Institute *for* Policy Integrity

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New York City Department of Environmental Protection
Office of Legal Affairs
Attention: Erin Callahan, Esq.
Electronic Submission via NYCRULES

Subject: Proposed Amendments to Chapter 2 of Title 15 of the Rules of the City of New York Pertaining to Emissions from the Use of #4 and #6 Fuel Oil in Heat and Hot Water Boilers and Burners (proposed January 27, 2011)

The Institute for Policy Integrity at New York University School of Law submits the following comments on the Department of Environmental Protection's ("DEP") proposed rules to limit the use of residual oil as heating fuel. Policy Integrity is a non-partisan think tank dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy.

The DEP's proposal to quickly phase out #6 oil and gradually phase out #4 oil will deliver undeniably important health, environmental, and economic benefits to New York City: any action to address the overdue public health threat of dirty heating fuels is welcome. But the DEP should reexamine whether it has selected the most efficient policy alternative. By trying to minimize the need for new capital investments, the DEP has foregone more stringent alternatives that could increase net benefits; moreover, the long time horizon and multiple exemptions built in to the rule do not address the concern for the fair distribution of compliance costs in the most optimal way. The DEP should also reconsider whether the emission equivalency standards provided by the rule are the most appropriate way to build flexibility into compliance options. Finally, the DEP should revisit the role that efficiency tests could play in the rule, especially as a potential prerequisite to awarding exemptions.

I. The Proposed Regulations Begin to Address the Urgent Health Threat of Residual Oil

Switching all residential and commercial boilers off residual oil as quickly as possibly will generate significant health and environmental benefits for New York City and its residents.

Overview of the Problem

New York City's air exceeds the minimum federal standards set for soot—the common name for particulate matter or "PM."[1] The smallest PM particles—fine particulate matter, or $PM_{2.5}$—are small enough to travel into human lungs or the bloodstream. Consequently, the cardiovascular and respiratory ailments experienced by people exposed to elevated soot concentrations are

[1] For more background on residual oil and the health and environmental effects of fine particulate matter, see Environmental Defense Fund, *Bottom of the Barrel: How the Dirtiest Heating Oil Pollutes Our Air and Harms Our Health* (2009), *available at* http://www.edf.org/documents/10085_EDF_Heating_Oil_Report.pdf; Kevin R. Cromar & Jason A Schwartz, *Residual Risks: The Unseen Costs of Using Dirty Oil in New York City Boilers* (Policy Integrity Report No. 5, 2010); and Kevin R. Cromar & Jason A Schwartz, *More Residual Risks: An Update on New York City Boilers* (Policy Integrity Policy Brief, May 2010) (attached).

comparable to those expected for a non-smoker who lives with a smoker. The more costly health endpoints include heart attacks, chronic bronchitis, childhood acute bronchitis, thousands of lost work days, and, ultimately, premature death.

In New York City, significant soot emissions result from burning "residual oils" in residential and commercial buildings. These residual oils, also known as #6 or #4 oil, emit noticeably more fine particulate matter than the fuel known as #2 distillate oil. Natural gas is even cleaner still. Switching all residential and commercial boilers off residual oil as quickly as possibly will generate significant health and environmental benefits for New York City and its residents. In particular, moving all boilers from dirty residual oil to natural gas would likely save 259 lives per year: over a thirty-year period, in excess of $22 billion worth of health benefits could be generated.[2] The move would also deliver up to $6 billion in climate benefits over a thirty-year period, and would even save New Yorkers several billion dollars in financial costs, thanks to the lower projected price of natural gas versus residual oil.[3] These large benefits swamp the smaller, one-time capital costs of upgrading boilers to cleaner fuels, and so the switch off residual oil is overwhelmingly cost-benefit justified.[4]

Recent legislation passed by the New York State Legislature and New York City Council recognized the detrimental health effects of #6 and #4 oils and lowered the sulfur content of these fuels as a preliminary way to cut soot emissions.[5] The DEP's regulations now continue to move New York City down the path toward cleaner air.

