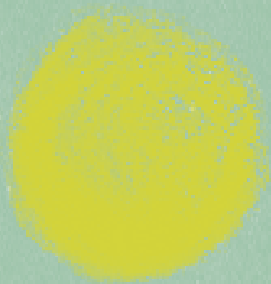


ZONING FOR SOLAR

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AFFORDABLE HOUSING



IN BRIEF

In order to reach the city's urgent climate goals, the city must remove zoning barriers for producing solar energy. Current restrictions do not allow 100 percent solar coverage on multi-family residential buildings. This is despite the fact that 75 percent of the city's emissions come from buildings alone.¹

By permitting 100 percent area roof coverage for solar panels citywide, the wattage generated is expected to increase 290 percent. Additionally, by increasing permitted height for solar panels from 15 feet to 20 feet, larger developments could better accommodate electrification technology.

INTRODUCTION

The City of New York has a goal of reducing city-wide GHG emissions by 80 percent (from 2005 levels) by 2050 – making history as the largest city in the world to sign onto the UN goal.² This announcement was made with an explicit commitment to advancing the green energy sector in the city, understanding that 75 percent of the city's emissions come from buildings alone.³

Expanding solar energy infrastructure across New York City is fundamental in the fight to reduce emissions. The city currently trails behind in solar panel installation, ranking thirty-sixth in the nation among cities on a per capita basis.⁴

NYC TRAILS BEHIND IN SOLAR PANEL INSTALLATION, RANKING JUST THIRTY-SIXTH IN THE NATION AMONG CITIES.⁵

Several measures have gone into effect over the last decade that expand access to solar technology. One key measure was the passing of Zone Green in 2012, which allowed solar energy systems up to four feet in height as a permitted obstruction on the roof of a building (ZR §23-62M Permitted Obstructions). For R6 to R10 districts, where multi-family residential

buildings are permitted, the systems could potentially go up to 15 feet but are limited by the zoning text to only 25 percent lot coverage of the roof.

The text amendments through Zone Green were catalytic to the expansion of solar panel technology in the New York. Along with other environmental policy measures since 2012, solar panel capacity citywide quadrupled between 2013 and 2016, from 25 megawatts (MW) to 92 MW in 2016.⁶ These numbers contribute to the city's overall goal of installing 1000 MW of solar technology by 2030 citywide.⁷ Electrification is estimated to save the city over \$70 million in annual energy costs, decreasing its yearly carbon dioxide equivalent by over 105,000 metric tons.⁸

Despite the positive impact Zone Green had on solar infrastructure, the 2012 zoning text amendment continues to limit solar panel coverage on roofs. **We are advocating for further reform of the zoning text to allow for a greater number of solar panels on multi-family residential developments.**

Although the zoning text allows solar energy systems on roofs up to 4 feet high, it is very hard to fit adequate panels on a roof with all the other required uses. As an Urban Green Council study on solar notes, roof area, like every other piece of real estate in New York City, "represents a battleground of competing uses."⁹ From mechanical and plumbing equipment to condensers and bulkheads, there are myriad uses required on a residential roof. Fire code §504.4.1 also requires that all building rooftops shall include "unobstructed passage across the building parapet, perimeter fence or other obstructions, and a safe landing," (New York City Fire Code, §504.4.1 Rooftop Access). Analysis by a housing architect shows that a typical new affordable development could only fit solar panels on approximately 33% of the

roof at a 4-foot height with all the competing uses.

Allowing solar energy systems to be elevated up to 15 feet certainly helps with this "competing uses on the roof" problem. A floating canopy/trellis for the panels can be elevated above other uses such as the bulkheads, mechanicals, and access in case of a fire. However, the current text only allows panels to cover 25% of the roof if they are elevated above 4 feet.

