

New York's Unexpected Summer Building Pollution

How efficient electric water heaters can help alleviate pollution from New York's buildings

Each summer, residents in the New York City area including Long Island and Westchester breathe in harmful levels of ozone pollution that consistently violate federal air quality standards. New research from Sonoma Technology for the first time identifies buildings as a major contributor to this pollution.¹

Using EPA National Emissions Inventory data to model estimated ozone levels in both 2016 and 2023, Sonoma Technology found:

- *Between 2016 and 2023, maximum daily ozone pollution impacts in the New York metro area from buildings statewide **increased 65%**.*
- *Not only did environmental justice communities in the New York metro area see **increased levels of unhealthy ozone pollution from buildings**, cities like Rochester also saw a spike in this pollution.*

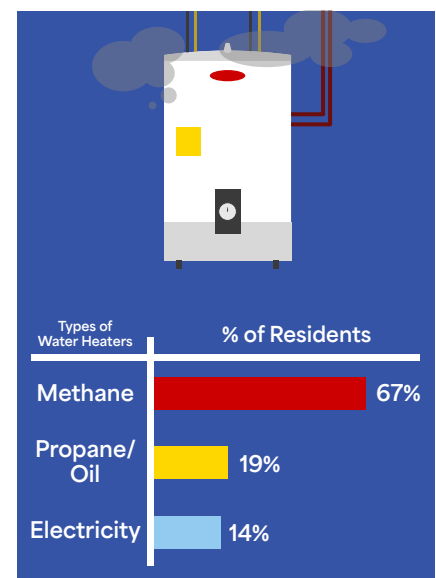
Ozone pollution, exacerbated by extreme heat, is a recurring summertime problem in New York and across the U.S. While household space heating needs fluctuate throughout the year, **approximately one fifth of residential energy consumption in New York comes from water heating**, which is used year round.

Upgrading households to efficient electric water heaters — in New York City and statewide — can **help alleviate this summer ozone pollution while helping to meet New York's climate goals**.

Fossil fuel water heaters contribute to poor air quality year-round.

While New York residents largely turn off heating systems during the summer, water heaters are used year round, making up the bulk of fossil fuel usage in residential buildings during the ozone season.

Statewide, 85% of New York single family homes rely on fossil fuels such as propane, fuel oil and methane gas for water heating. These fossil fuel water heaters, alongside



¹ While all fossil fuel appliances contribute to poor air quality, this fact sheet focuses on outdoor air quality impacts from equipment that ventilates outdoors.

21%

of single-family homes in the New York City Metro Area, including Long Island, use fuel oil for water heating—more than other parts of the state.

other household fossil fuel equipment such as dryers and stoves, emit nitrogen oxides (NO_x), a common family of air pollutants that not only harm health, but contribute to the formation of deadly fine particulate matter (PM_{2.5}), and can combine with volatile organic compounds (VOCs) to form ozone in the presence of heat and sunlight. This [ozone pollution](#), or 'smog' has been **linked to respiratory and cardiovascular illnesses as well as cancer and premature death.**

This poor air quality is caused by and [compounded further](#) by extreme heat, an all too common occurrence as New York continues to experience longer, hotter summers each year. Low-income residents and people of color are particularly [vulnerable to heat](#) and are more likely to live in neighborhoods with fewer green spaces and less access to air-conditioning.

Already, New Yorkers can access thousands of dollars in both state and federal rebates and incentives to upgrade their homes with efficient, electric water heating through the state's EmPOWER+ and Clean Heat programs. New York policy makers can make an important dent in dangerous summertime air quality by building on these resources to help residents upgrade to zero-emissions alternatives such as heat pump water heaters.

Combined Fossil Fuel Heating & Hot Water Systems Perpetuate Summer Smog

In a 2017 [assessment](#) of NYC's energy and water use data from benchmarked buildings in 2014 and 2015, 80% of multifamily properties used their space-heating steam boilers to serve both their heating and hot water needs. (Pg. 35) This means a building's boiler is running in the summer just to provide hot water, wasting energy and emitting excess pollution that contributes to ozone formation.



Pollution from New York's buildings is on the rise.

