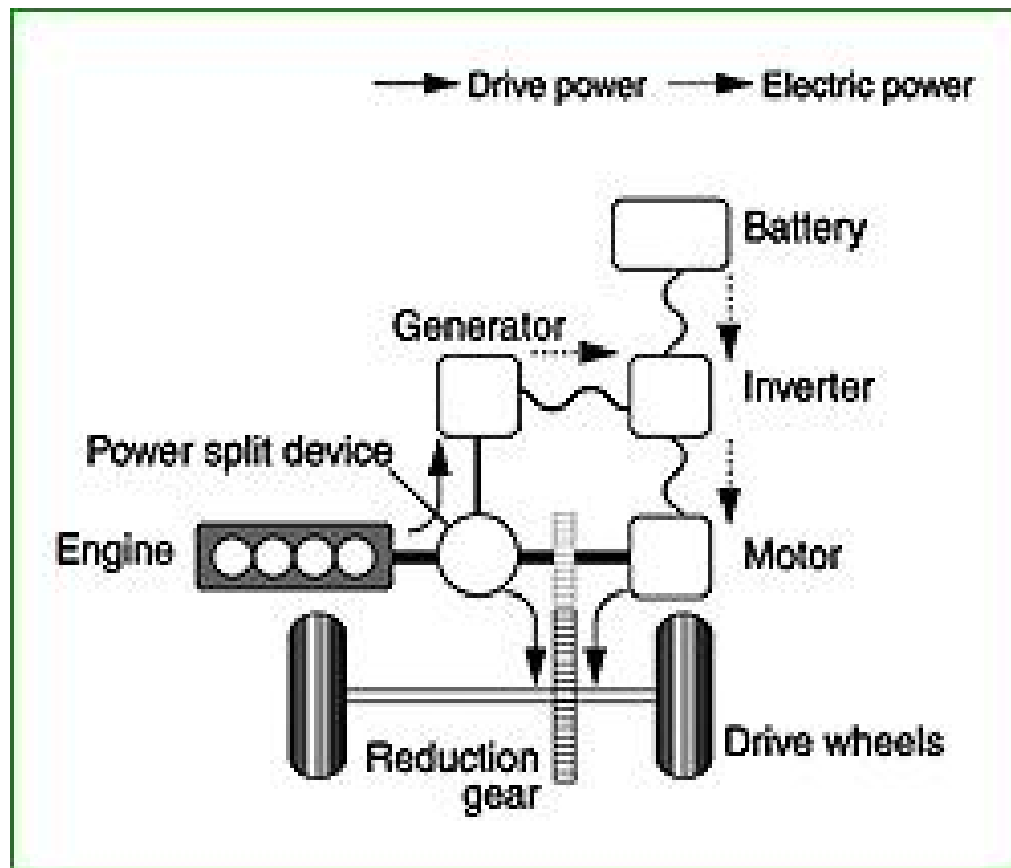
Hybrids: Series



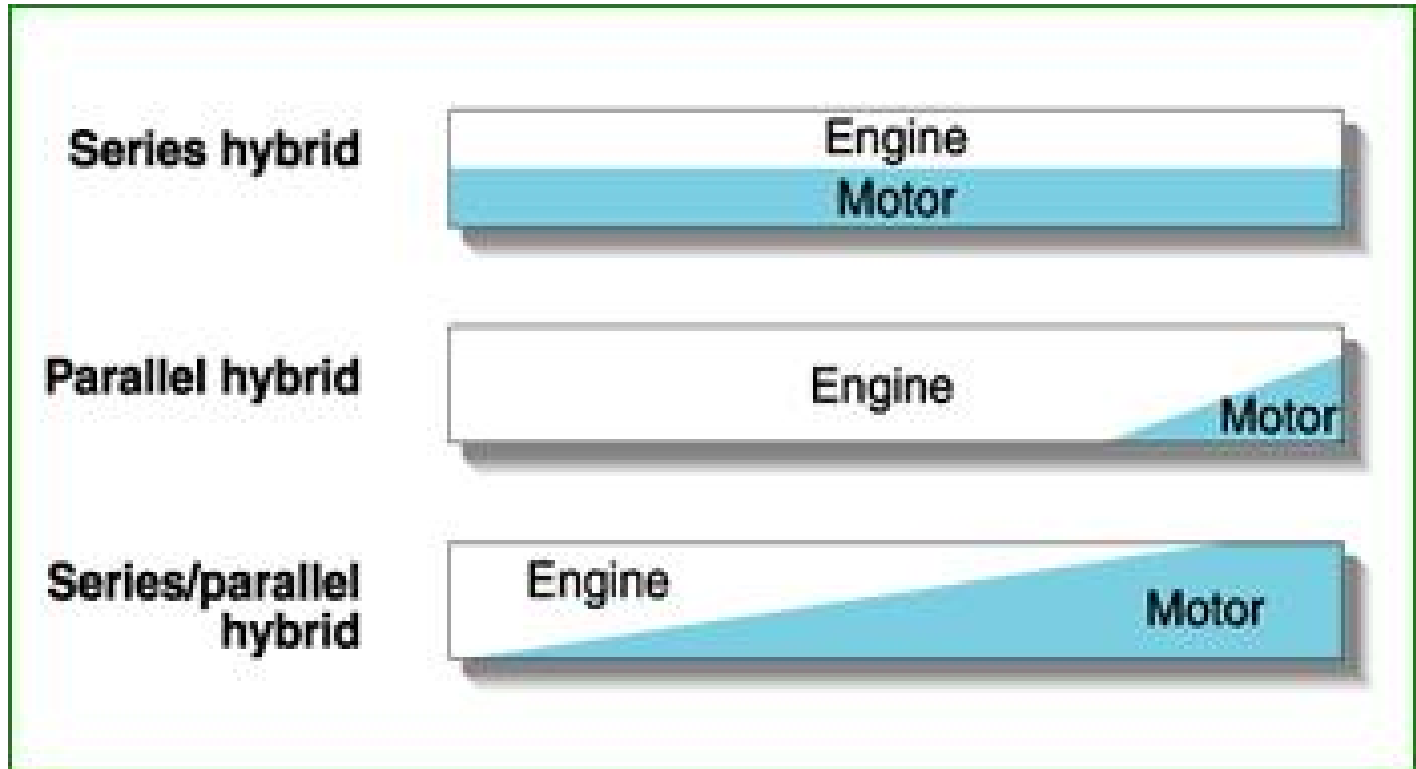
Hybrids: Parallel



Hybrids: Series/Parallel



Ratio of Internal Combustion Engine and Electric Motor Operation



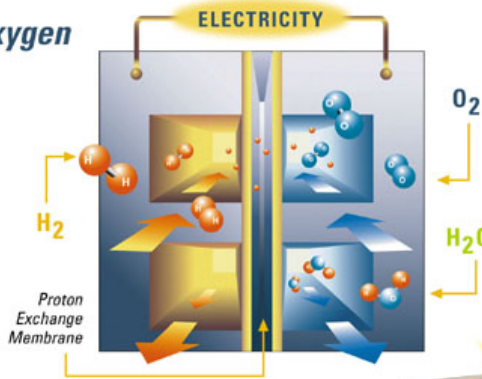
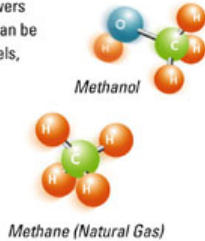
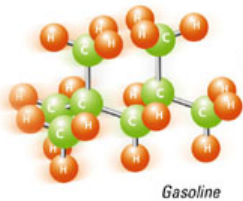
Fuel Cells

<http://www.cartoonistgroup.com/store/add.php?iid=11313>

How a Fuel Cell Works

Fuel cells use hydrogen with oxygen from air to produce electricity

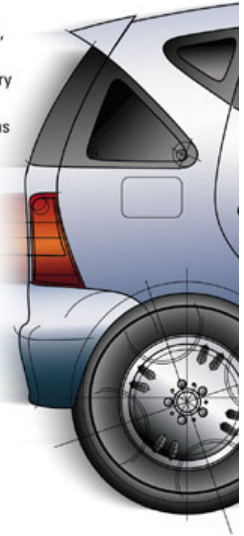
The electricity generated powers a vehicle's motor. Hydrogen can be produced from a variety of fuels, including gasoline, methanol, ethanol, and natural gas.



