

How Humble Moss Could be the Solution to Urban Pollution Woes

Covid-19 lockdowns led to dramatic decreases in air pollution in many global cities and allowed us to see the benefits of cleaner air. One young German horticulturist has come up with a novel technology-based solution to clean polluted air: the world's first bio-tech filter, based on common-or-garden moss.

The Covid-19 pandemic showed many global city dwellers a future in which we might all breathe more freely. Across the world, as populations were subject to stay-at-home orders and road transport activity dipped, city-dwellers enjoyed clear skies; and a respite from road traffic produced pollutants such as nitrogen dioxides, carbon monoxides and the dangerous vehicle particulates PM 2.5s: tiny specks of pollution which, once inhaled, lodge in the lungs and can cause a variety of health problems.

Those traffic-borne emissions prompted the World health Organisation, in 2019, to characterise air pollution as the number one environmental health risk globally, the cause of an estimated 7.1 million premature deaths per year.

One solution to cities' [pollution problem](#) is air purifiers and, as populations demand clearer air yet policies to reduce car-borne pollution lag behind, air purifiers are big business. Indeed market size is expected to reach USD 22.80 billion by 2028 and is expected to expand ten percent a year from 2021 to 2028.

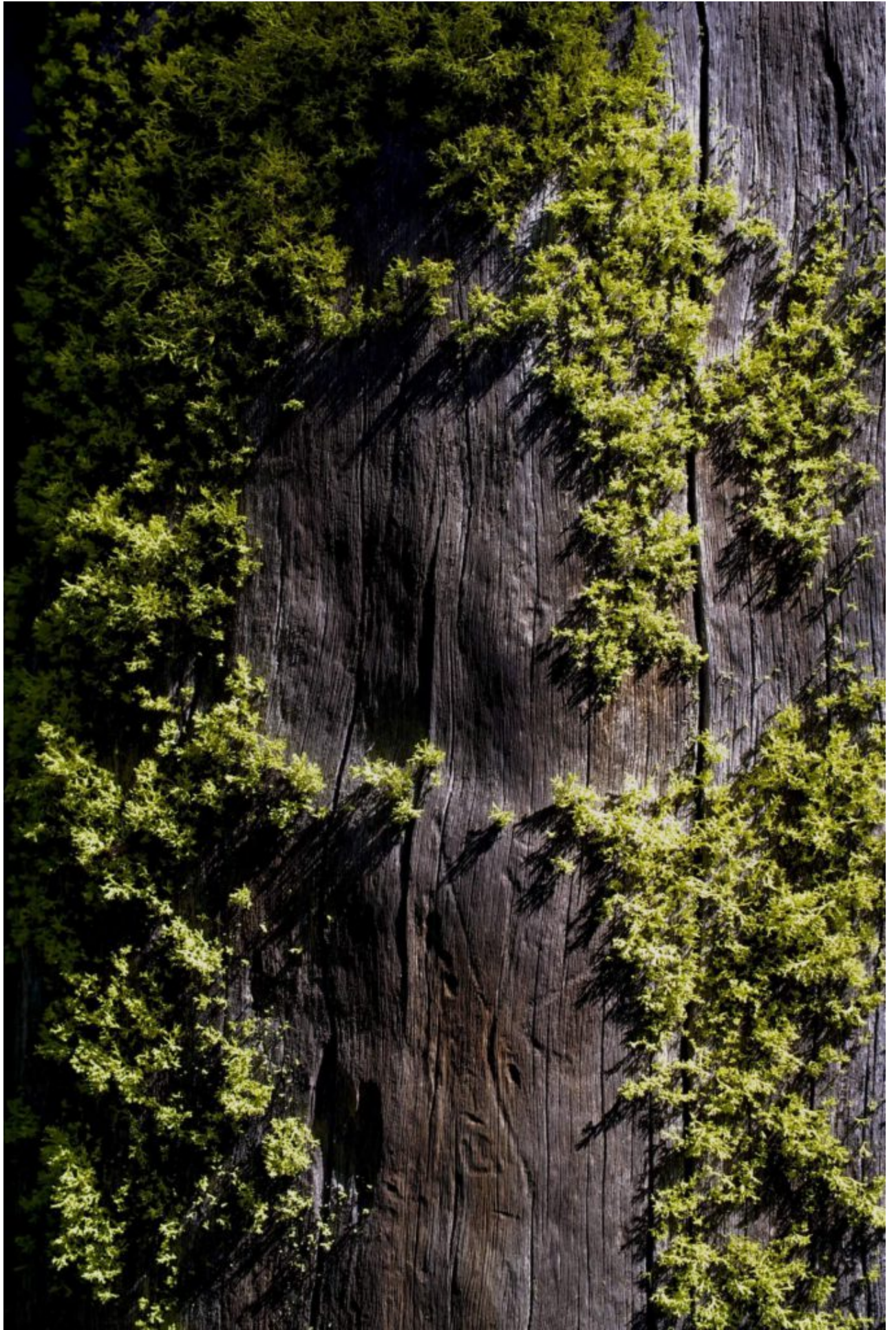
The problem with standard electric air purifiers however is similar to air conditioners, in that they can compound the problem in themselves requiring power to run, which, in most global contexts, produces additional carbon pollution. Trees, of course, are excellent natural air purifiers but demands for land in cities make it difficult to plant the number of trees necessary to drastically improve air quality.



Green City Solutions – City Tree Model

One answer to this problem also comes from nature, in one young German horticulturist's design for an air filter that's based on air-cleansing abilities of common-or-garden moss.

Green City Solutions was founded in 2014 by 29-year-old Peter Sanger, who brought together a team of experts in fields ranging from horticulture to mechanical engineering to design a novel bio-tech filter, the City Tree. "I felt the solution to air pollution can only emerge in combination with nature," he says, of concentrating his research efforts on moss. "After all, nature has millions of years of experience in air purification."





Mosses being grown

Moss is well adapted to the task of filtering polluted air, possessing the ability to bind fine dust and metabolise it. It can filter soot and particulates from the air breathed by 7,000 people every hour. In

addition, mosses cool surrounding air by evaporating water on their leaf surface. The problem is that mosses can barely survive in cities due to their need for water and shade. So Green City Solutions solved this problem by connecting a range of species of mosses (with different filtering abilities) to low-energy water and nutrient provision based on unique Internet of Things technology, which measures the plants' requirements and surrounding pollution levels in real time.

Independent field studies have shown that up to 82 percent of the fine dust in city air can be filtered directly by the City Trees, which the company has installed in cities across Germany, and in London and Paris. Each moss tower has the carbon dioxide absorbing capability of 275 trees.



Green City Solutions Berlin



• City Tree Deutsche Telekom Bonn

Positioning is key; as Sanger notes: “Not all places where people live are polluted, and people aren’t everywhere there is pollution. Where the two meet, that’s where we place the trees.” Sanger would like to see his devices installed in the world’s most vehicle-polluted cities within the next decade.

The company is now developing moss-based air filters that are also suitable for consumers to use in their homes or that function – in an extra boon – as attractive greenery for vertical facades.

Author: James Gavin, The India Story Agency for Sacred Groves

Images Credit: Green City Solutions; Peter Sanger and Peter Puhlmann for Green City Solutions; Nate Bell