



ADVANTAGES - DISADVANTAGES

Fuel Cell Today – Education Kit 9

Obviously, fuel cells have various advantages compared to conventional power sources, such as internal combustion engines or batteries. Although some of the fuel cells' attributes are only valid for some applications, most advantages are more general. However, there are some disadvantages facing developers and the commercialisation of fuel cells as well.

Advantages

- Fuel cells eliminate pollution caused by burning fossil fuels; the only by-product is water.
- If the hydrogen used comes from the electrolysis of water, then using fuel cells eliminates greenhouse gases.
- Fuel cells do not need conventional fuels such as oil or gas and can therefore eliminate economic dependence on politically unstable countries.
- Since hydrogen can be produced anywhere where there is water and electricity, production of potential fuel can be distributed.
- Installation of smaller stationary fuel cells leads to a more stabilised and decentralised power grid.
- Fuel cells have a higher efficiency than diesel or gas engines
- Most fuel cells operate silently, compared to internal combustion engines
- Low temperature fuel cells (PEM, DMFC) have low heat transmission which makes them ideal for military applications.

- Operating times are much longer than with batteries, since doubling the operating time needs only doubling the amount of fuel and not the doubling of the capacity of the unit itself.
- Fuel cells have no “memory effect” when they are getting refuelled.
- The maintenance of fuel cells is simple since there are few moving parts in the system.

Disadvantages

- Fuelling fuel cells is still a problem since the production, transportation, distribution and storage of hydrogen is difficult.
- Reforming hydrocarbons via reformer to produce hydrogen is technically challenging and not clearly environmentally friendly.
- The refuelling and the starting time of fuel cell vehicles are longer and the driving range is shorter than in a “normal” car.
- Fuel cells are in general slightly bigger than comparable batteries or engines. However, the size of the units is decreasing.
- Fuel cells are currently expensive to produce, since most units are hand-made.
- Some fuel cells use expensive materials.
- The technology is not yet fully developed and few products are available.