SIERRA CLUB
IOWA CHAPTER

Understanding Particulate Matter Air Pollution: Black Carbon (Soot)

Black carbon is a harmful air pollutant. A contributor to climate change, black carbon is also known as soot and elemental carbon.

Black carbon is created from the incomplete combustion of fossil fuels, wood and biomass. It is usually created from burning diesel fuel, gasoline, yard waste fireplace wood and outdoor wood burners and coal.

Black carbon belongs to a class of air pollutants called particulate matter. Particulate matter consists of small particles of dust, soot, liquid droplets and wood smoke particles that have become suspended in the air. These particles are smaller than the diameter of a human hair. Some particulate matter can be seen as dust, haze or smog. Other particulate matter can be seen only with microscopes.

Because black carbon is so small, it can easily be drawn into the lungs leading to health consequences. It can also irritate your eyes, nose and throat. People with asthma or other lung disease are at increased risk from black carbon exposure. Exercising will increase the risk from black carbon since air is drawn more deeply into the lungs and breathing is faster.

Contributor to climate change

Recent research has shown that black carbon is the second largest contributor to global temperature increases, with carbon dioxide remaining as the number one contributor to global warming. Scientists are estimating that black carbon is responsible for approximately 20 percent of global warming, with black carbon emissions sources in the United States contributing about 5.5 percent of the total. By comparison, carbon dioxide causes approximately 50 percent of global warming.[1] Most of the black carbon is emitted in Asia and Africa. Efforts to curb climate change will require reduction of the greenhouse gases such as carbon dioxide as well as the reduction of black carbon.

Black carbon absorbs sunlight, which warms the atmosphere. The presence of air-borne black carbon over glaciers, snow and ice causes an increased effect in the air temperature of the area. The warmer air temperatures then melt the ice and glaciers. When black carbon is deposited on ice and snow, the black carbon absorbs sunlight, raises the surface temperature and causes the ice and snow to melt.

Black carbon lasts a few weeks in the atmosphere before settling onto the land or water, whereas carbon dioxide will last for a century. Therefore, when black carbon emissions are reduced, benefits can be seen very quickly.

Black carbon may be relatively easy to reduce.

Pollution control devices are available to capture the black carbon emitted by power plants that burn coal.

Reducing the intentional burning of forests and agricultural waste would make a significant reduction in the amount of black carbon emitted into the air. In developing countries, replacing primitive cook stoves with solar-powered stoves or more efficient cooking stoves, estimated to cost $20 a piece, would also significantly reduce the amount of black carbon.

[1] "'Black Carbon' Crackdown Offers Fast-Action Solution to Slow Warming" by Stacy Feldman, March 17, 2010, http://solveclimatenews.com/news/20100317/black-carbon-crackdown-offers-fast-action-solution-slow-warming?page=show

Filters are available to trap 90 percent of the black carbon emitted from diesel engines. Eliminating unnecessary idling of diesel engines also reduces the black carbon emissions.

Policy recommendations

The Iowa Chapter of the Sierra Club supports policies that

- Prohibit burning of trash, yard waste, leaves;
- Regulate outdoor wood boilers;
- Reduce excess idling of diesel engines;
- Support complete streets, including bike paths and sidewalks, which would reduce use of vehicles;
- Support the use of public transportation, such as buses and rail, which utilize transportation fuels more efficiently;
- Support municipalities and school districts replacing buses with buses that use electric technology.

What can I personally do to reduce the creation of black carbon?

- Keep personal vehicles tuned and the tires inflated;
- Reduce the number of miles traveled in a vehicle;
- Drive a vehicle with greater miles per gallon;
- Do not idle your car;
- Keep your vehicle functioning properly;
- Walk, bike, carpool, or use mass transit;
- Compost yard waste;
- Do not burn garbage and yard waste;
- Replace your gasoline-powered lawn mower with a reel mower or an electric-powered mower;
- If burning wood in a fireplace or fire pit, only burn seasoned wood, never burn green wood.

Sources

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