

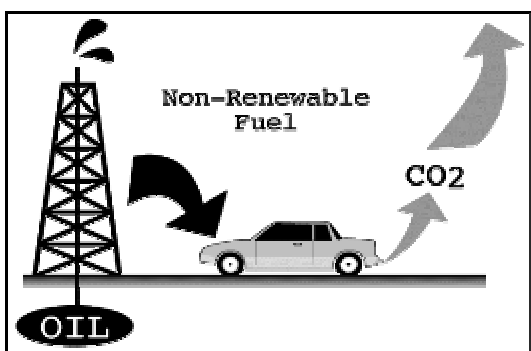
## SHEET EIGHT – SUPPORT



The support subsystem is not part of any vehicle. Rather it is the components that provide the energy and infrastructure that keep vehicles operating. Cars need roads and maintenance for continued safe driving. They also need petrol. As cars developed and improved, the infrastructure needed to support travel had to develop and improve as well. Road systems began to connect communities. Petrol stations became frequent enough that greater distances could be travelled.



Improved transportation systems affect our way of life in many ways. People no longer need to live close to their work. Families can stay connected without living in the same town. Food can be transported over great distances. The automobile and its support systems enable the highly mobile society that we enjoy today. A car is driven an average 12,000 kilometres per year or about 30 kilometres per day. We live miles from work, school and stores. We travel miles for vacation and other leisure activities.



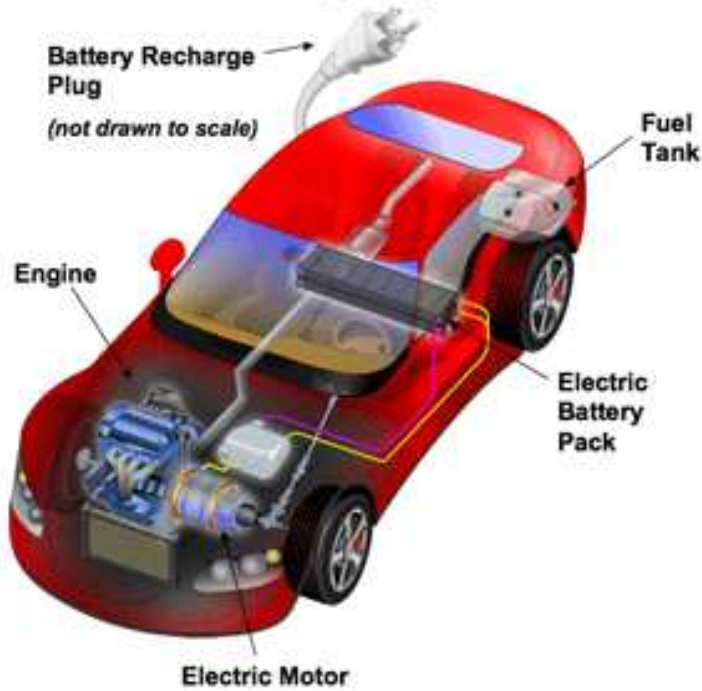
Like all technologies, with the good there is also bad. The fuel that powers our transportation systems is made from oil. Oil is a non-renewable resource - a resource that cannot be replaced. We will eventually run out of oil. In addition, burning oil creates pollution that affects our environment. There are always tradeoffs.

Given oil dependency and environmental problems, scientists and engineers have been exploring alternative fuel vehicles.



Electric powered vehicles have shown promise as a viable option. However, batteries are heavy, contain caustic chemicals and take a long time to charge. Fuel cells show some promise in overcoming these problems. Fuel cells produce electricity from hydrogen and oxygen. The by-product is water so they are pollution free. At this time they are too expensive for mass production, but the future is promising.

## How a Plug-In Hybrid Works



Hybrid vehicles have been seeing a commercial success. These vehicles are gas and electric powered vehicles. An internal combustion engine is used to power the vehicle and charge batteries for the electric motor. The electric motor is used to help power the vehicle to save gas. Since the vehicle is primarily powered by gas, the infrastructure to support hybrids exists. Drivers simply need to stop at a petrol station. Development of hybrids overcame a design limitation of electric vehicles because they fit the existing fuel support system.