Ozone pollution isn't driven by any one source, but by the accumulation of NO_x and VOCs emitted by the millions of individual sources that burn fossil fuels, from power plants to the cars we drive to the water heaters in our homes. This pollution can travel hundreds of miles, across county lines and even state borders, compounding poor air quality for communities downwind. **Identifying collections of smaller sources that collectively are responsible for even 1% of this NO_x pollution can be a critical tool for policymakers working to improve public health and meet federal air quality standards.**

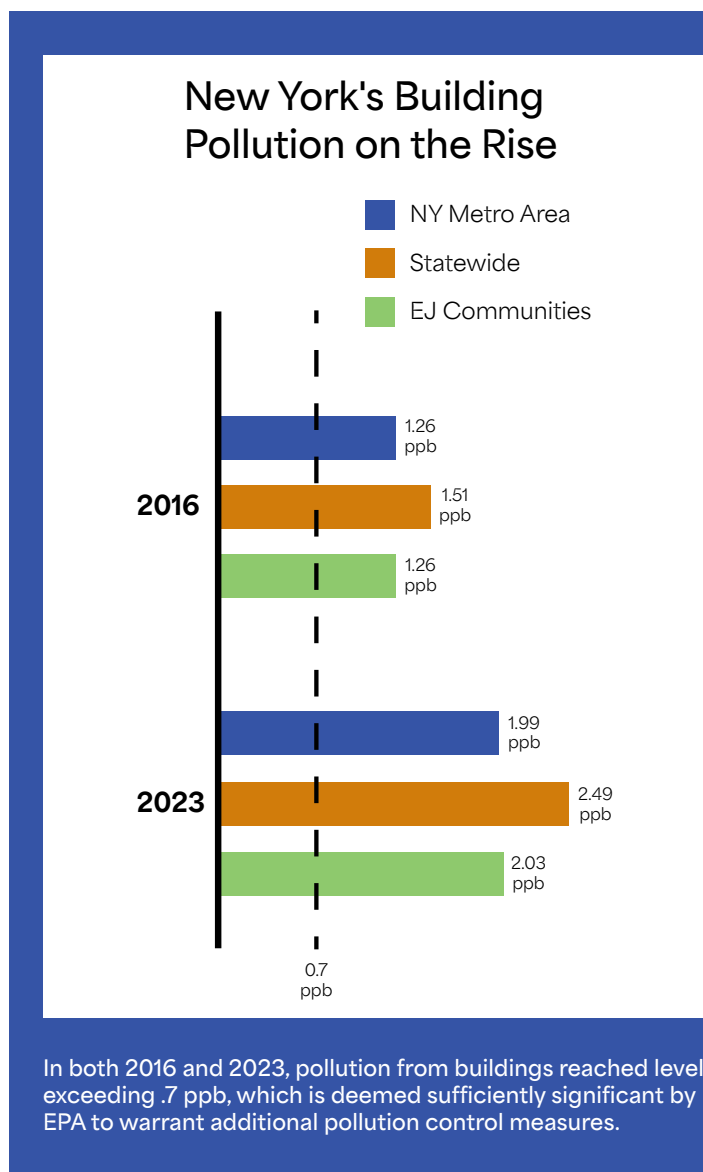
According to the U.S. Environmental Protection Agency National Ambient Air Quality Standards (NAAQS), levels of ozone above 70 parts per billion (ppb) are considered out of attainment with federal air quality standards. In addressing ozone pollution transported across state lines, EPA has deemed statewide contributions of 1% of the NAAQS, or 0.7 ppb, sufficiently significant to ozone pollution to warrant implementation of additional pollution control measures.

Using EPA's model developed for its Cross-State Air Pollution Rules for the 2016 and 2023 ozone seasons, Sonoma Technology found that on a number of high ozone days, residential, commercial and institutional buildings in New York emitted enough air pollution for their contributions to exceed this 1% significance threshold, compounding ozone pollution in the New York metro area and statewide.

In particular, researchers found maximum daily ozone pollution impacts from buildings statewide increased 65% from 2016 to 2023, environmental justice communities in the New York metro area experienced elevated levels of pollution from buildings in both years, and that pollution from buildings within New York state but outside the New York metro area exacerbates the region's smog.

According to modeling of the days with the worst pollution, based on EPA's 2016 emissions inventory:

