



Striking the Balance Between Health, Safety & Expense

Things to Remember

- Air pollution is harmful particles, liquids, or gases in the atmosphere that are detrimental to humans and other forms of life. Air pollution can exist both outside and inside—and it comes from a mix of sources. Although some air pollution comes from natural events (like forest fires), most is a result of human activity.
- Air pollution is a global problem as pollutants generated in one part of the earth can migrate to another part. Also, greenhouse gases (GHG) contribute to global climate change, impacting the entire world.
- While clean air is undoubtedly a desirable state, achieving clean air requires a balance between regulatory requirements and the ability of the corporations that produce pollutants to comply without jeopardizing business operations.
- Because power plants are the main contributors to GHG emissions—which causes outdoor air pollution—in recent years the Environmental Protection Agency (EPA) has ramped up standards to reduce pollutants from these sources. This has led to conflict between the EPA, the legal system, power plants, mining companies, and other environmental groups—at times stalling implementation of the new standards.
- Indoor air pollution can be a major cause of employee absenteeism and poor health. While outdoor air pollution may be beyond a business's control—other than conforming to

standards—indoor air pollution can be very controllable.

The Basics

The term “air pollution” refers to harmful particles, liquids, or gases that exist in the Earth’s atmosphere. Although air pollution can occur naturally through events like forest fires and volcanic eruptions, most air pollution is caused by human activity. The burning of wood, coal, and other fossil fuels is the single greatest contributor to air pollution, although many aspects of industry, agriculture, waste management, and everyday living add to the problem.

Air pollution can be either local or global, depending on the type of pollution and prevailing wind currents. Some types of pollution exist in the troposphere (the layer closest to earth) and mainly affect the region where the pollution is created. However, local particulate matter and gases are also capable of traveling thousands of miles within the troposphere. Some of the air pollution on North America’s west coast has been traced to China, proving that harmful material can travel all the way across the Pacific Ocean. Greenhouse gas (GHG) pollution is truly a global problem, regardless of where the GHG pollution originates, because GHGs impact global climate change.

Air pollution can be both an indoor or outdoor problem. In general, outdoor pollution is caused



by industrial and vehicular emissions, while indoor pollution is caused by office equipment, office furnishings, and inadequate ventilation. Poor outdoor air quality can lead to or exacerbate asthma and other respiratory illnesses. Poor indoor air quality can lead to similar symptoms and a host of other problems, including Sick Building Syndrome (SBS) and Building Related Illnesses (BRI).

Companies that emit a significant amount of a particular pollutant are required to meet Environmental Protection Agency (EPA) emissions standards. The essential piece of air pollution regulation in the United States is the EPA's Clean Air Act (CAA). The CAA was first implemented in 1963, and has since been strengthened by significant amendments in 1970, 1977, and 1990. The 1990 amendments govern much of today's air pollution regulation.

Although the EPA sets federal limits on air pollutants, state (and tribal) governments actually implement the standards. States submit State Implementation Plans (SIPs) that lay out the regulations, policies, and programs they will use to control and improve air pollution. States are also responsible for distributing permits and fines.

The last major amendment to the CAA in 1990 called for the establishment of the National Ambient Air Quality Standards (NAAQS), which sets appropriate levels for six primary "criteria pollutants" for air quality: particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. The EPA sets "primary standard" levels for these pollutants based on criteria for human health and "secondary standard" levels based on issues like visibility and property damage. These standards refer to acceptable standards for specific time periods, which range from one-hour to one-year averages.

The EPA has also used its authority to propose regulations for the largest industrial pollution sources. In 2010, the EPA began requiring large fossil fuel power plants and oil refineries to monitor their GHG emissions and submit reports. New plants and plants undergoing major upgrades are also required to follow pollution control standards based on the maximum degree of control that can be achieved, taking into account technical feasibility, costs, and other energy, environmental, and economic impacts.

Challenges

Resolving air pollution problems requires a balance between desired air quality conditions and polluters' ability to comply with standards. This is a recurring issue between the EPA and the entities they regulate. In 2011, the EPA finalized the Cross-State Air Pollution Rule (CSAPR), which requires states to improve air quality by reducing power plant emissions that contribute to ozone and/or fine particle pollution in other states. The new standards have caused a significant political backlash and stalled implementation, as industrial groups protest the increased costs and warn of a compromised power grid and increasing unemployment.

