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THE NEW YORK CITY GREEN ROOF TAX ABATEMENT: POLICY LESSONS

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Abstract

This study assesses the efficacy of the New York City green roof tax abatement. We begin with a review of the tax abatement's history, including the Storm Water Infrastructure Matters coalition's advocacy for the enabling legislation in 2008. Next, we explain why a property tax abatement could be an appropriate mechanism for incentivizing green roofs in New York City. To assess the effectiveness of the program, we conducted interviews with key stakeholders who received the abatement, held a public meeting and follow up conversations with contractors, designers, suppliers, developers, and building owners, and performed an economic analysis of the incentive's value. We conclude by recommending financial and administrative improvements for the New York City tax abatement and identifying lessons for other cities that wish to develop or assess a cost sharing green roof incentive program.

"State legislature approves tax breaks for rooftop gardens," read the New York Daily News on June 20, 2008 (Ettlinger 2008). The Storm Water Infrastructure Matters (S.W.I.M.) coalition's advocacy had resulted in a property tax abatement of \$4.50 per square foot, up to \$100,000 per project, for most private property owners in New York City. S.W.I.M. advanced this incentive because green roofs reduce the volume of raw sewage flowing into the city's waterways by retaining storm water, while cooling the city's air, improving air quality, saving energy, and supporting biodiversity (eds. Rosenzweig, Gaffin & Parshall 2006; Rosenthal, Crauderueff & Carter 2008).

Given the challenge of working with city and state officials, the tax incentive's approval appeared a success. Passing the legislation required both City and State political support, since the State legislature approves City budgetary decisions. The incentive, however, did not pass without controversy, resulting in financial and administrative challenges that negated the tax abatement's value. As of May 2012, just four building owners received tax abatements for green roofs during the program's first three years.

In February 2012, S.W.I.M. re-kindled its Green Roof Working Group, comprised of green roof contractors, architects, material suppliers, policy analysts, soil scientists, urban

farmers, educators, and economic development professionals, in an effort to extend and improve the tax abatement. We use information gathered and lessons learned through the Working Group to evaluate the 5-year pilot program, which expires March 15, 2013.

We begin by describing S.W.I.M.'s involvement in New York City green infrastructure policy, particularly with respect to green roofs. Next, we explain how the green roof tax abatement program complements green roof policies and programs that have since emerged through Mayor Bloomberg's PlaNYC 2030 sustainability initiative. After describing our methodology, we summarize key findings specific to New York City. We conclude with preliminary recommendations for New York City, as well as lessons for other cities seeking to develop or evaluate cost sharing programs for green roofs on private property.

S.W.I.M. Coalition Background

Storm Water Infrastructure Matters is a coalition dedicated to ensuring swimmable waterways around New York City through natural, sustainable storm water management practices in our neighborhoods. S.W.I.M. has more than 70 member organizations, including community based organizations, river alliances, citywide and national environmental organizations, green infrastructure contractors, and research institutions. S.W.I.M.'s Steering Committee, reflective of its membership, is comprised of the New York City Soil and Water Conservation District, the Natural Resources Defense Council, Riverkeeper, the Newtown Creek Alliance, the Bronx River Alliance, the Gaia Institute, the Pratt Institute, and Rocking the Boat. S.W.I.M. was founded in 2006 to improve local water quality through green infrastructure practices, with the goal of achieving water quality that meets U.S. EPA Clean Water Act "Swimmable / Fishable" standards. S.W.I.M.'s platform calls on the City of New York to support green roofs through programs and incentives (Stormwater Infrastructure Matters 2010).

Prior to S.W.I.M., the city only promoted hard infrastructure such as concrete pipes and water holding tanks to manage combined sewer overflows (CSOs). New York City's sewer system was originally designed to combine storm water runoff with raw sewage. The city's combined sewer system becomes over burdened during storm events as small as 1/10" of rain, releasing more than 27 billion gallons of combined sewage effluent into the New York Harbor each year (Plumb 2008). S.W.I.M.'s stakeholder-driven policy analysis and advocacy, however, have advanced the use of green infrastructure in New York City as a cost-effective alternative to hard infrastructure systems.

