



Parisians call the Champs Elysees La Plus Belle Avenue du Monde—the most beautiful avenue in the world. The Mayor of Paris, Anne Hidalgo has another name for the grand, 1.25-mile avenue from Place de la Concorde down to the Arc de Triomphe. She calls it “a canyon of pollution.”

That is a relatively recent development. For decades, few observers would have put Paris among the most polluted cities in Europe, let alone the world. But that has changed. In 2014, air pollution in Paris hit health-threatening levels, more than 80 percent higher than in London and Berlin. In the spring of that year, according to the European Environment Agency, on at least one occasion the PM₁₀ level hit 147 micrograms per cubic meter of air in Paris, compared with 114 in Brussels, 104 in Amsterdam, 81 in Berlin, and 80 in London. A year later, the situation was even worse, as Paris briefly held the distinction of the city with the most polluted air in the world. The city's iconic monuments were shrouded in haze.

Vehicle exhaust is the primary culprit, responsible for two-thirds of the city's nitrogen dioxide pollution, which produces ozone, and more than half of the city's particle pollution. In 2014, the city instituted alternate driving days (only odd- or even-numbered license plates permitted) and temporarily eliminated fares on all public transportation.

Those steps had limited impact, so Mayor Hidalgo went further. As an experiment, she decided to ban cars from key areas of the city, including the Champs Elysees, for seven hours one day in the fall of 2015. According to air-quality network Airparif, which monitors pollution levels in Paris, there was a 40-percent drop in harmful exhaust emissions in parts of Paris.

The success of that one-day experiment led to a broader campaign, called Paris Breathes. Some two dozen routes in the city will now be car-free on the first Sunday of every month. Another four zones will also be pedestrian-only on Sundays during summer months.

In July 2016, Paris banned old cars from its streets in a further bid to crackdown on air pollution.

Any car registered before 1997—excluding vintage vehicles—will be barred in the city center on weekdays between 8 a.m. and 8 p.m. Any car owner caught breaking the rules will be issued a €35 fine for their first offense, with the fines set to nearly double early next year.

By 2020, Mayor Hidalgo says, the ban could be extended to include all combustion-engine cars manufactured before 2011. More than a half-million car owners in Paris are expected to be affected.

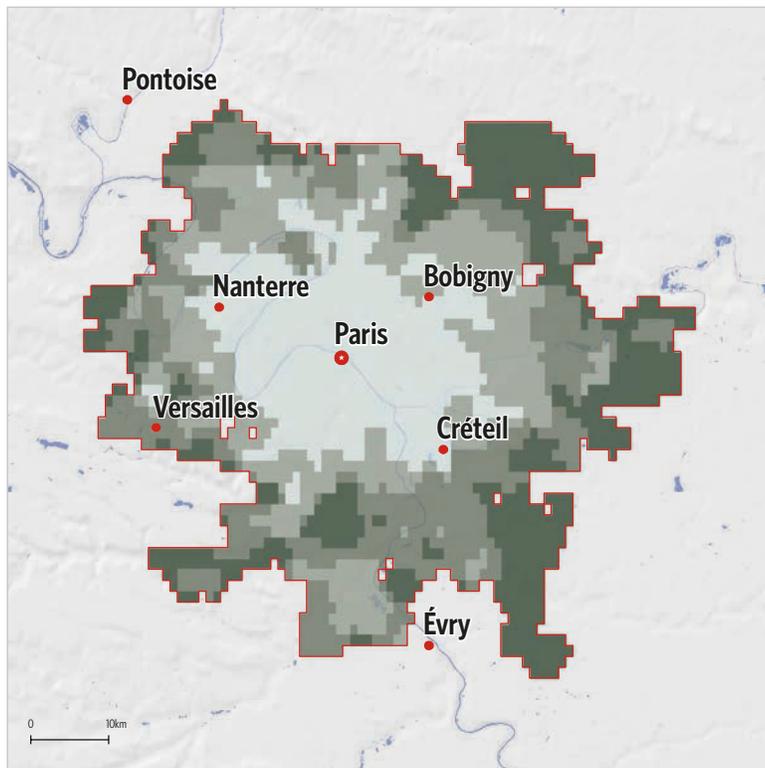
The efforts to clear the air in Paris go beyond just changing how Parisians drive. In Place de la Nation, one of the city's famous squares, are three steel-sided structures, about 13 feet all and several feet thick. Free standing, with a curved, brushed-steel foot and a bench on one side, each one almost looks like it might be a piece of public sculpture, a frame for a large advertisement, or an electronic message board. You would not, at a glance, mistake it for a tree. But in an important sense, that is exactly what it is.

The vertical face of the structure is not intended for words or pictures, but rather for moss. Outfitted with sophisticated air pollution monitors and connected to the internet, it is in effect a high-tech tree, built with the sole purpose of scrubbing fine dust and nitrous oxides from the air. According to the manufacturer, a German company called Green City Solutions, each of these “City Trees” can remove the same amount of pollution as 275 typical trees.

The project in Place de la Nation is a pilot, but if it is successful, Green City Solutions could roll out the “trees” across Paris. But this technology does not come cheaply; each City Tree costs more than \$25,000.

Paris will also benefit from the more old-fashioned trees. Compared with other global cities, Paris only has a moderate ROI of tree planting. The central parts of Paris are the densest and have the highest estimated ROI. For an additional annual investment of \$10 million in tree planting and maintenance, we estimate that 2.3 million people could have a reduction of > 1 µg/m³ of PM_{2.5}.

Results from the Paris study



Map 25. Neighborhood-level ROI for Paris (PM reduction).

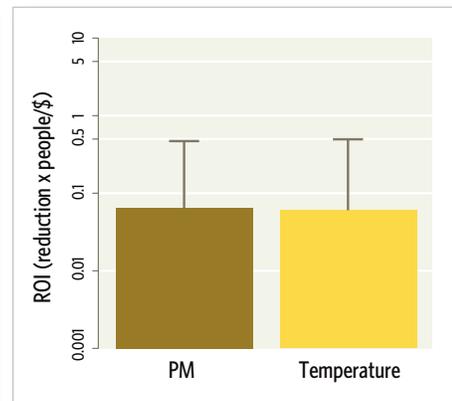


Figure 30. ROI for tree planting for Paris.



Investment	Annual Cost (\$)	> 1 µg/m ² PM _{2.5}	1.5 deg C
10% of sites	10,300,000	2,350,000	2,360,000
20% of sites	19,900,000	3,340,000	3,350,000
Full Investment	89,600,000	6,040,000	6,040,000

Table 18. Temperature and PM reduction benefits under three investment scenarios, for Paris.