IBO

New York City Independent Budget Office

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Drilling for Natural Gas in the Catskills Could Lead to Higher Water Bills in the City

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SUMMARY

WITH STATE POLICYMAKERS NOW CONSIDERING whether to allow companies to drill for natural gas in the Catskill/Delaware watershed, many environmentalists and other New Yorkers are concerned about potential contamination of the water from chemicals used in drilling. More than 90 percent of the city's water supply comes from the Catskills/Delaware watershed. Under terms of an agreement with the federal Environmental Protection Agency, the state, and upstate communitites, the city is already spending more than $630 million from fiscal years 2008 through 2017 to protect the watershed and avoid the need to build a filtration plant. If the city were to fall out of compliance with its filtration avoidance agreement—as a result of chemicals in the runoff from drilling, or other development in the watershed area—the city could be forced to build a large filtration plant at a cost of $6 billion–$10 billion.

IBO has examined the capital costs of filtration avoidance as well as the effect of building a filtration plant on residential water and sewer charges in New York City. Among our findings:

- If a filtration plant were built, IBO projects that water rates would increase a cumulative 171.1 percent over the 10-year construction period, compared to a projected increase of 148.1 percent in the same period if the plant were not built.

- Building a filtration plant is expected to increase the average single-family homeowner's annual water bill by $367 more than the increase we would expect to see if the city were not required to filter the Catskills/Delaware watershed.

- In 2008 and 2009, the city's Department of Environment Protection committed $337.7 million to protect the Catskill watershed and avoid the need to build a filtration plant, and plans to commit an additional $292.4 million in 2010–2017.

The New York State Department of Environmental Conservation recently released a draft Supplemental Generic Environmental Impact Statement that analyzes the range of potential effects from drilling in the watershed using horizontal drilling and high-volume hydraulic fracturing and lays out proposed regulations for natural gas drilling. The city's Department of Environmental Protection and some elected officials have argued that the state should prohibit drilling in the watershed due to concerns about polluted runoff and the potential for jeopardizing the agreement the city now has with federal regulators to avoid building a filtration plant.

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BACKGROUND

Filtration in the Watershed. In July 2007 New York City was granted a 10-year filtration avoidance determination (FAD) for its Catskill/Delaware water supply after the United Stated Environmental Protection Agency (EPA) determined that the city's long-term watershed protection program met the requirements of the Surface Water Treatment Rule and the Interim Enhanced Surface Water Treatment Rule for unfiltered water. There have been a series of six FADs, with the first issued in January 1993, followed by others in December 1993, January 1997, May 1997, and November 2002.

The current FAD, issued in July 2007, covers a watershed protection program to be undertaken by the city over 10 years, consisting of two five-year periods: July 2007–June 2012 ("First Five Year Period," fiscal years 2008–2012); and July 2012-May 2017 ("Second Five Year Period," roughly corresponding with fiscal years 2013–2017).

By December 15, 2011, the city is required to provide its Revised Long-Term Watershed Protection Program for the Second Five Year Period. The current FAD is set to expire in May 2017. However, the EPA at any time may determine that the city's watershed program no longer provides adequate protection of the city's water supply and require the filtering of the Catskill/Delaware water supply.

Costs of the Long-Term Watershed Protection Program. As of September 2009, the city's capital commitment plan for 2010 through 2012 provides more than $141.9 million for capital projects relating to the most recent FAD. In 2008 and 2009, $337.7 million was committed for filtration avoidance. Additionally, the city's Department of Environmental Protection's (DEP) expense budget included $13.4 million in 2009 and $24.0 million for this year for contracts, materials, and supplies relating to the FAD, although these costs do not include outlays for personnel.

For the second five-year period beginning in 2013, the city has, so far, planned to commit $150.6 million, exclusively for land acquisition. These future planned commitments are included in the city's 10-year capital strategy. It is not uncommon for projects to be only gradually reflected in the 10-year strategy and the current plan probably understates what the city will schedule for filtration avoidance in the second five-year period.

Spending for the FAD is multi-faceted and can be divided into several broad categories used by the EPA, which include: protection and remediation; environmental infrastructure; watershed monitoring, modeling, and geographic information system (GIS); and in-city programs. Each of these categories include a variety of programs (see Appendix on page 6 for more details on each of these categories and programs).

FINANCING A FILTRATION PLANT

Assumptions. Should the EPA determine that New York City is no longer able to meet the requirements outlined in the 2007 FAD, the city would need to construct a plant to filter the water it uses from the Catskill/Delaware watershed. Many policymakers and environmentalists are concerned that drilling for natural gas in the region using a process called hydraulic fracturing, which the state is now considering giving drilling companies permission to do, could lead to contamination of the watershed and force the city to build a filtration plant. In order to determine how water and sewer rates would be affected, IBO made a number of assumptions about filtration plant construction and capital financing.

