As companies like Google pioneer technologies to allow cars to drive themselves, futurists have been imagining a world where autonomous vehicles rule the roadway. Using computer programs, map data, complex sensors, and soon the ability to "see" all vehicles within miles, these cars hold the promise of averting the vast majority of car accidents caused by human error, while passengers in the driver's seat can nap, work, and do anything but concentrate on driving. The future is here to some extent: self-parking technologies are already in use with more coming soon, and Google's autonomous car program has made internet waves (video here), sparking enabling legislation in Nevada and a bill in California. In another few decades, we may have a driving revolution on our hands (and the idea of dying in a car accident may seem as foreign to our grandchildren as dying of small pox).

But what could this technology mean for the environment? We know that cars are responsible for significant greenhouse gas emissions and toxic air pollution. Self-driving vehicles hold the potential to reduce these emissions by driving more efficiently, including the possibility of not having to stop at intersections or even red lights as cars seamlessly avoid each other. Vehicles may also be able to tailgate like train cars, adding more capacity and enabling efficient speeds for existing roads and highways. Cars may also become extremely lightweight and fuel efficient, as consumers no longer need heavy cars to survive collisions.

But as the video below suggests, overall vehicle miles traveled may increase as driving becomes possible for those currently unable to drive, such as the elderly, the physically disabled or impaired, and of course the inebriated. Self-driving vehicles may also outcompete public transit for those who can afford to drive, as their cars would provide the same benefits as transit (such as the ability to work while commuting) without the hassles. In addition, self-driving vehicles may clog the road as households share vehicles that drive themselves around to pick up multiple people, such as spouses driving the same car to work at different times.

At this point, proponents of self-driving cars are more interested in issues like insurance liability than environmental law. And the technology still requires more research and development. But as the cars become more common, policy makers and clean air advocates could benefit from studying the impacts of these cars to see how they might mitigate our pressing air pollution problems.

[youtube http://www.youtube.com/watch?v=cdgQpa1pUUE&w=560&h=315]