S.W.I.M. accomplishments include:

- The 2008 green roof tax abatement, providing a \$4.50 per square foot property tax abatement up to \$100,000 for most private building owners;
- Local Law 5 of 2008, requiring the City of New York to develop a Sustainable Storm Water Management Plan;
- The "Minds in the Gutter" green infrastructure design competition, raising awareness of green infrastructure to hundreds of professionals citywide;
- The NYC Department of Environmental Protection Green Infrastructure Plan, a \$187 million commitment to green infrastructure over the next four years through a legally binding agreement with New York State to meet Clean Water Act requirements (Stormwater Infrastructure Matters 2010b).

S.W.I.M. Efforts Result in 2008 Green Roof Property Tax Abatement

S.W.I.M. organized green roof professionals, policymakers, environmental justice organizations, and environmental organizations to develop a shared vision for a tax abatement. The City committed, in 2007 through PlaNYC, to develop a tax abatement for green roofs worth 35% the cost of installation. However, the City allowed 2007 to conclude without actively supporting the creation of this incentive, and was reluctant to meet with S.W.I.M. about the tax

abatement in 2008. Caroline Harris, a land use attorney, along with Rob Crauderueff, S.W.I.M. policy coordinator, convened S.W.I.M. stakeholders and facilitated this discussion. S.W.I.M.'s efforts informed a bill for \$6.75 per square foot sponsored by New York State Assembly Member Diaz, Jr. (A 11226). However, rather than supporting the Diaz bill, the City proposed its own bill through the New York State Senate, worth \$4.50 per square foot, with complicated language around both the definition of a green roof and the requirements for receiving a tax abatement (S 7553). As the legislative session was nearing a close, S.W.I.M. could either support the Senate bill with Diaz as Assembly sponsor or wait until the following legislative session, risking the loss of any tax abatement. S.W.I.M. decided to support the tax abatement, with assurance from the City that the rulemaking process – the city's process of interpreting how the state law should be implemented – could address legislative shortcomings. S.W.I.M. supported the bill's passage, which Governor Patterson signed into law August 5, 2008.

Rulemaking, however, further complicated the tax abatement. The initial draft required 2" plugs to cover 80% of a green roof at the time of installation, and an onerous process for acquiring a building permit (Crauderueff et al 2009). S.W.I.M. provided the City with an economic analysis of the abatement's application costs, which demonstrated the administrative costs would exceed value of the abatement for most projects (Stormwater Infrastructure Matters 2009). Though the requirement for 2" plugs was removed, complications remained in the application process.

Policy Context for a Cost Sharing Program

Existing City programs cover the full cost of green roofs, are limited in geographic scope, and target public buildings. The New York City Department of Environmental Protection's (DEP) Green Infrastructure Grant Program requires participation in a competitive process and emphasizes innovative design and partnerships, while the DEP Green Infrastructure Master Plan program focuses on greening publicly owned buildings and the public right-of-way in targeted geographic areas (City of New York 2012a, City of New York 2012b).

A cost sharing program, where private building owners contribute to the overall cost of a green roof, would reduce the public cost of green roofs. Given the benefits of green roofs to building owners and tenants, including energy savings, rooftop longevity, and increased property value, it is reasonable to expect private sector investment in green roofs. An incentive worth 35% the full cost of green roofs may cost effectively manage storm water runoff by reducing the volume of CSOs (Plumb 2008).

The green roof tax abatement, accessible to all Class 1, 2 and 4 property owners (most residential properties and all commercial and industrial properties), could help the City achieve scale for green roofs on private property citywide. An effective citywide pilot program also could help the City to better understand private building owners' willingness to pay for green roofs, informing the development of agency-specific cost sharing programs that support Clean Water Act regulatory requirements.

Evaluation Methods

S.W.I.M. hosted a public meeting on March 23, 2012 to assess the tax abatement's performance. The organizations that attended this meeting decided to form a renewed S.W.I.M. working group, which had more than twenty members as of July, 2012. S.W.I.M.'s work supported the City's 2011 commitment to assess the Green Roof Tax Abatement for extension (City of New York, 2011). A series of meetings served as stakeholder-driven focus groups; structured follow-up conversations with green roof contractors helped us to systematically understand program challenges. We analyzed the design and installation costs of building green roofs in New York City, and the application costs of applying for the tax abatement. We also developed scenarios that estimated tax abatement values based on policy improvements.