The Mayor's Office of Management and Budget estimates the cost of a filtration plant for the Catskill/Delaware system will be between $6 billion and $8 billion. The New York State Department of Environmental Conservation estimates an even higher price tag of $8 billion to $10 billion (as of September 2007). In recent testimony before the City Council, the DEP estimated the cost of the plant to be about $10 billion. IBO's analysis used the $10 billion estimate for determining the effect of a filtration plant on residential and water sewer charges in New York City.

Given that an interim review of the city's 10-year FAD is slated for December 2011, IBO has assumed that the determination to require filtration would be made in 2012 and construction would begin three years later, in 2015, and would take 10 years. The three-year window allows for environmental reviews, design, and siting of the plant. While the design and review process could take longer, IBO chose three years in order to account for the need for such a review, without extending the analysis so far into the future that the underlying assumptions would be too speculative. The $10 billion estimate for the cost of constructing the plant has been adjusted to account for inflation, using a forecast of the New York Consumer Price Index, to the midpoint of construction (January 2020). Hence, the cost for the plant in 2015 is projected to be $12.3 billion. The current estimate for annual operating expenses for the filtration plant is $100 million. Inflated to 2026, the first year of operation, IBO estimated annual operating expenses of $155 million.

This project would represent a significant capital undertaking that the city would presumably finance through new debt issuance by

the New York City Municipal Water Finance Authority. All debt would be issued in the form of revenue bonds by the water finance authority since the state's Drinking Water State Revolving Fund, which also issues debt on behalf of the water system, will have exhausted its debt issuing capacity in the near term. The water finance authority would begin issuing debt for the new plant in 2015, with the first interest payment due in 2016.

In order to be able to model the effect of debt service spread out over the course of construction, IBO made some simplifying assumptions about the structure and timing of the issuances. With a 10-year construction period, IBO assumed that the water finance authority would issue 10 separate bond offerings, each equaling about $1.2 billion. Bonds for capital projects are generally not issued in totality at the start of a project, but over the course of the project as funds are needed. This debt would be structured to have a term of 30 years and an interest rate of 6.75 percent, a conservative projection taken from a recent water finance authority bond offering, Fiscal 2009 GG Bonds. The actual issuances would most likely have a mix of maturities.

Although the structure of Municipal Water Finance Authority bonds varies by deal, we have assumed a balloon structure, similar to financing structures that the water finance authority has used in the past, where it pays only interest for the first 27 years, followed by three balloon payments of principal and interest in the final three years. Although this structure tends to delay the full effect of additional debt issuance, since the larger principal payments are deferred, the water finance authority usually includes the option of calling or refunding certain debt before its stated maturity, options it routinely exercises to lower its borrowing costs. Additionally, the water finance authority indicated that it uses the balloon structure to have more control over when principal payments are scheduled, allowing a fairly steady increase in debt service costs over time.

In order to estimate the effect of building a filtration plant on water rates, IBO needed to estimate total expenses and user fees without a filtration plant (the baseline estimate). For the baseline for 2010 to 2013, IBO used water finance authority projections, and then used the average yearly growth from 2006 to 2013 to forecast the baseline costs through the construction period.

Effect on Water Rates. Water and sewer rates are set at a level sufficient to fully recover system costs, which include operations and maintenance, debt service, the rental payment made by the Water Board to the City of New York, and other costs allocated to the water and sewer system (for more information see IBO's May 2008 "*Water and Sewer Rates: Factors Driving the Increases and Options for Reduction*"). Debt service on bonds issued to finance the system's extensive capital program is the largest category of system spending. Therefore, in order to capture how much more water rates would have to increase should a filtration plant be built, we have focused our analysis on the impact of the additional debt service issued for plant construction.

