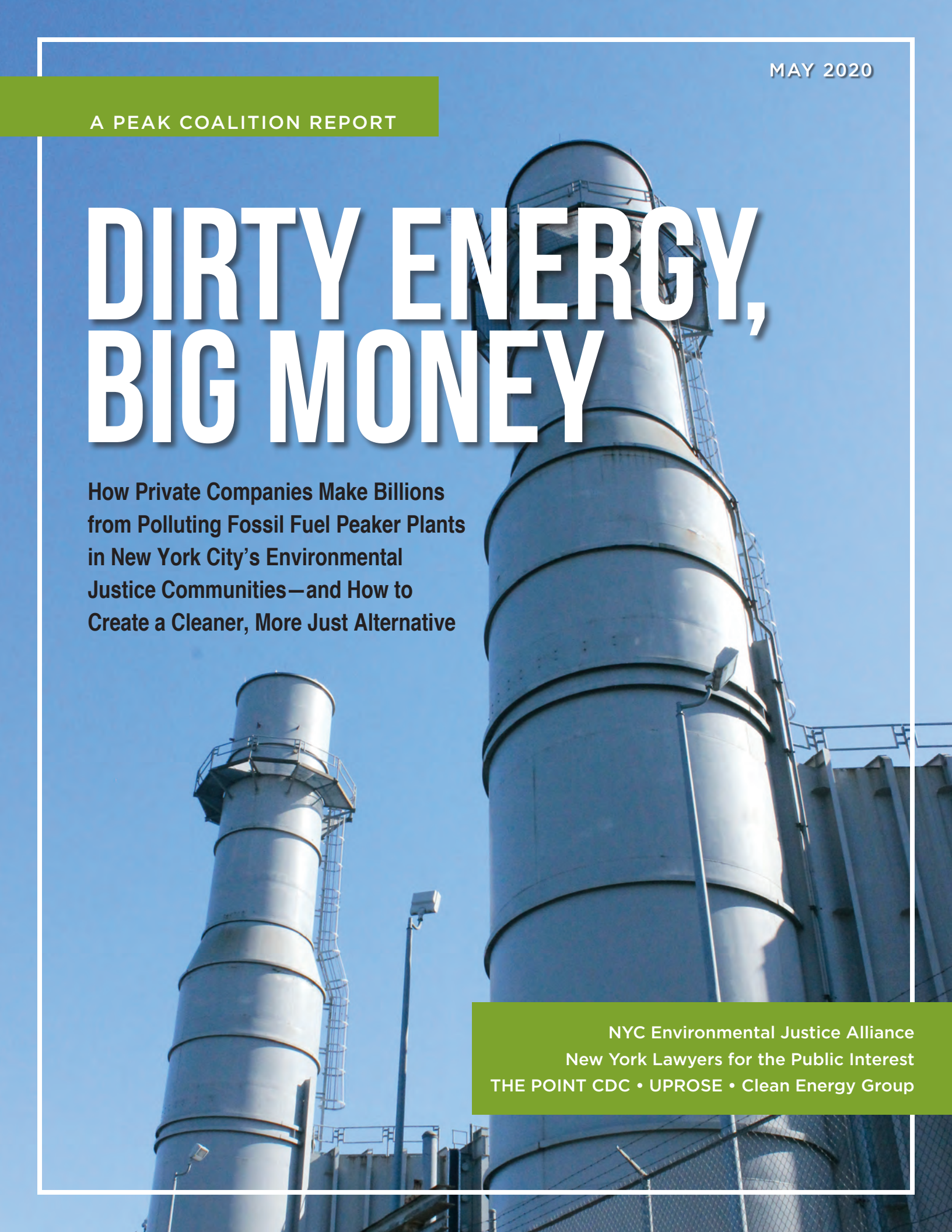
MAY 2020

A PEAK COALITION REPORT

# DIRTY ENERGY, BIG MONEY

## How Private Companies Make Billions from Polluting Fossil Fuel Peaker Plants in New York City's Environmental Justice Communities—and How to Create a Cleaner, More Just Alternative



