

The Basics of Coal

BACKGROUND

Coal is a nonrenewable resource composed of hydrocarbons, and like all fossil fuels forms from the combination of heat and pressure underground over a span of hundreds of millions of years. America possesses roughly 27%¹ of the world's recoverable coal supply,² and energy suppliers use more than 90% of this coal to produce and convert thermal energy into electricity.³ Unfortunately, coal is also the dirtiest energy source available, tearing up the land, polluting waters, devastating communities, and exacerbating global warming.

COAL MINING

Coal mining companies use surface and underground mining to extract coal in the U.S. Surface mining accounts for roughly two-thirds of mining production.⁴ With machines removing the top layer of the earth, surface mining not only dramatically alters the landscape, but also results in large amounts of waste that is often pushed into streams. In Appalachia coal companies blow off the tops of mountains to reach thin streams of coal below. This most destructive form of mining, known as mountaintop removal coal mining, has already damaged or destroyed more than 1,200 miles of streams, disrupted drinking water supplies, flooded communities, eliminated forests, and destroyed wildlife habitat.⁵ Underground mining accounts for the other third of mining and occurs at depths more than several hundred feet below ground. Following the mining process, water can become contaminated by entering abandoned mines, combining with toxic heavy metals and minerals, and then leaking out to pollute groundwater and streams.

In addition to destroying lands and waters, mining coal releases significant amounts of methane – a global warming gas more than 20 times as potent as carbon dioxide – into the atmosphere.⁶

CONVERTING COAL TO ELECTRICITY

Coal-fired power plants burn millions of pounds of coal each year to convert thermal energy to electricity. Burning coal releases stored carbon and contributes roughly 40 percent of America's carbon emissions, the most common global warming gas.⁷ Although coal-fired power plants generate about half of America's electricity, they contribute 80 percent of greenhouse gases that result from energy.⁸ In fact, each addition of a new coal-fired power plant to our energy supply is the equivalent of putting 600,000 new cars on the road.⁹



Coal burning emits other pollutants as well, including nitrogen oxides and sulfur dioxide, which lead to deadly soot and smog pollution as well as acid rain. Coal-fired power plants are also one of the largest sources of toxic mercury pollution,¹⁰ putting unborn children and infants at risk for brain damage, mental retardation, and other developmental problems.¹¹ Mercury pollution has also been linked to increased risk of coronary heart disease in men.¹²

After electricity is generated, coal-fired power plants leave behind coal-combustion wastes amounting to 120 million tons of solid wastes every year.¹³ Most of this waste resides in landfills, abandoned coal-mine sites, or surface impoundments (typically on-site locations at power plants that store liquid wastes). The dangers of this waste include potential water leakage of lead, mercury, and other toxic chemicals from storage sites that can harm humans when they are exposed to contaminated soil, inhale polluted dust, or eat plants and animals that have been exposed. Symptoms of such exposure include organ disease, increased cancer, respiratory illness, neurological damage, and developmental problems.¹⁴

LIQUID COAL

Coal-to-liquid technology refers to the process of refining and converting coal into transportation fuels. Many coal proponents purport this technology as an adequate solution to our dependence on foreign oil. However, liquid coal is inefficient, uses large amounts of water in dry areas of the United States, damages air and water quality, and is energy intensive. Additionally, liquid coal emits double the global warming pollution of petroleum fuel.¹⁵

THE PROMISE OF “CLEAN COAL” TECHNOLOGY

Although many coal proponents have been pushing so-called “clean coal” technology as a solution to global warming and pollution problems resulting from coal-fired power plants, the truth is that “clean coal” does not exist. Although there is talk about technologies like carbon sequestration, coal gasification, and enhanced oil recovery, there are no technologies in place today that deal with the range of environmental problems associated with coal use, including global warming pollution.

SIERRA CLUB RECOMMENDATIONS

There is nothing clean about coal-fired power plants—from being the largest source of toxic mercury pollution to releasing 40% of our nation’s total carbon dioxide emissions every year, coal-fired power plants are the dirtiest source of energy we use today. While we will not be able to wean ourselves off of coal tomorrow, we should begin moving beyond coal energy and cleaning up the existing plants that are the worst polluters. A truly cleaner and healthier energy future relies on smart solutions, like efficiency and renewables, that can create jobs and boost the economy, all while protecting public health and fighting global warming.

FURTHER RESOURCES

- Sierra Club’s *Dirty Truth About Coal* Report (<http://www.sierraclub.org/coal/dirtytruth/>)
- The Cost of Coal Globally: http://assets.panda.org/downloads/ipcc_wg3_coal_costs_briefing.pdf

¹ Energy Information Administration. (May-July 2006). *International Energy Annual 2004*, Table 2.5. <http://www.eia.doe.gov/oiaf/ieo/pdf/coal.pdf> (Accessed 1/26/08)

² Energy Information Administration. (May-July 2006). *International Energy Annual 2004*, Table 2.5. <http://www.eia.doe.gov/oiaf/ieo/pdf/coal.pdf> (Accessed 1/26/08)

³ Energy Information Administration. (2006). *Annual Coal Report*. http://www.eia.doe.gov/cneaf/coal/page/acr/acr_sum.html (Accessed 1/29/08).

⁴ Energy Information Administration, “Coal: A Fossil Fuel.”

⁵ U.S. EPA, “Draft Programmatic Environmental Impact Statement,” 2003 and “Final Programmatic Environmental Impact Statement,” October 2005.

⁶ US EPA, “Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004,” April 2006.

⁷ Environmental Protection Agency. (April 2007). *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005* Based on calculation of CO2 emissions from tables 3-1 and 3-3. <http://epa.gov/climatechange/emissions/usinventoryreport.html> (Accessed 1/29/08)

⁸ Department of Energy & Environmental Protection Agency. (July 2000). *Carbon Dioxide Emissions from the Generation of Electric Power in the United States*. http://www.eia.doe.gov/cneaf/electricity/page/co2_report/co2emiss.pdf (Accessed 1/29/08).

⁹ Union of Concerned Scientists. (July 2007). *The Costs of Coal*. http://www.ucsusa.org/clean_energy/fossil_fuels/costs_of_coal.html (Accessed 1/29/08).

¹⁰ U.S. EPA, “EPA to Regulate Mercury and Other Air Toxics Emissions from Coal and Oil-Fired Power Plants,” December 14, 2000.

¹¹ Agency for Toxic Substances and Disease Registry, “ToxFAQs for Mercury,” April 1999.

¹² American Heart Association. *Mercury...and Coronary Heart Disease*. <<http://atvb.ahajournals.org/cgi/content/abstract/25/1/228>>

¹³ National Research Council, “Managing Coal Combustion Residues in Mines,” 2006.

¹⁴ Ibid; See also US EPA, “Report to Congress: Wastes from the Combustion of Fossil Fuels Volume 2,” 1999.

¹⁵ American Association for the Advancement of Science. (June 2007). *AAAS Policy Brief: Coal-to-Liquid Technology*. <http://www.aaas.org/spp/cstc/briefs/coaltoliquid/> (Accessed 1/26/08).