

These pages are taken from the
G4 "Forms of Energy" journal.



Where do we get our energy?

We use energy to travel from place to place and to power devices and appliances. Because electricity is so important, we need to make a lot of it. All the energy and fuel that we use comes from natural resources and their uses affect the environment. Some energy sources that we use are **renewable** and will always be available, such as wind and sunlight. Other sources of energy are called **non-renewable** because they are in limited supply and can run out, such as coal, oil and gasoline. Fuels that we burn to make energy, create pollution and cause Earth's climates to warm.

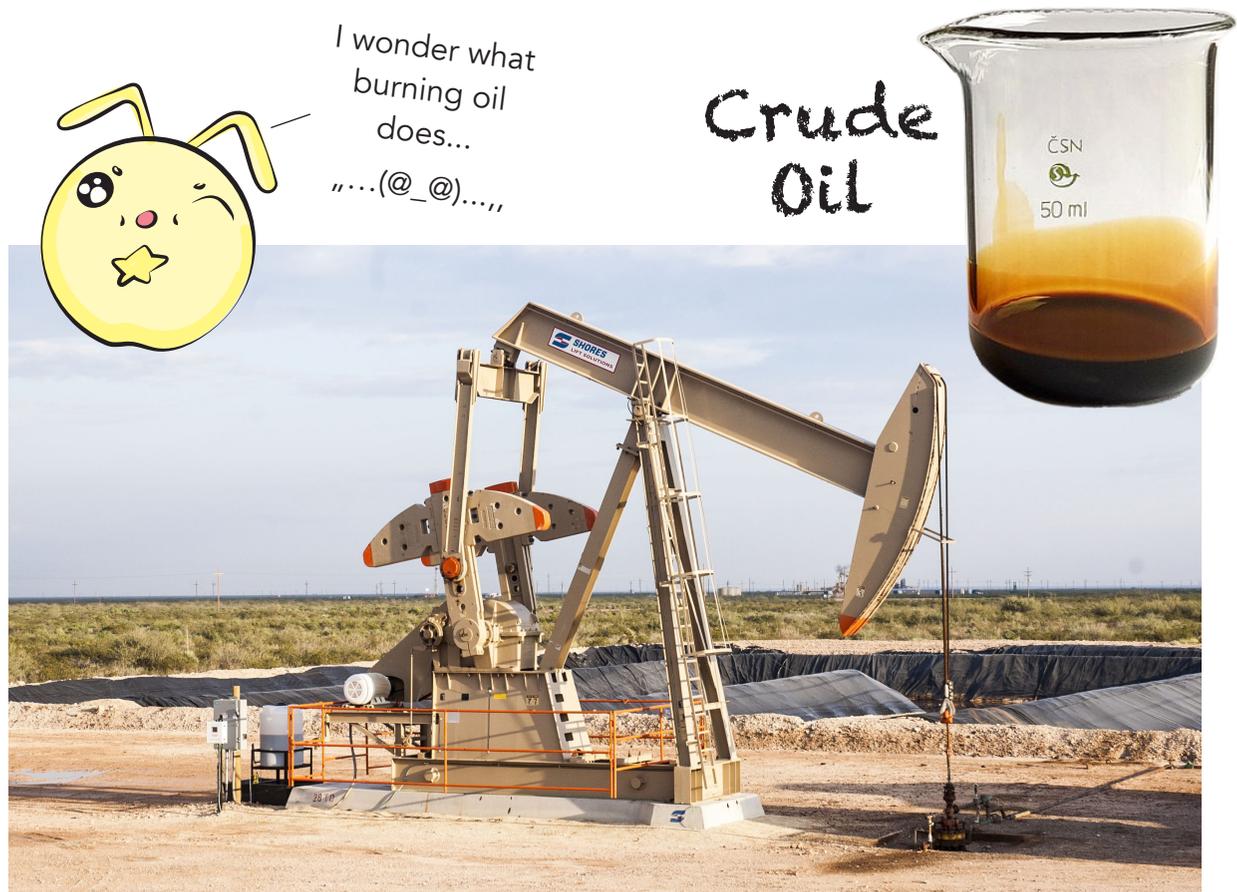


Fuels such as coal, oil and natural gas cause pollution.



Oil and natural gas are burned as fuel

Crude oil is a yellow-black liquid found below the Earth's surface. It forms when organic materials become buried deep under ocean floor sediments and after millions of years, it becomes oil and natural gas. This oil can be refined into **petroleum products** such as gasoline, diesel fuel, kerosene and jet fuel. We commonly use these products for transportation. These are non-renewable resources because we cannot create more of them.



This is a pumping unit that extracts oil from the ground.



How does burning oil affect the environment?

When you burn petroleum products carbon dioxide gas is created. Carbon dioxide is called a **greenhouse gas** because it causes our atmosphere to trap heat created by sunlight. In the last 100 years, burning fuels has caused carbon dioxide levels in the atmosphere to double. This rise in carbon dioxide concentrations has caused Earth's climates to warm. We call this **climate change**, or **global warming**.



Burning fuels impacts the environment

- Global warming is causing Arctic temperatures to rise drastically. Satellites have measured a reduction of almost half of all the summer Arctic ice since satellite measurements started in 1979. All the melting ice is causing sea levels to rise.
- Global warming is also causing ocean temperatures to rise. Sensitive organisms such as corals are dying due to the rise in ocean temperatures. Coral reefs across the world are threatened by global warming.