While corporate leaders should be aware of their own company's impact on outdoor air quality, especially in terms of regulation, there is little else they can do to control the actual quality of the outdoor air. However, the same cannot be said about Indoor Air Quality (IAQ). IAQ is a key factor in employees' health and productivity. Poor IAQ can cause a host of problems, including headaches, respiratory problems, nausea, skin and eye problems, and lack of focus. If a heating, ventilation, and air conditioning (HVAC) system is old, or if



the building is serving more people than it was designed for, the ventilation will be inadequate. Even if an HVAC system is designed appropriately, it still needs significant maintenance to keep it free from bacteria and mold—two of the main causes of SBS and BRI.

In addition to HVAC inadequacies, pollutants inside the building can detract significantly from IAQ and cause employee health and comfort problems. Many common items in the workplace emit chemical gases, called “volatile organic compounds” (VOCs). One common VOC is formaldehyde, a residue in pressed wood furniture. Other sources of VOCs are cleaning supplies, pesticides, toner from printers and copiers, paint, adhesives, carpeting, and upholstery.

There are other potential office “pollutants” that are extremely dangerous and are not usually included in discussions about SBS or BRI because their effects are much more long-term. Radon is a naturally formed radioactive gas that can collect in poorly ventilated areas. The EPA has stated that radon is the second-leading cause of lung cancer in the United States, and the leading cause for non-smokers. Asbestos is a fibrous mineral that was used extensively in buildings until the EPA banned it in 1991. Asbestos fibers can be inhaled, causing serious and deadly health threats including lung cancer, asbestosis, and mesothelioma—another form of cancer. It is critical that all buildings be tested for both radon and asbestos.

Opportunities

A good HVAC system can go a long way toward combating poor IAQ. Due to the numerous sources of VOCs, it is not always feasible to cut VOCs out of offices entirely, although proactive leaders can certainly make choices about the

types of products they purchase. Using “green” cleaning products and processes, for instance, can cut down considerably on VOCs. Businesses should look for products that are free of dyes and perfumes and are biodegradable. Products that are not sprayed are also a better choice because the chemicals will have less opportunity to disperse into the air. When purchasing furniture and furnishings, businesses should look for solid (not pressed) wood and for carpets that carry the Green Label from the Carpet and Rug Institute (CRI). The Green Label indicates that the carpet has significantly lower VOC levels. Companies should also avoid the use of air fresheners because they add significant VOCs to the air.

Employee education can also help improve IAQ. One of the biggest contributors to poor IAQ is smoking. Environmental tobacco smoke contains over 4,000 chemicals, many of which are carcinogens. Most offices are now smoke free, but secondhand smoke can be an issue if employees smoke elsewhere but bring VOCs and odors back into the workplace. Companies should ensure that employees have a place to smoke that will minimize these effects.

Another employee behavior that can affect IAQ is wearing dry-cleaned clothing. The most commonly-used chemical for dry cleaning has been shown to cause cancer in animals and health problems in humans. Employees should be informed of this and encouraged to air out dry-cleaned clothes until there is no odor.

In addition to educating employees, making safer purchases, and testing air quality and HVAC systems regularly, the best way a business can combat SBS and BRI is to have a comprehensive air quality management program. The National Institute for Occupational Safety and Health (NIOSH), a department of the Centers for Disease Control, has published a report entitled “Manag-



ing Buildings for Good IAQ.” The report includes specific recommendations for inventorying current status, identifying and assigning key roles, and planning for improvement. It also includes a checklist to help organize IAQ management. Building managers can also benefit from following a purchasing guide like the Greenguard Certification Program. The online product guide features a range of products, from electronics to cleaning supplies, that meet acceptable indoor air quality pollutant standards and guidelines.

ebscohost.com/login.aspx?direct=true&db=bth&AN=42513916&site=ehost-live

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Related Sustainability Watch Reports

- Carbon Footprint
- Direct & Indirect Greenhouse Gas Emissions
- Global Warming
- Indoor Air Quality

Further Reading

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