The Health Impacts of Energy Choices

A Healthy Energy Initiative Fact Sheet

Access to energy for cooking, heating, transport, and productive activities is essential to human health. Access to electricity is also critical to improving health service delivery, strengthening health systems, and achieving universal health coverage. At the same time, the generation, distribution, and consumption of energy can have marked adverse impacts on health. In particular, the exploitation of fossil fuels for energy generation has serious implications for human health through its contribution to both local pollution and global climate change. These health impacts accrue into a heavy and largely unaccounted-for economic burden borne by communities, governments, and health systems.

Health impacts in the community

For all energy systems, the siting of facilities can directly and indirectly affect public health through air pollution, water pollution and consumption, and land use. The production lifecycle of fossil fuels in particular -- from extraction to waste disposal -- exacts a heavy toll on the health of communities both near and well beyond the immediate vicinity of the facilities.[1,2] Fossil fuel combustion is a major contributor to outdoor air pollution, a leading global health risk.[3]

Health impacts for workers

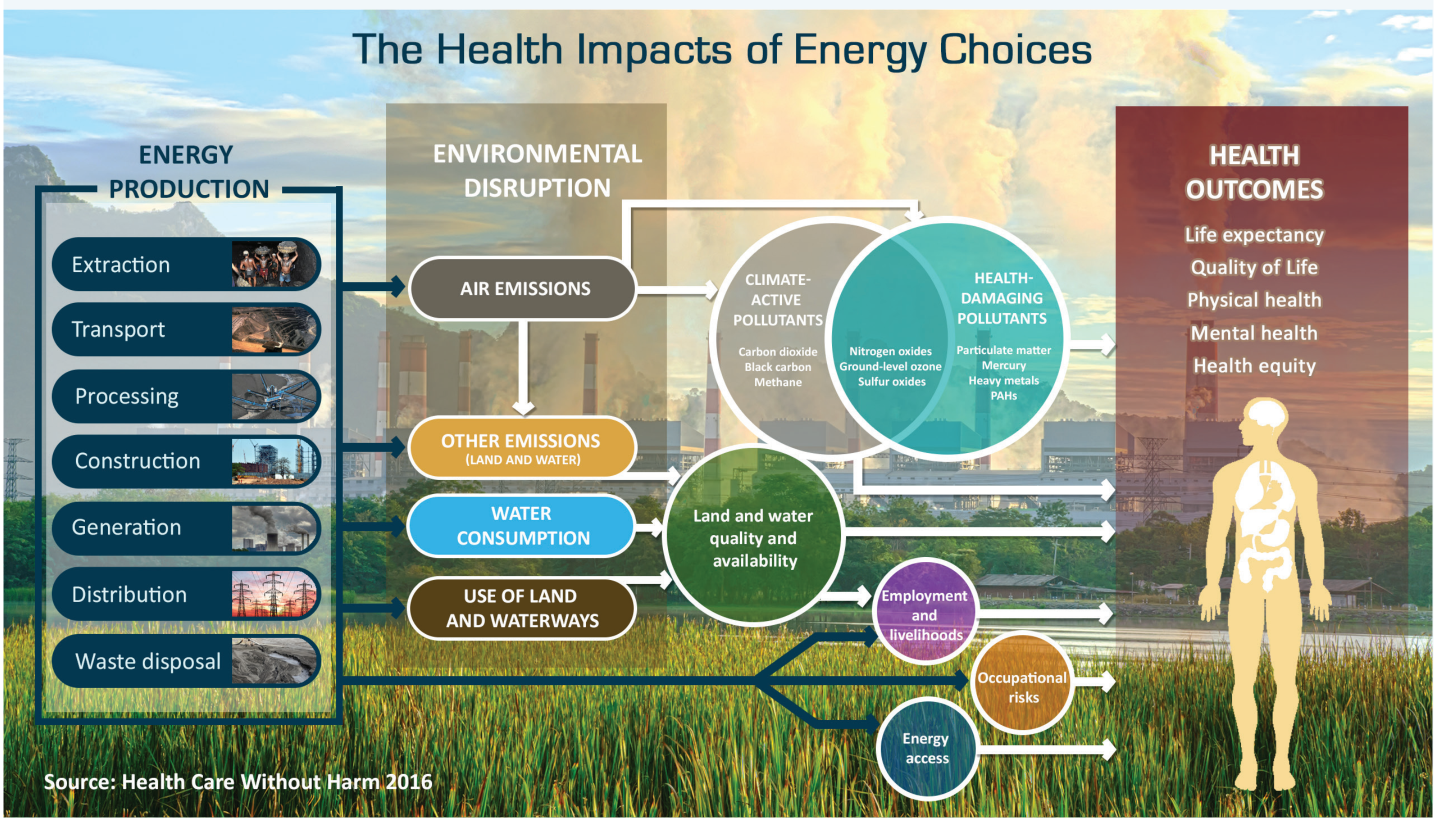
Energy systems are supported by millions of workers involved in construction, extraction, processing, transport, waste disposal, and end use. Many workers, particularly in low- and middle-income countries, are exposed to physically challenging work conditions that put them at risk of injuries, lung disease, cancer, poisoning, hearing loss, heat stroke, and radiation effects.[1]