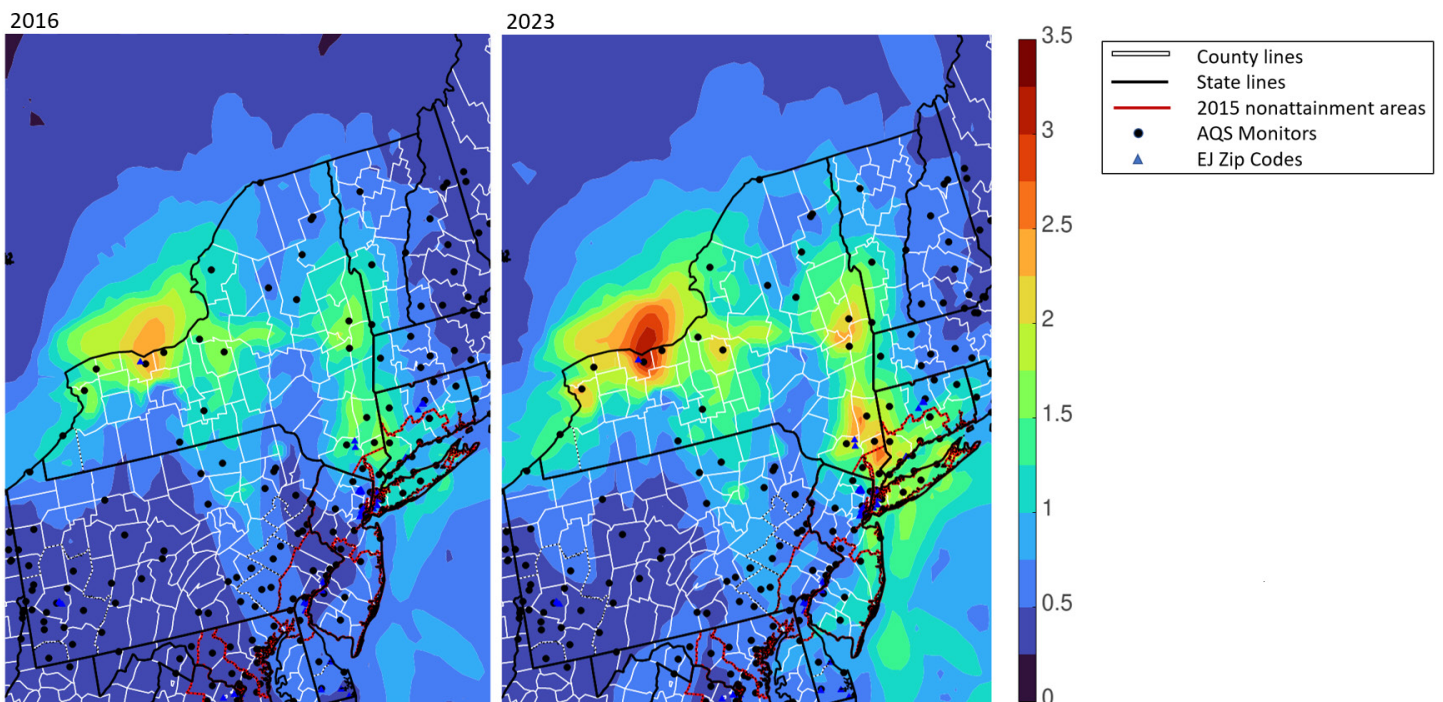
- On an ozone exceedance day, buildings in the NY Metro Area **contributed nearly double the level of ozone pollution** considered 'significant' by EPA for its transport rules (1.26 ppb).
- Statewide, buildings **contributed more than twice as much ozone pollution** in the New York metro area as EPA's significance threshold on an ozone exceedance day (1.51 ppb).
- One or more EJ communities experienced contributions of ozone pollution from buildings at levels **nearly twice** EPA's significance threshold (1.26 ppb).
- Buildings statewide were a **significant source of ozone pollution on 6 of the 18** exceedance days in 2016.
- Buildings statewide were a **significant source of ozone pollution at an EJ community on 6 of the 18** exceedance days in 2016.



According to EPA's National Emissions Inventory, in 2023:

- On an ozone exceedance day, buildings in the NY metro area **contributed nearly triple the level of ozone pollution** considered 'significant' by EPA for its transport rules (1.99 ppb).
- Statewide, buildings **contributed nearly four times as much ozone pollution** in the New York metro area as EPA's significance threshold on an ozone exceedance day (2.49 ppb).
- One or more EJ communities experienced contributions of ozone pollution from buildings at levels **nearly three times EPA's significance threshold** (2.03 ppb).
- Buildings statewide were a significant **source of ozone pollution on 18 of the 18** exceedance days in 2023.
- Buildings statewide were a **significant source of ozone pollution at an EJ community on 8 of the 18** exceedance days in 2023.

While Upstate and Western New York as a whole experience cleaner air compared to the New York City metro area, Sonoma Technology found that metro areas outside of New York City experienced an uptick in pollution from buildings between 2016 and 2023, including a significant increase in Rochester.



Note: higher ozone from buildings in Rochester, Albany (Capitol Region), Westchester/Yonkers, and Long Island

According to Sonoma Technology, on an ozone exceedance day in 2016, buildings statewide contributed amounts of ozone pollution in East Harlem's 10029 zip code 44% above the levels considered 'significant' by EPA (1.01 ppb).

Case Study : Building pollution exacerbates health disparities, inequities in East Harlem

Sonoma Technology's research shows that the New York metro area's environmental justice populations experience significant pollution from buildings. For these communities, the largest impacts of **building pollution originate from buildings within the New York metro area.**

East Harlem residents experience major health disparities, face greater risk from extreme heat, and live in close proximity to congested traffic areas and industrial pollution. In 2014, children in East Harlem went to the [emergency room for asthma](#) at **more than twice the rate** of children across New York City. Due to fewer green spaces, East Harlem is disproportionately [vulnerable to extreme heat](#) compared to the New York Metro Area. In 2021, the New York Times recorded a surface temperature of 115°F in East Harlem—31 degrees hotter than the neighboring Upper West Side. According to the [New York City Health Department](#), as of 2011, “76% of renter-occupied homes in East Harlem had maintenance problems such as leaks, cracks and holes.”



