

This is part of an occasional series of posts about the evolution of pollution standards. Today's subject is pollution control for new vehicles, which have been known to cause smog since the 1960s. The history of these pollution standards is quite distinctive.

At the high temperatures in internal combustion engines, some of the nitrogen in the air actually burns, resulting in the formation NO or NO₂, which are collectively called NO_x. NO_x plays a role in forming ground level ozone and fine particulates (PM_{2.5}), both of which are human health hazards.

For the first 20 years of federal regulation, Congress set the NO_x standards for new cars itself. That's quite different from the standards for industrial pollution sources, which Congress has always delegated to EPA. The reason may have been the high political stakes in the car industry or the relatively easier task of setting standards for new products in a single industry using a single energy process.

For convenience, I'm only going to address standards for cars, although they've become a smaller part of the vehicle mix as SUVs and pickup trucks have grown in popularity. The initial standard, set in the 1970 Clean Air Act, was 3.1 grams per mile (gpm) for NO_x. Achieving that standard was thought to be nearly impossible when Congress created this mandate, but the mandate forced the car companies to make technological breakthroughs with catalytic converters.

Note that the standard is set in terms of pollution per mile rather than pollution per gallon. That means that any increase in fuel efficiency automatically helps a company meet the pollution standards as well. Theoretically, a car could have no pollution control at all but get such phenomenal mileage that it met the pollution standard. Actual mileage has improved but not enough to obviate the need for pollution controls.

Congress adjusted the standards twice. A 1977 amendment reset the limit to 1 gpm in 1981. The 1990 amendments changed the standard to 0.6 gpm, effective in 1994. These are called Tier 1 standards. Apparently Congress did not relish the task of periodically resetting the standards itself. The 1990 Amendments authorized EPA to set standards for 2004 and beyond.

In 1998, however, the Clinton Administration brokered a deal between the car companies and Northeastern states who complained that ozone was getting blown into their states from upwind states. The companies agreed to sell national Low Emission Vehicles, with an NO_x standard of 0.3gpm.

The following year, EPA proposed Tier 2 standards, including a 0.07 gpm NO_x standard.

Tier 3 standards were phased in starting with 2017 cars. When fully phased in, they will set a 0.7 fleetwide ceiling of 0.07 for NO_x plus NMOG (non-methane organic gases).

In April of 2023, the Biden Administration [proposed](#) new standards for cars, SUVs, and light trucks that covering both greenhouse gases and conventional pollutants like NO_x. EPA proposed a phasedown for NO_x to 12mg/m, or 0.012 gpm. These are fleetwide requirements, so the more EVs a company sells, the less it needs to reduce emissions from its vehicles with internal combustion engines. Theoretically, if the proportion of electric vehicles were high enough, it wouldn't need pollution controls on its gas-powered vehicles. That's not, however, a realistic. compliance option.

This has to be considered a successful regulatory program. The Biden proposed standard allow less than 1% of the pollution levels that Congress mandated in 1970.

Still, the program has an inherent limitation: it addresses pollution per mile, but not the number of miles driven. That has approximately tripled since 1970. It's not a term I'm found of, but I have to say the current figure is jaw dropping: 3.2 trillion miles in 2022. (If we charged people \$2 per mile, we could cover the whole government budget, social security and Medicaid included. How about that for tax reform?)

As a result of the growth in vehicle use, the improvements in vehicle pollution control have not resulted in proportional improvements in air quality. Smog has definitely gotten better in urban areas, but not nearly as much as it might have, if we had more compact cities and heavier use of public transportation. Given the limited tools that Congress gave it, however, EPA has achieved impressive results.