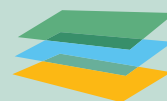


A Review of Green Roof Laws & Policies

Domestic and International Examples

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February 2019



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A REVIEW OF GREEN ROOF LAWS & POLICIES

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There are a number of reasons to install a green roof in an urban setting. Green roofs can help with stormwater retention, mitigate the urban heat island effect, enhance biodiversity, improve local air quality, and reduce building energy usage.¹ The myriad benefits provided make green roofs an attractive tool for cities seeking to improve their sustainability.

With this in mind, cities around the world have adopted diverse policies to promote green roofs in recent years. Several cities, including Toronto, San Francisco, and Copenhagen, have passed laws mandating green roof installations when constructing new buildings, or when renovating an existing buildings. Other cities, including Washington, DC, provide rebates or tax credits for green roof installation projects. Still others, including Austin and Portland, have amended their zoning laws to grant density bonuses or other zoning incentives to developers who pursue green roof projects. Finally, several cities provide reductions to stormwater fees to those who install green roofs.

As shown below, New York City has provided financial incentives for green roof projects via both a tax abatement and a grant program. However, neither has been particularly effective at incentivizing green roofs. The tax abatement is set to expire this year, and, in the eight years that it was offered, only seven property owners were granted abatements.² Meanwhile, the grant program has funded only thirty-five green infrastructure projects in the eight years since it was launched and has done so at great expense.³ These efforts can be strengthened.

The following is a table of several different mechanisms by which other cities have mandated or incentivized the construction of green roofs in their jurisdictions. This is not intended to be an exhaustive list. It does, however, provide examples of some of the more common approaches in the United States and abroad.

The laws and policies presented in the table below have been grouped into six separate categories. The cities listed under **Green Roof Mandates** are those that have required the installation of green roofs in certain circumstances, such as when a new building is constructed or an existing building undergoes substantial renovation. The following category, **Sustainability Mandates**, lists cities that provide green roofs as an option for complying with general green infrastructure or sustainability laws or policies, but do not specifically mandate them. The third category, **Rebates, Tax Abatements, & Refunds**, lists cities that offer tax credits or rebates to those who install green roofs. The cities listed under the fourth category, **Zoning Incentives**, are those that offer density bonuses and Floor Area Ratio (FAR) bonuses to developers who pursue green roofs. The fifth category is **Grant & Loan Programs**, which lists cities that offer full or partial funding, in the form of grants or loans, to construct green roofs. Finally, the sixth category, **Reduction in Stormwater Charges**, lists cities that apply credits to a property's sewer charges in exchange for installing green roofs. Notably, the goal of this table is merely to provide an accounting of policies that other jurisdictions have adopted to promote green roofs. We do not intend to express judgment here on the relative merits of any particular policy that has been adopted.

¹ Danielle Spiegel-Feld & Lauren Sherman, *Expanding Green Roofs in New York City: Towards A Location-Specific Tax Incentive*, 26 N.Y.U. ENVTL. L.J. 297 (2018).

² *Id.* at 298.

³ *Id.* at 319–20; N.Y.C. DEP'T OF ENVTL. PROT., NYC GREEN INFRASTRUCTURE: 2017 ANNUAL REPORT 10 (2018), https://www1.nyc.gov/html/dep/pdf/green_infrastructure/gi_annual_report_2018.pdf.