NYC Environmental Justice Alliance
New York Lawyers for the Public Interest
THE POINT CDC • UPROSE • Clean Energy Group

## ABOUT THE PEAK COALITION

The PEAK coalition—UPROSE, THE POINT CDC, New York City Environmental Justice Alliance (NYC-EJA), New York Lawyers for the Public Interest (NYLPI), and Clean Energy Group (CEG)—has come together to end the long-standing pollution burden from power plants on the city's most climate-vulnerable people. This coalition will be the first comprehensive effort in the US to reduce the negative and racially disproportionate health impacts of a city's peaker plants by replacing them with renewable energy and storage solutions. Our collaboration brings technical, legal, public health, and planning expertise to support organizing and advocacy led by communities harmed by peaker plant emissions. Together with communities, we are advocating for a system of localized renewable energy generation and battery storage to replace peaker plants, reduce greenhouse gas (GHG) emissions, lower energy bills, improve equity and public health, and make the electricity system more resilient in the face of increased storms and climate impacts. This report lays the groundwork to make the case for that transformation.

## ACKNOWLEDGEMENTS

*Dirty Energy, Big Money* was prepared by the PEAK Coalition and produced in collaboration with a national network of research partners. This report would not have been possible without the help of many dedicated people. We want to thank the exceptionally hard working and talented teams at Strategen Consulting and at Physicians, Scientists, and Engineers for Healthy Energy for their assistance.

The authors would also like to thank the New York State Energy Research and Development Authority, New York Power Authority, and New York City Council member Costa Constantinides for their continued support in helping advance the transition to a cleaner and more equitable energy system.

Finally, PEAK also thanks the numerous individuals and organizations that provided constructive technical feedback during the stakeholder review period. These efforts dramatically improved the quality of the final product.

This report was made possible through the generous support of The Scherman Foundation's Rosin Fund. The views reflected in the report are entirely those of the authors.

# Dirty Energy, Big Money

## How Private Companies Make Billions from Polluting Fossil Fuel Peaker Plants in New York City's Environmental Justice Communities—and How to Create a Cleaner, More Just Alternative

A PEAK COALITION REPORT

Prepared by

New York City Environmental Justice Alliance
New York Lawyers for the Public Interest
THE POINT CDC
UPROSE
Clean Energy Group

MAY 2020

www.peakcoalition.org

# Contents

# Executive Summary

When energy demand in New York City spikes above normal levels, highly polluting power plants known as "peakers" fire up in the South Bronx, Sunset Park, and other under-resourced communities and environmental justice communities, spewing harmful emissions (i.e., $NO_x$, $SO_x$, $PM_{2.5}$) into neighborhoods overburdened by pollution. Consequentially, New York City's frontline communities, already impacted disproportionately by air pollution, are also emerging as among the most hard-hit by the deadly respiratory virus COVID-19.[1,2] New research links the long-term exposure to air pollution to the significantly higher rates of death in people infected with COVID-19. Environmental justice communities have developed historical health disparities and vulnerabilities from air pollution from fossil-fuel energy infrastructure such as peaker plants, which are disproportionately sited in environmental justice communities.

Most of these fossil fuel peaker plants are very old. The oldest peaking units still operating in New York City date back to the 1950s, and many others were built in the 1960s and 1970s. What's worse, many have been operating in the city for decades without any modern pollution control equipment. Some plants run on highly polluting fuels like kerosene or oil, at least part of the time.

