The State of the Environment: Evaluating Progress and Priorities

Testimony

Before the

Committee on Science, Space and Technology
Subcommittee on the Environment
U.S. House of Representatives
Washington, D.C.

February 14, 2013

By

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Introduction

Thank you Chairman Whitfield and fellow members of the Environment Subcommittee for the opportunity to testify on the critically important but far too neglected topic of this hearing: The State of the Environment: Evaluating Progress and Priorities. As a former chief state environmental regulator in Texas, whose job for six years was to implement federal environmental regulations, I thank you for the opportunity to share a perspective developed in the arena where the regulatory rubber meets the road in towns, businesses, homes, and real individual lives across Texas.

Although rarely heard, the environmental record of the U.S. is one of dramatically improving air and water quality. The U.S. environment has now achieved a state in which the most dangerous risks from polluted air and contaminated water are largely eliminated. Of course, there are exceptions in specific locations and days when air pollution may temporarily rise in a specific place. And of course the regulatory effort to reduce environmental risks to human health should continue, but the record should give us environmental optimism. The consistently positive trend began in the early 1960s even before the enactment of the major federal environmental laws in the early 1970s.

Assessment of the actual conditions of our physical environment today and measurement of the effectiveness of the massive web of regulations imposed under the main federal environmental laws enacted over forty years ago is, regrettably, a neglected topic in the policymaking debates of the day. The current leadership of the EPA apparently thinks that our environment is so severely polluted that risk of death abounds. Over the last four years, during which EPA has promulgated regulations unprecedented in number, infeasible stringency, and cost, the former Administrator repeatedly told the public that air quality was so bad that aggressive new regulation was necessary to prevent the deaths of thousands people.

In October 2011 on the Bill Maher show, the former Administrator noted, “We are actually at the point in many areas of this country where on a hot summer day, the best advice is don’t go outside. Don’t breathe the air. It might kill you.”[1] In a similarly hyperbolic vein, she told this subcommittee, “If we could reduce particulate matter to levels that are healthy, it would have identical impacts to finding a cure for cancer.” The American public needs an exhaustive explanation of this assertion. In recent years, cancer has caused the death of approximately 600,000 real people per year.

In fact, the state of our environment is remarkably improved as is public health. There is far more empirical scientific data supporting the claim of huge strides in environmental health than EPA’s chilling assertions about “early deaths.” Data available on EPA’s own website and in abundant toxicological studies document a radically different story than EPA’s alarming assertions of acute environmental peril.

Whether we consider air pollutants, water contaminants, or release of hazardous chemicals, the environmental trend is vigorously positive.

State of the Environment: Air, Water and Toxins

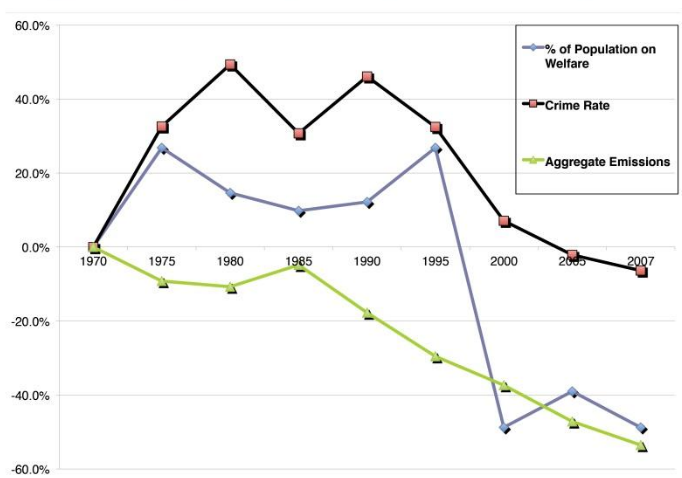
Over the last four decades and particularly over the last two decades, environmental conditions and public health (with few exceptions) have dramatically improved. Regardless of the EPA's exaggerated statements about mortal risks, it is EPA's own data available on the Agency's own website (See "Our Nation's Air–Status and Trends") that documents the improvements.[2]

Meaningful, timely, and comprehensive assessments of environmental conditions over time are rare. The one exception is Stephen Hayward's "2011 Almanac of Environmental Trends." This peer-reviewed compendium provides current data from official federal sources on a broad range of environmental issues with useful historical background. I understand Dr. Hayward is working on a 2012 edition of the Almanac.

The dramatic improvement in air quality across the U.S. is a major public policy success although one to which the EPA or the media give less than lip service. And while the EPA's regulation under the Clean Air Act played a key role, the main engines driving this transformation were technological advances in emission control and efficiencies–innovations spurred and made possible by economic growth within the dynamics of the free market.

