

Institute for Policy Integrity
Residual Risks: The Unseen Costs of Using Dirty Oil in New York City's Boilers
Media Resource Kit

Thanks so much for your interest in the Institute for Policy Integrity's latest project, "Residual Risks: The Unseen Costs of Using Dirty Oil in New York City's Boilers." Enclosed here, you will find the following resources:

Fact Sheet # 1: Summary of Results

Fact Sheet # 2: Backgrounder

To schedule an interview with a member of the project team, contact Edna Ishayik at ednai@nyu.edu or (212) 998-6085.

Institute for Policy Integrity
Residual Risks Media Kit
Fact Sheet # 1: Summary of Results

New Yorkers breathe in a lot of pollution. Most people know smog from cars and buses is a major culprit, but a significant amount of dangerous air pollution comes from the buildings we live and work in. This hidden pollution may cause nearly 200 premature deaths every year.

In the basements of about 9000 big apartment and commercial buildings in Manhattan, Brooklyn, Queens, and the Bronx, boilers burn a dirty fuel to heat their units. This type of oil—referred to as “residual” because it is essentially the leftovers from the petroleum distillation process—releases soot and toxic chemicals into the air. Over time, inhaling the fumes can lead to cardiovascular disease, asthma, and even early death.

“Residual Risks” analyses the health, environmental, and economic benefits of switching away from this dirty fuel to cleaner alternatives like natural gas.

Citywide, residential, commercial, and institutional boilers that burn residual oil contribute as much as 29% of all locally-generated, wintertime soot. Converting those buildings to natural gas could decrease their contribution to soot concentrations by 60%.

The results of upgrading to cleaner fuels would be hundreds of avoided deaths, billions of dollars worth of measurable health benefits, and untold additional health, environmental, and welfare effects.

Lives Saved and Health Benefits

Small particles in residual oil emissions can travel deep into lungs and even slip directly into the bloodstream. That makes it at least partially responsible for many negative health problems: cardiovascular death, respiratory disease, chronic bronchitis and more. The increased health risks to New Yorkers exposed to elevated soot concentrations are so significant, they are comparable to those expected for a non-smoker who lives with a smoker.

“Residual Risks” estimates that full conversion from residual oil to natural gas will help New York City avoid a minimum of 73 to 188 deaths each year. In addition, a switchover would prevent thousands of lost work days, significantly reduce the incidence of chronic bronchitis and non-fatal heart attacks, and lower the rate of childhood acute bronchitis by about 115 cases per year.

The faster these pollutants are reduced, the more lives are saved. Over a twenty-year period, a minimum of nearly 600 lives will be saved. For every year quicker that full conversion is implemented, a minimum of 10 additional deaths will be avoided over that same twenty-year period.

However, avoided deaths could reach as high as 1,540 over twenty years, with 28 additional lives saved for every year earlier that full conversion is achieved.

Measurable Economic Benefits

When governments decide to regulate a dangerous substance, they sometimes use cost-benefit analysis to determine whether a regulation makes economic sense. Where lives are concerned, the usual practice is to assign monetary values on the basis of avoiding deaths and health problems. For example, when deciding on environmental regulations, the U.S. EPA will usually translate health benefits into dollars and cents.

Calculating the value of a health benefits means tallying tangible factors like medical resources used, lost productivity and wages, and so forth are some of the many line-items looked at. But individuals and society as a whole have a “willingness to pay” to avoid negative health outcomes. Regulators research what that rate would be and include it as a factor in the cost-benefit analysis.

Different values have been used by the EPA over the last several years in response to updated data, new economic theories, and changing economic conditions. This analysis uses a widely-accepted value of a “statistical life”—the willingness to pay to eliminate a risk that results in an average of one mortality—which is \$6.9 million in 2008 dollars.

In applying that and other conservative estimates to place a monetary value on the various possible health outcomes of inhaling PM_{2.5}, this report finds that phasing out the use of residual oil at commercial, industrial and residential sites over a twenty-year period will generate about \$5.3 billion worth of health benefits. For every year earlier that full conversion occurs, an average of \$111 million in additional cumulative health benefits can be expected.

Greenhouse Gases and Environmental Benefits

Residual oil also emits more carbon dioxide and elemental carbon than other fuel alternatives, both of which are potent greenhouse gases. Cutting the emissions from these fuels will help mitigate the speed and severity of global warming. Though no precise benefit can be quantified, switching a single large apartment building from residual oil to natural gas could cut nearly 300 metric tons of carbon dioxide each year. Citywide, the total climate benefits of switching to cleaner fuels could easily total over a million metric tons per year.

Switching boilers over to cleaner fuel types will also help increase national energy security, protect the natural and built environments from soot, and achieve cost-savings for energy consumers.

Methodology and Conservative Estimates

“Residual Risks” uses an innovative approach to calculate how much soot in New York City’s ambient air can be traced back to the burning of residual oil in certain buildings. This is made possible by two special characteristics of residual oil: (1) its emissions are high in nickel, and (2) its use varies widely from winter to summer. By comparing heating season and non-heating season nickel concentrations, in conjunction with other factors, the report determined what the air would be like if residual oil were phased out.

This analysis used generally conservative methodologies and assumptions to estimate the health benefits of restricting residual oil. So it is likely that the actual impacts of residual oil use reported are underestimates. In other words, all results reported here are considered minimum estimates of the actual health benefits of converting to cleaner fuels.

