

Dirty and Dangerous: Damages to Health from Coal-Fired Power Plants

SUMMARY

Burning coal for energy comes at a significant cost to human health. Coal's serious adverse health impacts are broadly accepted by scientific and medical communities and include: developmental/neurological damage in babies even before birth and in older adults; respiratory illnesses and lung cancer; heart disease; stroke; and premature death. Infants, children and the elderly are at greatest risk.

COAL COMBUSTION PRODUCES MANY HARMFUL POLLUTANTS

Burning coal produces many dangerous emissions that pollute our air and water. While carbon dioxide from coal combustion is well known as a major contributor to climate change, other emissions contribute to air pollution that can harm human health.

These emissions include **Sulfur Dioxide (SO₂)**, **Nitrogen Oxides (NO_x)**, **Particulate Matter (PM_{2.5}, PM₁₀)**; and **Mercury** and other toxic chemicals such as **Lead** and **Arsenic**. Sulfur dioxide and nitrogen oxides create unhealthy smog and ozone pollution.

Coal plants are responsible for:

- 66% of SO₂ emissions in the United States;
- 25% of NO_x emissions;¹ and
- 42% of all mercury emissions.²

Coal plants are the largest industrial emitter of mercury³ and the single largest source of unregulated mercury emissions in the United States.⁴

HEALTH IMPACTS

Exposure to emissions from coal-fired power plants can be extremely harmful to human health – even deadly.

- Major organ systems in the human body – the brain, heart and lungs – are damaged by coal pollution, which contributes to four of the five leading causes of mortality in the United States: heart disease, cancer, stroke and chronic lower respiratory diseases.⁵

And mortality is only the tip of the iceberg when accounting for the health consequences of burning coal. Pollution from coal plants also contributes to unnecessary high incidence of life-altering illnesses in both children and adults.

Neurological Impacts

Mercury is a potent neurotoxin. When women are exposed to mercury during pregnancy, it can be passed to the developing fetus. Harm to infants and young children includes: **developmental delays; reduced neurological test scores; mental retardation; reduced IQ and permanent loss of intelligence; and, at high levels of exposure, cerebral palsy.**⁶

- Over 600,000 babies born each year – more than 15% of annual births – have elevated blood mercury levels high enough to damage IQ levels.⁷

Humans are also exposed to mercury through the consumption of fish from water contaminated by coal plant pollution. The Environmental Protection Agency reports that all 50 states have mercury advisories warning against consumption of fish



contaminated by mercury. In 35 of these states, the advisories pertain to fish in all waters statewide.⁸

Air pollution from coal plants has also been linked to harmful effects on cognition and behavior in children and to the risk of childhood autism.

There is a correlation between coal-related air pollutants (SO₂, NO_x, PM_{2.5}, PM₁₀) and ischemic stroke, which represents 87% of all strokes.

The elderly, people with high blood pressure, and people with diabetes are at greatest risk.⁹

- Almost 800,000 people suffer ischemic strokes each year, 140,000 of which are fatal.

Respiratory Impacts

Fine particles (PM_{2.5} and PM₁₀) are responsible for a variety of respiratory problems. PM_{2.5} is especially harmful because these tiny particles can get deep into the lungs when inhaled. Health damages include **asthma/aggravated asthma, chronic obstructive pulmonary disease in adults, stunted lung development in children, Sudden Infant Death Syndrome and other causes of child mortality, chronic bronchitis, and lung cancer**.^{10,11} People with pre-existing lung disease, children and the elderly are at especially high risk.

- Coal-related air pollution (from NO_x and PM_{2.5}) harms lung development in children), which often leads to other pulmonary diseases.¹²

According to the Clean Air Task Force, breathing ground-level ozone created from NO_x emissions annually causes:

- 159,000 emergency room visits;
- 6.2 million asthma attacks; and
- 69,000 hospital admissions¹³

Cardiovascular Impacts

Pollutants produced when coal is burned cause cardiovascular diseases, including **artery blockages** that can lead to heart attacks and tissue death from oxygen deprivation, which can result in permanent heart damage. Coal-related pollutants also contribute to **cardiac arrhythmias, congestive heart failure** and **acute myocardial infarction** (chest pain and heart attacks). Adults with high blood pressure, diabetes or pre-existing cardiovascular disease are especially vulnerable.^{14,15}

- NO_x and PM_{2.5} are associated with increased hospital admissions for heart-related illnesses.¹⁶

ECONOMIC IMPACTS

All these damages to health carry enormous financial burdens to healthcare systems, employers and families. Conversely, reducing emissions results in significant, measurable gains to both human health and the economy:

- **For every \$1 industry spends complying with the Clean Air Act, we reap \$25 in health care cost savings.** The savings stem from a reduction in premature deaths, bronchitis, asthma and myocardial infarctions (heart attacks).¹⁷ If all health damages from coal were factored in, the health care savings from stopping coal use would be even greater.
- Retirement of 150 US coal plants between 2010 and 2013 yielded \$1.8 billion in avoided health care costs.¹⁸

CONCLUSION

Burning coal to produce energy releases pollutants known to cause serious harms to human health that place huge, unnecessary burdens on the healthcare system. The health costs and human toll, when coupled with the rapidly changing economics of the energy industry that make cleaner energy sources ever more competitive financially, argue for an end to coal burning in the United States and around the world.

ENDNOTES

1 <http://www.catf.us/fossil/problems/nonco2/>

2 <https://www.ucsusa.org/clean-energy/coal-and-other-fossil-fuels/coal-air-pollution>, https://www.epa.gov/sites/production/files/2016-12/documents/nei2014v1_tsd.pdf

3 <http://www.catf.us/fossil/problems/nonco2/>

4 <https://content.sierraclub.org/coal/burning-toxic-mercury>

5 <https://www.psr.org/wp-content/uploads/2018/05/coals-assault-on-human-health.pdf>

6 <https://www.psr.org/wp-content/uploads/2018/05/coals-assault-on-human-health.pdf>; <http://www.catf.us/fossil/problems/nonco2/>

7 <https://www.psr.org/wp-content/uploads/2018/05/coals-assault-on-human-health.pdf>

8 <http://www.catf.us/fossil/problems/nonco2/>

9 <https://www.psr.org/wp-content/uploads/2018/05/coals-assault-on-human-health.pdf>

10 Ibid

11 <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>

12 Gauderman WJ, Avol E, Gilliland F et al. The effect of air pollution on lung development from 10 to 18 years of age. *N Engl J Med* 2004; 351(11):1057–1067.

13 <http://www.catf.us/fossil/problems/nonco2/>

14 <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>

15 <https://www.psr.org/wp-content/uploads/2018/05/coals-assault-on-human-health.pdf>

16 Peters A, Liu E, Verrier RL et al. Air pollution and incidence of cardiac arrhythmia. *Epidemiology* 2000; 11(1):11–17; Peters A, Dockery DW, Muller JE, Mittleman MA. Increased particulate air pollution and the triggering of myocardial infarction. *Circulation* 2001; 103(23):2810–2815; Dominici F, Peng RD, Bell ML et al. Fine particulate air pollution and hospital admission for cardiovascular and respiratory diseases. *JAMA* 2006; 295(10):1127–1134.

17 US Environmental Protection Agency Office of Air and Radiation. *The Benefits and Costs of the Clean Air Act: 1990-2020*. Washington DC: EPA, 2010.

18 Perera, F. Slide presentation at Global Climate Action Summit, San Francisco, 13 September 2018.