The high costs of these peaker plants—both in public health impacts and on New Yorkers' electric utility bills—are largely hidden to the public. It is not well known, but the owners of these plants receive exorbitant payments from utilities and other energy service providers just for the plants to exist. This report highlights the following:

- Over the last decade, an estimated $4.5 billion of ratepayer money—in the form of what are called "capacity payments"—have gone to the owners of the city's peaker plants, simply to keep peakers online in case they may be needed.
- About 85 percent of capacity payments, or almost $4 billion, has gone to just three out-of-state private firms—a Boston hedge fund, a Houston fossil fuel generation company, and a New Jersey private equity firm—that together own the bulk of the oldest and dirtiest fossil fuel peaker plants in the city.
- This makes peak electricity in New York City some of the most expensive in the United States—up to 1,300 percent higher than the average cost of electricity in New York.
- These expensive, highly polluting power plants significantly contribute to the energy cost burden disproportionately impacting low-income New Yorkers, with at least 609,850 families paying greater than six percent of their annual household income in energy payments.

1 Larry Buchnan, et al., "A Month of Coronavirus in New York City: See the Hardest-Hit Areas." *New York Times*, April 1, 2020, *https://www.nytimes.com/interactive/2020/04/01/nyregion/nyc-coronavirus-cases-map.html*.

2 Lisa Friedman, "New Research Links Air Pollution to Higher Coronavirus Death Rates," *New York Times*, April 7, 2020, *https://www.nytimes.com/2020/04/07/climate/air-pollution-coronavirus-covid.html*.

Regulators require that the grid has enough generating capacity to keep the lights on when demand spikes. But these exorbitant payments maintain an outdated, inefficient, polluting system at a time when New York City needs to transition to an equitable renewable energy economy. Billions of dollars in capacity payments to privately owned polluting fossil fuel power plants, located predominantly in communities of color, is diametrically opposed to what New York City needs. These payments block investment in alternative, renewable energy technologies and transmission upgrades; keep fossil fuel infrastructure in place; add significantly to public health problems in New York's most vulnerable neighborhoods and across the entire region; and they make New York City's energy costs among the highest in the nation.

There is a better way. Members of the PEAK coalition—UPROSE, THE POINT CDC, New York City Environmental Justice Alliance (NYC-EJA), New York Lawyers for the Public Interest (NYLPI) and Clean Energy Group (CEG)—have come together to end this long-standing pollution burden on the city's most climate-vulnerable people. Replacing peaker plants with a system of localized renewable energy generation and battery storage can reduce greenhouse gas (GHG) emissions, reduce energy bills, improve public health and equity, and make the system more resilient in the face of increased storms and climate impacts.

The need to transition from fossil fuels to renewable sources of energy has never been more evident in this era of climate crisis. With strong leadership from New York State and City government, in partnership with directly impacted community members and leaders in renewable and storage technology, New York City can be on the forefront in developing innovative renewable energy and battery storage systems.

# Background on New York City Peaker Plants

Today's electric power system is built on a foundation of baseload power—largely coal, nuclear and natural gas—supported by more flexible, predominantly natural gas-powered peaker plants deployed to meet peak electricity demand and grid flexibility needs.

In New York City, only a certain amount of baseload power can enter the city through transmission lines. So when electricity demand rises above that amount—for example on hot days when residents turn up their air conditioners—highly polluting power plants known as "peakers" fire up in the South Bronx, Sunset Park, and other communities of color, burning fossil fuels and spewing harmful emissions into neighborhoods already overburdened by pollution and exacerbating widespread health problems.

Peaker plants are a prime example of how low-income communities and environmental justice communities bear the brunt of a host of energy and industrial infrastructure that poses significant public health and environmental hazards. Peaker plants often operate on days when air quality is already poor,

exacerbating the impact of their harmful emissions. For years, many grassroots organizations have fought the siting and re-permitting of these polluting peakers.[3]

The ownership of New York City's rapidly aging, fossil fuel peaker plants is limited to just a few entities. Seven of the city's largest and oldest peaker plants are owned by three private, out-of-state companies, including ArcLight Capital, a privately owned, Boston-based hedge fund; NRG Energy Inc., a Houston-based fossil fuel generation company; and LS Power Group, a New Jersey-based private equity firm in the energy business. The remaining peaker plants are owned and operated by Consolidated Edison (ConEd), which is an investor-owned utility, and the New York Power Authority (NYPA), a public entity. See Table 1 for list New York City peaker plant ownership.