The following findings and recommendations are preliminary; S.W.I.M. is conducting further analysis in preparation for the 2013 legislative session.

Key Findings

The low level of participation in the tax abatement program contrasts with the high level of interest in green roofs in New York City. Working Group members noted that private property owners, non-profit building owners and affordable housing owners are interested in green roofs, but need a meaningful incentive to participate. We identified three financial challenges and six administrative challenges to program participation.

Financial Challenges

- 1) *The abatement's current value, \$4.50/s.f., is too low to appeal to private building owners, even if no administrative costs were associated with applying.* Working Group members anticipate that an incentive covering 35% of the cost of designing and installing green roofs and the full administrative costs of applying would encourage a significant number of private building owners to install green roofs.
- 2) *The program's amortization schedule reduces the abatement's value.* The property owner of the Brooklyn Grange's 40,000 s.f. green roof, eligible for a \$100,000 tax abatement, is receiving four annual abatements of \$25,000 even though his property tax liability was over \$100,000 for the application year. At a real discount rate of 6%, fully amortizing a \$100,000 abatement over the first tax year and three additional years reduces the incentive's net present value to \$91,825.30 – a loss of more than \$8,000 for the property owner.
- 3) *Not-for-profit organizations and affordable housing owners are interested in benefitting from the incentive, but the program does not have a mechanism enabling their participation.* Although non-profits and affordable housing managers are leaders in green building, they are not able to benefit from this program because they do not pay property taxes.

Administrative Challenges

The program's administration provides further challenges to participation. *We found that large, unnecessary administrative costs are imposed on applicants, adding more than \$15,000 to several projects – negating the abatement's value.* The law, rules, and administrative processes are so onerous that participating in the program can increase the cost of green roof projects. Whereas the abatement is worth \$4.50/s.f., the administrative costs range from about \$7.50/s.f. for a 10,000 square foot green roof to about \$19/s.f. for a 1,000 square foot green roof. Many green roof contractors do not recommend their clients apply for the tax abatement because of the costly administrative process.

Six administrative challenges stand out:

- 1) *The permit application requirements are expensive and time consuming, without increasing public safety for extensive green roof projects.* Applying for a permit adds about \$5000 for an architect or engineer and a permit expeditor, plus around \$0.20/s.f. for the DOB permit filing fee.

- 2) *Professional time to apply for the tax abatement is excessive.* Three of the four successful applicants spent over 100 hours of staff time, equivalent to approximately \$7,500 in professional time. The applicant first goes through a building permit process and then goes through a second, separate review process with a different DOB staff member for the tax abatement application. This creates a confusing and duplicative process requiring additional visits with the DOB, and additional drawings that architects and engineers need to produce.
- 3) *The requirement that 80% of the roof must be covered with vegetation one year after the application adds costs and reduces ecological health.* To accommodate this requirement, green roof installers must increase planting densities or use pre-grown vegetative mats, increasing cost by up to \$6/s.f. The density requirements add no additional benefit, and may negatively impact long term plant health because higher density plantings compete with one another for light, water and nutrients. Pre-vegetated mats may not adapt to local environments as effectively as plants that grow out naturally on the roof, and may reduce species diversity.
- 4) *The current legislation is overly prescriptive, providing direction for sedum but not other plant selections.* The law (§2 Art 4 Title 4-B) requires “a vegetation layer, at least eighty percent of which must be covered by live plants such as sedum or equally drought resistant and hardy plant species”. This definition of a vegetation layer adds uncertainty for building owners and green roof contractors interested in other planting types, such as agricultural or native plantings, that can have greater ecological, social, and economic values.
- 5) *Green roofs are not expedited through the Landmark Preservation Commission’s (LPC) review process.* The non-expedited LPC review adds, for all green roof projects on historically designated buildings, additional review time.
- 6) *The City’s delay in finalizing local rules created confusion for applicants, and reduced the time building owners could apply for incentive.* Although Governor Patterson signed the green roof bill into law August 5, 2008, the City did not adopt rules until March 11, 2009. This delay may have reduced participation in the program. At least one green roof contractor applied for the tax abatement retroactively. This contractor’s project was installed after the tax abatement became law but before the city’s rules were finalized. The review process to receive the tax abatement was unclear and onerous; the contractor has since avoided the program.