Overview of Proposed Regulations

The proposed regulations restrict the use of residual oils in both new and existing boilers, but they treat new and existing installations quite differently. Starting immediately, the emissions from all new installations must meet or exceed the factors for #2 oil. By contrast, multiple exceptions and delayed timelines characterize the requirements for existing boilers. Starting on July 1, 2012, existing boilers begin to face restrictions on the use of #6 oil: certificates of operation (which last three years) will not be renewed unless the boiler's emissions meet or exceed the factors for #4 oil—except any owner can apply for "additional time" due to "undue hardship." Also starting on July 1, 2012, existing boilers begin to face restrictions on the use of #4 oil: if an owner wants to replace equipment, the replacement will be treated as a new installation, meaning its emissions must meet or exceed the factors for #2 oil—except if the owner makes an "in-kind replacement," and also owners can still apply for additional time due to undue hardship. Finally, starting after January 1, 2030, certificates of operation (which last three years) will not be renewed and work permits (which are necessary for replacements) will not be issued unless the boiler's emissions meet or exceed the factors for #2 oil—except owners of fifty or more buildings that burn residual oil can apply for additional time due to infeasibility or hardship.

In short, many existing boiler could theoretically continue burning #6 oil until 2015 and #4 oil until nearly 2033, without even seeking a special exemption; and under a compliance agreement, certain existing boilers could theoretically continue burning residual oil indefinitely.

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[2] *See* Cromar & Schwartz, *More Residual Risks*, *supra* note 1 (calculating the benefits); *see also* Cromar & Schwartz, *Residual Risks*, *supra* note 1 (detailing the methodology).

[3] *Id.*

[4] *Id.*

[5] NY LAWS A.8642-A, S.1145-C (July 2010) (requiring all #2 oil to meet EPA requirements for diesel fuel for trucks and buses); NY CITY LAWS INTRO 194-A (August 2010) (capping sulfur in #4 oil at 1,500 ppm (half of the prior cap), and requiring all heating oil (#2, #4, #6) to contain at least 2% biodiesel fuel).

II. The Proposal Sacrifices Efficiency in the Name of Fairness, but Optimizes Neither

Regulations should balance the goals of efficiency, fairness, and workability.[6] The proposed regulations instead prioritize goals such as "minimizing major capital investments that would not have otherwise happened."[7] In the pursuit of that goal, the DEP has foregone more stringent alternatives that could increase net benefits by delivering significant economic, public health, and environmental gains. Moreover, the proposal does not address the concern for the fair distribution of compliance costs in the most optimal way, nor does it preserve administrative resources. The DEP should reexamine whether alternative policy options would better achieve efficiency, fairness, and workability.

Long Time Horizons and In-Kind Replacements Reflect the Sunk Cost Fallacy

To select the alternative that maximizes net benefits, the DEP should weigh the potential compliance costs (one-time capital expenses to upgrade equipment and any increased operational costs from higher fuel prices) against the potential regulatory benefits: economic benefits (operational cost savings from lower fuel prices and potential efficiency gains), public health benefits (fewer fatal heart attacks, fewer respiratory ailments, and fewer work days lost), and environmental benefits (fewer greenhouse gas emissions).

Importantly, the costs of past capital investments do not enter into that calculation, because sunk costs should not impact decisions about future investments. Rather, "[t]he proper standard of comparison is whether incremental benefits exceed incremental costs. The decision to commit additional funds should not be based on past expenditures that are irreversible."[8] Imagine a business invests a million dollars in equipment that can produce widgets at a cost of two dollars: if the market price of widgets drops to one dollar, the company should not continue producing and selling the widgets at a loss just because it made a million-dollar investment in the technology. What matters are future costs and benefits, and the business should select the most efficient path from this point forward. Similarly, when the government regulates, what matters are future costs and benefits, and agencies should select the policy alternative that delivers the greatest net social benefits going forward.