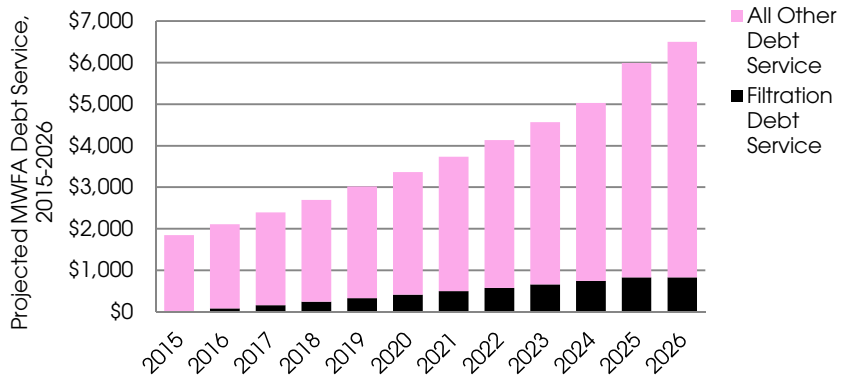
Our analysis is not intended to explain all the factors that drive water rates or illustrate the complete process for rate increases over time but rather to estimate how much more water rates would have to increase should the total debt service for constructing a filtration plant be fully covered by user payments. We believe this is an appropriate method because user payments constitute about 95 percent of all revenue for the water finance authority, and the new debt issued to cover a filtration plant would likely be in the form of revenue bonds backed by user payments.

Even in the absence of building a filtration plant, the water finance authority would be issuing debt to finance the rest of its capital program, which includes construction of an ultraviolet disinfection facility, completion of Water Tunnel No. 3, and upgrades to wastewater treatment plants in the city. Between 2009 and 2013, the water finance authority projects that it will issue $10.9 billion in debt (thus far, about $3.1 billion has already been issued) and pay debt service costs of $6.2 billion on all of its outstanding debt.

Should it become necessary to also build a filtration plant,

Water-Related Debt Service Projected to Rise, With or Without Filtration Plant

Dollars in millions



SOURCE: IBO.
NOTES: Projections for filtration debt service calculated based on the issuance of $12.3 billion in debt over 10 years to finance plant construction. Projections for all other debt service calculated based on average annual growth in debt issued by the Municipal Water Finance Authority for all other capital needs.

Projected Water Rate Increases Due to Filtration Plant Construction

Year	Annual Increase
2015	0.0%
2016	2.3%
2017	2.1%
2018	1.8%
2019	1.7%
2020	1.5%
2021	1.4%
2022	1.2%
2023	1.1%
2024	1.0%
2025	0.9%
2026	1.4%

SOURCE: IBO

IBO assumes the water finance authority would issue additional debt beginning in 2015 to cover these additional capital costs, while continuing to issue debt for other parts of DEP's capital plan. IBO does not assume any reduction in the existing capital plan as a result of a new filtration plant. Any savings from a reduction in capital activities associated with the FAD would be small, in terms of DEP's total capital program, and would likely be offset by annual capital expenditures to maintain and upgrade the new plant.

The water finance authority would begin accumulating additional debt service costs for the filtration plant in 2016, when the first annual interest payment totaling about $83.2 million would be due. Municipal Water Finance Authority debt service costs during the 10-year plant construction period will total an additional $4.6 billion, as each additional bond offering (of the 10 in IBO's model) enters repayment. Over this 10-year period, debt service for filtration plant construction would represent about 12.5 percent of the water finance authority's total debt service costs. In 2026, the first full year the plant is operational, 13.9 percent of the $6.0 billion in projected debt service would be attributable to filtration plant debt service.

These increases are above and beyond baseline increases that IBO calculated without filtration. As a result of the need to build a filtration plant, annual debt service in 2026 would be about 16.1 percent higher than it would have been without the plant.

In order to cover the additional filtration plant debt service, we estimate that water rates would need to increase an additional 2.3 percent in 2016, the first year interest payments are due. In 2025, the last year of construction, water rates would increase an additional 0.9 percent to accommodate the additional filtration debt service. The annual percent increase in water bills for filtration will be lower in the out-years because the incremental annual increase in filtration debt service stays the same while total DEP debt service grows and DEP continues to issue new debt for other capital projects.

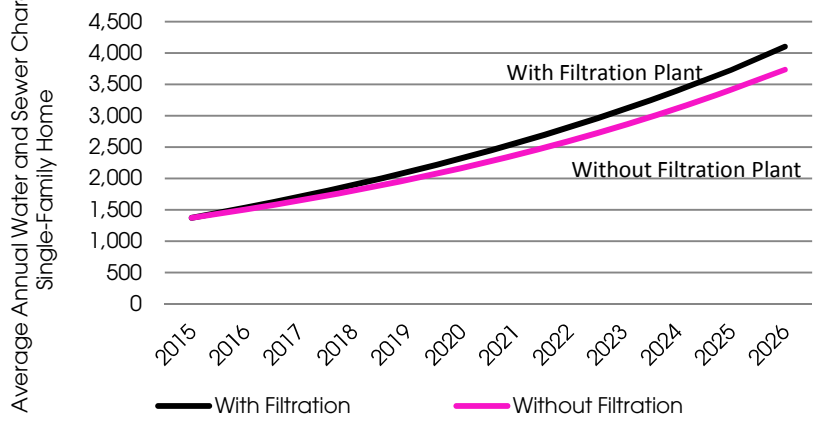
Water rates would increase an additional 1.4 percent in 2026, the first year of operation, due to the need to fund plant operating costs.