The U.S. now produces much more with less inputs and waste. The prosperity made possible by economic growth has allowed businesses and consumers to absorb the steep cost of elaborate emission controls. Objective science, creative technology, entrepreneurial investments of capital and rapid information exchange—these hallmarks of the free market have–and if allowed to function—will fuel continual environmental enhancements and improved human health. Studies such as the Environmental Performance Index, the Index of Economic Freedom, and the Fraser Institute's Economic Freedom of the World demonstrate that countries which structurally enshrine economic freedom under the rule of clear, limited laws and private property right also achieve environmental quality.[3]

A Comparison of Crime Rate, Welfare, and Air Pollution, 1970-2007



Source: Steve Hayward, *2011 Almanac of Environmental Trends*, (Apr. 2011);
FBI Uniform Crime Reports, U.S. Department of Health and Human Services, EPA.

Environmental progress remains an elusive goal for most of the developing countries and heavily centralized governments. In the World Bank's list of the 78 cities with the highest particulate matter pollution (PM), only two U.S. cities appear: Los Angeles (as the 64th highest) and Chicago (as the 78th highest). In this study, Los Angeles has a PM level of 34 micrograms per cubic meter level, while Cairo, as the first city on list, has a PM level at the extremely high level of 169 micrograms per cubic meter.[4]

In the list of cities most polluted by sulfur dioxide (SO2), Guiyang, China ranks first with a daily mean level of 424 micrograms per cubic meter, while Los Angeles, last on the list of 89 cities, has a level of 9. These values are calculated according to the World Health Organization's standard for SO2 of 20 micrograms per cubic meter–a standard much higher than EPA's typically far more stringent air quality standards.[5] I might add that new coal-fired power plants in the U.S. achieve SO2 levels approximately 95 percent lower than in the early years of the 20th century.

Of course, efforts to maintain and improve air quality should continue. But regulation must be proportionate to current, meaningful risk. And EPA should recognize the remarkable trends in our state's and our nation's air quality, return to sound scientific assessment of remaining health risks, and inform the American people about wholly positive trends in our environmental quality.

Air Quality Improvement

National Ambient Air Quality Standards

EPA data show that since 1970, aggregate emissions of the six criteria pollutants for which the Clean Air Act (CAA) requires National Ambient Air Quality Standards (NAAQS) have decreased by over 60 percent and these emissions are still falling. These air quality achievements occurred while the U.S. Gross Domestic Product (GDP) increased 200 percent. Over the last several decades, tailpipe emissions have been reduced by 90 percent while vehicle miles traveled have increased 165 percent. Improvement will continue with the turn-over vehicles and new equipment.

Virtually the entire country attains four of the six NAAQS. Some urban areas still struggle with attainment of the NAAQS for ozone and fine particulate matter (PM2.5), but the levels and frequencies of exceeding the NAAQS are sharply falling. In the Houston region of Texas, the number of days in the year of exceeding the ozone NAAQS has fallen from a high of 73 days in 1995 to 14 days in 2012. In 1997, the EPA classified 113 metropolitan areas across the country as ozone non-attainment areas. That number has fallen to below 30 metropolitan areas. My analysis is confined to NAAQS in legal effect before current administration's changes. The new NAAQS are not yet in full effect.

Air Quality Improvement 1980-2010

	Ambient 1980-2008	Ambient 1980-2010	Emissions 1980-2008	Emissions 1980-2010
Carbon Monoxide (CO)	-79%	-82%	-58%	-71%
Ozone (O3)	-25%	-28%	-49%	NCD
Lead (Pb)	-92%	-90%	-96%	-97%
Nitrogen Dioxide NO2	-46%	-52%	-40%	-52%
Particulates (PM10)*	-31%	-38%	-46%	-83%
Fine Particulates (PM2.5)**	-21%	-27%	-36%	-55%
Sulfur Dioxides (SO2)	-71%	-76%	-56%	-69%
NCD- No Current Data				
*1990-2010				
**2000-2010				

U.S. Environmental Protection Agency, "Air Quality Trends," January 2012, http://www.epa.gov/airtrends/aqtrends.html (April 18, 2012).