Consequently, building owners' prior investments in boilers that burn residual oils should not be relevant to the DEP in determining whether it is cost-benefit justified to regulate such boilers. The only relevant considerations are the capital conversion costs, the future operating cost differences after conversion, and the social benefits from conversion.

Unfortunately, the proposed rule seems to be influenced by the sunk cost fallacy.[9] The proposal does not fully phase out residual oils for existing boilers until 2030 (or possibly until 2033), only requires earlier switches upon equipment replacement, and exempts in-kind replacements. These choices were made not because they are the most efficient, but because the DEP presumes this

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[6] These regulatory goals have been repeatedly recognized at all levels of government. *See*, *e.g.,* Exec. Order No. 13,563, 76 Fed. Reg. 3,821 (issued by President Obama on January 21, 2011, reaffirming the federal principle that all regulations should maximize net benefits); N.Y. Exec. Order No. 20 (issued in 1995); *see also* Jason A Schwartz, 52 Experiments in Regulatory Review (Policy Integrity Report No. 6, 2010) (summarizing the literature on the goals of the rulemaking process).

[7] *See* Presentation by City of New York, Stakeholder Meeting on Heating Oil, Mar. 3, 2010 (describing goals and proposing an approach that combines a quick switch off #6 to ultra-low-sulfur #4 with a more gradual phase-out of all residual oil).

[8] Daniel F. Spulber, *Pricing and the Incentive to Invest in Pipelines after Great Lakes*, 15 ENERGY L. J. 377, 392 (1994).

[9] *See* Abraham Bell & Gideon Parchomovsky, *Of Property and Antiproperty*, 102 MICH. L. REV. 1, 33 n.135 (2003) ("Under the sunk-costs doctrine, 'costs incurred in the past . . . should not be counted as costs of present or future decisions.' People who irrationally fail to operate under this rule have fallen prey to the sunk-cost fallacy.") (quoting David R. Steele, *Nozick on Sunk Costs*, 106 ETHICS 605, 605-06 (1996)).

lenient approach will avoid forcing building owners to upgrade equipment before its natural retirement age, to "minimiz[e] major capital investments that would not have otherwise happened."[10] From the perspective of social costs and benefits, however, this is the wrong approach, because it needlessly delays the achievement of crucial public health and environmental benefits, and because there are other, more appropriate ways to address distributional concerns.

In short, the DEP should move toward a faster timeline for phasing out all residual oil and a narrower in-kind exemption,[11] since these more stringent alternatives will be cost-benefit justified. Moving New York City off of residual oil as quickly as possible has real health consequences. Converting all residual oil to at least ultra-low-sulfur #4 oil is a good start, saving perhaps as many as 84 lives per year. But full conversion from residual oil to either ultra-low-sulfur #2 oil or natural gas could save somewhere between 154 (for a full conversion to #2 oil) and 259 (for a full conversion to natural gas) lives per year.[12] Every year quicker that full conversion is achieved could prevent an additional 28 mortalities.[13] The rule's timing clearly matters, and the DEP has not demonstrated that the time horizon it selected is the most efficient.

In-Kind Exemption Disincentivizes Adopting More Efficient Technologies

The exemptions for in-kind replacements also risk replicating the inefficient and administratively burdensome consequences often witnessed when environmental regulations "grandfather" existing sources. The exemption could have the perverse result of slowing the adoption of newer technology, by creating an incentive for building owners to seek out old boiler and burner models in order to avoid upgrading to cleaner fuels.[14]

Variances Should Be Limited to Cases Where Exemptions Increase Net Benefits

The proposed regulations allow any building owner to claim undue hardship and apply for additional time to comply with either the switch from #6 oil or the switch from #4 oil upon equipment replacement. Owners of a large number of regulated buildings can also cite either infeasibility or undue hardship and apply for additional time to comply with the 2030 sunset provision on the use of #4 oil. The rule does not specify what evidence of hardship the owners must submit, but instead lists nine factors that the DEP can consider in deciding whether to grant an exception and how to structure the compliance agreement.