Economic Analysis

Building from our initial focus groups and individual conversations, we conducted an economic analysis to determine the appropriate value for a green roof tax abatement. We developed three scenarios to estimate what value a tax abatement should be to cover 35% the cost of designing and building a green roof, while covering the full administrative costs. For an itemization of costs for extensive green roofs and a description of our methodology, see Table 2 in the Appendix.

The three scenarios assume the following policy changes:

- Scenario 1 assumes 80% vegetative coverage must be achieved after two years, rather than one, enabling the use of plugs at normal densities rather than vegetative mats (reducing costs by \$6.00/s.f.).

- Scenario 2 assumes, in addition to the Scenario 1 improvement, that professional time for DOB review is reduced by streamlining the application process (reducing costs by \$6,500 per project).
- Scenario 3 assumes, in addition to the Scenario 1 and Scenario 2 improvements, the elimination of building permit requirement for extensive green roofs (reducing professional costs by \$5000 and eliminating the filing fee of appx. \$0.20/s.f.).

Table 1 lists incentives we suggest by project size for each scenario.

Table 1

S.W.I.M. Proposed Green Roof Incentive Schedule, Current Program and Scenarios 1 through 3				
	Current	Scenario 1	Scenario 2	Scenario 3
Square Feet	Same law and rules	80% vegetation requirement changes from 1 year to 2 years	All S.W.I.M. recommendations plus minimum permit costs	All S.W.I.M. recommendations
1000	\$26.79	\$20.79	\$14.29	\$9.09
2500	\$18.64	\$12.64	\$10.04	\$7.84
5000	\$15.92	\$9.92	\$8.62	\$7.42
10000	\$14.56	\$8.56	\$7.91	\$7.21

Our findings for each scenario are as follows:

- For Scenario 1, a cost sharing program would not be cost-effective. Incentive values would generally be equal to or greater than the full cost of a green roof. .
- For Scenario 2, we estimate an incentive of \$14.00 per square foot would be effective for all rooftop sizes.
- For Scenario 3, a minimum abatement value of \$9.00/s.f. would promote green roofs on buildings with any rooftop size.

Policy Recommendations for NYC

The following financial, legislative and policy improvements would improve or eliminate the above financial and administrative challenges. We provided the following preliminary analysis and recommendations to the City in the first half of 2012.

Financial Recommendations

- 1) *Increase the value of a tax incentive by providing an incentive in the range of \$9.00 to \$14.00 per s.f., depending on whether a permit is required for extensive green roofs.* Our economic analysis indicates that a tax in this range would effectively cover administrative and installation costs.
- 2) *Change the incentive to a tax credit program rather than a tax abatement program.* A tax credit program that allows for credit transfer would enable not-for-profit organizations and other building owners not paying property taxes to benefit from the incentive. A transferrable tax credit would guarantee income to a third party investor who finances part of a green roof project. The City also should develop an efficient administrative process for credit transfer, based on best practices from the New York State Solar Income Tax Credit and the federal Low Income Housing Tax Credit.

- 3) *Improve and codify best practices for amortization.* The New York City Department of Finance should amortize the incentive for the fewest possible years given the property tax liability of the applicant, but allow amortization for up to 3 years. For example, if a building owner's property tax liability is \$90,000 for two consecutive years s/he should receive a \$90,000 abatement or credit in the first year and a \$10,000 abatement or credit in the second year. This practice would increase the value of the tax abatement and, by codifying through state legislation or local rule, provide certainty to building owners and investors.

