

5 Engineering: The impact of Modern Technologies



Non-negotiable Knowledge (What you need to know)

- Automation and its impact on production
- New technologies impact on society
- New technologies impact on the environment
- Different engineering industries and their impact on society
- Different engineering industries and their impact on the economy

Key words/ terminology

Automation	The creation of technology and its application in order to control and monitor the production and delivery of various goods and services. It performs tasks that were previously performed by humans
Society	A society is a group of individuals involved in persistent social interaction
Finite resources	Resources that will run out. Can not be replaced
Environment	The ecosystem around us
Carbon emissions	Carbon released into the air through production/ industry
Economy	Trade and how it effects a country or internationally

The impact of engineering industries on society and the economy

- The term engineering industry covers all aspects of the development and production of engineered products and systems.
- Engineers should be aware of the impacts of their work on society and the economy



Impact on society

- Engineering industries can impact on society in different ways. some of these are-
- Improving opportunities for local communities.
- changing how people behave on a massive scale.
- An example of this is the mobile phones and communications technology industry.
- Another social impact of engineering industries is on employment. If engineering businesses grows there will be more opportunities for work available. This is not just for engineers, but for all workers that could be involved in a company.



The use of new and emerging technologies – their impact on production, society and the environment

New and emerging technologies are technologies that are either newly available or are in the process of being developed. Examples of these are in the fields of robotics, nano-technology and communications. New technologies can have both positive and negative impacts on the production of products, on society and on the environment.

Impact on the environment

Engineered products require the sourcing of raw materials, which can be damaging to natural habitats. some of these are finite resources, which means they cannot be replaced easily.

Sometimes, the effects on the environment are unintended or unplanned. Think about how many products are oil based/ plastic based.

Eventually plastics end up int the oceans and have massive negative impacts, such as marine left eating the plastics, killing them, or getting back into our food chain.



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Hydrogen fuel cells

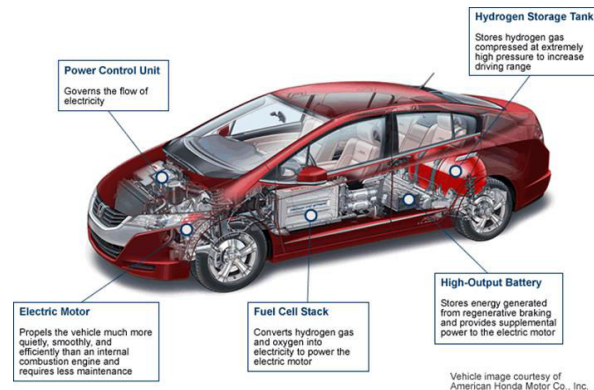
Fuel cells are another way of decreasing pollution and the amount of non renewable energy used. these produce power from chemical reactions between hydrogen and oxygen. They can be used to provide power for building and transport.

Advantages-

- The only by-product is water which does not harm the atmosphere.
- Directly convert energy with little waste. The only waste is pure water and a little heat.
- They have fewer moving parts and are much simpler in construct, making them easier to mass produce and less likely to break.

Disadvantages-

The technology is still developing, and is not fully ready to replace other methods such as petrol and diesel.



Electric cars

Electric cars run at least partially on electricity. Unlike conventional vehicles that use a gasoline or diesel-powered engine, electric cars and trucks use an electric motor powered by electricity from batteries or a fuel cell. Hybrid vehicles also have an electric motor, but aren't considered EVs as they can't be plugged-in.

Advantages-

Much less air pollution and greenhouse gas emissions.

Disadvantages-

More expensive initial upfront purchase costs, however this is made back through long term use.



Nanotechnology

- **Nanotechnology** is a field of research and innovation concerned with building 'things' - generally, materials and devices - on the scale of atoms and molecules
- Some nanomaterials are special coatings use to protect surfaces and resist damage. They can be used on; Sporting equipment: Golf clubs, tennis racquets, lacrosse sticks, socks and phone displays.
- One practical application is in ultra-efficient solar panels, manufactured from nano-crystalline materials, converting sunlight into electricity, very efficiently.



Companies like Siemens have a massive positive impact on our society economy. They specialize in different engineering sectors

Jacobs also have a similar impact with new solutions and technologies