Many of these power plants are extremely old. The oldest peaker plant operating in New York City was built in 1954, 66 years ago. Most of the other peakers were installed in the 1960s and 1970s. None of those archaic plants were commissioned with modern air pollution control equipment,

TABLE 1: **Peaker Power Plants Operating in New York City**[4]

| Plant Name | Parent Company | Location | Name Plate Capacity (MW) | Online Date |
|---|---|---|---|---|
| **59 St.** | Consolidated Edison Inc. | Manhattan | 17 | 1969 |
| **74 St.** | Consolidated Edison Inc. | Manhattan | 37 | 1968 |
| **Arthur Kill** | NRG Energy Inc. | Staten Island | 878 | 1959 |
| **Astoria** | ArcLight Capital Holdings LLC | Queens | 572 | 1954 |
| **Astoria GT** | NRG Energy Inc. | Queens | 558 | 1970 |
| **Bayswater Plant** | Long Island Power Authority | Queens | 61 | 2002 |
| **East River** | Consolidated Edison Inc. | Manhattan | 370 | 1955 |
| **Gowanus** | ArcLight Capital Holdings LLC | Brooklyn | 640 | 1971 |
| **Harlem River** | New York Power Authority | Bronx | 94 | 2001 |
| **Hellgate** | New York Power Authority | Bronx | 94 | 2001 |
| **Hudson Ave.** | Consolidated Edison Inc. | Brooklyn | 49 | 1970 |
| **Jamaica Bay** | Long Island Power Authority | Queens | 61 | 2003 |
| **Joseph J. Seymour** | New York Power Authority | Brooklyn | 94 | 2001 |
| **Kent** | New York Power Authority | Brooklyn | 47 | 2001 |
| **Narrows** | ArcLight Capital Holdings LLC | Brooklyn | 352 | 1972 |
| **Pouch** | New York Power Authority | Staten Island | 47 | 2001 |
| **Ravenswood** | LS Power Group | Queens | 1,827 | 1969 |
| **Vernon Blvd.** | New York Power Authority | Queens | 94 | 2001 |

Source: NYISO Gold Book 2019

3 Caroline Spivack, "Bronx's Asthma Alley Protests Plans to Extend Power Plant Permits," *City Limits*, November 12, 2015, *https://citylimits.org/2015/11/12/bronxs-asthma-alley-protests-plans-to-extend-power-plant-permit*.

4 Name plate capacity refers to the maximum power a plant could potentially generate, which is typically higher than actual operational generating capacity. Online date refers to the oldest peaker unit currently in operation. A power plant with multiple peaking units may have some newer units as well.

and most still operate today without it. In 2000, NYPA expedited the siting of new peaker plants without a full environmental review.[5]

Most peaker plants run very infrequently. In 2018, 15 New York City peaker plants ran 15 percent of the time or less throughout a typical year.[6] In fact, on average these power plants only ran about six percent of the time, which is equivalent to about 500 hours throughout the entire year. For some plants, it's even less, running no more than one percent of the time—an equivalent less than 90 hours over an entire year.

One of these older power plants, the Gowanus Gas Turbine Facility,[7] ran the equivalent of only about 30 hours in 2018, emitting on average 19,519 tons of $CO_2$ emissions annually.[8] In Queens, the Ravenswood gas turbine unit emitted about 4,264 tons in 2018. While in the South Bronx, one of the newer peaker plants, Hell Gate, emitted an average of 25,751 tons $CO_2$ annually, between 2010–2019.[9]

**Gowanus gas turbine facility peaker in Brooklyn.** PHOTO: NEW YORK LAWYERS FOR THE PUBLIC INTEREST

5 NYPA stated that its turbines would only generate a maximum of 79.9 MW at each plant to avoid the lengthy review process under Article 10 of the Environmental Conservation Law, and shortened other public comment periods for air permits and under the State Environmental Quality Review Act. See Rebecca Bratspeis, "Shutting Down Poletti: Human Rights Lessons from Environmental Victories," 36 Wis. Int'l L.J. 247 (Spring 2019). 6 See Appendix: What Are the Costs of New York City's Power Plants?, Strategen Consulting, (May 2019).