How a Fuel Cell Works

Hydrogen can also be produced through electrolysis, a process that splits water into hydrogen and oxygen using electricity. In the future, hydrogen may be supplied from solar, wind, and other renewable energy sources.

Developing fuel infrastructure solutions that are safe, reliable, environmentally-friendly, and cost-effective remains a primary challenge. CaFCP is working together to drive those solutions forward, and deliver fuel cell vehicles to the marketplace.



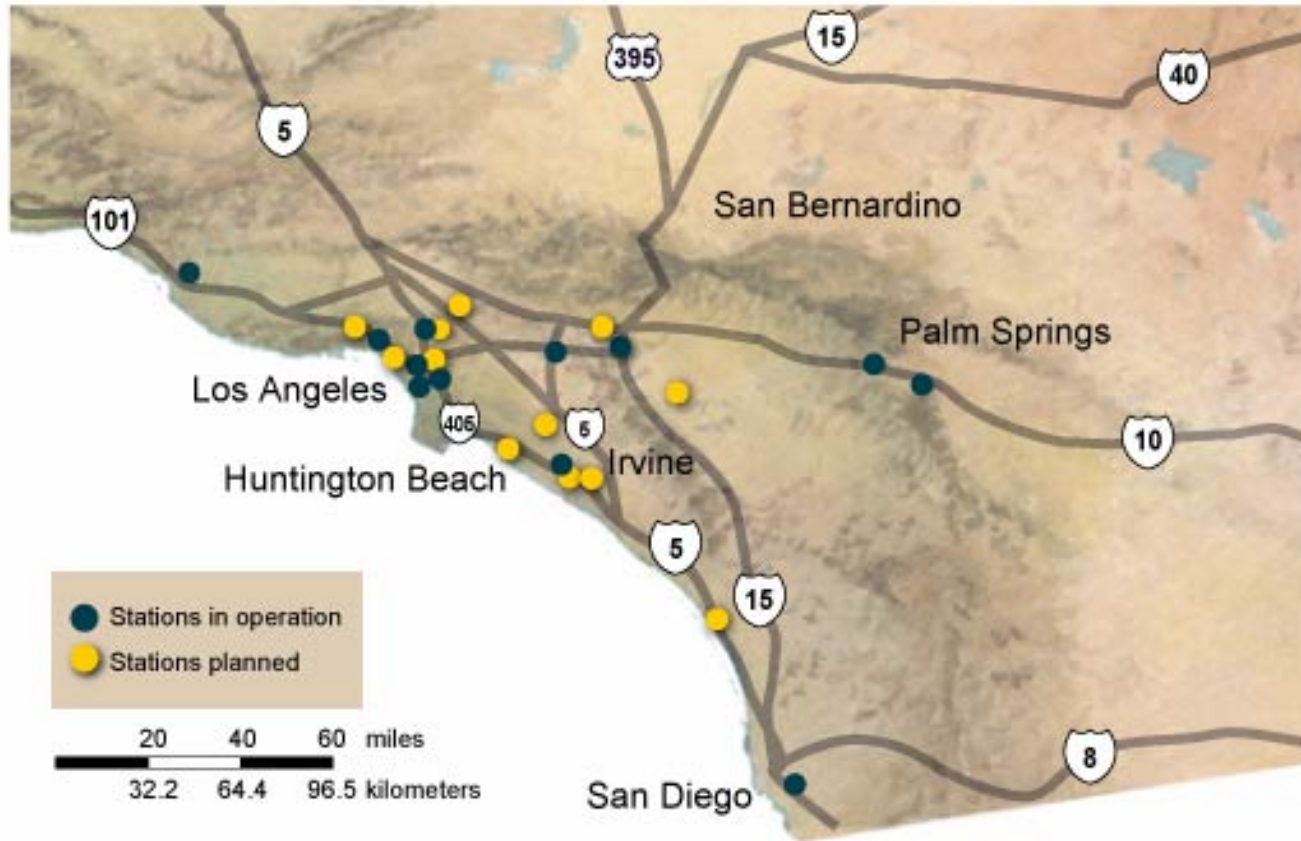
http://www.fuelcellpartnership.org/fuel-vehl_functions.html

Honda FCX



http://www.fuelcellpartnership.org/fuel-vehl_cars.html

Hydrogen Fueling Stations



http://www.fuelcellpartnership.org/fuel-vehl_map.html