Zoning policy innovation has set a precedent to solve this problem. The recently passed Special Gowanus Mixed Use District allows for 100 percent lot coverage for solar panels on roofs with 15-foot solar trellises (ZR §139-23, Special Height and Setback Regulations). **We believe that this allowance needs to be extended citywide. In particular, contextual districts must be included in this reform, as the hard height caps of these districts render solar energy systems much more challenging.**

Changing the zoning code to allow higher canopies for solar panels over 100 percent of the lot coverage of the roof would be an important step in reaching the city's goal of 1000 MW by 2030. By using floating canopies or trellises, the requirements for safety and building systems can still be met, while also accommodating solar panels. A recent solar study, conducted across 15 Quality Housing projects by a group of housing architects, found that increasing roof area coverage to 100 percent for 15-foot solar panels would increase the amount of wattage generated by solar panels by 290 percent. At a time when the City is also promoting the electrification of residential buildings, this additional capacity is paramount. Furthermore, such generation capacity would be added locally, diminishing the load on transmission lines that connect the city to power stations upstate.

In addition to our advocacy to extend the Gowanus Special District text for solar energy panels citywide, we also believe that the permitted height should be increased from 15 feet to 20 feet. This additional five feet will also allow

greater air circulation under the solar panels, increasing the efficiency of power generation by cooling the panels. More importantly, this extra five feet would provide additional flexibility to housing architects, circumventing some of the previously mentioned barriers and the limited roof area available. **At present, 15 feet results in extremely narrow tolerances and does not allow architects to maximize power generation while accounting for FDNY access and building insulation.**

ROOF AREA, LIKE EVERY OTHER PIECE OF REAL ESTATE IN NEW YORK CITY, REPRESENTS A “BATTLEGROUND OF COMPETING USES”¹⁰

The required FDNY clearance of nine feet is measured from the finished roof surface to the underside of the solar energy support system. Due to roof insulation thickness and high points for drainage pitch (especially with more highly insulated and energy efficient buildings), the insulation and roofing assembly can be a foot or more above the roof slab. The maximum building height permitted by the zoning resolution and the solar energy system height is measured from the roof slab, however, not the finished roof.

Frequently, the optimal support system for a rooftop solar energy array is a steel framed trellis with long spans to minimize roof penetrations and transfer loads onto perimeter superstructure bearing elements. The steel member depth and corner bracing required for a support trellis, miscellaneous mounting rails, and the solar panels (especially if tilted

41 degrees to orientation at NYC's latitude) typically has a substantial assembly depth of several feet.

These various issues together mean that 15 feet is insufficient to allow both FDNY access and optimal solar power generation. **The City should amend the Zoning Resolution to allow for 20-foot solar trellises on all multi-family developments.**

The city's climate goals are steep and will require sweeping and speedy action to meet them. As Zone Green demonstrated in 2012, zoning is a fundamental tool to encourage the housing industry to include solar panels in their developments. Permitting 100 percent area roof coverage and increasing height restrictions to 20 feet for solar energy systems would be an integral and transformational step for the city to reach its 2030 climate goals.

ACKNOWLEDGEMENTS

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ENDNOTES

1 "One City Built to Last – Transforming New York City’s Buildings for a Low-Carbon Future" Mayor’s Office of Long-Term Planning and Sustainability. <https://www1.nyc.gov/assets/builttolast/downloads/OneCity.pdf>

2 Ibid.

3 Ibid.

4 "Shining Cities 2019 – The Top U.S. Cities for Solar Energy" Environment America and Frontier Group. 2019. https://environmentamerica.org/sites/environment/files/reports/WEB_AME_Shining-Cities_2019_040919-v1.pdf

5 Ibid.

6 "Solar Energy" NYC Mayor’s Office of Climate and Environmental Justice. <https://www1.nyc.gov/site/sustainability/codes/solar-panels.page>

7 "Install 1,000 MW by 2030." NYC Climate Dashboard. New York City Comptroller Brad Lander. <https://comptroller.nyc.gov/services/for-the-public/nyc-climate-dashboard/energy/>

8 "One City Built to Last – Transforming New York City’s Buildings for a Low-Carbon Future" Mayor’s Office of Long-Term Planning and Sustainability. <https://www1.nyc.gov/assets/builttolast/downloads/OneCity.pdf>

9 Zone Greener, by Urban Green Council, March 2018, https://www.urbangreencouncil.org/sites/default/files/zone_greener_1.pdf

10 Ibid.