6 See Appendix: *What are the Costs of New York City's Power Plants?*, Strategen Consulting, (May 2019).

7 The operator of the Gowanus Gas Turbine Facility, Astoria Generating Company, is in the process of submitting an application to the New York State Board on Electric Generation Siting and the Environment to close its current facility at Gowanus as well as the Narrows Generating Station, and to build a new gas-fired peaker plant at the Gowanus location.

8 "Opportunities for replacing peaker plants with energy storage in New York State," Physicians, Scientists, and Engineers (PSE) for Healthy Energy, *http://psehealthyenrg.staging.wpengine.com/our-work/energy-storage-peaker-plant-replacement-project/new-york*, (accessed March 18, 2020). This page contains a section on "Individual Plan Operational View" to view emissions results for the Gowanus Gas Turbine Station.

9 Hell Gate, Individual Plant Operational View, Peaker Replacement: New York, PSE, *http://psehealthyenrg.staging.wpengine.com/our-work/energy-storage-peaker-plant-replacement-project/new-york/*, last accessed March 18, 2020.

# Public Health Impacts

Even though these peaker plants do not run much, their limited operation contributes significantly to local air pollution in the city's communities of color. Combustion of fossil fuels at peaker plants emits localized pollutants such as nitrogen oxides ($NO_x$) and sulfur dioxide ($SO_2$), which are both directly harmful and can contribute to the secondary formation of ozone and fine particulate matter ($PM_{2.5}$). Peakers, particularly older ones, emit a higher level of pollutants relative to the electricity they generate. When New York's gas-fired peaker plants are operating, "they can account for over one-third of New York's daily power plant $NO_x$ emissions."[10]

In September 2018, the Public Service Commission's *Environmental Impact Statement for New York's Energy Storage Roadmap* found that deploying battery storage to replace peaker plants could result in a significant reduction in these criteria air pollutants and improve public health outcomes.[11]

Pollutants from peaker plants contribute to significant public health problems. According to the New York City Department of Health and Mental Hygiene's (DOHMH) *Air Pollution and the Health of New Yorkers* report, "each year, $PM_{2.5}$ pollution in [New York City] causes more than 3,000 deaths, 2,000 hospital admissions for lung and heart conditions, and approximately 6,000 emergency department visits for asthma in children and adults."[12] Each year, exposures to ozone concentrations above background levels cause an estimated "400 premature deaths, 850 hospitalizations for asthma and 4,500 emergency department visits for asthma."[13]

These public health problems disproportionately affect low-income New Yorkers and those living in communities of color. The DOHMH report notes that high-poverty neighborhoods bear 55 percent of the burden of hospital admissions due to ozone-attributable asthma and account for 56 percent of emergency department visits among children.[14] In these highly impacted neighborhoods, rates are four times higher for ozone-attributable asthma hospital admissions.

A recent assessment of health, environmental, and demographic indicators for populations living near peaker power plants highlights many of the environmental justice concerns regarding these facilities. Physicians, Scientists, and Engineers (PSE) for Healthy Energy, a nonprofit organization, developed a Cumulative Vulnerability Index by analyzing demographic and environmental data for communities living

10 *Governor Cuomo Announces Proposed Regulations to Improve Air Quality and Reduce Harmful Ozone Caused by Power Plant Emissions*, NYSERDA (February 28, 2019), *https://www.nyserda.ny.gov/About/Newsroom/2019-Announcements/2019-02-28-Governor-Cuomo-Announces-Proposed-Regulations-to-Improve-Air-Quality-and-Reduce-Harmful-Ozone*.

