As my colleague Ann Carlson explained, the EPA is expected to announce a catastrophic rollback this week to freeze national vehicle emission and fuel economy standards and challenge California's authority to set their own, more stringent standards. The Trump EPA's decision to weaken the vehicle standards despite thorough midterm reviews by both the Obama-era EPA and California that found manufacturers are perfectly capable of complying with the standards (and in fact are actually *over-complying* with the GHG standards) follows a disturbing trend prioritizing the demands of regulated industries over public health. It also represents yet another retreat from the strongest and most successful tool environmental regulators have to protect public health: technology-forcing.

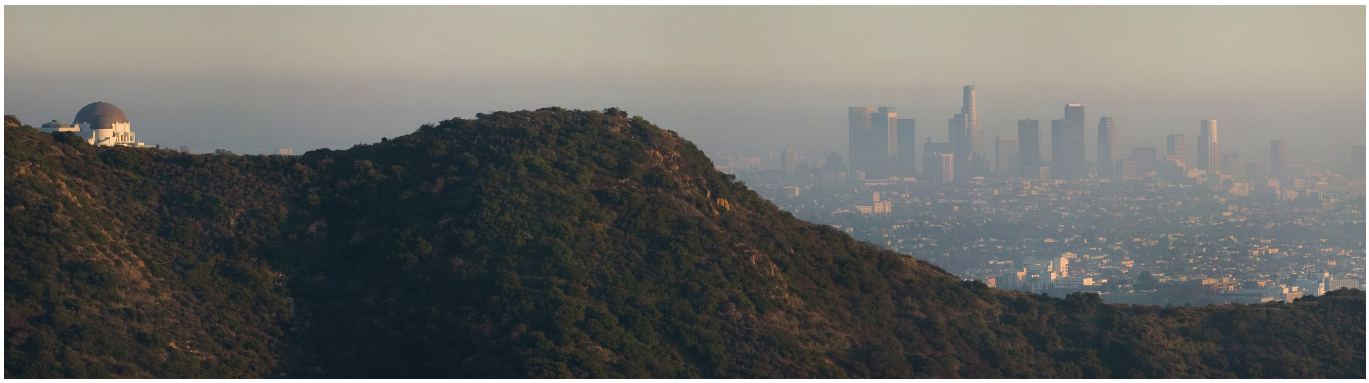

Los Angeles traffic (Eric Demarcq, Flickr)

Technology-forcing regulations drive innovation by requiring industry to meet standards that require technology beyond the current state-of-the art. This is particularly important in areas where a regulated industry has little or no incentive to act on their own to address negative externalities whose costs are borne by the public at large. In the environmental context, this shifts the economic burden previously borne by the public to cover clean up costs and public health impacts, instead forcing regulated entities to research and develop new technologies to reduce or eliminate the pollution in the first place.

Unsurprisingly, industry hates these kinds of regulations. Indeed, before Congress adopted the first national vehicle emission standards in the late 1960s, DOJ investigated whether the big four automakers had violated antitrust laws by conspiring to delay the development of air pollution control equipment. Automakers may have wanted to avoid the financial impacts

of proactively reducing emissions, but uncontrolled vehicle emissions were imposing massive public health costs.

Los Angeles was ground zero for air quality research in the 1950s. The post-war population boom and the explosion of freeway construction and corresponding decline in the Pacific Electric Red Cars meant that more people than ever were driving cars in Los Angeles. Caltech chemist Arie Jan Haagen-Smit (who would later go on to become the first chair of the California Air Resources Board) discovered in 1952 that worsening Los Angeles smog episodes were caused by a photochemical reaction between California's sunshine and nitrogen oxides (NOx) and unburned hydrocarbons (volatile organic compounds, or VOCs) in motor vehicle exhaust. NOx and VOCs react in the presence of ultraviolet radiation to form ozone, which is then trapped in the Los Angeles air basin by the surrounding mountains and a warm inversion layer from the Pacific.



Los Angeles and Griffith Observatory, as viewed from the Hollywood Hills (DAVID ILIFF, Wikimedia Commons)

Exposure to ground-level ozone causes a number of serious health impacts. Short term exposure irritates the respiratory system by reducing lung function and exacerbating asthma, and as well as increasing risks for cardiovascular disease. Long term exposure increases the risk of premature death and may result in reproductive and developmental harms.

It didn't take long for California to act to reduce vehicle emissions. The state Motor Vehicle Pollution Control Board issued the nation's very first tailpipe standards for VOCs and CO in 1966, NOx in 1971, and diesel particulate in 1982. Congress would follow California's lead in the 1970 Clean Air Act amendments, authorizing the newly created EPA to issue strict new tailpipe standards at the national level. Automakers realized they couldn't meet the

new VOC, CO, and NOx emission standards using existing technologies and minor engine modifications, leading directly to the introduction of the catalytic converter in 1975. With each new ratcheting-down of emission standards, patent activity in the vehicle emissions control industry would explode.

Research shows a significant positive correlation between the introduction of technology-forcing regulations and automaker innovation. And these innovations have resulted in significant emission reductions and associated health benefits. But many areas of California remain woefully out of attainment with health-based ambient air quality standards for ozone, and we still have a long way to go before reaching our 2030 climate targets. Reducing vehicle emissions even further is a key part of meeting both the ozone standard and our climate goals.

As former EPA Administrator Gina McCarthy aptly described in her op-ed for Automotive News back in April when the potential vehicle rollback was first announced, then-Administrator Pruitt and his cronies "view all rules, by definition, to be anti-business even when they were undertaken to provide essential public health and climate protections and would provide far more benefits than costs." This perfectly sums up the short-sightedness that Trump's EPA seems determined to continue under new acting Administrator Wheeler. By freezing the CAFE standards and attacking California's authority to to regulate vehicle emissions, the EPA is ignoring the externalities that technology-forcing rules are designed to address and instead pursuing an anti-regulatory agenda that will have measurable impacts on our health, our air quality, and our climate for generations to come.

At its heart, technology-forcing is a refusal to accept the status quo. It's based on a recognition that existing technologies do not adequately protect public health, and a belief that regulated industries can and should do better. Senator Edmund Muskie of Maine put it best during Congressional debate over the Clean Air Act amendments of 1970:

> The first responsibility of Congress is not the making of technological or economic judgments or even to be limited by what is or appears to be technologically or economically feasible. **Our responsibility is to establish what the public interest requires to protect the health of persons.** This may mean that people and industries will be asked to do what seems to be impossible at the present time.

It's this sense of public service, this belief that public health is more important than industry

bottom lines, that’s most sorely lacking in the political appointees currently running EPA. I hope we see it return someday.