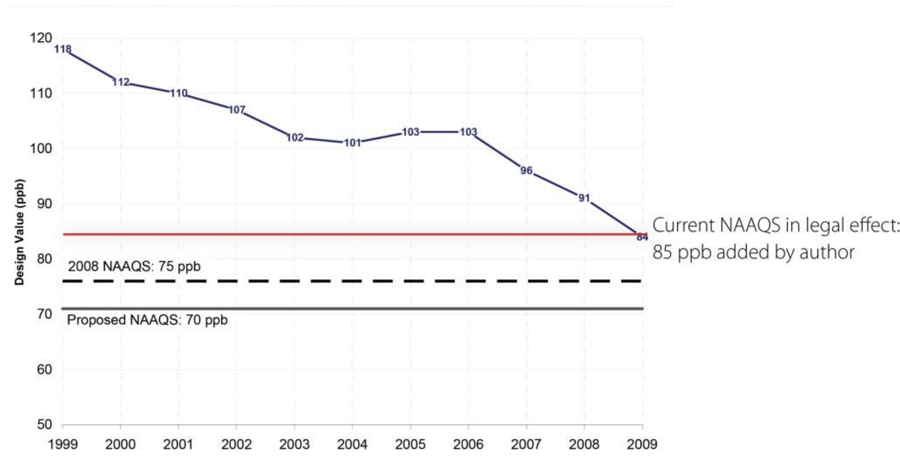
The table above notes the percentage of reduction as a national average from 1980-2010. In some states, like Texas, the reductions are significantly greater. The condition, or trend, of air quality is measured in terms of ambient levels in the air and emission volumes. Emissions are an estimate (typically made by models) of the volume of pollutants released into the air by human activities. The ambient levels are the key measure of health risk because they are a physical measurement of the actual concentration of pollutants in the air to which humans are exposed. Monitors measure ambient levels while models estimate emissions.

The ambient levels overstate environmental risk because they do not incorporate representative exposure. Most—although not all—pollutants decline by as much as 90 percent indoors. And most people spend 90 percent of their lives indoors. EPA's risk assessments and the ambient standards calculated on the basis of the risk assessments assume exposure to the highest monitored levels 24/7, an indication of how highly protective are the NAAQS.

The big improvement over the two years from 2008 and 2010 is great news but unusual because reductions of this magnitude typically occur gradually. A combination of variables likely accounts for the reductions between 2008-2010. The decrease in economic activity during the recession is likely the greatest cause. Installation of additional emission controls and greater use of renewable energy sources and natural gas also likely contributed.

With the second largest population, six of the 20 largest U.S. cities, economic growth far outpacing the national average, and the largest industrial sector, Texas has reduced ozone levels across the state since 2000 by 23 percent compared to a national average of 13 percent. The Houston region has reduced ozone precursor emissions by at least 85 percent (nitrogen oxides) and 70 percent (volatile organic compounds). Once vying with Los Angeles as the most ozone polluted city in the country, Houston, Texas–home of the largest petrochemical complex in the world with an optimal climate for ozone formation—attained the 85 parts per billion ozone standard in 2009 and 2010. And Texas is likely to attain the new annual fine particulate matter NAAQS.

Eight-Hour Ozone Design Values for the Houston-Galveston-Brazoria (HGB) Area



Note: 2009 design values based on average of 2007 to 2009 data. Design values are as of November 13, 2009 and are subject to change.
Source: TCEQ Emission Inventory, Air Quality Division, AMDA: 2010

Many regard this air quality success in Houston an evanescent anomaly, but it was the result of an elaborately orchestrated team effort by the state. Our legislature, state agencies, local governments, industry, and multiple universities worked collaboratively to design and implement creative technology, market incentives, state-of-the-art science, and targeted regulatory controls. We resisted EPA's one-size-fits-all, over-reaching blueprint to develop a State Implementation Plan addressing the distinctive state/local parameters of our ozone problem and without shackling economic growth. It worked!

The historically record-breaking heat in 2011 sent Texas ozone levels higher, but with more normal weather returning in 2012, ozone levels in every region of the state regained their downward trajectory. And Houston remains only a hair's breadth from the highly questionable 2008 eight-hour ozone standard of 75 ppb. The Dallas area also has seen dramatic reduction and is approaching attainment of the ozone NAAQS.

Increasingly effective emission detection and control technology and huge gains in operational efficiency—driven by the dynamics of the private market place—facilitate this major emission reduction in Texas. With all these controls, heavy industry no longer is the predominant source of smog and soot. Now think tailpipe, not smokestack. Tailpipe emissions from cars, trucks, and construction equipment are the main source of ozone, particulate matter, and some key toxins such as benzene.

Hazardous Air Pollutants (HAPS) and Toxins

The rarely told story of major air quality improvements also includes hazardous or toxic pollutants. EPA's Toxic Release Inventory (TRI) tracks the "releases" of more than 600 chemical compounds from more than 20,000 businesses and industrial facilities across the U.S. EPA's TRI reports that 225 "core" chemical compounds have declined by 65 percent since 1988. Note that the TRI provides no information about whether the public is exposed to hazardous chemicals in a manner potentially harmful to human health. The TRI merely indicates the sharply declining use of hazardous chemicals as a positive trend. Much of the reduction shown by the TRI is a result of efficiencies gained in the petrochemical industries.