Administrative Recommendations

We recommend the following six administrative improvements:

- 1) *While ensuring public safety, do not require a building permit for extensive green roofs.* The DOB relies on licensed architects and engineers expertise to ensure the roof's safety and insurance to cover liability. In other words, engineers and architects 'self-certify' for green roof applications and building permits. Extensive green roofs are relatively uniform from a load-bearing standpoint, meriting a simple application process. Therefore, rather than requiring a building permit, the City should require engineers or architects to submit a simple form that certifies the live load bearing capacity of the roof, what the green roof system will weigh fully saturated, and that building will support the green roof system.
- 2) *Provide, for semi-intensive and intensive rooftops, a single point person to approve the tax abatement and permit applications.* The City should continue requiring green roof projects greater than four inches in depth to apply for a building permit, because structural requirements vary substantially from project to project. However, the permit and application processes need to be streamlined to avoid extraneous costs by architects and engineers. We suggest that a single DOB point person advise applicants on all permitting and tax abatement application requirements, reducing redundancy and confusion.
- 3) *Require 80% coverage of live plants after two years rather than one year.* This modification would reduce project costs by up to \$6/s.f. and enable plantings to establish naturally over time.
- 4) *Encourage biodiversity, including urban agriculture and native plant selection, through flexible legislative requirements.* Rooftop farming has emerged as a desired use of this incentive. Additionally, the New York City Department of Parks and Recreation recognizes the additional benefits of native green roof systems, and provides a native plant list specifically for green roofs (City of New York 2012c). Flexible language should facilitate the adoption of these practices.
- 5) *Expedite green roofs through the Landmarks Preservation Commission.* Expedited LPC review would reduce review time and project cost.
- 6) *Make the law effective immediately upon signing from the Governor.* Immediate implementation would increase participation in 2013 and 2014.

Policy Lessons for other Cities

While the above mentioned recommendations are specific to New York, we also have identified the following procedural, financial, and administrative lessons for other cities seeking to develop or evaluate a green roof program.

Procedural Lessons

- 1) *Collaborate with a broad range of stakeholders while designing, implementing and evaluating a program.* S.W.I.M. sought to develop a common goals for an incentive program through an open, collaborative process, and in doing so, identified market opportunities and barriers to participation. In contrast, the City of New York's reluctance to partner with stakeholders during the development of the green roof tax abatement resulted in preventable program challenges that discouraged potential participants. S.W.I.M.'s activities could be adapted by public agencies, who could identify and convene stakeholders, facilitate meetings, provide stakeholders with access to policymakers, and offer free meeting space.
- 2) *Utilize appropriate technical expertise.* Policymakers and the green roof industry also could benefit by collaborating with non-industry technical experts. The legal expertise of Caroline Harris helped the S.W.I.M. Green Roof Working Group understand administrative challenges and develop implementable recommendations. The additional legal, scientific, and economic expertise of the S.W.I.M. Steering Committee ensured these recommendations were rooted in the most recent understanding of green roof benefits.

Financial Lessons

- 1) *Seek to 'get the price right.'* A pilot cost-sharing program, in New York and other cities, could serve as an opportunity to understand market behavior – i.e. the number and types of buildings whose owners may be willing to participate in a green roof program, based on an incentive of a certain size. The experience of New York City suggests the value of an incentive needs to account for both administrative and installation costs. Existing information on the participation of the private sector in green roof policies should be utilized while developing programs. Data should be collected and analyzed to understand the impact of an incentive program.
- 2) *Link program incentives to program benefits.* New York City provides one model for monetizing the multiple public benefits of green roofs: develop a program linked to the general revenue fund. A citywide cost sharing program may also provide public agencies interested in creating their own programs.

Administrative Lessons

- 1) *Develop process and outcome – based goals.* The New York City tax abatement program lacked clear goals. Process – based goals could include the time required to apply for an incentive, the economic costs of applying, and the number of steps required for an applicant to receive an abatement. In terms of outcomes, programs would benefit by understanding the number of green roofs installed, the square feet of green roof installed, the types of green roofs installed by building size, building type, ownership type, and neighborhood, and the amount of each project funded by private versus public dollars.
- 2) *Develop flexible and easy participation requirements.* The City of New York's requirements for receiving the tax abatement were overly prescriptive, inhibiting best practices and innovation. Flexible design requirements could encourage urban farming, biodiversity, and new ideas, which should be assessed for future policies and programs.

