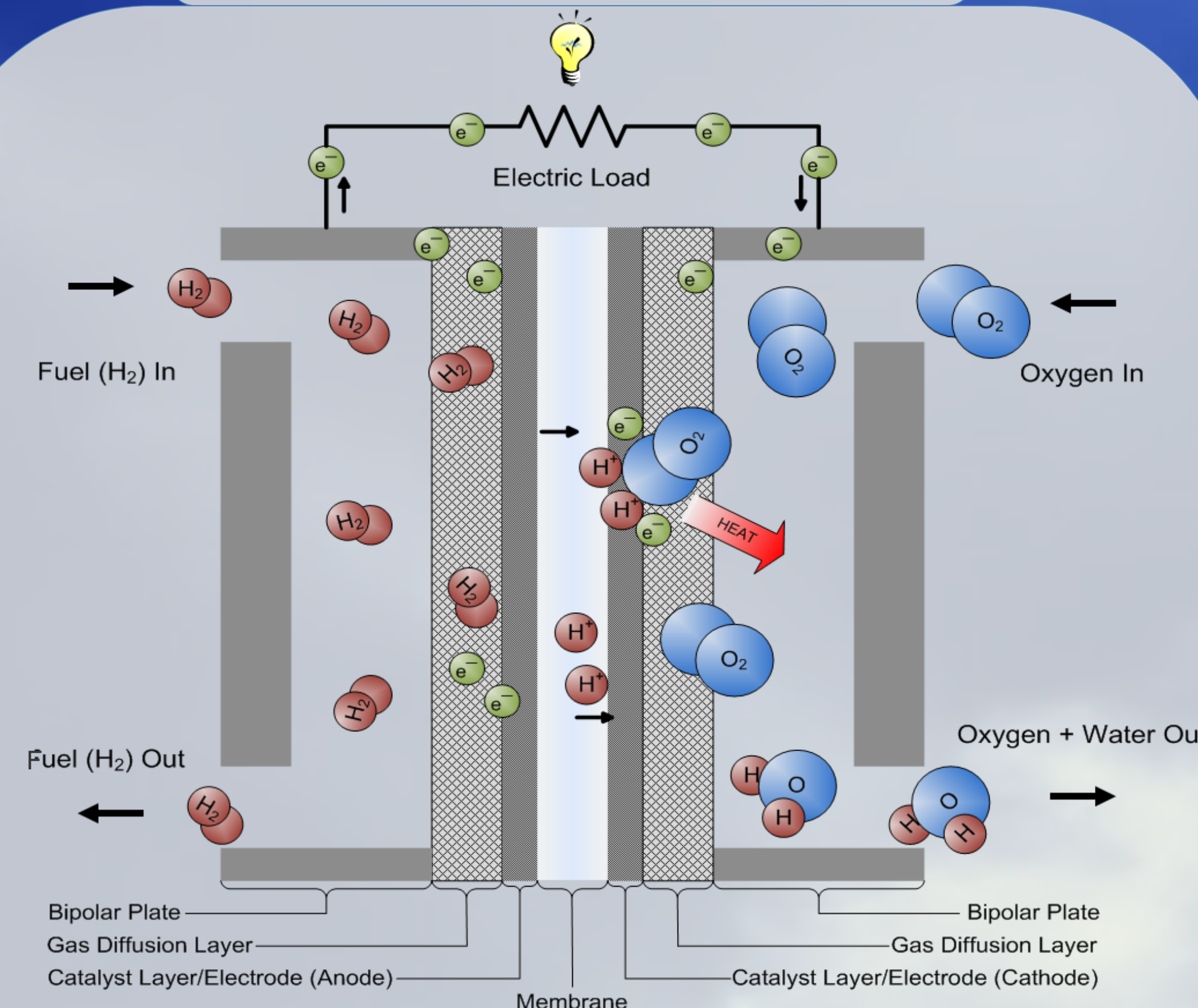


Abstract

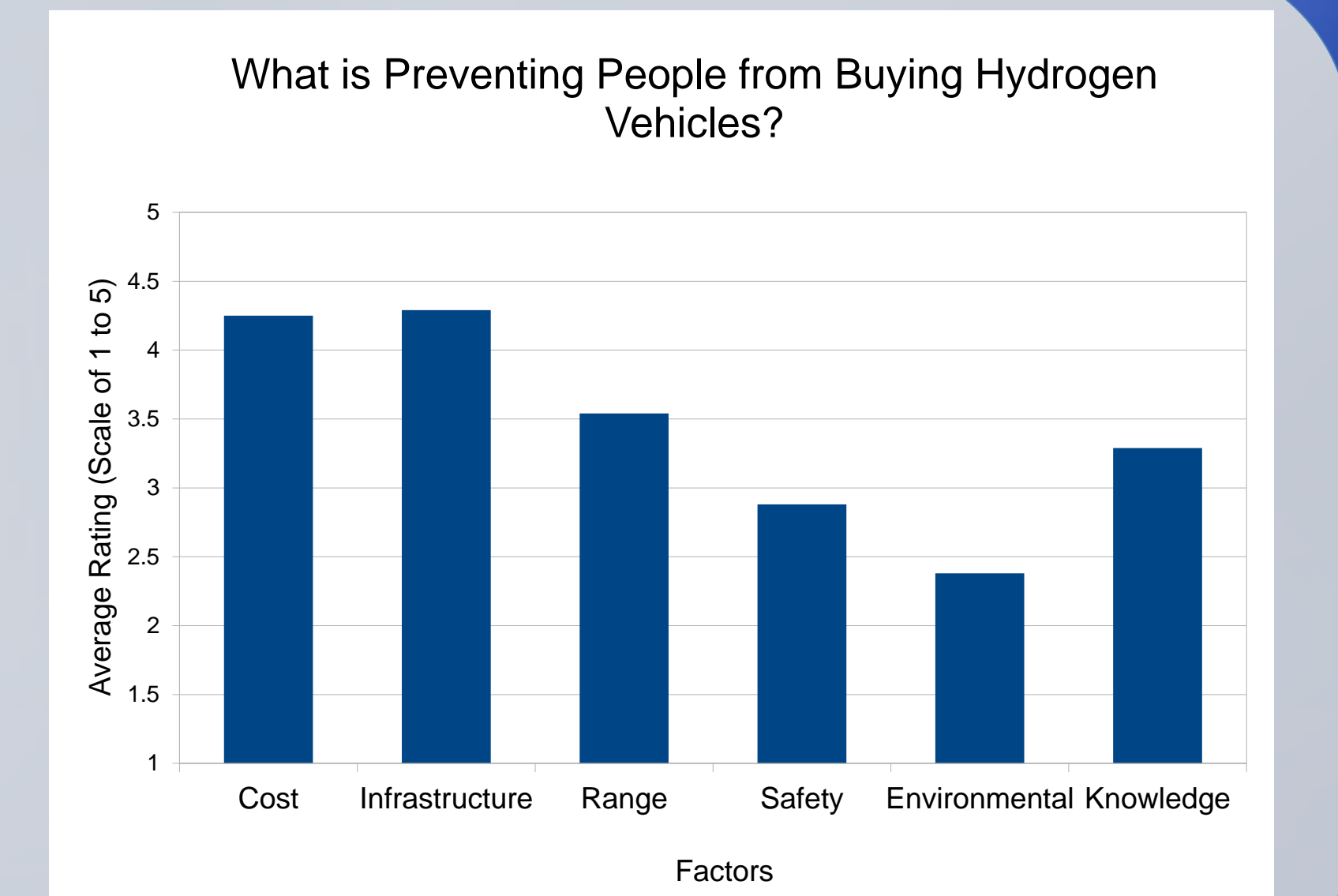
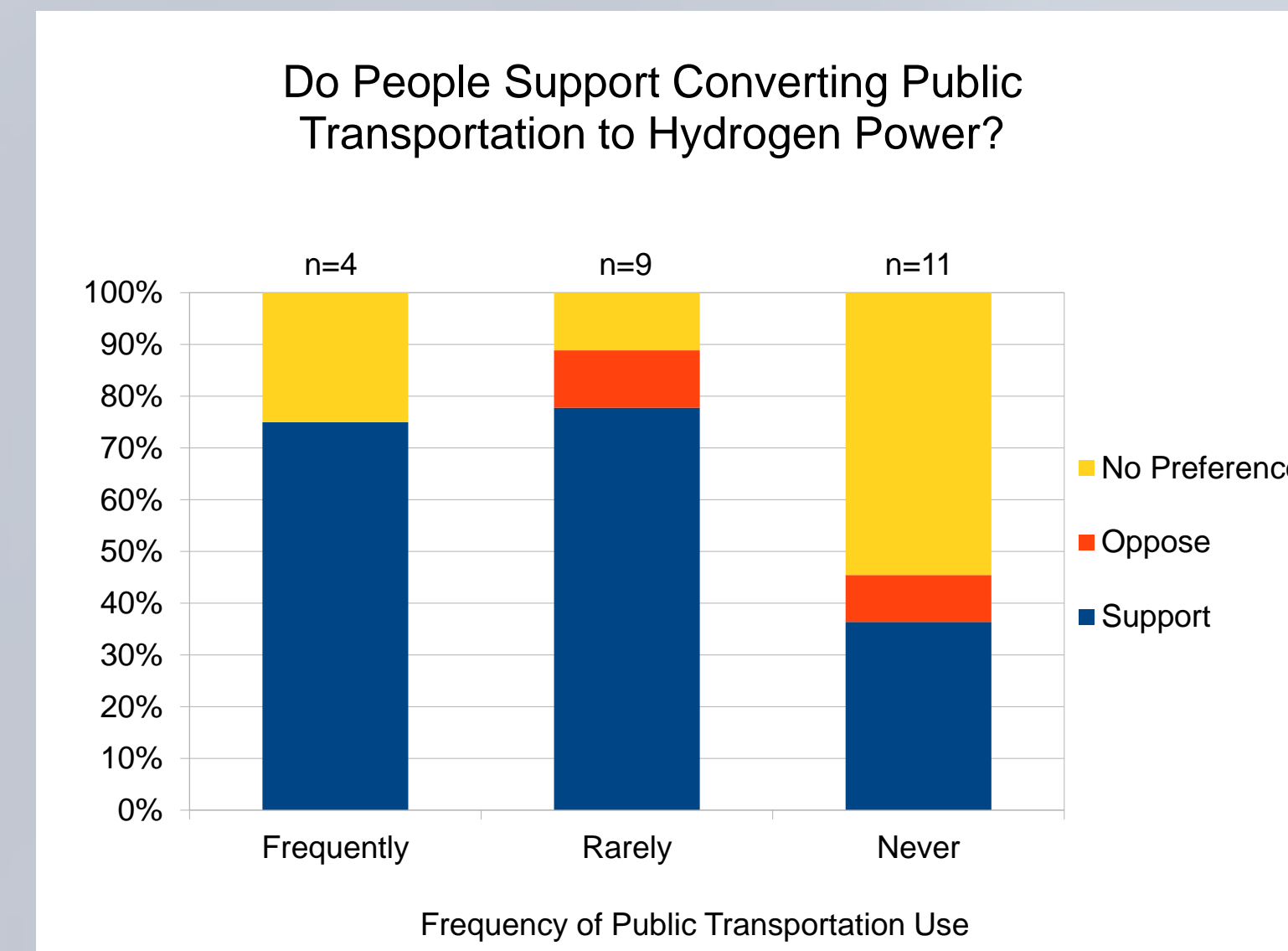
The dependence of the transportation industry on oil based fuels like gasoline and diesel is a major problem in today's world. Comparisons between hydrogen and gasoline cars based on total cost of ownership and carbon emissions were made to decide if a "Hydrogen Economy" was a practical alternative to the current oil economy. It was determined that hydrogen vehicles are a very practical solution to the world's fuel needs in the years to come.