Texas has developed a state-specific program to intensely monitor and reduce ambient levels of HAPS. Like most environmental issues, programs designed and implemented by states which have far more detailed and site-specific information are more effective and cost efficient.

Lead

When lead was eliminated from transportation fuels in the late 1970s, ambient concentrations of lead decreased 97 percent. In the 1970s, 88 percent of children ages one through five years had lead levels in their blood above the Center for Disease Control and Prevention's (CDC) threshold of risk to cognitive development. In 2006, only 1.2 percent of children in this age group had lead levels above the threshold. EPA could declare victory on lead and maintain the current NAAQS but instead chose to lower the standard below naturally occurring background levels in most areas.

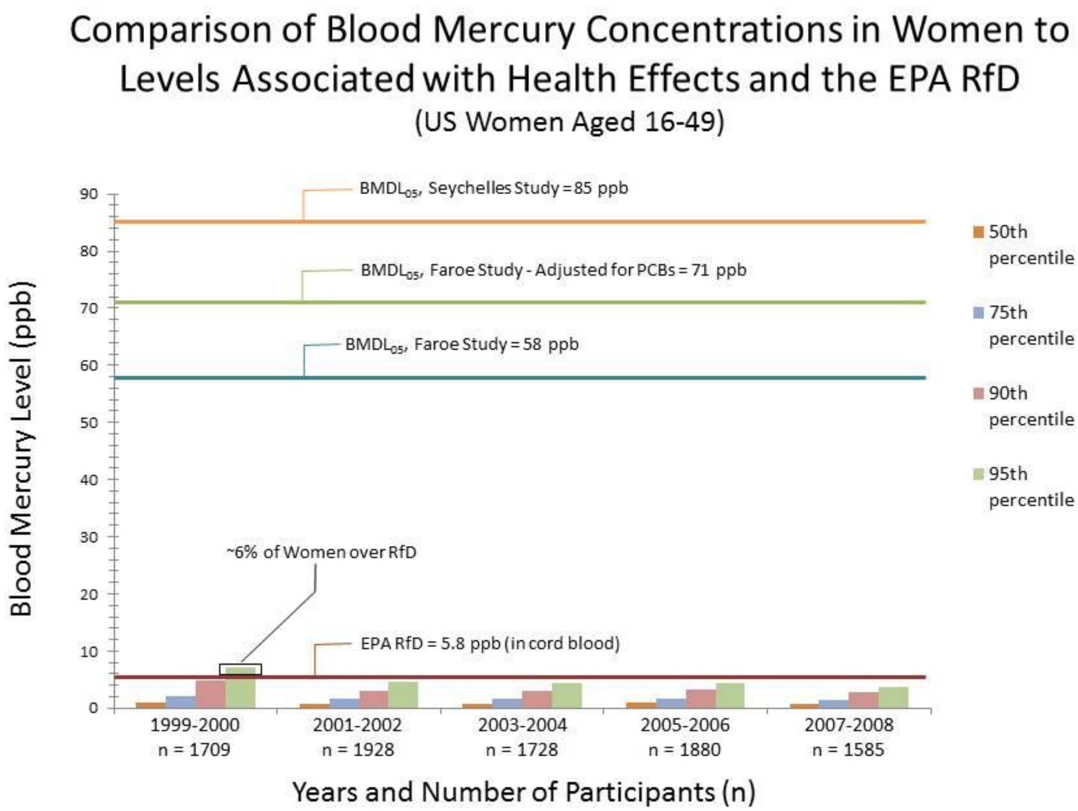
Dioxin

A family of naturally occurring and man-made chemical compounds of widely varying degrees of toxicity, dioxin levels in the air, water, and human tissue have sharply fallen. According to EPA's measure of "toxic equivalents" (TEQ), dioxin declined 92 percent over the last twenty years. Two international studies have found that the level of dioxin in human tissue has fallen 90 percent since 1970.[6]

Mercury

Airborne emissions of mercury in the U.S. also have declined by approximately 60-70 percent and account for less than two percent of a global deposition affecting ambient levels in the U.S. Empirical data shows a strong positive trend. Control measures to reduce the criteria pollutants also work to reduce mercury. As such, it remains debatable whether stringent regulation of mercury per se is justified.

The graph below shows that the CDC's most recent survey finds the blood levels of young women are well below the level at which EPA has set the risk to mercury exposure–an extremely conservative level that is two-three times stricter than that set by the World Health Organization and the Food and Drug Administration.

