



In the 1970s and 1980s, Denver's air pollution was so bad it made national news. The bad air even had a name: the brown cloud. In 1989, after the Denver Broncos had lost their third Super Bowl in as many appearances, a CBS sportscaster joked that Denver had "never been No. 1 in anything—but carbon monoxide."

The joke stung because it was largely true. In 1975, Denver violated Federal carbon monoxide standards 177 times.

The stain on both the city's air and its reputation, not to mention the health of its residents and its tourist industry, prompted a lengthy and aggressive campaign to fight pollution. Denver banned construction of new wood-burning fireplaces and the use of old wood-burning fireplaces on pollution "alert" days, which dramatically cut the amount of wood smoke in the air. The city began using more liquid de-icers on roads following snowstorms, replacing the sand that would get ground into fine particles and end up in the air as part of the brown cloud.

The problem is one of location as well. Denver sits in the South Platte river basin, bounded to the west by 13,000-foot peaks, a perfect recipe for smog. The wind often does not clear the air, and the high altitude means older cars burn gasoline less efficiently because the air has less oxygen. In response, Colorado enacted the nation's first oxygenated fuels program in 1988. Two years later, 39 cities across the country were required to use oxygenated fuel under the Clean Air Act.

In 2007, Denver's Mayor (now Colorado Governor) John Hickenlooper launched an ambitious effort to make the city sustainable by 2020. Among the initiatives was Greenprint Denver, a city agency that plans and coordinates citywide environmental programs. According to the Green City Index, a research effort sponsored by Siemens, Denver is now a model of environmental governance and is the fifth-greenest city in the United States and Canada, falling behind only San Francisco, Vancouver, New York City, and Seattle. Denver now has some of the strongest clean air policies in the United States, according to the report.

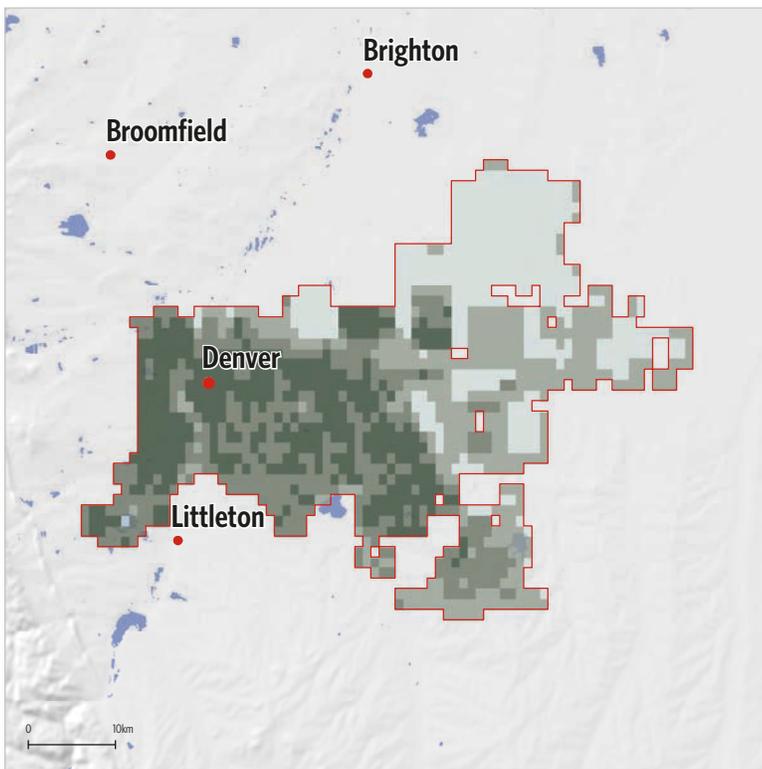
Population growth is part of the continuing challenges to Denver's air quality. In 2014, Denver reached number 6 on the *Forbes Magazine* list of the 20 fastest-growing cities in the country. The city's population now tops 3 million and is expected to continue to grow. The expanding population also means more cars, and even though each new car is far cleaner than in past years, the sheer number of vehicles on the roads means an increase in pollution.

Denver is continuing its efforts to be more energy efficient, reduce its deep dependence on coal, and make new building greener. Not all of Denver's sustainability projects, however, have worked out as planned. The Mile High Million, an effort to plant a million trees in the city by 2025, was canceled because of budget cuts in 2013, having gotten less than halfway to its goal.

Compared to some cities, Denver has a relatively low median ROI of tree planting, since the population density of its neighborhoods is relatively low. However, some neighborhoods in Denver (the denser neighborhoods near the historic downtown) have relatively high ROI of tree planting. Note that since Denver’s PM concentrations are relatively low already, by global standards, the absolute reduction in PM that trees could provide is likely below 1 µg/m³.

Among the most promising of Denver’s efforts to become a greener city focus on rehabilitating old industrial sites. Denver’s Brownfield Program is looking for ways to revitalize 3,500 acres of land along an 11-mile portion of the South Platte, an area that contains 33 brownfield sites. Green space along the South Platte could eventually help connect two recent additions to the National Wildlife Refuge system, both of which were brownfields of a different sort: the 25-square-mile Rocky Mountain Arsenal northeast of the city, and Rocky Flats, a far smaller Cold War-era nuclear weapons trigger factory to the west.

Results from the Denver study



Map 16. Neighborhood-level ROI for Denver (PM reduction).

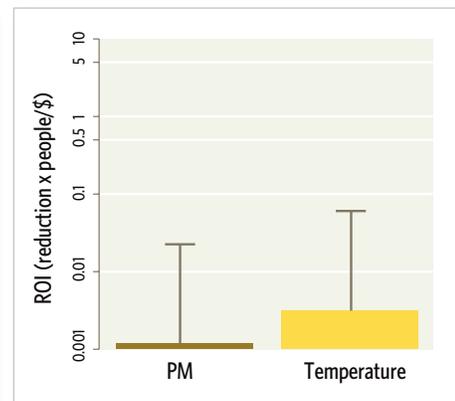


Figure 21. ROI for tree planting for Denver.



Investment	Annual Cost (\$)	> 1 µg/m ² PM _{2.5}	1.5 deg C
10% of sites	3,500,000	0	110,000
20% of sites	6,980,000	0	185,000
Full Investment	26,200,000	0	301,000

Table 9. Temperature and PM reduction benefits under three investment scenarios for Denver.