TABLE: GREEN ROOF LAWS & POLICIES

CITY	LAW / POLICY TITLE	YEAR ENACTED	OPERATIVE PROVISION
Green Roof Mandates			
Basel, Switzerland	Building and Construction Law ⁴	2002	Green roofs required on all new and renovated flat roofs.
Copenhagen, Denmark	Green Roof Policy ⁵	2010	Requires green roofs on all new buildings with roof slopes of less than 30 degrees.
France (nationwide)	Biodiversity Act and Green Roof Statement ⁶	2015	Developers must build either green roofs or solar panels on all new commercial buildings.
Munich, Germany	Green Roof Ordinance ⁷	1997	Requires green roofs on all flat roofs larger than 100 square meters.
Portland, OR	Ecoroof Requirement ⁸	2018	Requires green roofs to cover 100 percent of the roofs on new buildings with a net building area of 20,000 square feet or more, excluding rooftop parking lots and several equipment and green alternatives (which can cover up to 40 percent of the roof).
San Francisco, CA	Better Roofs Ordinance ⁹	2017	Green roofs, solar, or a combination of both must comprise between 15 and 30 percent of the roof space on most new construction projects. San Francisco was the first city in the nation to mandate solar and green roofs on new buildings.
Tokyo, Japan	Green Roof Law ¹⁰	2001	Green roofs are required on new buildings with a flat roof area of at least 1,000 square meters.
Toronto, Canada	Green Roof Bylaw ¹¹	2009	Applies to new development or additions greater than 2,000 m ² gross floor area. Requires the installation of green roofs on new commercial, institutional, and multifamily residential developments. The size of green roof required ranges from 20 to 60 percent of the available roofs space, depending on the size of the building.

⁴ CLIMATE ADAPT, *Green Roofs in Basel, Switzerland: Combining Mitigation and Adaptation Measures* (2015), <https://climate-adapt.eea.europa.eu/metadata/case-studies/green-roofs-in-basel-switzerland-combining-mitigation-and-adaptation-measures-1>.

⁵ *Copenhagen Adopts a Mandatory Green Roof Policy*, INHABITAT (June 9, 2010), <https://inhabitat.com/copenhagen-adopts-a-mandatory-green-roof-policy/>. See also GREEN ROOFS COPENHAGEN, <https://www.kk.dk/files/green-roofs-copenhagenpdf/download>.

⁶ Alexa Carrasco, *New French Law Forces Buildings to Plan for Green Roofs*, CURBED (Mar. 26, 2015), <https://www.curbed.com/2015/3/26/9976798/france-law-green-roofs>.

⁷ NASA, NASA & GREEN ROOF RESEARCH (2012), https://www.nasa.gov/pdf/665643main_NASA_and_Green_Roofs_Research_Brochure_Revised_9_5_2012.pdf.

⁸ Portland City Code § 33.510.243, available at <http://www.portlandonline.com/shared/cfm/image.cfm?id=53363>. ENVTL. SERVS. & CITY OF PORTLAND, GUIDANCE ON CC2035 ECOROOF REQUIREMENTS AND THE SWMM (2018), <https://www.portland.oregon.gov/bes/article/691262>.

⁹ SF PLANNING DEPT., *San Francisco Better Roofs*, <https://sf-planning.org/san-francisco-better-roofs> (last updated Jan. 2017).

¹⁰ U.S. COMM. SERV., AN OVERVIEW OF JAPAN'S GREEN ROOF MARKET (2016), https://build.export.gov/build/groups/public/@bg_jp/documents/webcontent/bg_jp_099194.pdf.

¹¹ TORONTO, *City of Toronto Green Roof Bylaw*, <https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/green-roofs/green-roof-bylaw/> (last visited Feb. 11, 2019).

Zürich, Switzerland	Green Roof Program ¹²	1991	All new or renovated buildings with flat roofs that are not used as roof terraces must have green roofs.
Sustainability Mandates			
Chicago, IL	Sustainable Development Policy ¹³	2004	Requires development projects that are receiving financial assistance or special approvals to reach a certain number of points, which are granted based on the use of specific sustainable strategies, including green roofs.
Denver, CO	Green Buildings Ordinance ¹⁴	2018	Requires new buildings 25,000 square feet or larger to have reflective, light-colored covering on the roof or portions of the roof, and must also do one of the following: install a green roof or solar panels; achieve LEED gold; purchase renewable energy; or pay a per-square-foot fee. A green roof ordinance was initially passed in 2017, but was altered in 2018 due to difficulties with the green roof mandate.
Seattle, WA	Seattle Green Factor ¹⁵	2006	Score-based code requirement that “increases the amount and improves the quality of landscaping in new development.” Developments in specified zoning districts must achieve a certain score from credits based on various green landscaping options, including green roofs.
Rebates, Tax Abatements, & Refunds			
Hamburg, Germany	Green Roof Strategy ¹⁶	--	Building owners who install green roofs can receive subsidies covering up to 60 percent of the installation costs. This financial support (up to €3 million in total) is available until the end of 2019 through the Hamburg Ministry for Environment and Energy.
New York, NY	Green Roof and Solar Tax Abatement Program ¹⁷	2008	The city and state provided a tax credit of \$5.23 per square foot, up to \$100,000, but stopped accepting applications on March 15, 2018.