This procedure seems to open to door to a potentially large number of applications that the DEP will have to weigh on a case-by-case basis. Not only will this create new administrative burdens, but the exemption is simultaneously overly broad and too restrictive. An exemption to the rule should be allowed if it would enhance net benefits. Eligibility for the exemption should not turn on the number of buildings the applicant owns. Any owner who can demonstrate that a temporary or permanent exemption would be cost-benefit justified should be entitled to submit such evidence to the DEP. For example, if a building burning #6 oil does not currently have access to natural gas pipelines but will in the very near future as the utilities expand the infrastructure, it might be cost-benefit justified to grant a temporary exemption to let the building wait and switch directly to natural gas when it becomes available, rather than forcing more immediate conversion to less clean

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[10] *See* Stakeholder Presentation, *supra* note 7.

[11] Some limited in-kind exemption might be necessary for emergency repairs, though a narrow in-kind exemption could be administratively difficult to police. Therefore, it might be useful to apply prerequisites to granting the in-kind exemption, such as periodic efficiency tests. See section four of these comments, *infra*.

[12] *See* Cromar & Schwartz, *More Residual Risks*, *supra* note 1.

[13] *See* Cromar & Schwartz, *Residual Risks*, *supra* note 1 (describing certain scenarios using conservative estimates).

[14] For an introduction to the literature on grandfathering, see Richard L. Revesz & Allison L. Westfahl Kong, *Regulatory Change and Optimal Transition Relief*, *available at* http://ssrn.com/astract=1674469 (Sept. 2010).

fuel options. Another candidate for a narrow exemption would be a building with limited impact on air quality where above-average conversion costs outweigh the benefits, for instance in the case of some underground tanks that may require special remediation. In extreme cases, exemptions may even make sense to allow continued use of residual oil beyond the 2030 sunset date.

The justification for all exemptions should be limited to cases where compliance costs outweigh benefits, and the burden of proof should be on the applicant, in order to reduce administrative burdens. The compliance agreements should also be periodically reevaluated as technology, infrastructure, and the understanding of public health effects may change over time. Also, the DEP should consider whether it makes sense to incorporate efficiency tests or other minimal standards into compliance agreements, as well as ways to facilitate the early, efficient compliance of those that have been granted exemptions.

Alternatives to Grandfathering Can Mitigate Any Potential Disproportionate Burdens

Governments should always recognize the distributional consequences of regulations: who will bear the costs, and who will benefit.[15] However, creating sweeping exemptions to a regulation is not necessarily the most appropriate way to address such effects.

This rule will require building owners to make one-time capital investments to convert their equipment. Some building owners may also face increased operating expenses, due to higher fuel prices for #4 and #2 oils compared to #6; others will enjoy long-term cost savings from switching to natural gas, or from potential efficiency increases from more technologically advanced boiler equipment. Still, most buildings will face at least short-term net costs. While those private costs are more than offset by the large public benefits that accrue to the people of New York City, the DEP may be rightly concerned about who bears the burden of those costs. Some building owners may be able to pass on some costs to tenants, in which case the DEP may be concerned about the impact to tenants, perhaps especially in buildings with a disproportionately high share of low-income tenants. Other building owners may not be able to pass along costs (though it is important to note that some regulatory compliance costs will overlap with the owner's inevitable costs to maintain and eventually replace existing boilers, which have a naturally limited lifespan).

The long time horizon and multiple exemptions created by the proposed rule are overly broad mechanisms to address distributional concerns. Many buildings capable of absorbing the limited, one-time costs of conversion will instead be allowed to delay compliance, sacrificing key public benefits in the meantime. For the few buildings that raise legitimate distributional concerns, grants, low-cost loans, or tax incentives could be more appropriate mitigation measures.[16] For example, the DEP could work with lenders and with local utilities to facilitate loans structured on future energy savings and to quickly expand natural gas infrastructure. Such alternative approaches are a more direct and more tailored way to address any distributional concerns that the regulations may create.