Taking into account these water rate increases, the average single-family homeowner will pay about $32 more as a result of filtration during the first year of plant construction. The increase is slightly less for multifamily properties, where the average bill per unit will increase by about $27 during the first year of plant construction. Once the plant is operational, the average bill will have increased by about $367 for single-family homes and $312 for multifamily residential properties, roughly 9.6 percent higher than the bill would have been without a filtration plant. The graph on this page shows the projected annual water and sewer charges for single-family homes with and without filtration through 2026, the first year the plant is operational. IBO's analysis forecasts an average annual increase in the average single-family water bill of 9.5 percent a year without filtration, compared to 10.5 percent a year with filtration.

From 2027 through 2042, water rates would increase only minimally due to filtration (mainly increasing operating costs). During this period, the water finance authority would only pay interest on the bonds. Based on our model, starting in 2043, the balloon payments on the principal of the 10 bonds (payable over three years for each bond, extending through 2054) would be due, which would result in another set of water rate increases due to filtration. IBO did not attempt to estimate for this increase for two main reasons. First, such an estimate requires an extremely long projection of water finance authority baseline costs, which is very unreliable. Second, the water finance authority has the option to refund or call those bonds, which would alter the repayment estimate.

Other Factors Affecting Rates. Our analysis shows that

Projected Average Annual Water and Sewer Charges for Single-Family Homeowners



SOURCE: IBO.

building a plant to filter the water in the Catskills and Delaware watersheds would lead to increased user payments and higher water bills for both single-family and multifamily properties and drive up debt service costs. These increases are above and beyond baseline increases already projected.

Several factors, however, are outside the scope of our analysis and could also affect water rates in the future, including changes in water consumption and nonpayment. For example, this year the Water Board is facing declining revenue, in part due to the current economic downturn. In addition, should the water finance authority be able to take advantage of federal stimulus financing options in the place of regular authority debt, our assumptions about future debt issuance might be overstated and impact the ultimate rate increases.

This report prepared by Alexis Arinsburg

APPENDIX
BACKGROUND ON PROGRAMS AND SPENDING TO AVOID FILTRATION

Spending to avoid filtration under the agreement with the state can be divided into a number of categories defined by the federal Environmental Protection Agency. Most of the categories contain a number of different programs. Detailed spending plans currently exist only through 2012 so our discussion focuses only to that point.

Protection and Remediation. The five programs in this category generally focus on reducing pollution and turbidity (cloudiness) in the watershed, on the protection of existing land in the watershed, and the acquisition of additional land. They represent about 46 percent of all spending on the FAD in fiscal year 2008 and 2009 and 50 percent of all planned spending in 2010 - 2012. The first program, land acquisition and management, is the most costly capital component of the FAD, with planned commitments of $60.7 million from 2010 to 2012, in addition to $84.9 million committed in 2008 and 2009. All planned commitments for 2013-2017 are for land acquisition.

A goal of this program is to ensure that undeveloped, environmentally sensitive watershed lands remain protected and that the watershed continues to be a source of high-quality drinking water to the city and upstate counties. Another component of this program is the development and implementation of a plan to substantially increase the use of land trusts and other nongovernmental organizations to identify and help the city acquire eligible lands.

The second program, the Watershed Agricultural Program, seeks to prevent pollution and improve water quality by reducing pollutants leaving farms. Thus far, more than 85 percent of large farms in the Catskill and Delaware watershed participate, with a goal of expanding participation to 90 percent of farms. To that end, DEP committed $34.0 million in 2008 and 2009, and no additional commitments are planned.

The third program, stream management, focuses on protecting and restoring stream stability through increased community participation from partnerships, education, and training. The city committed $24.3 million in 2008 and 2009 and plans to commit another $3.7 million by 2012.

The fourth program, Catskill Turbidity Control**,** addresses elevated turbidity in the Catskill watershed and provides for the development and submission of an engineering analysis of potential turbidity reduction measures for the Ashokan Reservoir. The city committed $11.5 million to this program in 2008 and 2009 and plans to commit an additional $6.0 million by 2012.

Lastly, salt and sand storage focuses on improving the storage of sand, salt, and other road de-icing materials in the west of Hudson watershed, to which $500,000 was committed in 2008 and 2009.

