

# COAL COMBUSTION

Coal has a poor reputation in today's environmentally conscious society. Despite a long history of providing many areas of the world with reliable electricity, reports keep appearing that state the need to do away with coal as a source of energy. Where is all this negativity coming from? Ontario is currently phasing out coal entirely, a process which should be completed by 2014. A look into the environmental impacts of coal mining and electricity generation explains this growing dislike for coal, especially as an energy source.

Using coal as a source of energy is a process that requires many steps, all of which have varying degrees of environmental ramifications. The process of coal extraction begins with site exploration, and already at this phase, before the land is actually being used as a mine, the environment is subject to disruptive changes. Exploration grids used to survey potential sites can permanently alter the landscape, and low-flying aircrafts are often used which, albeit minimally, disturb wildlife and people. However, satellite exploration can also be used and is completely harmless to the environment.

Sometimes transportation routes to and from a mine are not already in place, and building roads or railroads is necessary. Along with the actual mine site, these routes disrupt wildlife and affect nearby communities. The type of mine used also influences the degree of damage. There are relative environmental advantages and disadvantages to different mining methods; for example, underground mining produce less waste rock than surface mining, but there is more oxidation of exposed material. Underground mining for coal has decreased substantially, from 25% in 1970 to less than 5% by 1986. Today, 90% of Canada's coal is mined in surface mines, which are less dangerous for workers but produce large amounts of waste rock and dust pollution.

The major problem people have with coal as a source of energy is the bi-products released into the atmosphere during the combustion process. Greenhouse gas emissions are considered the leading cause of global climate change, and the coal combustion process emits large amounts of two major greenhouse gases, carbon dioxide and methane. The Kyoto Protocol, which was negotiated in 1997 and fully implemented in 2005, requires that industrialized countries reduce their greenhouse gas emissions. This stipulation has been a driving factor behind many country's decisions to reduce or fully eradicate the use of coal for energy.

Coal combustion also produces solid waste, such as fly ash, which must be collected and stored or safely disposed of. In the United States, fly ash is collected from the chimneys of coal plants and most of it is stored in landfills. About 43% is recycled and can be used in concrete production. However, solid wastes may contain toxic elements such as arsenic and lead, so recycling fly ash has brought about health concerns. In addition, the fly ash retaining facilities on the mine sites can be extremely destructive to the area if not properly contained, which was seen when a fly ash containment area at the Kingston Fossil Plant collapsed in 2008, spilling toxic sludge over land and into nearby waterways. Drinking water for almost 25,000 residents was contaminated and the aquatic life of the area was destroyed. Large mishaps such as the Kingston Fossil Plant spill only add to coal's negative image.

Despite the many environmental concerns, coal continues to be used today. In Ontario, the original target date for complete coal eradication was 2009. Yet this plan was quickly discovered to be unfeasible due to the inconsistent rate of power generation of renewable energy sources such as wind turbines and solar PV panels, as well as the higher cost of these same energies. Coal is still the cheapest form of energy, with a rate of about \$0.045/kWh (compare to the next cheapest: nuclear energy at \$0.05/kWh).

So instead of phasing out coal completely worldwide, countries are investing money into cleaner methods of coal use in terms of better mining practices, carbon capture and storage technologies, and clean coal. For the time being, we are accepting the negative environmental impacts of coal in order to meet energy demands and keep costs down, but Ontario is currently demonstrating that a complete phase out of coal is a feasible reality for the near future.

Source: <http://www.sassweb.ca/3bb3/volume1-0/coal1-0/sorry-santa-were-phasing-out-coal>