Cost Comparison and Conclusion

Some opponents of regulating the use of residual oils will complain about the costs. And it is true that unnecessary financial burdens on businesses and individuals are not to be taken lightly, particularly in a recession.

However, the costs of conversion may not be large enough to impose a significant burden: capital costs of converting boilers to cleaner burning fuels are likely to be one-time expenses that, at least partially, would be inevitable as boilers must be eventually replaced and maintained. And though annual operating costs are speculative, most predictions suggest that switching from residual oil to natural gas could be a cheaper option for consumers—there could even be some additional efficiency gains and cost-savings from conversion.

By contrast, the quantitative and qualitative benefits of phasing out residual oil are real and significant: potentially hundreds of lives saved and billions of dollars in better health outcomes for New Yorkers.

While the speed of conversion might increase costs, policymakers should consider whether those costs are justified by the increased benefits of quicker conversion: as many as 28 additional lives saved and \$111 million additional benefits for every year earlier that full conversion is achieved.

The findings of “Residual Risks” suggest that phasing out residual oil would be a wise policy decision. Even strong regulation would be cost-benefit justified given the number of lives saved and the tremendous economic benefits that correspond.

**Institute for Policy Integrity
Residual Risks Media Kit
Fact Sheet # 2: Backgrounder**

What Is Particulate Matter?

Of the many air pollutants that plague New York City, one called “fine particulate matter” is among the most common. Often referred to as “soot” it’s practically synonymous with pollution itself, and the title quickly conjures up images of smokestacks spewing filth and blackening the skies.

Soot is actually a combination of microscopic particles that scientists call particulate matter or “PM.” PM is a complex and diverse mixture of tiny particles and liquids suspended in the air. The smallest of these particles, about 1/30 the diameter of a human hair, are called PM_{2.5}.

These fine particles are small enough that they can travel deep into human lungs and can even slip directly into the bloodstream.

The health risks from the long-term inhalation of PM_{2.5} are severe: impaired respiratory function, altered cardiovascular function, and premature death. This means higher incidences of asthma, bronchitis, impaired lung development in children, and heart attacks.

The increased health risks experienced by individuals exposed to elevated PM_{2.5} concentrations are comparable to those expected for a non-smoker who lives with a smoker.

What Is Residual Oil?

As the name implies, residual oil is often thought of as leftovers from the process of refining and distilling petroleum.

Many types of NYC buildings, from single-family homes to large industrial facilities, use boilers to generate heat and set water temperature. Boilers typically use either natural gas or petroleum-based heating oils as fuel.

Heating oil is classified into six types—numbered one through six. At higher numbers, the fuel is thicker, has a higher boiling point and emits more pollutants but tends to be cheaper—these are the residuals. The heaviest oils like #6 are near solid at room temperature, resembling tar or asphalt.

While most residential, commercial, and institutional buildings both nationwide and in New York City have opted to use the cleaner, lighter #2 oil or natural gas, many buildings in the City continue to burn the #6 or residual oil thanks to its low price and accessibility.

Residual oil has particularly high concentrations of nickel, a toxic heavy metal. Scientists believe high nickel levels may be even more linked to premature mortality than other types of soot pollution.

Additionally, residual oil emits more coarse particles, more sulfur dioxide, and more nitric oxides than other fuel alternatives. Reductions in these pollutants may also lead to improvements in public health, even though these potential effects are not quantified here.

Political Landscape

The federal government sets standards for maximum allowable daily and annual concentrations for fine particulate matter. But New York City lags behind most of the country in controlling soot, and the City has never managed to reach the federal limits.

Starting in 2007, with its *PlaNYC* effort, New York City began work on a new approach to combat fine particulate matter and many other persistent environmental threats. The main sources of soot are transportation, power plants, heating fuel, and industrial processes.

The City is aware that many of the largest sources of particulate matter are out-of-state and so beyond its reach. For example: coal-fired plants in Ohio spew soot from their smokestacks, which wafts into New York and pollutes our air. Industrial plants across the Hudson in New Jersey contribute to the City's air pollution as do ships and planes that travel in and out of nearby harbors and airports

To address in-state sources of air pollution and to reach the federal standards for healthy air, the City developed a four-pronged strategy to deal with the largest sources of PM_{2.5} that they have control over. They have been working to cut emissions from transportation and off-road sources, set new standards for buildings and enhance local green spaces. *PlaNYC* line-items dozens of initiatives like retrofitting school buses, working with the Port Authority to reduce emissions from ships, improving buildings' energy efficiency, and planting 1 million trees by 2017.

The City has achieved success with some of its initiatives. Already, 335,000 trees have been planted, Three Staten Island ferries have been retrofitted with cleaner engines, anti-idling rules have been enforced against buses and trucks to name only a few.

But other projects have faltered or been delayed due to outside influences that oppose the plans. Mayor Bloomberg's plans for an all-hybrid, lower-polluting taxi fleet have been tied up in litigation regarding the city's preemption by federal legislation. Also, his effort to reduce transportation emissions and traffic through congestion pricing were stymied by a bitter debate and eventually blocked by the state legislature.

That leaves heating oil as one of the largest sources of particulate matter that the City can try to control directly. Our report finds that the significant health benefits earned from converting from these dirty fuels make it a good target for regulation.