How can we stop burning so much fuel?



Coal is nonrenewable and creates smog

Coal forms when dead plant matter decays and becomes buried deep underground. After millions of years and under tremendous heat and pressure, the organic materials become coal. We mine coal from the ground and burn it in power plants to produce electricity. Coal is a non-renewable resource that creates greenhouse gasses when we burn it.



I wonder what
burning coal
does...

....(x_x)/*

Coal



This excavating machine digs coal from the ground and loads it into a truck.



How does burning coal affect the environment?

Coal is easy to get and provides an effective way to make electricity; however, burning coal has serious negative environmental and health impacts. To better protect the environment, many countries have reduced or eliminated their use of coal power. The United Nations Secretary General asked all governments to stop building new power plants fueled by coal.



Burning coal has many negative effects

- The use of coal causes premature deaths and respiratory illness.
- Burning coal releases sulfur dioxide gas, nitrogen oxide gas and smog particles which cause acid rain pollution, and lung disease.
- Burning coal produces carbon dioxide which causes global warming. The coal that humans burn produces around 40% of the total fossil fuel emissions.
- Waste material from mines can poison rivers, lakes and ground water. The contamination damages ecosystems and makes people and animals sick.



Splitting atoms makes nuclear energy

We can use nuclear energy to make electricity. Everything around us is made up of teeny-tiny particles called atoms. Nuclear energy holds together the atoms in all forms of matter. We get nuclear energy by breaking apart one atom into two atoms. When this happens, energy is released, and because there are a lot of atoms, a lot of energy is made. The drawback to using nuclear energy is that it creates radioactive waste which takes a long time to decay and is very toxic and harmful to all life.



Nuclear power plants create reactions that break atoms apart and convert their energy into electricity. Scientists are working to make this power source safer.



Clean energy does not cause pollution

An important problem scientists are trying to solve right now is finding new sources of renewable and clean energy. There is a lot of energy in sunlight, wind and rushing water that can be converted into electrical energy. These forms of energy are called renewable sources of energy because they will always be available.

We can make electricity using wind

Wind turbines are used to capture the motion of the wind to make electricity. Wind farms can provide renewable energy in windy places without causing pollution.



Wind energy is a form of renewable energy that does not cause pollution.



We can make electricity using sunlight

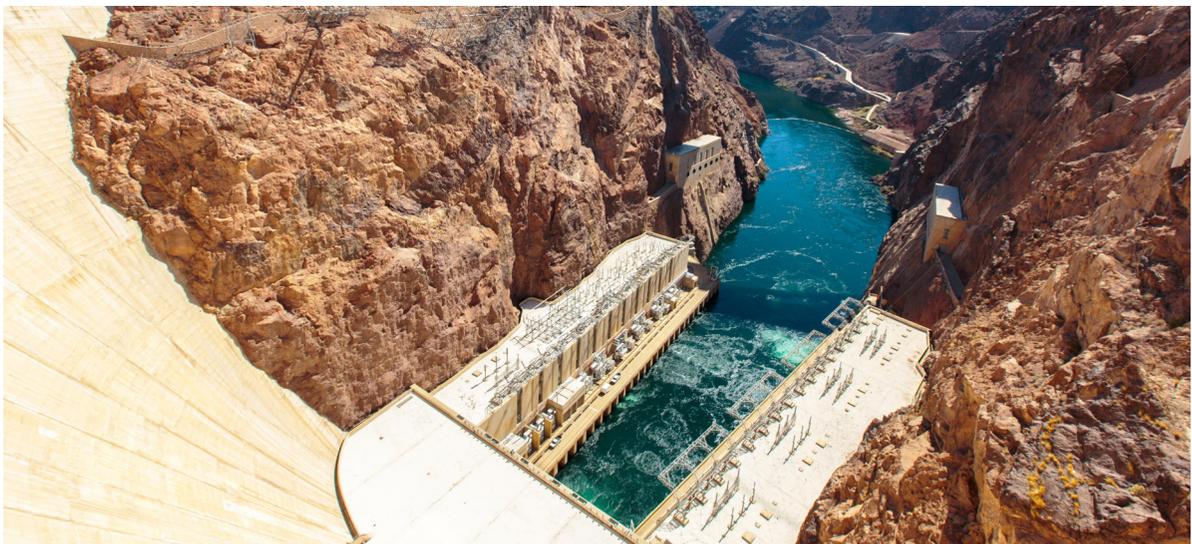
Solar panels capture sunlight and convert it into electricity. This energy is renewable and does not cause pollution.



Solar panels capture the Sun's light to make electricity.

We can make electricity with flowing water

Hydroelectric power plants use the energy in moving water to generate electricity. Moving water is a renewable and clean energy source. However, dammed rivers can impact the environment and disrupt ecosystems.



Hydroelectric power is made at dams such as this one.

What types of energy is the world using?

Humans use a lot of energy for electricity generation, transportation and to heat and cool homes and buildings. The majority of the energy we use comes from non-renewable energy sources such as coal, oil and gas.

2021 Global Total Energy Usage (%)