Technology



- Hydrogen is reacted in a PEM (proton exchange membrane) fuel cell to produce electricity and water.
- By making the hydrogen with clean energy, it can be completely sustainable.
- When the hydrogen is stored in a compressed tank the vehicle has a range of 240 miles.

Survey Results



Conclusion

- Storing compressed hydrogen in composite tanks and reacting it in a PEM fuel cell is a viable and sustainable means to powering vehicles.
- The cost of fuel per mile of hydrogen powered cars (4-17cents/mi) is comparable to or better than gasoline powered cars (16cents/mi).
- The environmental impact from the use of these vehicles is far less than any gasoline car on the road today when clean energy sources like wind and solar are used to produce the hydrogen.
- Urban areas that depend heavily on oil for transportation or have issues with vehicle pollution can benefit the most.

Background



- In 1838, the fuel cell effect, which occurs when hydrogen and oxygen are combined to produce water and an electric current was discovered.
- Many major auto companies like Honda, BMW, GM, and others, have all developed concept cars that run on hydrogen.
- The Hydrogen Highway is a functioning system of hydrogen fueled cars and filling stations in California.

Comparison Chart

Hydrogen		Battery		Gasoline	
Pros	Cons	Pros	Cons	Pros	Cons
Vehicle price is almost as low as gasoline (\$21,600). Range is almost as far as gasoline (240mi). Produces non-polluting emissions. Sustainable fuel.	Scarce refueling stations. Fuel is flammable. Fuel is compressed.	Cheapest fuel. Produces no emissions. Sustainable fuel.	Highest vehicle price (\$40,000). Limited materials available for the battery. Long refueling time. Shortest range (100mi).	Lowest vehicle price. Most developed technology. Longest range (300mi). Most energy dense fuel.	Exhaust is a harmful pollutant. Fuel is approaching peak production. Emits carbon dioxide. Must be imported to meet demand. Byproducts of fuel production are pollutants. Fuel is flammable.

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