11 *Final Generic Environmental Impact Statement CASE 18-E-0130 – In the Matter of Energy Storage Deployment Program,* Industrial Economics, Inc., 1-7 (September 12, 2018), available at *http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B2D2304AA-857E-429A-B17D-7335AB6D58DA%7D*.

12 *Air Pollution and the Health of New Yorkers: The Impact of Fine Particles and Ozone,* New York City Department of Health and Mental Hygiene, available at *https://www1.nyc.gov/assets/doh/downloads/pdf/eode/eode-air-quality-impact.pdf*.

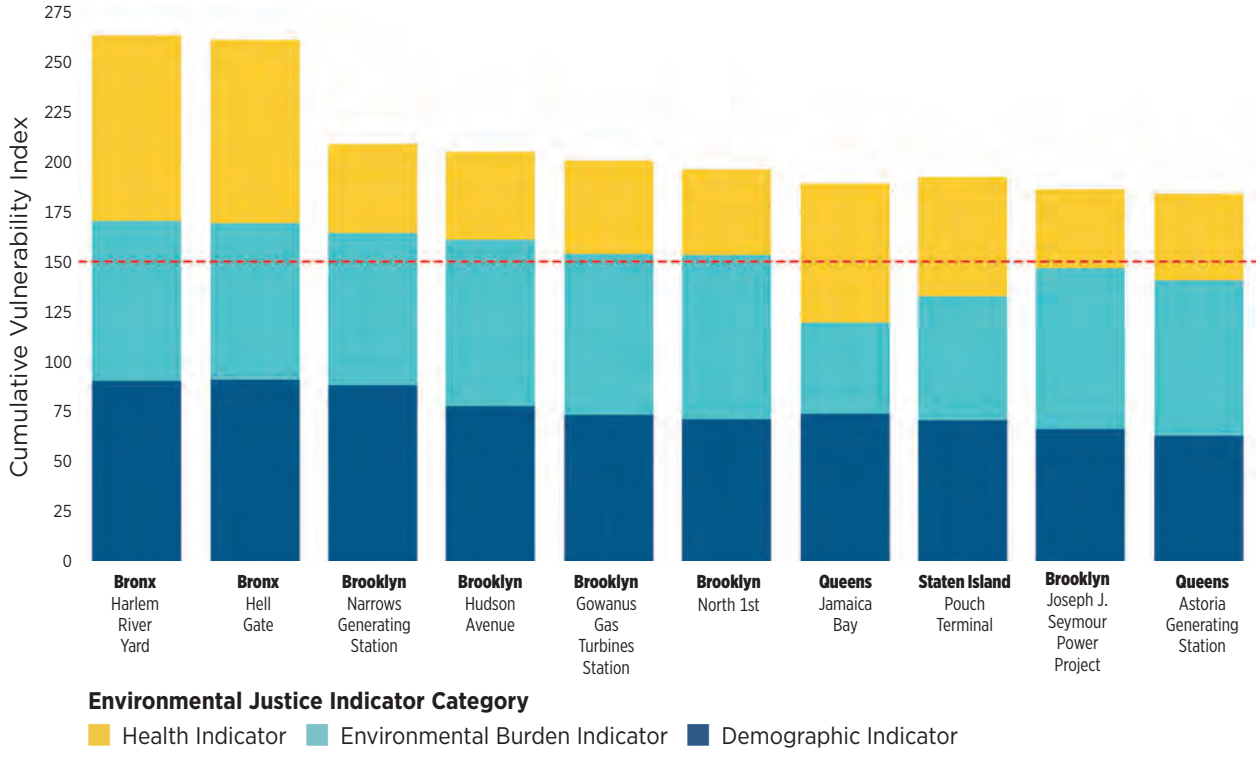
13 *Id.* at 28–30.