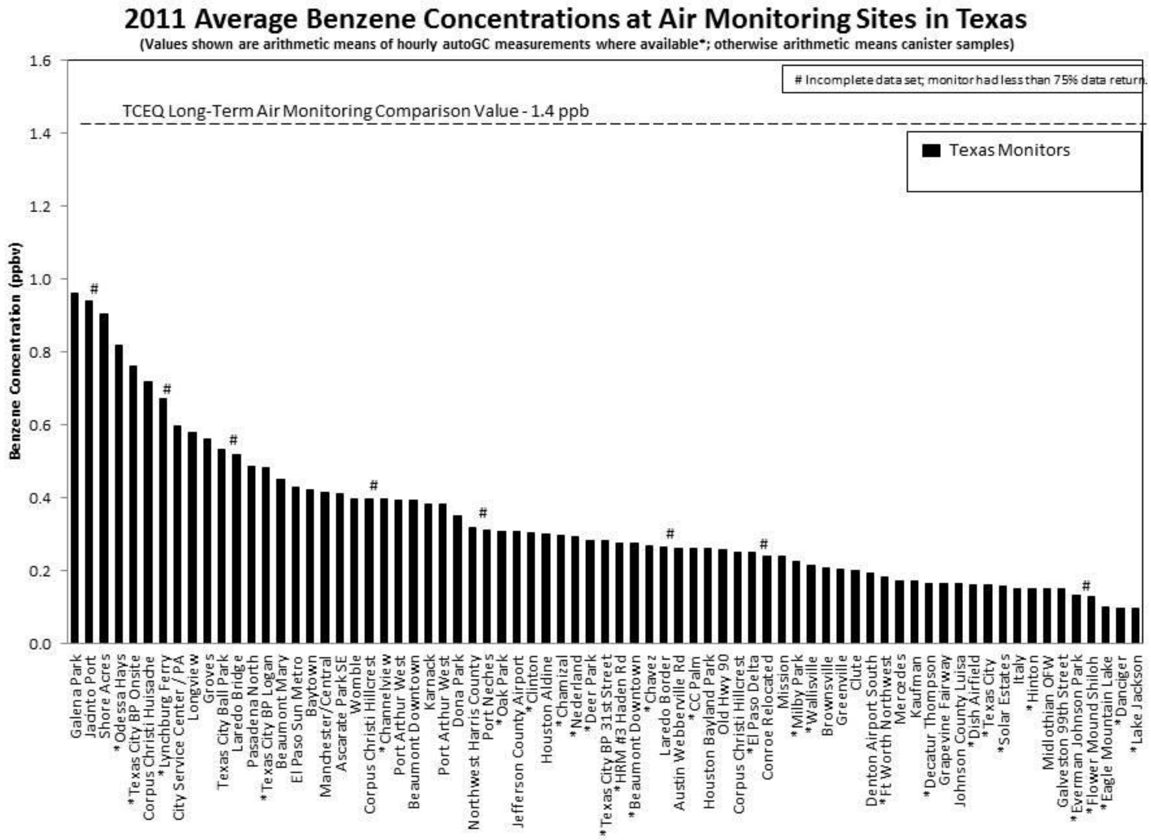


Source: CDC (Centers for Disease Control and Prevention). 2009. National Center for Health Statistics, National Health and Nutrition Examination Survey (NHANES). Decreases over time occurred for each of the four percentiles, but were most pronounced at the 90th and especially 95th percentiles. For example, during the 1999-2000 survey, 10 percent of surveyed women age 16 to 49 had blood mercury levels of $\geq$ 4.9 ppb. In the 2007-2008 survey, however, the 90th percentile value had decreased to 2.7 ppb.

Nonetheless the EPA has adopted a rule (Utility MACT) mandating massive reduction of mercury emissions from power plants. The rule imposes limits so aggressive that they are infeasible for many plants, many of which have already announced closure. And while EPA admits that the cost of this regulation—at the EPA estimate of $10 billion per year—is perhaps the most expensive air regulation to date, EPA also admits that the benefits from mercury reduction are so minute to be immeasurable.

Benzene

A well-known carcinogen and the most wide-spread HAP, benzene levels have significantly declined by more than 64 percent as a national average. As the graph below shows, benzene levels in the petrochemical center of the U.S.–the Houston region—have declined as much as 80 percent. Through a partnership with industry and the state environmental agency, Texas has implemented perhaps the most concentrated monitoring system for air toxics anywhere in the world. EPA's few monitoring sites, on the other hand, limit the reliability of estimating national average ambient emissions of hazardous air pollutants and preclude identification of hot spots—localized areas with higher ambient levels of HAPs.



