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envision²
RESEARCH & DEVELOPMENT

Globally, outdoor air pollution causes more than 3.7 million premature deaths each year.

PROBLEM

Traffic creates air pollution

Every year, the world's cars, trucks, buses and other vehicles pump millions of tonnes of pollutants into the air.

Burning gasoline or diesel fuel creates nitrogen oxides (NO_x): highly reactive gases that contribute to smog and acid rain. It also creates volatile organic compounds (VOCs). Some of these chemicals have been linked to cancer, while others contribute to smog.

Meanwhile, vehicles also generate small particulates that penetrate deep into the lungs. According to one study, even a few micrograms in a cubic metre of air can affect human health. These problems are particularly serious in the developing world. But even in the United States, with its strict pollution controls, more than 58,000 people die prematurely each year because of traffic emissions.

Globally, outdoor air pollution causes more than 3.7 million premature deaths each year. And much of that pollution comes from vehicles. According to a recent United Nations report, road transportation accounts for roughly half of the health costs created by air pollution in OECD countries.

IMPACT

Cancer, heart disease & respiratory disease

Nearby residents suffer the greatest health consequences. A Vancouver study found that people who live within 150 metres of a highway or within 50 metres of a major road are 29 per cent more likely to die from coronary heart disease.

Those figures put millions of people at risk. According to researchers, 54 percent of Beijing residents live within 100 metres of a highway or 50 metres of a major road. So do 43 percent of Parisians, 80 per cent of Barcelona residents and 30 percent of residents in Mexico City.

The dangers don't stop there, however. Traffic-related air pollution is also linked to stroke, cancer, asthma and other respiratory problems. Children, infants and unborn babies are particularly vulnerable because their lungs aren't fully developed.

Nor are the impacts strictly local. Vehicle emissions contribute to smog that can blanket entire regions, causing thousands of premature deaths, overloading emergency rooms and making it dangerous for even healthy people to exercise outdoors.

SmogStop Barrier reduces air and noise pollution levels in surrounding neighborhoods.

SOLUTION

An innovative pollution barrier that reduces smog and noise

EnvisionSQ's SmogStop Barrier takes a two-pronged approach to reducing air pollution from major roads, highways and railways.

Our patented aerodynamic design reduces pollution levels by enhancing dispersion so that neighbouring residents can breathe easier. At the same time, a proprietary coating on the barrier actually breaks down the NO_x and VOCs that produce smog, transforming them into harmless byproducts.

And yes, it also blocks traffic noise.

Clearly the right choice

SmogStop Barrier incorporates a sound-reducing, break-resistant and highly transparent grade of acrylic. **The result? A dramatic reduction in noise and air pollution — without sacrificing sunlight.**

SmogStop reduces traffic emissions in downwind neighbourhoods by 58% compared to a conventional noise barrier.

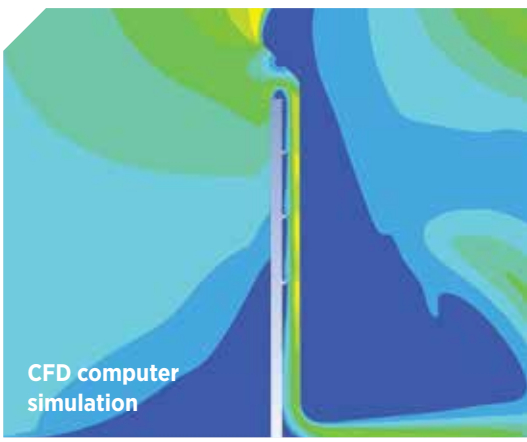
Aerodynamic tests performed by University of Ontario Institute of Technology, Western University and University of Guelph.