14 *Id.* at 25.

within one mile of plants using data from the Environmental Protection Agency's Environmental Justice Screening and Mapping Tool (EJSCREEN). Index data includes low-income population levels, particulate matter ($PM_{2.5}$) concentrations, and proximity to high traffic areas. Additionally, the Index integrated additional health vulnerability indicators such as rates of asthma and cardiovascular diseases, and other health vulnerability indicators, based on the available data.[15] The Index demonstrates the need to prioritize pollution reduction and peaker replacement in environmental justice communities, particularly in the South Bronx and Sunset Park. See Figure 1 for peaker plants with the highest index.

In addition to local air pollution impacts, climate change is projected to increase the morbidity and mortality impacts of ozone in the Northeast region of the United States by 2030 due to increases in the average daily maximum temperature,[16] making it even more urgent to mitigate local air pollution.

FIGURE 1: **Cumulative Vulnerability Index of Peaker Plants**




Source: PSE Healthy Energy

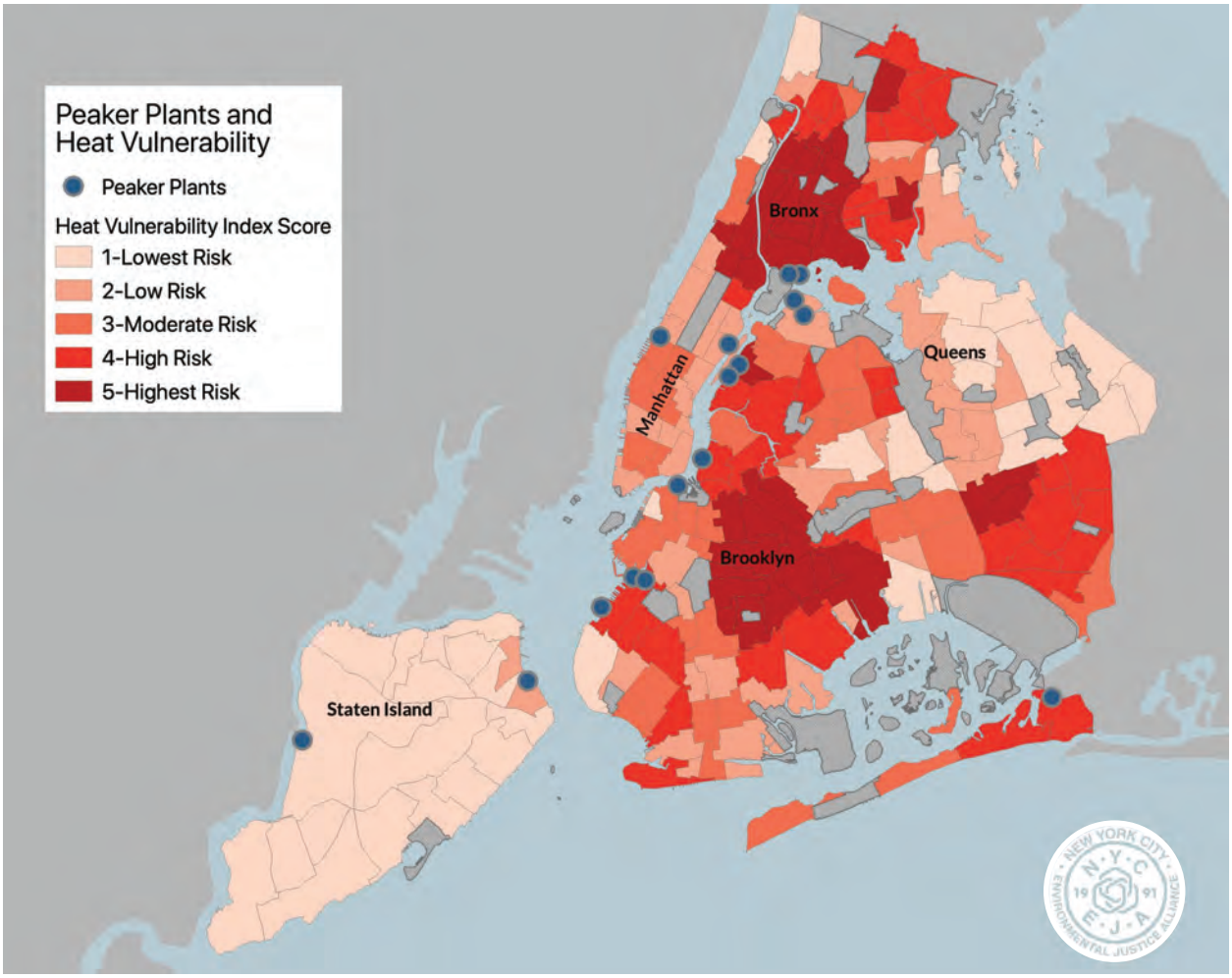
**The Cumulative Vulnerability Index (CVI), developed by PSE Healthy Energy, is designed to assess the socioeconomic, health, and environmental burdens facing communities in close proximity to power plants. The index value is calculated by summing various health, environmental, and demographic indicators for neighborhoods within one mile of a power plant. Higher index values indicate greater environmental justice burdens, with 150 being the median CVI value for all peaker plants in New York State (as shown by the dashed red line).**