¹² Zürich, Switzerland, URBAN GREEN-BLUE GRIDS, <https://www.urbangreenbluegrids.com/projects/zurich-switzerland/>.

¹³ CITY OF CHICAGO, *Chicago Sustainable Development Policy*, https://www.chicago.gov/city/en/depts/dcd/supp_info/sustainable_development/chicago-sustainable-development-policy-update.html (last updated Jan. 2017); CITY OF CHICAGO, *Chicago Sustainable Development Policy Handbook*, https://www.chicago.gov/city/en/depts/dcd/supp_info/sustainable_development/chicago-sustainable-development-policy-handbook0.html (last visited Feb. 20, 2019).

¹⁴ DENVER, *Denver's Green Buildings Ordinance*, <https://www.denvergov.org/content/denvergov/en/denver-development-services/commercial-projects/green-roof-initiative.html> (last visited Feb. 11, 2019). DENVER, *From Green Roofs to Green Buildings*, <https://www.denvergov.org/content/denvergov/en/denver-development-services/commercial-projects/green-roof-initiative/Green-Buildings-Background.html> (last visited Feb. 11, 2019).

¹⁵ SEATTLE.GOV, *Seattle Green Factor*, [https://www.seattle.gov/sdci/codes/codes-we-enforce-\(a-z\)/seattle-green-factor](https://www.seattle.gov/sdci/codes/codes-we-enforce-(a-z)/seattle-green-factor) (last visited Feb. 11, 2019).

¹⁶ CLIMATE ADAPT, *Four Pillars to Hamburg's Green Roof Strategy: Financial Incentive, Dialogue, Regulation, and Science* (2016), https://climate-adapt.eea.europa.eu/metadata/case-studies/four-pillars-to-hamburg2019s-green-roof-strategy-financial-incentive-dialogue-regulation-and-science/#legal_aspects.

¹⁷ NYC MAYOR'S OFF. OF SUSTAINABILITY, *Green Roof Tax Abatement*, <https://www1.nyc.gov/html/gbee/html/incentives/roof.shtml>; S.B. 4802, 2013-2014 Reg. Sess. (N.Y. 2013).

Palo Alto, CA	Green Roof Rebate ¹⁸	2008	Provides \$1.50 per square foot of installed green roofs (limited to \$1,000 max for residential properties and \$10,000 max for commercial properties). Part of the city's Stormwater Measures Rebate Program.
Philadelphia, PA	Green Roof Tax Credit ¹⁹	2007	The credit is against the Business Income and Receipts Tax. Since 2016, the credit amounts to 50 percent of all construction costs of the green roof, up to \$100,000.
Washington, DC	RiverSmart Rooftops Green Roof Rebate Program ²⁰	2006	DC's Department of Energy & Environment offers a rebate of \$10 (if the proposed green roof is within the combined sewer system) or \$15 (if it is within the municipal storm sewer system) per square foot of voluntary green roof installations.
Zoning Incentives			
Austin, TX	Green Roof Density Bonus ²¹	--	Green roof installations earn up to nine bonus square feet of floor area, depending on the percent of roof covered, public access to the roof, and whether or not the green roof meets the city's Downtown Public Plaza Standards.
Chicago, IL	FAR Bonus ²²	2015	A bonus of up to 2 FAR is granted for green roofs covering over 50 percent, or 2000 square feet, of the roof area of downtown developments.
Philadelphia, PA	FAR Bonus ²³	--	FAR bonus is granted for residential green roofs and "green buildings," which can earn that designation through green roofs.
Portland, OR	Ecoroof FAR Bonus ²⁴	2009	FAR bonus is granted for large-scale development programs within the Central City Plan District. Developers are allowed one additional square foot for 10 to 30 percent green roof coverage, two additional square feet for 30 to 60 percent coverage, and three additional square feet for over 60 percent coverage.