Health impacts through climate change

The burning of fossil fuels contributes a majority of the greenhouse gas emissions that drive global climate change. Climate change poses threats to human health through direct pathways such as heat stress, floods, drought, and intense storms, as well as indirectly through adverse impacts on air pollution, the spread of disease vectors, food insecurity and under-nutrition, displacement, and mental ill health.[4] Because of its wide-ranging health implications, climate change is viewed as one the greatest challenges to global public health, and tackling it could be the greatest global health opportunity in the 21st century.[4,5]

Inequitable distribution of health impacts

Economically and socially marginalized populations bear a disproportionate health burden from fossil fuels due to higher exposures to pollution, greater vulnerability to factors such as malnutrition and poor access to health care, and lower resilience to climate change.[1] Additionally, the energy production lifecycle can further undermine the social determinants of health for these already vulnerable populations, causing significant health harms through population displacement, social fragmentation, and livelihood disruption.[4]



A Comparison of the Health Impacts of Energy Choices

Source: Health Care Without Harm 2016

Energy source	PUBLIC HEALTH RISKS	OCCUPATIONAL HEALTH RISKS	CLIMATE RISKS
COAL	Mining causes ecological damage, stresses nearby communities, increases risk of mudslides, and contaminates water. Transport causes air pollution, noise, and injuries. Combustion results in significant air pollution including particulate matter, ozone, and mercury. Coal waste contains toxic metals and radioactive materials.	Accidents, silica and coal dust, carcinogens, heat, noise, and vibration.	44% of global CO_2 from fuel combustion; methane; and short-lived pollutants.
OIL	Communities near refineries are exposed to a range of air toxics. Large-scale spills can cause injuries and fatalities, food contamination, and mental health disorders. Combustion yields a range of air pollutants as with coal. Waste may have health effects similar to those of coal waste.	Accidents, chronic musculoskeletal repetitive stress, noise, vibration, airborne hydrocarbons, and carcinogens.	35% of global CO_2 from fuel combustion; methane; and short-lived pollutants.
GAS	**Conventional gas:** Air pollution from power plant operations. **Unconventional gas:** Hydraulic fracturing is highly water intensive and can contaminate water. Communities near production sites could also be exposed to air pollution, seismic activity, and radioactivity.	Varies by drilling method; includes accidents, air borne particulates, carcinogens, and pulmonary asthmagens and irritants.	20% of global CO_2 from fuel combustion; methane; and short-lived pollutants.
NUCLEAR	Each step in nuclear energy production leads to radioactive and chemical emissions and waste streams, which carry a low risk of water contamination and cancer in nearby communities. Accidents are rare but result in highly damaging radiation exposure.	Accidents, heat stress, leaks causing airborne carcinogens including ionizing radiation, and psychological stress.	Minor climate impact from construction and mining-related land use changes.
BIOFUELS	Combustion creates less air pollution compared to fossil fuels. Diversion of farmland can threaten nutrition and food security. Depending on the feedstock, biofuel production may result in land use changes, high water consumption, water contamination, and ecological damage.	Injuries, ultraviolet radiation, exposure to dust and other toxins, and other risks from commercial forestry.	Climate benefit from reduced combustion emissions may be negated by fossil fuel inputs, land use changes, and other factors.
HYDROELECTRIC	**Large hydro:** Construction can displace vulnerable populations. Alteration of local hydrology may increase risk of infectious diseases. Dam failures can be catastrophic to downstream communities. **Small hydro:** Public health risks are not well-documented but assumed to be minimal.	Toxic chemical exposures, diesel fumes, drowning, electrocution, noise, and other hazards involved in construction and operation, primarily for large dams.	Variable climate impact from construction and operation, including significant emissions from reservoirs.
GEOTHERMAL	Relatively low public health risks from air pollution, water contamination, water use, and land use in modern systems with appropriate controls. Some systems generate air pollutants and hazardous waste.	Injuries, silicosis, noise, and toxic chemical exposures.	Minor climate impact from construction and operation. Open-loop systems emit relatively small amounts of CO_2 and methane.
SOLAR	Public health risks are likely far lower than that of any fossil fuel, as there are no emissions during operation and no routine waste stream. Health concerns center around the management of toxic materials during manufacturing and end-of-life disposal.	Hazards typical of manufacturing industries, including injuries, noise, and toxic chemical exposures.	Minor climate impact from equipment manufacture.
WIND	Public health risks are likely far lower than that of any fossil fuel, as there are no emissions during operation and no routine waste stream. Health concerns center on noise from moving gear trains and turbine blades, which can disturb sleep or contribute to stress related disorders.	Hazards typical of manufacturing industries, including injuries, noise, and toxic chemical exposures.	Minor climate impact from equipment manufacture.