Water Quality

Drinking Water

The quality of drinking water is of the utmost importance to human health. The U.S. now provides highly safe drinking water. EPA regulates public water systems under highly strict limits for hundreds of contaminants. In 2008, 94 percent of the water systems that provide drinking water met all of EPA's highly protective standards. In 1993, only 79 percent of water system met all EPA standards. In 2001, EPA adopted highly controversial standards to mandate reduction of minute levels of naturally occurring arsenic and radio-nucleides. Approximately 2 percent of the nation's water systems cannot yet attain these standards which often necessitate securing an entirely different water source, sometimes at a prohibitive cost.

Public Health

Life expectancy–the most important measure of public health—has increased by at least 40 percent over the last century. According to the Center for Disease Control (CDC), average life expectancy in 1900 was 49.2 years and in 2010, life expectancy increased to 78.7 years.[7] Medical science and disease prevention have dramatically reduced disabling and fatal diseases. As the table below shows over the period 1960-2009, the trends in leading causes of chronic disease and death show tremendous progress, with 69 percent decline in heart disease and 78 percent decline in stroke.

Trends in the Leading Causes of Deaths --- United States, 1960 and 2009

Trends in the leading causes of chronic disease--related deaths --- United States, 1960 and 2009

Disease†	Rate,* by year		Trends, 2009 vs. 1960		No. lives saved (lost)§
	1960	2009	% Change	Rate difference*	
Heart disease	559	180	--68%	--379	1,137,000
Cancer	194	174	--10%	--20	60,000
Stroke	178	38.9	--78%	--139	417,300
Diabetes	22.5	20.9	--7%	--1.6	4,800
Liver disease	13.3	9.2	--31%	--4.1	12,300
Pneumonia & influenza	53.7	16.2	--70%	--38	112,500
Accidents	62.3	37	--41%	--25	75,900
Suicide	12.5	11.7	--6%	--0.8	2,400
Homicide	5.0	5.5	+10%	+0.5	(1,500)
Total					820,700

Sources: Health, United States, 2010: with special feature on death and dying. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics; 2011. Available at www.cdc.gov/nchs/data/hus/hus10.pdf ; and Kochanek KD, Xu JQ, Murphy SL, et al. Deaths: preliminary data for 2009. National Vital Statistics Reports 2011;59(4). Available at http://www.cdc.gov/nchs/data/nvsr/nvsr59/nvsr59_04.pdf .

* Per 100,000 population (age adjusted to the 2000 US population).

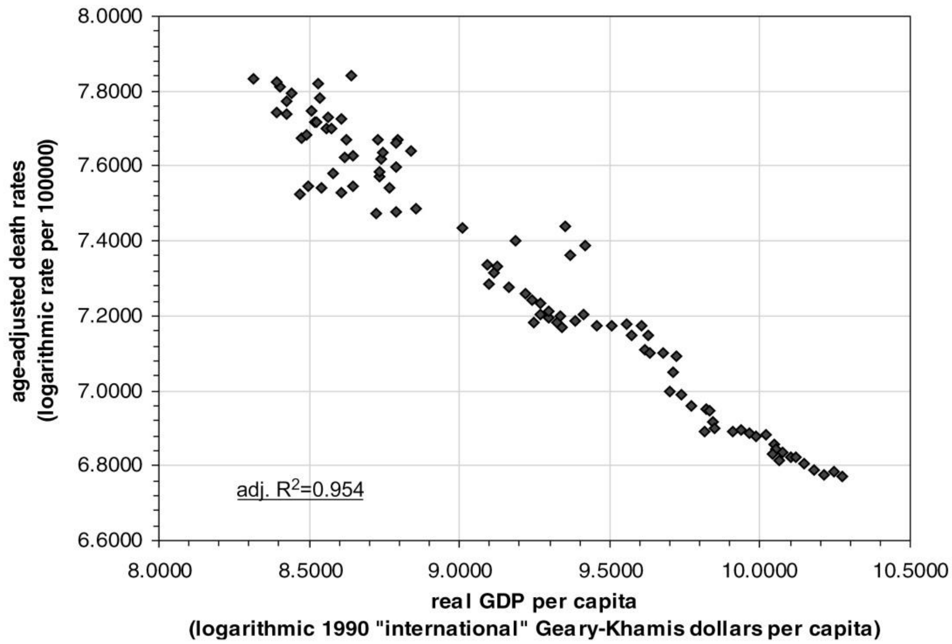
† For chronic obstructive pulmonary disease, comparison is 1980 vs. 2009, as follows: 1980 rate---28.3; 2009 rate---42.2; % change, 2009 vs. 1980---+49%; rate difference---+14; no. lives saved: 41,700.

§ Estimated by multiplying the rate difference by the 2010 US population (300 million persons) rounded to the nearest 1,000.