III. The Proposed Rule's Equivalency Standards Need Clarification

At various points, the proposed regulations require boilers to meet PM and NOx emissions equivalent to the factors provided in EPA's *AP-42* for either #4 or #2 oil. Generally, setting a performance standard is preferable to a design standard,[17] and giving building owners flexibility to

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[15] *See* Exec. Order 13,563, *supra* note 6; N.Y. Exec. Order 20, *supra* note 6.

[16] However, if the DEP finds it necessary to help building owners that cannot pass along the cost to their tenants, the agency must determine on a per-building basis which expenditures are truly compliance costs as opposed to the building's inevitable replacement costs. This would prevent a building owner from receiving a windfall from a compensation mechanism when the owner was due to replace the burner or boiler anyway.

[17] *See* Exec. Order 13,563, *supra* note 6; Schwartz, *52 Experiments*, *supra* note 6.

select their method of compliance will help lower costs. Unfortunately, the equivalency standards proposed in the rule may not be the most appropriate choice. EPA's *AP-42* document reflects average emissions factors for residual and distillate oils based on tests conducted mostly on boilers in large, industrial plants with average sulfur contents more than three times higher than fuel used in New York City. The figures are not specific to the kinds of boilers found in New York City buildings; in fact, the tests are based on a completely different scale of oil consumption: the general cut-off in boiler size in the *AP-42* document is 100 MMBtu/hr, while the median energy output of New York City boilers burning residual oil is 4.2 MMBtu/hr. Moreover, the figures have not been updated in over a dozen years. The lack of updated emissions factors will be especially critical in considering the emissions of cleaner, ultra-low-sulfur fuels.[18]

Finally the emission factors in the *AP-42* document are averaged values: averages can be useful in estimating certain effects, but they are not necessarily the appropriate benchmark to spot-check individual facility compliance, since there will always be variation across sources and between fuel batches.[19] For such reasons, the *AP-42* specifically advises: "because emission factors represent average emission rates for an entire source category, they are *not* recommended as emission limits or standards for any specific source" (emphasis original).[20]

Even if the DEP were to use the *AP-42* as a benchmark for equivalency standards, it is not clear the rule selects the right emissions factors. The figures included in the proposed rule's preamble do not reflect the numbers for ultra-low-sulfur #2 and #4 oil, and the rule does not clarify whether equivalency to ultra-low-sulfur oil emissions would be required.[21] Also, including the condensable PM fraction into the equivalency standards presents problems for the verification process since the determination of the condensable fraction is much more complicated than that of the filterable fraction alone.[22]

The DEP should only use the *AP-42* factors if it first determines they are somehow representative of building emissions in New York City. If the DEP insists on using the *AP-42* factors, the rule should specify the equivalency to the emissions of ultra-low-sulfur oils is required, and the DEP should periodically reevaluate the numbers as emissions factors are updated and in case low-sulfur fuels become cleaner over time, either with improved technology or due to new legal standards.

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[18] Two additional data points for boilers under 100 MMBtu/hr were obtained for a 1998 revision report on Section 1.3, which had an average NOx emission factor of 13 lb/103 gallons. However, the current *AP-42* emission factor of 20 lb/103 gallons was retained from the 19 original, older data points, ignoring these newer, lower emission values. No such evidence of lower emission values was observed for newly obtained data points for #6 oil. EPA, REPORT ON REVISIONS TO 5TH EDITION AP-42 SECTION 1.3 FUEL OIL COMBUSTION 2-3 (1998). The emission factors for #4 oil were based on those for #6 oil, but not one of the 88 points used to derive the regression equation for #6 oil's PM emission factors had a sulfur content as low as 1500 ppm, which is the new sulfur limit for #4 oil. In fact, the average sulfur content of the data points is 10,650 ppm. 88 individual data points were aggregated into 7 averaged data points in order to calculate the regression equation used to determine PM emission factors for #6 oil based on sulfur content. The average sulfur content of these 88 points is 1.07%, as opposed to the New York limit of 0.3% for #6 oil and 0.15% for #4 oil.