COLOR GUIDE: most harmful to health; phase-out and strong protections advised | less harmful to health; caution and protections advised | minimally harmful to health, but protections for affected populations advised

Health costs and fossil fuel subsidies

Continued investment in, and subsidization of, coal and other fossil fuels for energy generation puts a tremendous strain on health systems and charges society with an "unpaid health bill".[6] Worldwide, post-tax consumer subsidies for fossil fuel companies (including the health costs of air pollution) have been estimated at US$5.3 trillion in 2015, or approximately 6.5% of global GDP.[7] A group of leading economists has stated that the cost of implementing climate mitigation policies could be more than offset by the cost savings associated with the resulting health gains.[8]

Conclusions

• In order to meet energy needs while maximizing health, policymakers must carefully consider the health benefits and health risks of energy options.

• A future powered by healthy energy will require reducing dependence on dirty sources of energy, using energy more efficiently, and increasing investment in clean, renewable energy choices.

• Together, these strategies yield health and climate co-benefits: lower greenhouse gas emissions, reduced environmental disruption, and improvements to public health.

Health Care Without Harm

healthy energy initiative

For More Information

Visit www.healthyenergyinitiative.org, follow @healthyenergyi on Twitter, or email healthyenergy@hcwh.org.

FOSSIL FUELS AND AIR POLLUTION

Fossil fuel combustion is a **major contributor to air pollution.** Air pollution caused **7 million** premature deaths in 2012[2], making it…

- the culprit behind **1 in 8** deaths around the world
- the **#1** global environmental health risk
- a risk factor that kills **more than twice** as many people than malaria, HIV/AIDS, and tuberculosis combined

Within the 3,000 cities in 103 countries included in the WHO's Global Urban Ambient Air Pollution Database, large proportions of inhabitants are exposed to **air pollution levels that exceed WHO guidelines**[9]:

- More than **80%** of inhabitants overall
- **98%** of cities in low- and middle-income countries with more than 100,000 inhabitants
- **56%** of cities in high-income countries with more than 100,000 inhabitants

Air pollution has both **acute and chronic effects** on human health.[10] The following are among the diseases with which air pollution has been associated:

- **Cardiovascular disease** (including coronary artery disease and stroke)
- **Respiratory diseases** (including asthma and chronic obstructive pulmonary disease)
- **Cancers** (including lung cancer)
- **Mental, behavioral, and neurological disorders** (including Alzheimer's disease and childhood developmental disorders)
- **Neonatal conditions** (including preterm birth)

In 2016, health ministers around the world adopted a road map for a global, multisectoral response to the adverse health effects of air pollution.[11]

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