

Coal: A Foul Fossil Fuel

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OUTLINE

- I. Introduction—Coal is the second largest industry in energy producing, and the dirtiest, having little enforced regulations.
 - A. Coal creates job, but wreaks havoc on the environment.
 - B. What regulations should be set and enforced?
 - C. Renewable resources may be the answer.
 - D. Thesis: An old fossil fuel could not clean up enough to compare to the efficiency of renewable resources.
- II. Body
 - A. History and problems with coal.
 1. Emissions and other environmental concerns.
 2. Contaminations and risks to health.
 - B. Pros for coal usage.
 1. Regulations set by EPA.
 2. By-products.
 - C. Argument against coal power.
 1. Environmental concerns and health issues.
 2. Non-renewable resource.
 3. FutureGen2.0 failure.
 4. Cost of clean coal facilities.
 - D. Renewable energy sources
 1. Wind power.
 2. Solar power.
 3. Biomass and landfill gases.
 4. Hydropower and ocean wave.
- III. Conclusion
 - A. Review definition of dirty coal.
 - B. Review reasons why America continues to use coal.
 - C. America should look to renewable resources and stop wasting money on one of the dirtiest resources in the energy business.

“We are now in the age of the extreme sports of fossil fuel extraction—mountain-top renewal, fracking, Arctic drilling. Why? The sun comes up every day and it provides more energy than we need” (Fionn, R., 2015, personal communication).

Kumi Naidoo, director of Greenpeace, spoke about climate change, ISIS and his last year as director. He proclaims that coal is one of three foulest fossil fuels the world uses to create energy. Coal, oil and gas are the three dirtiest and yet most widely used sources of energy. Americans literally kill the environment and themselves trying to get the resources out of the ground, and when the energy-making process finally starts, the effects are even more toxic (Goodman & Gonzales, 2014). The waste is dirtying the environment with the coal ash and sludge left over from the process at approximately 440 plants in America today (Manuel, 2009). Coal mining, processing for power, and clean-up provide many jobs for citizens and the companies that employ them are getting richer while the waste piles up. In fact, the nation's second largest energy producer, Duke Energy, just dumped 39,000 tons of coal ash and twenty-seven million gallons of slurry into the Dan River in North Carolina in February this year, largely due to shoddy regulations and enforcements. The third-largest spill in the United States sprang environmental activists, attorneys, and citizens into action (Zucchini, 2015). Coal ash is the hazardous by-product of burning coal, and slurry is a waste product of mining coal. The coal industry has been dumping unregulated waste having catastrophic effects (“Glossary,” 2014). Many sources of water have been contaminated, not just the Dan River. Groundwater has been contaminated by the leaks of the slurry ponds near homes, and wellwater near the sites is not

safe for residents to drink. Such accidents have finally prompted legislators to incorporate strict new regulations for the industry since, but is it enough? Should America keep feeding the old dinosaurs that costs so much to mine and clean up, or should America fund more projects that focus on renewable energy? A focus on renewable resources would ensure a continuous energy future for America.

Since federal funding to clean up the coal industry has been less than successful, and the environmental along with health issues keep building, renewable resources for power must become the focus. There is a serious debate about the coal controversy, topics including what kinds of regulations the Environmental Protection Agency (EPA) will enforce now that they have been set by the federal government. Other topics include using green resources to power the earth. A combination of solar, wind, geothermal, biomass, and hydropower will provide “more than enough energy for all of us,” says Rhiannon Fionn, the “Queen of Coal Ash” and creator of *Coal Ash Chronicles*. That “mix,” she says, “will ensure every place is able to use the type of energy best suited to the area,” (Fionn, R., personal communication, 2015).

Despite the fact that people have been using coal since the thirteenth century, the way it is used is crippling the environment and has devastating results to human health. The CO₂ released, carbon dioxide, is a gas that destroys the ozone and causes global warming. If emissions of CO₂ continue at the same rate for another fifteen years, emissions will equal all the emissions from 1750 to 2000. Sulfur dioxide, SO₂, is another compound released that caused acid rain and brought about an environmental awareness to the effects of the industry in the 1980's (Sherwood, 2010). Strip mining destroys the landscape, and coal ash settles in the air around the plants. The by-product waste is sometimes recyclable, but mostly rejected by

companies that want to use it because of the high levels of toxins found in it, afraid that the EPA may classify it as a hazardous substance (Hunter, 2014). Many plants in the U.S. date back to the 1950's and are just not equipped with machines or technology that can regassify the toxic gases into useful by-products, leaving them to simply escape into the atmosphere (Sherwood, 2010). Many of the ponds that hold the waste ashes and slurries are not lined, which allows the toxins to simply escape into the groundwater and other water sources. In 2012, Jared Saylor, an agent of Earth Justice, a national environmental advocacy group, stated that the chemicals found in coal ash cause “cancer, birth defects, organ damage, and other health issues” (qtd. in Neville & Power, 2012). He is quoted in *Business Source Complete*, stating that there are “nearly 200 proven cases of contamination in dozens of states...state regulations are not effective in protecting public health and the environment” (qtd. in Neville & Power, 2012).