The 14 percent uptake in chronic obstructive pulmonary disease (noted in footnote to the Table above) is exceptional and often used to blame air pollution is the cause. But could this occur while air pollution was on the sharp decline? There many confounding factors in the studies. While the incidence of asthma has increased, this occurred over the period of the most dramatic reduction of the criteria pollutants in the forty year history of the CAA. And some studies show a higher incidence of asthma and other chronic respiratory disease in the winter months when ozone and PM is far, far below the levels of summer months.

Over the last five years, EPA's regulatory initiatives have been pre-occupied with PM 2.5 as if it was a source of major risk of premature mortality. Yet, the weak epidemiological studies on which EPA typically relies are incapable of evaluating whether and to what extent outdoor concentrations of PM 2.5 may causally impact cardiopulmonary function. The majority of toxicological studies on the matter strongly suggest that current ambient PM 2.5 is too low to cause major disease or death. According to leading statistician Dr. Ton Cox, "The expectation that lives will be saved by reducing ambient PM 2.5 is not supported by the weight of evidence, although other bases for regulating PM may be justifiable.

Health Effects of Poverty and Unemployment



Source: Brenner MH Int., J. Epidemiol. (2005) 34: 1214-1221.

Far more studies find far stronger correlation between unemployment/low income and premature mortality than the minute correlations EPA identifies in cherry-picked epidemiological studies to assume that current ambient air quality "causes" "early deaths."

Evaluating Progress

Other than the partial data in EPA's "Our Nation's Air: Status and Trends," the limited Toxic Release Inventory, the similarly limited and now dated National Water Quality Inventory (NWQI), the new Wadeable Streams Assessment (WSA), and anecdotal data, the EPA lacks a reliable, consistent, systematic, scientifically meaningful, and publically accessible means of measuring environmental conditions over time.

Regulatory Effectiveness

Equally important, EPA, like most federal regulatory agencies, lacks a methodology for credibly assessing regulatory effectiveness. Agencies continually add to the regulatory edifice but they rarely try to determine whether a regulation achieved its regulatory objective (e.g. reduction of X pollutant by X degrees) and policy objective (e.g. reduction of X degree in risk of adverse health effect).

Federal agencies like EPA are awash in data points, but they overwhelmingly relate to administrative outputs (number of fines, permits, rules, etc.) and not to measurable outcomes. Programs to measure and track regulatory outcomes at EPA were initiated several years ago, but not long after they were shelved. Various methodologies to measure and track regulatory effectiveness exist and could be legislatively required.

Cost-Benefit Analysis

Regulatory impact analysis, such as cost-benefit analyses (conducted at the stage of rule promulgation) should provide a rubric to assess the importance of the policy objective of a regulation. EPA's current method of cost-benefit analysis is so manipulated, however, that it lacks credibility and grossly misleads the public.

I submit with my written testimony my paper on EPA's 2011 study titled "Benefits and Costs of the Clean Air Act, 1990-2020." My study is entitled "EPA's Pretense of Science: Regulating Phantom Risks."[8] The EPA study should provide critical information about air quality progress. Built on implausible assumptions, weak and selective science, statistical manipulation, and pure policy choice, however, this study is worse than meaningless. Concluding that CAA regulation will provide $30 dollars in health benefits for every $1 in cost and will "save" 230,000 lives, this "Benefits Study" deceives the public about health risks and regulatory costs.

Monitors Trump Models

After forty years of continually increasing regulation, meaningful indicators of environmental trends, conditions, and relative risks must be rooted in empirical data and thus the more robust sciences such as toxicology and medicine. Models used to characterize current or future conditions are useful in many areas, but as a basis of regulatory decision: monitors trump models. Physical measurement of environmental condition in real-time and over-time is a critical tool. The technology now exists to measure the conditions. Ambient air quality monitors, continuous emission monitors (CEMS), representative air sampling, infrared cameras, auto gas chronometers, and many other technologies enable far more precise measurement than EPA's excessive use of models driven by assumptions of unrealistic worst case scenarios.

One of the two grounds for the rare, complete vacature of the Cross State Air Pollution Rule (CSAPR) by the DC Circuit Court of Appeals indirectly involved EPA's speculative models about interstate transport of emissions. EPA formulated these models to calculate the amount of emission reduction in an upwind state necessary to avoid impact on a downwind state–usually already in attainment of the NAAQS in question! The court found that CSAPR as adopted mandated emission reductions in upwind states of a magnitude far disproportionate to their impact on air quality in the downwind state. EPA had relied on its flawed, worst-case modeling of future conditions to justify the amount of reductions imposed on the upwind state.

A major reason for the air quality success enjoyed in Texas is the state's investment in what is likely the most intensive and extensive ambient air quality monitoring system, especially in the Houston region. Precise, localized data is essential to effective, targeted, location-specific air and water quality management.