These factors compound the pollution from buildings East Harlem residents face each summer. According to Sonoma Technology, on an ozone exceedance day in 2016, buildings statewide contributed **amounts of ozone pollution in East Harlem's 10029 zip code nearly one-and-a-half times the levels** considered 'significant' by EPA (1.01 ppb). In 2023, this pollution from buildings reached 1.45 ppb, **more than twice as much ozone pollution as EPA's significance threshold** on an ozone exceedance day

By investing in well-designed programs, New York policy makers can help East Harlem residents weatherize their homes and upgrade to highly efficient equipment such as heat pump water heaters that can alleviate this air pollution, taking a measurable step toward a more climate resilient future.

Targeting fossil fuel water heaters can help New York reach its climate goals.

New York's buildings represents 32% of the state's greenhouse gas emissions. While New York State's greenhouse gas inventory does not isolate emissions from water heating, a [2016 assessment of pollution from buildings](#) over 50,000 square feet in New York City found 22% of annual emissions from those multifamily buildings comes from burning fossil

fuels for domestic hot water. Reducing this climate pollution is critical to meeting the state's ambitious goals to reduce emissions 40% compared to 1990 levels by 2030 and 85% by 2050 under the Climate Leadership and Community Protection Act.

Alongside the public health benefits, investing in programs to help New Yorkers upgrade to zero-emissions water heaters can help eliminate a major source of emissions from buildings.

Recommendations

While more than two thirds of New York households rely on fossil fuel water heaters today, policies already in place can help residents make the switch to efficient electric equipment, helping New Yorkers breathe easier and making progress toward federal air quality standards. This includes a recently [unveiled federal efficiency standard](#) that will result in over 50% of newly manufactured electric water heaters using highly efficient heat pump technology beginning in 2029, **saving consumers \$1,800 over the lifetime of the equipment.**

In addition, low- and moderate-income New Yorkers can now access up to \$8,100 for insulation and electrical upgrades as well as \$1,750 for a heat pump water heater through the Inflation Reduction Act, in addition to [rebates and incentives](#) through the state's [Clean Heat](#) program. [EmPower+](#) also offers no-cost energy efficiency improvements to low- and moderate-income households worth up to \$10,000 depending on income.

However, to help accelerate the adoption of clean water heating technologies further, **New York policymakers must do more to make this technology accessible to the state's most vulnerable communities.** This includes allocating more funding to make it easier for residents to tackle the upfront costs of heat pump water heater installation and energy efficiency upgrades and making funding easier to access for residents, landlords, and contractors alike.



The following includes a suite of regulatory and legislative policy actions New York leaders can take to help residents upgrade to highly efficient heat pump water heaters:

- **New Efficiency: New York:** The Public Service Commission has an opportunity this fall to invest in programs to help low- and moderate-income New Yorkers better access up to \$5 billion in ratepayer funds over four years to help weatherize their homes and upgrade to efficient electric water heaters, heat pumps, induction stoves, electric panel upgrades and more. In order to maximize the impact of this program, the PSC must:

1. Direct at least **50%** of program funds toward low- and moderate-income households.
 2. Design programs to be **adequate, flexible, and immediately available** to help residents when they face an emergency repair.
 3. Make programs and funding **easy to access and navigable** for residents, landlords, and contractors alike.
- **Bucks for Boilers:** This program aims to offer new funding opportunities to help residents cover the upfront costs of installing a highly efficient heat pump or heat pump water heater, setting aside funding to cover the full cost of installation for disadvantaged communities.
 - **Green Affordable Pre-Electrification Fund:** The GAP Fund would set aside at least \$200 million per year for necessary repairs households often face before they can upgrade to efficient electric equipment, including deferred maintenance, weatherization and energy efficiency improvements, mold, lead and asbestos remediation, electrical panel upgrades, and more. This legislation seeks to make funding for home upgrades easy to access, help low- and moderate-income households upgrade to healthier homes, and ensure tenants are not displaced as a result of building improvements.
 - **NY HEAT, the NY Home Energy Affordable Transition Act:** New York's gas companies are on track to sink \$28 billion into replacing costly methane gas pipelines that will soon become obsolete, causing gas rates to continue to climb to unaffordable heights. The NY HEAT Act unlocks this funding to help residents upgrade to highly efficient electric alternatives while creating a pathway for clean energy union careers, saving customers money, delivering cleaner air, and meeting the state's climate goals.