Environmental Infrastructure. The four programs in this category focus on the maintenance and construction of wastewater, septic and sewer, and storm water systems in the communities in the watershed. These programs protect the watershed by minimizing potential contamination from wastewater and sewage through improvement and upgrades to existing infrastructure and have the largest commitments besides land acquisition. They made up about 52 percent of 2008 and 2009 spending and 42 percent of planned spending for 2010 to 2012.

Sewage treatment plants—the first and largest of the programs—provides funding for the design and construction of new

Actual and Planned Capital Commitments Relating to the 10-Year Filtration Avoidance Directive of July 2007

Dollars in millions

Category	Actual 2008-2009	Planned 2010-2012	Planned 2013-2017
Protection and Remediation	**$155.2**	**$70.4**	**$150.6**
Land Acquisition	84.9	60.7	150.6
Watershed Agricultural Program	34.0	0.0	0.0
Stream Management	24.3	3.7	0.0
Catskills Turbidity	11.5	6.0	0.0
Salt and Sand Storage	0.5	0.0	0.0
Environmental Infrastructure	**$175.4**	**$59.8**	**$0.0**
Sewage Treatment Plants	104.9	35.0	0.0
Community Wastewater Program	37.2	0.0	0.0
Septic and Sewer Programs	26.1	8.6	0.0
Stormwater Management	7.3	16.2	0.0
Watershed Monitoring, Modeling, and Geographic Information System Total	**$5.8**	**$7.3**	**$0.0**
Geographic Information System	2.9	6.5	0.0
Multi-Tiered Water Quality Modeling	2.9	0.6	0.0
Monitoring	0.0	0.1	0.0
In-City Water Monitoring	**$1.2**	**$4.4**	**$0.0**
In-City Water Monitoring	1.2	4.4	0.0
TOTAL	**$337.7**	**$141.9**	**$150.6**

SOURCES: IBO, Adopted 2010 Capital Commitment Plan, Financial Management System.

wastewater treatment facilities in communities located within the watershed. DEP committed $104.9 million in 2008 and 2009 for sewage treatment plants and plans to commit another $35.0 million from 2010 to 2012.

The second program, community wastewater management, provides funding for the design and construction of community septic systems, including related sewerage collection systems, and the creation of septic maintenance districts. In 2008 and 2009, $37.2 million was committed with no additional commitments planned.

The septic and sewer programs enable DEP to identify, as it is required to do under the FAD, failing or potentially failing residential septic systems and to prioritize their rehabilitation or replacement throughout the watershed. In 2008 and 2009, $26.1 million was committed with an additional $8.6 million planned for 2010 to 2012.

Lastly, Storm Water Management provides financial support for the cost of designing, constructing, and maintaining storm water controls. In addition to $7.3 million committed in 2008 and 2009, DEP plans to commit $16.2 million from 2010 to 2012 for Storm Water Management.

Watershed Monitoring, Modeling, and Geographic Information System. The three programs in this category focus on protecting the watershed through evaluation, analysis, and assessment at a cost in 2008 and 2009 of $5.8 million. The city plans to spend an additional $7.2 million from 2010 to 2012.

The first program, geographic information system (GIS), is used for watershed management applications and remote sensing, where information about the watershed and water quality is acquired through electromagnetic radiation with no physical contact. GIS is the largest program in the watershed monitoring category; actual commitments of $2.9 million in 2008 and 2009 and planned commitments of $6.5 million between 2010 and 2012 represent 72 percent of 2008-2012 spending in this area.

Multi-Tiered Water Quality Modeling, the second program, uses computer models to evaluate watershed management programs, including those to control eutrophication in the Delaware water supply system (often referred to as algal bloom, when excess nutrients in the water encourage plant growth that reduces dissolved oxygen and makes the environment inhospitable to other organisms, see http://toxics.usgs.gov/definitions/eutrophication.html) and those to predict turbidity transport in the Catskill water supply system and Kensico Reservoir. Models are also employed to evaluate reservoir operations and long-term water supply planning. The city is committing $2.9 million in 2008 and 2009 and plans an additional $600,000 outlay for 2010–2012.

Lastly, through the watershed monitoring program, DEP conducts monitoring throughout the watershed and submits a monthly report that describes its compliance with the objective regulatory requirements for filtration avoidance. A more comprehensive evaluation is scheduled for March 31, 2011. Planned commitments for 2010 to 2012 are $100,000.

In-city Water Monitoring. These efforts focus on monitoring the city's water supply for waterborne diseases and sources of contamination, and the city plans to commit $4.4 million between 2010 and 2012, in addition to the $1.2 million committed in 2008 and 2009.