Air Quality in New York City Since 1970

A study to document and quantify the gains and benefits

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Introduction and Summary

Through inspired citizen activism, enlightened governance and improved technology, air quality in New York City has improved steadily and markedly over the past 40 years. These improvements have been impressive. They have enhanced public health and reduced public and private medical costs, and have almost certainly contributed to New York City's economic and demographic resurgence in recent decades.

Yet this phenomenon is unheralded and the benefits largely unquantified. The absence of rigorous, comprehensive documentation of the gains in the city's air quality and the resulting benefits is striking from the perspective of historical scholarship alone. But it may also be a colossal missed opportunity. Documenting and monetizing these gains in the world's most iconic city could bolster efforts to improve air quality in mega-cities around the world, thus improving the well-being of billions of people. Moreover, establishing the true extent of the benefits and recounting the initiatives that brought them about could provide a powerful counterweight to the belief that has taken hold nationally and even globally that environmental progress is antithetical to robust economic activity.

We propose a detailed, definitive study to:

- Quantify the extent of NYC's improved air quality on a decade by decade basis.
- Calculate the health benefits in terms of reduced mortality and morbidity and avoided public health costs.
- Document the major air pollution control measures and other actions that effected the air quality improvements.

To the extent that data are available, we will also assess the role that improved air quality has played in the city's revitalization as a place where people choose to live, visit and work.

The study will be led by Charles Komanoff and Ronald White, specialists in air pollution, public health and economics. Komanoff is a prominent public policy analyst who worked on air pollution and environmental policy for New York City government in the early 1970s and has since consulted in this area for agencies and NGO's. He has gained renown for his comprehensive cost-benefit studies and other quantitative analyses in nuclear power, urban transportation and traffic pricing. Ronald White, M.S.T., is an environmental health scientist who teaches outdoor air quality management and policy at Johns Hopkins University and was formerly Deputy Director for the Johns Hopkins Risk Sciences and Public Policy Institute. White was lead expert for the national American Lung Association on air pollution control policy, served on USEPA's Clean Air Scientific Advisory Committee, and has authored numerous publications on air pollution health impact assessments and control. Messrs. Komanoff and White will

consult closely with staff of the NYC Department of Health and Mental Hygiene to draw upon their extensive expertise in New York City air quality monitoring, health effects and demographics.[1]

Study Outline

I. Quantify the Improvement by Collecting, Compiling, Analyzing, and Trending the Air Quality Data

The foundation of the study will be collecting, compiling, analyzing, and distilling trends from 40+ years of NYC air quality data. A number of factors make this task challenging: changes over time in pollution-monitoring technology, locations and definitions; spotty record-keeping throughout the 1970s and into the 1980s; changes in record-keeping formats and locations — much of the data predates the digital era and is archived only on microfilm; and evolving epidemiological evidence and other scientific beliefs as to which of the "criteria" pollutants are most critical in affecting human health. (These difficulties go a long way toward explaining why no one to date has quantified the extent of the city's improved air quality, let alone the health and economic benefits.) The painstaking work to obtain and mine the data needed to establish the trajectory of ambient air quality improvements over time will be a major part of the study.

II. Calculate the Health Benefits of the Improved Air Quality

This component of the study will rely on US EPA's BenMAP computer model to concretize the air quality benefits in terms of improved health outcomes and monetary savings. BenMAP is a powerful, widely used and "battle-tested" program for translating air quality changes into health effect outcomes.[2] It is extremely data-intensive, however, and requires geographic and demographic as well as pollutant level inputs. Utilizing BenMAP to "backcast" estimated health benefits in earlier decades will be particularly challenging. We will employ three-year rolling averages at 5- or approximately 10-year intervals selected to reflect implementation of major revisions to the Clean Air Act (e.g., 1977 and 1990 Amendments) to aid in both handling the data and telling the story of the air quality gains and associated health benefits. Establishing and aggregating these benefits is the analytical core of the project, particularly since the dollar values of the health benefits are expected to be significant.

To the extent feasible, we will estimate the costs of selected control measures and draw instructive comparisons with their health-related benefits. These benefit-cost comparisons will be approximate rather than precise, due to the fact that some measures have had large "co-benefits," and some important control strategies were regional or national in scope.

[1] DOH/DOMH's 2011 report, Air Pollution and the Health of New Yorkers: The Impact of Fine Particles and Ozone," available at <http://www.nyc.gov/html/doh/downloads/pdf/eode/eode-air-quality-impact.pdf>, is a superb examination of present-day health effects of PM2.5 and ozone, particularly their differential impacts on low-income and minority neighborhoods. It does not, however, examine reductions in those pollutants and health effects over time.

[2] See http://www.epa.gov/air/benmap/.

III. Describe and Explain the Processes that Have Engendered the Improved Air Quality

There was no single regulation or program that brought about the striking gains in New York City's air quality. Rather, a multiplicity of initiatives contributed to reducing air pollution levels. We believe the following strategies have been key:

- Lowering 5-to-10-fold the sulfur content of fuel oil burned for heating and power generation
- Tailpipe and engine technologies that cut per-mile auto emissions at least 10-fold
- Cleaner fuels and engines for diesel-powered heavy vehicles (still under way)
- Re-investment in mass transit that helped stanch growth in auto travel
- Widespread switching of oil-fired power, steam and heating provision to natural gas
- Decommissioning in-building incinerators
- Controls on emissions from upwind refineries, power plants and other sources

These initiatives run the gamut from local to national, from famous to obscure, from environment-related to more multi-purpose. Our study will thread them together through a series of narratives relating their origins, as applicable, to citizen activism and expert advocacy, and relating their progress to local or national legislation, agency enforcement and technical innovation. The narratives will demonstrate implicitly that the measures that improved air quality weren't pre-ordained but rather came about through creative and concerted actions. Identifying the initiatives and crediting the work that engendered and sustained them will both broaden our historical understanding and serve as a spur to future efforts locally, nationally and globally.

IV. Appropriately Credit the Air Quality Gains for NYC's Revitalization

This last facet of the investigation, documenting the role of improved air quality in New York's revitalization in recent decades, is speculative at this time. It is a reasonable hypothesis that reductions in air pollution levels have had an impact in making New York a more attractive place to live and work and thus contributed to its revitalization. This is not to rank cleaner air with reduced crime, better schools, and improved public transportation in attracting and retaining residents and businesses to New York City. Nevertheless, the meme from earlier decades that "breathing NYC air is tantamount to smoking two packs of cigarettes a day" is no longer heard, and most New Yorkers now open their windows to admit fresh air without fear of soot inundation. We will locate and analyze potential sources such as survey data, opinion polling and anecdotal evidence to properly assess the extent to which New York City's economic and demographic resurgence can be ascribed to the air quality gains established in Parts I and II.

Timeline

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Budget

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Conclusion

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