The Incredible Benefits of the Clean Air Act's Half Century

Joseph E. Aldy is an economist on the faculty at the Harvard Kennedy School. You can contact him at Joseph_Aldy@hks.harvard.edu.

This coming New Year's Eve marks the golden anniversary of the Clean Air Act. For 50 years, the Environmental Protection Agency's implementation of this law and its subsequent amendments have significantly reduced air pollution and improved public health. Since 1980, when the basic regulations were in place, the U.S. economy has nearly tripled in size as the concentrations of the six most common air pollutants — lead, ozone, particulate matter, nitrogen dioxide, sulfur dioxide, and carbon monoxide — have declined an average of 69 percent.

The regulations contributing to lower pollution have come at a cost, and many of these have concentrated costs in a small number of the most pollution-intensive industries. For example, retrospective analyses have shown the adverse impacts of stringent CAA regulations on manufacturing plant births and manufacturing employment. In some cases, workers losing jobs due to such regulations realized long-term costs through lower incomes even after finding new employment.

You can't fill up your car or turn on a light without encountering a market instrument

While these costs are important for those who bear them, when we compare all of the benefits and costs expected under these rules, the monetized value of the public health benefits clearly outweigh the monetized costs. In recent work with multiple colleagues, we reviewed every EPA analysis that monetized benefits and costs of major CAA regulations published since 1997. Out of these 48 regulations, the median rule had benefits exceeding costs by more than $4 billion per year and only five rules had costs exceeding benefits. Ten regulations had net annual social benefits in excess of $40 billion each. Undertaking the investment to cut air pollution justifies the costs by delivering reduced premature mortality, fewer asthma-related hospitalizations, and less chronic bronchitis.

Delivering substantial public health benefits over five decades reflects the CAA's durability. And the act has endured because of an adaptable and flexible statutory design. For example, EPA staff adapted to new evidence in the 1980s about the health threats from airborne lead exposure to accelerate the phase-down of lead in gasoline through a flexible, tradable credit pollution market. Eliminating this hazardous metal in gasoline cut lead emissions by 94 percent and delivers about a trillion dollars in public health benefits per decade in the form of lower premature mortality, higher IQs, and reduced hypertension.

Over the past two decades, the adaptability of the act has enabled EPA to implement regulations that have dramatically reduced fine particulate matter pollution. The term "fine particulate matter" does not appear in the Clean Air Act of 1970. Based on more recent epidemiological research, it clearly satisfies the criteria for a national ambient air quality standard, and the act's regulations reducing emissions of fine PM save tens of thousands of lives per year. In a number of cases, producing such public health benefits have occurred through the implementation of pollution markets, such as cap-and-trade programs and tradable performance standards.

The experimentation with various approaches to trading under the CAA — with some early successes (e.g., the phase-down of lead in gasoline) and some failures (e.g., the rarely used project-specific trading for new sources in non-attainment areas) — led to more extensive policy innovation. The emergence of pollution markets served as a counter to criticisms that CAA regulations were imposing excessive costs on American businesses. They also altered the political economy of long-simmering policy disputes, such as how to address the problem of acid rain, and created a path forward for more ambitious environmental goals.

One of the major legacies of EPA's implementation of the CAA is the testing of, learning about, and exporting the idea of leveraging pollution markets to deliver on environmental and energy goals. Today, it is virtually impossible for Americans to fill up their cars or turn on their lights and consume energy that is not produced subject to some kind of market-based instrument. Cap-and-trade programs for carbon dioxide, sulfur dioxide, and nitrogen oxides have covered power-sector emissions. About two-thirds of the country consumes electricity subject to state renewable portfolio mandates. And transportation fuels are subject to credit trading under the renewable fuel standard and fuel content standards, such as benzene and sulfur.

Despite the improvement in air quality since 1970, more progress can be made. While pollution has fallen across the country, and the differences in exposure among White and minority populations have likewise decreased, disparities remain. And the most-polluted areas four decades ago continue to be the most-polluted today. Moreover, the threats posed by climate change require more ambitious actions to cut greenhouse gases — a task that would benefit from revising and modernizing our laws to launch the CAA's second half century.