Proven aerodynamic design improves local air quality

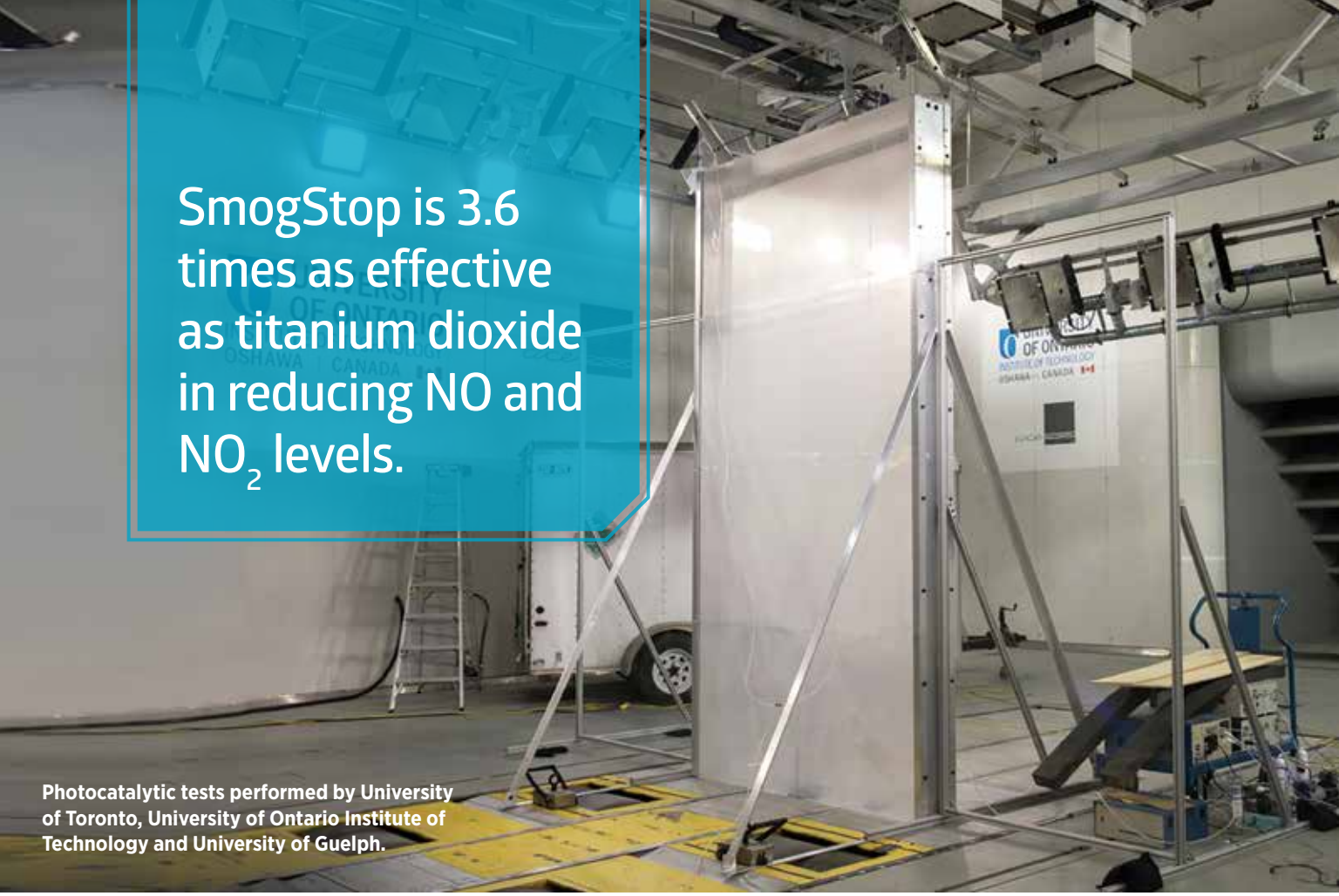
SmogStop Barrier's aerodynamic design serves two main purposes. First, it directs traffic emissions into a channel and towards a photocatalytic coating that treats the pollutants. Second, it generates vortexes and enhances vertical mixing of emissions with clean air, significantly decreasing pollution levels in surrounding neighbourhoods.

Advanced computer models and wind tunnel testing conducted by Western University and the University of Guelph proved that SmogStop can reduce traffic emissions in downwind neighbourhoods by 58 per cent compared to a conventional noise barrier.

But that's not all.



CFD computer simulation



SmogStop is 3.6 times as effective as titanium dioxide in reducing NO and NO_2 levels.

Photocatalytic tests performed by University of Toronto, University of Ontario Institute of Technology and University of Guelph.

Powerful photocatalytic technology reduces regional smog

EnvisionSQ has developed a proprietary coating that breaks down the NO_x and VOCs that produce smog. Powered by sunlight, it transforms these pollutants into harmless gases and water.

Wind tunnel and field tests conducted by the University of Guelph prove **our aerodynamic design coupled with our photocatalytic coating can reduce monthly NO_x levels by 54 per cent and daytime NO_x levels by 92 per cent.** Over the course of a year, a single kilometre of SmogStop barrier can remove 16 tonnes of NO_x — the equivalent of taking 200,000 cars off that stretch of road every day.

Meanwhile, laboratory testing at the University of Toronto and University of Guelph shows **SmogStop is 3.6 times as efficient as titanium dioxide**. And unlike titanium dioxide, which develops a scale that reduces its efficiency over time, our proprietary coating produces harmless byproducts that do not compromise performance.

A single kilometre of roadside SmogStop barrier can create up to $10.4 million in benefits each year.

Field Study performed by University of Guelph and Ministry of Transportation Ontario

BOTTOM-LINE BENEFITS

Reducing air pollution saves lives — and money

According to a 2016 World Bank report, air pollution costs $3.55 trillion in premature deaths each year. That figure doesn't include the costs of pollution-related illness: doctor visits, emergency room admissions, lost wages and more.

Traffic is a major contributor to the problem. An OECD report suggests that road transportation accounts for roughly half of the health costs created by air pollution in member countries. In China, traffic emissions is one of the biggest causes of deaths due to air pollution, second only to industrial coal.

The good news is that reducing pollution saves lives — and money. A 2016 study estimates that each ton of NO_x removed in the city of Toronto would create $650,000 in health benefits. Based on those numbers, **a single kilometre of roadside SmogStop barrier can create up to $10.4 million in benefits each year.**

The more we emit, the more damage it creates.

Urban areas face the highest costs. A recent Canadian study put the price at $500,000 per ton in Ottawa, $510,000 per ton in Vancouver and $650,000 in Toronto. That's just the cost of premature death. It doesn't include the costs of pollution-related illness: doctor visits, emergency room admissions, lost wages and more.

The higher the concentration, the greater the impact. Because each additional ton of NO_X emitted compounds the health impact, the damaging effects intensify.

Save lives. Save dollars. Breathe easier.

On the flip side, each ton removed makes removing the next ton even more rewarding. For example, the same Canadian study estimates that cutting Canada's NO_X emissions 25 per cent would create benefits of $870,000 per ton in Toronto. Cutting emissions 50 per cent increases that figure to $1,250,000 per ton.

This creates a powerful incentive to control emissions not just in highly polluted urban areas but even in less polluted rural areas. The researchers conclude that "NO_X abatement has the potential to incur substantial and increasing health benefits."

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