

PROSPECTS OF USING FOSSIL FUELS

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Nowadays fossil fuels and nuclear power supply 93% of the world's energy resources. Nuclear energy, which is produced by splitting atoms, covers only 6% of the world's energy resources. This means that coal, oil and natural gas – these are three types of fossil fuels we depend on for most part in our energy needs. All three were formed many hundreds of millions of years ago before the time of the dinosaurs. The age they were formed is called the Carboniferous Period.

Coal is a hard, black colored substance. It is made up of carbon, hydrogen, oxygen, nitrogen and varying amounts of sulfur. There are three main types of coal – anthracite, bituminous and lignite. Anthracite coal is the hardest and has more carbon, which gives it higher energy content. Lignite is the softest and is low in carbon but high in hydrogen and oxygen content.

Coal is mined out of the ground using various methods. Some coal mines are dug by sinking vertical or horizontal shafts deep underground, and coal miners travel by elevators or trains deep underground to dig the coal. Other coal is mined in strip mines where huge steam shovels strip away the top layers above the coal. The layers are then restored after the coal is taken away. The coal is then shipped by train and boats and even in pipelines.

Oil is another fossil fuel. It was also formed more than 300 million years ago. We use oil for a long list of applications, including: transportation fuels, asphalt, military and defense, fertilizer, heating, feedstock, petrochemicals, plastics, solvents. To find oil, companies drill through the earth to the deposits deep below the surface. The oil is then pumped from below the ground by oil rigs. They then usually travel through pipelines or by ship.

Natural gas is mostly made up of a gas called methane. This gas is highly flammable. Natural gas is usually found near petroleum underground. It is pumped from below ground and travels in pipelines to storage areas. Natural gas usually has no odor and you can't see it.

Fossil fuels are used for providing electricity, fueling transportation, heating and cooling. One of the main uses of fossil fuels is to generate electricity. Coal is the number one fuel source for electric generation, accounting for more than half of all resources used. Natural gas and petroleum also contribute their fair share. Fossil fuels are overwhelmingly responsible for fueling our transportation system. Petroleum-based fuels are the standard. Our country's entire transportation infrastructure of pipelines and gas stations is built around fossil fuels. Heating and cooling are also accomplished mainly through the use of fossil fuels like natural gas and oil.

Many of the environmental problems our country faces today result from our fossil fuel dependence. These impacts include global warming, air quality deterioration, water and land pollution, thermal pollution, and acid rain.

Global warming. Among the gases emitted when fossil fuels are burned, one of the most significant is carbon dioxide, a gas that traps heat in the earth's atmosphere. Over the last 150 years, burning fossil fuels has resulted in more than a 25 percent increase in the amount of carbon dioxide in our atmosphere. Climate scientists predict that if carbon dioxide levels continue to increase, the planet will become warmer in the next century. Projected temperature increases will most likely result in a variety of impacts. In coastal areas, sea-level rise due to the warming of the oceans and the melting of glaciers may lead to the inundation of wetlands, river deltas, and even populated areas.

Air Pollution. Clean air is essential to life and good health. Several important pollutants are produced by fossil fuel combustion: carbon monoxide, nitrogen oxides, sulfur oxides, and hydrocarbons. All these gases are important constituents of acid rain and smog, or tropospheric ozone. Human exposure to ozone can produce shortness of breath and, over time, permanent lung damage.

Water and land pollution. Production, transportation, and use of oil can cause water pollution. Oil spills, for example, leaving waterways and their surrounding shores uninhabitable for some time. Such spills often result in the loss of plant and animal life. Coal mining also contributes to wa-

ter pollution. Coal mining, especially strip mining, affects the area that is being mined. Characteristically, the material closest to the coal is acidic. After the mining is completed, the land will remain barren.

Thermal pollution. During the electricity-generation process, burning fossil fuels produce heat energy, some of which is used to generate electricity. Because the process is inefficient, much of the heat is released to the atmosphere or to water that is used as a coolant. Heated air is not a problem, but heated water, once returned to rivers or lakes, can upset the aquatic ecosystems.

Acid rain. The principal cause of acid rain is sulfur and nitrogen compounds from human sources, such as electricity generation, factories, and motor vehicles. Coal power plants are one of the most polluting. The gases can be carried hundreds of kilometres in the atmosphere before they are converted to acids and deposited. In the past, factories had short funnels to let out smoke, but this caused many problems locally; thus, factories now have taller smoke funnels. However, dispersal from these taller stacks causes pollutants to be carried farther, causing widespread ecological damage.

Clearly fossil fuel reserves are finite – it's only a matter of when they run out. Globally – every year we currently consume the equivalent of over 11 billion tonnes of oil in fossil fuels. Crude oil reserves are vanishing at the rate of 4 billion tonnes a year – if we carry on at this rate without any increase for our growing population or aspirations, our known oil deposits will be gone by 2052.

We'll still have gas left, and coal too. However, if we increase gas production to fill the energy gap left by oil, then those reserves will only give us an additional eight years, taking us to 2060. But the rate at which the world consumes fossil fuels is not standing still, it is increasing as the world's population increases and as living standards rise in parts of the world that until recently had consumed very little energy. Fossil fuels will therefore run out earlier.

It's often claimed that we have enough coal to last hundreds of years. But if we step up production to fill the gap left through depleting our oil and gas reserves, the coal deposits we know about will only give us enough energy to take us as far as 2088.

So, does 2088 mark the point that we run out of fossil fuels? The simple answer is no. Some new reserves will be found which will help extend this deadline slightly, but these can't last forever. New reserves of fossil fuels are becoming harder to find, and those that are being discovered are significantly smaller than the ones that were found in the past.

Take oil, for example. We're probably already on a downward slope. Sixteen of the world's twenty largest oil fields have already reached their peak level of production (the point at which they are producing their largest annual oil yield), whilst the golden age of oil field discovery was nearly 50 years ago.

Renewables offer us another way, a way to avoid this (fossil fuelled) energy time bomb, but we must start now. As the Saudi Oil Minister said in the 1970s, "The Stone Age didn't end for lack of stone, and the oil age will end long before the world runs out of oil."

References

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