¹⁸ CITY OF PALO ALTO, *Green Roofs*, <https://www.cityofpaloalto.org/gov/depts/pwd/stormwater/rebates/greenroofs.asp> (last updated May 16, 2018).

¹⁹ CITY OF PHILADELPHIA, *Green Roof Tax Credit*, <https://www.phila.gov/services/payments-assistance-taxes/tax-credits/green-roof-tax-credit/> (last visited Feb. 11, 2019).

²⁰ DC.GOV, *Green Roofs in the District of Columbia*, <https://doee.dc.gov/greenroofs> (last visited Feb. 11, 2019).

²¹ EXISTING CREDITS FOR GREEN ROOF PROJECTS IN AUSTIN (2014), http://www.austintexas.gov/sites/default/files/files/Sustainability/GR_Existing_Credit_Fact_Sheet_Revised_2014.pdf.

²² ADAPTATION CLEARINGHOUSE, *Chicago Zoning Ordinance 17-4-1015 Green Roofs Incentives*, <https://www.adaptationclearinghouse.org/resources/chicago-zoning-ordinance-17-4-1015-green-roofs-incentives.html>; FLOOR AREA BONUS MENU, <https://www.chicago.gov/content/dam/city/depts/dcd/general/maps/bonuses.pdf>.

²³ PHILADELPHIA WATER, *GREEN ROOF ZONING INCENTIVES* (2016), http://phillywatersheds.org/doc/Green%20Roof%20Zoning%20Incentives_2016%20Fact%20Sheet.pdf.

²⁴ ENVTL. SERVS. & CITY OF PORTLAND, *ECOROOF FLOOR AREA RATIO BONUS OPTION* (2009), <https://www.portland.oregon.gov/bes/article/474490>.

Grant & Loan Programs			
Basel, Switzerland	Green Roof Installation Subsidies ²⁵	1996–1997 2005–2006	Basel had two year-long incentive programs; both programs provided subsidies for green roof installations.
Chicago, IL	Green Roof Grant Program ²⁶	2005	The Department of Environment offers residential and small commercial building owners \$5,000 for green roof installations.
Chicago, IL	Green Roof Improvement Fund ²⁷	2006	Reimburses building owners in the central business district for green roof projects. The reimbursement totals 50 percent of “highly visible projects covering at least half the available roof area.”
Cincinnati, OH	Green Roof Loan Program ²⁸	2011	Offers low-interest loans for green roof design and construction for both new and existing buildings.
New York, NY	Green Infrastructure Grant Program ²⁹	2011	Provides funds for green infrastructure projects’ design and construction, including green roof projects.
Portland, OR	Green Investment Fund ³⁰	2005–2009	The city granted a total of \$425,000 per year to innovative green building projects, including green roof projects.
Portland, OR	Grey to Green Initiative ³¹	2008–2013	The Bureau of Environmental Services offered \$5 per square foot of new green roof construction.
Toronto, Canada	Eco-Roof Incentive Program ³²	2006	Provides grants for the installation of green roofs or cool roofs on existing buildings, new buildings with a gross floor area of less than 2,000 square meters, or new building projects conducted by the Toronto School Boards or nonprofits. Projects receive \$100 CAD per square meter and up to \$1,000 CAD for a structural assessment, with a maximum of \$100,000 CAD (though larger requests may be granted with City Council approval).