With the rapid expansion of natural gas production in the Barnet Shale area surrounding the highly populous Dallas-Forth area, many residents were concerned about environmental impacts. The state's initial models of the impact showed considerable impact. But after developing elaborate monitoring protocols and deploying monitors, the Texas Commission on Environmental Quality (TCEQ) found that the drilling had no adverse impact on air quality.

More Vigorous Science of Health Effects

Any measurement of environmental condition and trend is intertwined with EPA's risk assessments or Integrated Science Assessments (ISA). Over the forty years of implementation of federal environmental laws enacted to protect human health, a wide body of diverse environmental science exists. Some scientific disciplines provide more robust, empirical findings. For example, ecological epidemiological studies can only detect correlations or concurrences between pollutant levels and health effects. They cannot establish causation–that pollutant level X caused health effect Y.

Toxicology, medical science, and clinical trials can establish causation and incorporate critical information such as dose, representative exposure, and plausible biological mechanism. After the magnitude of environmental improvement, particularly in air quality, EPA must now ground its risk assessment for health effects (Integrated Science Assessment) in the more vigorous empirical sciences. Epidemiological studies may be useful but alone are no longer sufficient to support regulation of the remaining environmental risks to human health.

Priorities

Abandon the No Safe Threshold Methodology

The single most important priority for effective, cost-efficient, beneficial EPA regulation is reform of the methodologies that EPA is now using to conduct risk assessment of human health effects–the foundation of EPA's regulatory decision. Numerous scientific bodies including the National Academy of Science have called attention to this problem.

After the great gains in air quality and ever-stricter air quality standards now approaching natural background levels in some areas, EPA has devised a methodology to create a vast reservoir of new health risks–and thus a supposedly scientific justification for more stringent new regulation. In the last four years, EPA has used these newly created health risks to justify its unprecedented regulatory agenda. Since 2009, EPA has been using the pure assumption (by data-free extrapolation) that there is no safe threshold of pollution–however low–"below which health risk reductions are not achieved by [regulation-caused] reduced exposure."[9] This is Assistant Administrator for Air Gina McCarthy's response to Chairman Upton's letter questioning the credibility of no safe threshold methodology.

Apparently beginning in 2009, EPA's use of this NST methodology increased health risks which EPA identified by four-fold. This increased the number of alleged "deaths" attributable to PM2.5 from 88,000 to 320,000. By using NST methodology, EPA found that over two-thirds of the public's health risk from

PM 2.5 comes from ambient levels not only far below the protective NAAQS but even well below the lowest modeled levels in the studies.[10]

EPA claims that scientific studies "have not observed a level below which premature mortality effects do not occur." But this is not a scientific conclusion; it is a policy choice. The EPA's defense of this absurdly precautionary assumption is another way of saying the point at which all risk is zero cannot be proven. If this NST assumption was expunged from EPA's cost-benefit analyses of regulation promulgated over the last four years, the estimated costs of EPA's many new rules would dwarf the estimated benefits.

Focus on the HAPS and Toxics

For forty years, EPA has spent most of its resources on the six criteria pollutants and not the many hazardous pollutants listed in the 1990 amendments of the CAA. Now that most of the country attains even the continually stricter NAAQS, it is time to focus more study on potential risks from HAPS. These are typically far more localized issues best identified and addressed by state and local authorities.

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[1] "Jackson Gets Real," *Politico Morning Energy* (Oct. 24, 2011).
[2] United States Environmental Protection Agency, "Our Nation's Air – Status and Trends Through 2010" (Feb 2012).
[3] Yale Center for Environmental Law & Policy, "Environmental Performance Index" (Feb. 2012); Terry Miller, Kim R. Holmes, and Edwin J. Feulner, *2012 Index of Economic Freedom* (Washington, DC: The Heritage Foundation and Dow Jones & Company, Inc., 2012), p. 155.
[4] Stephen F. Hayward, *2011 Almanac of Environmental Trends* (San Francisco, CA: Pacific Research Institute, 2011), p. 65.
[5] Ibid. at p. 68-69.
[6] Ibid. at p. 264.
[7] Centers for Disease Control and Prevention, "Life Expectancy" (Jan. 2013).
[8] Kathleen Hartnett White, "EPA's Pretense of Science: Regulating Phantom Risk," *Texas Public Policy Foundation* (May 2012).
[9] Gina McCarthy, Assistant Administrator, Environmental Protection Agency, to Rep. Fred Upton (3 Feb. 2012).
[10] Anne Smith, Ph.D., "An Evaluation of the PM 2.5 Health Benefits Estimates for Regulatory Impact Analysis of Recent Air Regulations," NERA (Dec. 2011); Louis Anthony Cox, Jr., "Reassessing the Human Health Benefits from Clean Air," Risk Analysis (Nov. 2011).