Coal is dirty in all processes, but America continues the fight for cleaning it up. The federal government has passed a “Subtitle D” to regulate new laws about storing and removing coal waste products. The EPA is helping the states to enforce regulations to be set by states individually. This shift in power could likely hold progress on what the rules *are*, however. There are guidelines the new subtitle requires, keeping the states busy for a while, and buying the coal companies some time to clean up refuse and refuse storage sites. Mary Ann Hitt of the Sierra Club, director of the Beyond Coal Campaign, says that the regulations are a “modest first step,” (qtd. in Hunter, 2014) but leave people to act solely to defend against the big utility companies, who have “historically ignored public health in favor of delayed reaction” (qtd. in Hunter, 2014). The new regulations include closing unlined surface storage of ashes or transferring them to lined ponds. Utility companies will have to use ash catchers. They will be

required to submit results of pollution testing in and around sites regularly. The EPA ultimately has the final say in the solid-waste management plans set forth by each state. Under these rules, coal ash and slurry are not classified as being hazardous to the environment. “Subtitle C” would have named the waste hazardous; thus, enforcement would be commenced by the EPA; activists and citizens claim that the substances are toxic, but the government will not agree (Hunter, 2014). Regardless of new regulations, citizens will always have the right to defend their environmental needs with the help of attorneys and activists (“EPA Coal Ash Rule,” 2015).

Coal energy produces around 131 million tons of waste, according to data in 2007 (Manuel, 2009). Forty-three percent of the waste goes on to the slurry ponds or dry-ash storage to await the new use in concrete mixes and wallboards. The American Road and Transportation Builders Association says that without ash, \$105 billion in taxpayer money would be spent over the next twenty years building roads, bridges and runways (Hunter, 2014). The world's only completely clean coal plant in Saskatchewan, Canada, pumps CO₂ back into the ground rather than releasing it into the atmosphere. The reason is oil. Pumping the gas actually permits the oil retrieved to increase from 500 to 15,000 barrels per day (Meader, 2015).

Even with the uses found for the waste, it has to sit somewhere or dry somewhere before the recycling application can be performed. That is how the largest environmental accidents involving the waste have happened. In 2008, the Tennessee Valley Authority accident left 5.4 million cubic yards of coal ash and slurry over a half-mile square after bursting through a dirt dam. Damages included loss of around six homes, blocked roads and train tracks, and a “stagnant gray muck” over the ecosystem of the Emory River. (See Figure 1 on next page.)



Figure 1—Tennessee Valley before spill in 2008, post spill, and current views.
Aerial series image. Retrieved from

http://www.epakingstontva.com/website_components/images/AerialSeries.jpg

Shortly afterwards, Alabama had a smaller spill of 10,000 gallons into a creek. Next, Maryland and West Virginia both had similar spills (Pearl, 2009). Then in February of 2015, Duke Energy also committed environmental homicide with the second largest spill in U.S. History on the Dan River. Activists, citizens and attorneys have gotten involved after eye-opening events. Duke was recently required to pay criminal fines, community service fees, and wetland protection funds totaling about \$102 million, but the ponds are still leaking. Three million gallons of coal ash water seep at roughly 200 leaks, adding potential threat to groundwater. Duke has started delivering bottled water to 123 residents after well water testing revealed levels of arsenic and other compounds that make the water unsafe for drinking or cooking. This decision on Duke's

part has nothing to do with the contamination because they claim the substances are naturally occurring elements. A spokeswoman from Duke states that they are using this as a temporary solution while they work to close the ponds that are not lined (Zucchini, 2015). In Alaska “in almost every case, the level of toxic chemicals were found to be significantly higher than background soils in Fairbanks...arsenic concentrations more than 100 times higher...mercury found at 70 times higher...enough to be a concern if inhaled in the form of windblown dust,” (Hughes, 2012). In pictures from around the web, a black blanket of snow covers the ground around coal-fired plants, and residents are concerned about their health. One resident recently died before her story could be published. Rosa deLima's blood contained high levels of selenium, probably as a result of her growing up next door to a coal plant.