²⁵ Available at <https://pd.zhaw.ch/publikation/upload/203013.pdf>.

²⁶ Catherine Malina, *Up on the Roof: Implementing Local Government Policies to Promote and Achieve the Environmental, Social, and Economic Benefits of Green Roof Technology*, 23 GEO. INT’L ENVTL. L. REV. 437, 450 (2011). We cannot confirm whether this program is still in effect.

²⁷ *Id.* We cannot confirm whether this program is still in effect.

²⁸ PROJECT GROUNDWORK, GREEN ROOF LOAN PROGRAM, http://projectgroundwork.org/downloads/green_roof_loan_program_final.pdf.

²⁹ NYC ENVTL. PROTECTION, *Grant Program for Private Property Owners*, https://www1.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_grant_program.shtml (last visited Feb. 11, 2019).

³⁰ CITY OF PORTLAND, *Green Investment Fund (GIF) Grant*, <https://www.portlandoregon.gov/bps/42134> (last visited Feb. 11, 2019).

³¹ CITY OF PORTLAND, PORTLAND’S GREEN INFRASTRUCTURE: QUANTIFYING THE HEALTH, ENERGY, AND COMMUNITY LIVABILITY BENEFITS 1-4 (2010), <https://www.portlandoregon.gov/bes/article/298042>.

³² TORONTO, *Eco-Roof Incentive Program*, <https://www.toronto.ca/services-payments/water-environment/environmental-grants-incentives-2/green-your-roof/> (last visited Feb. 11, 2019).

Reduction in Stormwater Charges			
Minneapolis, MN	Stormwater Utility Fee Credit ³³	2005	Buildings that implement stormwater practices, including by installing green roofs, can receive up to 50 percent credit against their stormwater utility fee for tools that address stormwater quality, and between a 50 and 100 percent credit reduction for tools that address stormwater quantity.
Nashville, TN	Green Roof Rebate ³⁴	2012	Applies a credit to the monthly sewer charges for a property, with a maximum total credit of \$10 per square foot of green roof, to be credited “for 60 months or until the maximum total is reached, whichever comes first.”
Philadelphia, PA	Stormwater Credits Program ³⁵	--	The Philadelphia Water Department provides credits to those who mitigate stormwater runoff by using stormwater management practices (SMPs), including green roofs.
Portland, OR	Stormwater Discount Program ³⁶	2006	Properties can receive up to a 100 percent discount on the stormwater utility fee by implementing stormwater management practices, including green roofs.
Washington, DC	Stormwater Fee Discount Program ³⁷	2013	The District’s Department of Energy & Environment has a discount of up to 55 percent of the stormwater fee for eligible best management practices, which include green roofs.

³³ MINNEAPOLISMN.GOV, *How Can I Reduce My Stormwater Fee?*, http://www.minneapolismn.gov/publicworks/stormwater/fee/stormwater_fee_stormwater_mngmnt_feecredits (last visited Feb. 11, 2019).

³⁴ NASHVILLE.GOV, *Green Roof Rebate*, <https://www.nashville.gov/Water-Services/Developers/Low-Impact-Development/Green-Roof-Rebate.aspx> (last visited Feb. 11, 2019).

³⁵ PHILADELPHIA WATER DEPARTMENT, *6.3 Stormwater Credits Program*, <https://www.pwdplanreview.org/manual/chapter-6/6.3-stormwater-credits-program>.

³⁶ CITY OF PORTLAND, *Stormwater Discount Program*, <https://www.portlandoregon.gov/bes/41976> (last visited Feb. 11, 2019); Catherine Malina, *Up on the Roof: Implementing Local Government Policies to Promote and Achieve the Environmental, Social, and Economic Benefits of Green Roof Technology*, 23 GEO. INT’L ENVTL. L. REV. 437, 452 (2011)

³⁷ *District Establishes New Stormwater Fee Discount Program*, DC.GOV (Oct. 21, 2013), <https://doee.dc.gov/release/district-establishes-new-stormwater-fee-discount-program>.