- 3) *Minimize administrative processes while protecting public safety.* The administration of green roof programs can determine whether or not green roofs projects move forwards, due to the costs and time associated with applying. S.W.I.M. identified creative ways to reduce the administrative costs: suggesting the City forgo the requirement for a building permit, reducing planting requirements, and streamlining the application process. Understanding the administrative processes and associated costs could help other programs increase participation.

Conclusion

Extending and improving New York City's green roof tax abatement program based on our recommendations would increase adoption rates. We are conducting further spatial and economic analyses to develop more specific policy recommendations. We have had several productive conversations with City officials since the beginning of 2012, and expect a more collaborative process for the 2013 legislative session.

We also believe a need exists for cities to share lessons with one another about the successes and challenges of their programs. We have articulated several lessons from the New York experience that could inform the planning of other green roof programs in North America. We will continue to share learning lessons from New York as our programs evolve in the future.

Appendix

Cost Assumptions and Estimates

We assume a constant cost of \$20 per square foot for green roofs of sizes ranging from 1,000 to 10,000 square feet, and \$2900 for a structural analysis. Working group members agreed that \$20 per square foot is a "typical" cost of designing and installing extensive green roofs, consistent with the cost estimate provided by Columbia University researchers in a recent study. We selected 1,000 square feet as our minimum size because it is close to the size of a brownstone (typically 850 square feet), and 10,000 as our maximum size because an improved tax incentive would reach the \$100,000 limit for projects of about that square footage. Insufficient data are available to accurately estimate the costs of green roofs or structural analyses by project size, which vary based on project-by-project conditions. Though the per-square-foot costs of green roof designs and installations tend to decline as project sizes increase, the costs of structural analyses tend to increase as project sizes increase. The \$2900 cost of a structural analysis is a simple average of the low end (\$800) and typical high end (\$5000) of costs provided by our working group members. Additionally, we identified the average costs incurred by green roof projects that have applied for a tax abatement, also summarized in Table 2. Next, we estimated the current cost of the tax abatement based on current rules. We estimated the cost of a typical green roof by dividing the design, installation and structural assessment costs by the square footage of green roof projects, ranging from \$20.29 for a 10,000 square foot green roof to \$22.90 for a 1,000 square foot green roof. Thirty-five percent of these costs ranges from approximately \$7.10 for a 10,000 s.f. green roof to \$8.02 for a 1,000 s.f. green roof. Considering the City's Sustainable Storm Water Management Plan estimated the cost of a green roof is \$24.50 per square foot (35% of which is \$8.58) without administrative costs, our cost estimate is more conservative than the City's.

Table 2

Administrative Cost Assessment of Extensive Green Roofs				
Item	Mean Design - Build Costs	Estimated Mean Application Cost, Current Rules	SWIM - Recommended Mean Application Costs	Notes
80% Coverage after one year	N/A	\$6/s.f. additional cost	\$0	May require vegetated mat, at \$7/s.f., *compared to plug install of 3/s.f. at appx. \$1/plug (labor included). Changing coverage requirement to 2 years (SWIM rec.) would eliminate this additional cost.
Professional Time for DOB review process	N/A	\$7,500	\$1,000	100+ hours have been spent on applications by contractors, architects and engineers. Removing the permit requirement for extensive green roofs and streamlining the review process (SWIM recs) would dramatically reduce this cost.
Expeditor	N/A	\$3,000	\$0	Required for building permit and application. Removing building permit requirement for extensive green roofs (SWIM rec) would eliminate this cost.
DOB Permit Filing Fee	N/A	\$.20 / s.f.	\$0	DOB not transparent in its calculation of permit cost. Based on assumption of 1% cost of project, which was case for one \$26,000 project we encountered.
DOB App. Costs	N/A	\$75	\$75	Estimate of application cost.
Contractor Design and Build Fee	\$20/sf	N/A	N/A	Varies based on project by project circumstances; costs tend to decrease as project size increases.
Structural Assessment	\$2900			Ranges from \$800 to \$5000, depending on project size; larger projects cost more.
Sum	\$20 per s.f + \$2900	\$12,575 + (\$6.20 per S.F.)	\$1,075	

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