Coal reserves are expected to run out in 250 years, which leaves America to find other sources. Annual coal consumption in the U.S. in 1913 was an average of 469 metric tons annually, a rise close to 400% since 1870. The reserves are found in the most populated countries around the globe, which suits the high energy consumption for those areas. Another reason for the high consumption rate is that fuel gas and oil can be produced from coal, making the transition from mine to plant more efficient. Using coal at the high rate the world requires will certainly deplete the reserves rather quickly (Sherwood, 2010).

Bush called into action a program designed to clean up coal energy called FutureGen2.0. Later, Obama picked the program up and invested governmental funds in 2009. After the program spent almost \$6 billion in federal funds and another \$2 billion in tax credits were given, the project has come to a halt. Another \$650 million in private funds would be needed for the projects to come to fruition. Plants in Texas, California, and Mississippi struggle to stay on track

with operations designed to realize clean-coal technology. Most have missed completion target dates and suffered severe lacks of funding from the very Washington officials who designed and implemented the plan. “Shaping modern energy systems rather than retrofitting an old clunker,” decides Ron Meader of the *Minnesota Post*, could be accomplished if investments were redirected to “renewables, efficiency, conservation, and other initiatives,” (2015). Even though it may seem a lost cause, the Department of Energy stated that it acquired valuable and information and benefits from the work done so far, and the department is still committed to funding efforts for carbon capture development and environmentally-sound release of the gases (Cama, 2015).

America could, in fact, harness the power of renewables like wind, solar, water, and gas technologies, creating a perfect mix of renewable resources that are locally found and locally used without damage to the environment. These resources and more are guaranteed to last millions of years, but the cost of generators to propel the energy may have a harmful effect on the environment and wallets, yet nothing like the damage done by fossil fuels. Burning any type of fossil fuel leads to contamination in the environment. Scientists believe that emission gases from the burning are an exceeding cause of global warming (“Fuels of the Future,” 2014).

Wind energy is produced by a turbine with rotating blades harnessing the kinetic energy of wind and transmitting it into electricity (“Frequently Asked Questions,” n.d.). Wind power is a major domestic contender, employing workers for installation and ongoing maintenance; the only drawback would be the parts being assembled in other countries. States should start looking further into the manufacture of the components, potentially keeping the industry even more viable to the U.S. Economy (Sterzinger, 2009). The only potential risk to the environment

with wind power is the occasionally winged creature that gets swept up in the turbines.

Large-scale solar plants have been erected in places that naturally receive sunlight. The sun's rays can be used traditionally, generating electricity from photovoltaic cells, or in a thermal method that heats water to produce steam then electricity. The cells are becoming less costly to produce, and even regular citizens have captured solar energy rather cost efficiently in recent years. Even in less sunny areas like the UK, power plants can generate power through power stations and rooftop cells. The town of Working saves around a million pounds yearly on fuel costs, and even produces a large sum of pure water as its “waste product,” (“Fuels of the Future”, 2014).

Biomass energy comes from several sources, including landfills and waste from plant and animals. In recent years, trapping gases such as methane from landfills has been used to produce this form of green energy. Any decaying organic waste produces gases that can be converted into electricity. Although landfills are the main source of the power, some industries that use plant products can convert the waste into energy. Biomass is one of the most commonly used green energy practices today because of the cleaner, more energy-efficient burning than that of fossil fuels, but one of the least underdeveloped. Public and political awareness of the exact usefulness lacks. Costs involved with starting a biomass business is also a drawback (“Fuels of the Future,” 2014).

Along with biomass, hydroelectricity is most commonly used. Turbines spin in waterways and produce clean energy, for the most part. The only real risks are a concern for the safety of fish and birds that may get trapped in the turbines and maybe the release of CO₂ from heavy vegetation in dam areas of rivers (“Fuels of the Future,” 2014). Current research is

being conducted to reduce the potential harm to ecosystems (“Renewable Energy Sources,” 2015). Very similar to hydroelectricity is wave energy from the ocean. Tides and waves create mechanical energy with their movements and sometimes create pure water safe for drinking, depending on the technology. Some ecosystems can be harmed as in the same way a dam can potentially harm them. Currently, though, technology is limited and not very efficient.

At the end of the day, coal is still lighting most homes, despite its reputation for being so disgusting. Since the world has not created a method of energy production capable of allowing to cease coal’s usage, ways to make the process a bit healthier are the next step. Coal is what has been powering the world for centuries, and it probably will not be easy to rid of the old dinosaur. Environmental issues have recently come to light with spills and health cases proving the dangers to the population and Earth, but the use of coal is now regulated and the situation is continuing to improve. Better, greener solutions to a problem of running out of high-cost fossil fuels are met with renewable resources. Funding for the right resources will open up a lifetime of power at no cost to human health and virtually no consequences for the investment. The process of dealing with coal can be cleaned up, but it will not ever surpass the capabilities of focusing on renewable resources for America’s energy future.

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