

## Air pollution challenges: new gadgets and clothing

As a global campaign to fight air pollution gains traction, scientists are rising to the occasion, introducing goods and technologies that eliminate some of the harmful pollutants that damage our lungs and hastening climate change.

According to the World Health Organization (WHO), air pollution causes around 7 million premature deaths each year. That is an average of 800 people per hour. The good news is that the public is aware that action is required.

In turn, the researchers at Cornell University found out that forty percent of the world's deaths are caused by air, water, and soil pollution. The main causes of deaths triggered by these factors are congenital pathologies, cancer, and disruption of the immune system.

That is why it is vitally important to improve air quality monitoring in all countries, especially in densely populated areas. Using sensors and other new technologies, observing and forecasting the air quality can be extended to areas that do not currently receive proper maintenance.

Air purifiers are the most widespread gadgets to protect us from polluted air. They come in all imaginable sizes and shapes. They clear the undetectable to the naked eye contaminants from the air and eliminate particles, bacteria, viruses, hazardous substances, and even scents.

Next, come the numerous “pollution-fighting” technologies such as:

- Air quality monitors - the “pollution finders”;
- HEPA filters - a fiber-like material to capture 99.97 percent of particles smaller than 0.3 microns;
- UV technology, which uses ultraviolet radiation to kill bacteria and viruses, and many others.

In addition to state-of-the-art gadgets and modern technologies, start-ups contribute greatly to the fight against polluted air.

Mexico City is known for its smog, but it is also known for its murals, and the two have now collided in an unexpectedly imaginative way as a part of the startup Advanced Materials. Mexican murals now have magic powers thanks to special paint. Artists are painting enormous murals using Airlite paint to purify filthy air in a way similar to photosynthesis.

When the paint is exposed to sunshine, a chemical process oxygenates the surrounding air. According to the project's creators, the murals will be able to offset the pollution produced by about 60,000 vehicles each year. The paint has a ten-year lifespan.

London scientists are working with Arborea startup on the project BioSolar Leaf, which consists of enormous panels covered in small plants that absorb carbon dioxide and produce oxygen at a rate similar to 100 trees from the surface area of a single tree.

German startup Green City Solutions' created mossy living walls. While placed over wooden seats, they work as the world's first intelligent biotech air filter and a comfortable place to sit after hours of walking around the city.

The wall is made up of various moss species that absorb pollution organically. Shade-giving plants protect the moss, allowing it to thrive in an otherwise unfriendly urban environment. The facility is

powered by solar panels. It uses rainwater through a built-in irrigation system and has a cooling effect on the environment as well.

In addition to implementing innovative gadgets and technologies, people have begun to create clothes that keep the air clean and usable.

The Bioscarf was created by the self-titled USA company, and presented a possible alternative to the usual medical masks and respirators. It looks like an ordinary warm scarf, and it copes with the task of preserving warmth. However, its main advantage is the ability to filter inhaled air.

In the multilayer structure of the scarf fabric, some layers act as a filter. According to the developers, they retain up to 99.75% of pollutants and microorganisms. The bio-scarf protects the wearer from smog, pollen from plants, bacteria, and ultrafine particles.

The Bioscarf can be used instead of medical masks to protect the body from air pollution, and during an epidemic of influenza and SARS - against infections. Thanks to the built-in air filter, it purifies the air from atmospheric pollution, allergens, flu, tuberculosis, and pneumonia pathogens. It can be utilized not only by patients with respiratory problems but also by healthy people. The Bioscarf is a perfect clothing piece for people, who bicycle, work around trucks, often travel by airplanes or buses, or just live in a smoggy area. These days it is effective protection from the COVID-19 virus as well.

“Climate change and the deterioration of air quality in large cities, viruses, and infections pose us with new threats. Traditional garments do not protect our bodies from these risks. That's why we created the first garment with a built-in filtration system,” - emphasizes the Bioscarf development company.

Numerous up-to-date technologies and inventions are now in use all over the world. They can greatly improve air quality while also assisting in the mitigation of climate change.

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