[19] In a re-analysis of the original data points used to derive the regression equation for #6 oil's PM emission factors, the factors calculated included 95% confidence intervals. Assuming no error in the estimate of the condensable fraction, the PM emission factor for #6 oil, including 95% confidence interval, is 0.050 (0.022-0.077). Data obtained from EPA, REPORT ON REVISIONS TO 5TH EDITION AP-42 SECTION 1.3 FUEL OIL COMBUSTION, 4-26 (1998), *available at* http://www.epa.gov/ttn/chief/ap42/ch01/bgdocs/b01s03.pdf.

[20] EPA, PROCEDURE FOR PREPARING EMISSION FACTOR DOCUMENTS 2-2 (1997), *available at* http://www.epa.gov/ttn/chief/efdocs/procedur.pdf.

[21] Finally, there is an argument that the factors for fine particulate matter ($PM_{2.5}$) might be more appropriate to use than those for coarse particulate matter (PM), given the different health effects.

[22] The condensable PM fraction is incorporated into the emission factors for #2, #4, and #6 oil as listed in the preamble.

But more broadly, the DEP should determine whether there might be a better way to promote flexible compliance without linking its standards to outdated emissions factors designed to measure average pollution from much larger sources.[23] The DEP should also consider whether some amount of compliance testing may be necessary to ensure that, over the long term, emissions continue to fall within the specified ranges.

IV. The Proposed Rule Should Include Efficiency Tests

Ample evidence shows that businesses do not always take advantage of all cost-effective investments at their facilities. For example, a McKinsey & Company report from 2007 discovered many un-adopted greenhouse gas reduction measures that would have a negative marginal cost for private actors.[24] The Department of Energy has discovered that some facilities could cost-effectively reduce energy use by 10 to 15 percent.

Many theories have been put forth to explain the apparent paradox of businesses failing to take advantage of cost-saving opportunities. Some persistent barriers to the voluntary pursuit of energy efficiency could include lack of information, lack of attention and salience, and prioritization. Requiring efficiency tests can partially solve this problem. While somewhat controversial, Professor Michael Porter and others have argued that certain types of regulations can have negative costs, by forcing firms to rethink their production processes.[25] Here, an efficiency test could provide regulated buildings with information they did not have before. New and better information can help overcome organizational inertia by giving evidence of cost-savings.

The DEP should consider whether a generally applicable efficiency tests would be justified in this rule. Regardless, the DEP should especially consider whether efficiency tests are justified as applied to buildings that enter into compliance agreements or that utilize the in-kind replacement exemption to the regulations. The DEP should also explore other tools and incentives to encourage building owners (especially those that enter into compliance agreements) to comply sooner.

Conclusion

While the proposed rule is another step in the right direction toward cleaner air for New York City, the DEP has ignored the net benefits that more stringent policy alternatives could deliver; and the longer time horizon and multiple pathways to exemptions it has selected are not the most direct or tailored way to address concerns about the distribution of compliance costs.

Sincerely,

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[23] The DEP should determine what its rationale for the equivalency standards are, and then decide the best way to permit such flexibility. For example, does the DEP want to allow end-of-the-pipe controls, or permit buildings to use new and different blends of oils? Perhaps there are more direct ways to achieve such flexibility.

[24] McKinsey & Company, Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost? (2007), *available at* http://www.mckinsey.com/clientservice/sustainability/pdf/US_ghg_final_report.pdf.

[25] *See* David Popp, Richard G. Newell & Adam B. Jaffe, *Energy, the Environment, and Technological Change* (NBER Working Paper No. 14832, Apr. 2009); Michael E. Porter & Claas van der Linde, *Towards a New Conception of the Environment-Competitiveness Relationship*, 4 J. Econ. Perspectives 97, 99 (1995).