15 "Opportunities for replacing peaker plants with energy storage in New York State," Physicians, Scientists, and Engineers (PSE) for Healthy Energy, *http://psehealthyenrg.staging.wpengine.com/our-work/energy-storage-peaker-plant-replacement-project/new-york*, (accessed March 18, 2020). This page contains a section on "Cumulative Vulnerability Index" to view impacts from power plants

16 Neal Fann et al., "The geographic distribution and economic value of climate change-related ozone health impacts in the United States in 2030," 66.5 *Journal of the Air and Waste Management Association*, 570-580 (2015), *https://doi.org/10.1080/10962247.2014.996270*.

In New York City, extreme heat and the urban heat island-effects will continue to exacerbate health and energy inequities.[17] See Figure 2 for Map of Peaker Plants and NYC Heat Vulnerability.

FIGURE 2: **Map of New York City Peaker Plants and Neighborhoods Prone to Heat Vulnerability**




Source: NYC Environmental Justice Alliance (Using data from the NYC Department of Health and Mental Hygiene, the New York State Department of Environmental Conservation, and the New York Independent Systems Operator)

**This map shows the locations of New York City's peaker power plants and identifies communities vulnerable to oppressive heat.**

17 Eddie Bautista et al., "A Just Transition for New York: Achieving Clean and Renewable Energy Equity for Environmental Justice Communities," 30:1 *Environmental Law in New York* 1, 3 (January 2019), *https://www.nyc-eja.org/wp-content/uploads/2019/01/Energy-Law-in-New-York-010419.pdf*.

# New York's Energy Reliability Process & Capacity Payments

It is vital to provide reliable energy to the electricity grid that powers New York City—to prevent blackouts and brownouts and to safeguard critical facilities like hospitals with reliable and resilient energy.

Maintaining the perfect balance between the supply and demand for electricity is difficult. Utilities and Independent Service Operators (ISOs) depend largely on the long-term forecast of electricity demand. Meeting the forecasted power demand requires planning for the generation and distribution of electricity.

A key part of the process in New York is ensuring the electrical grid's "Resource Adequacy." Resource adequacy signifies that there are sufficient electricity generation and demand-side resources (e.g., energy efficiency and load management programs) available to meet customers' current and projected electricity needs. Once a year, New York[18] mandates that utilities procure from energy generators a specified amount of electricity to decrease the chance of widespread blackouts due to a lack of sufficient energy supply.[19]

Once the energy mandate is established and approved, the New York Independent System Operator (NYISO) begins the process of procuring electricity to ensure New York's resource adequacy. NYISO coordinates, controls, and monitors the operation of the electrical power system, also known as the "bulk power system." NYISO also runs the wholesale electricity markets in which energy suppliers sell energy and other grid services to regional utilities.

The first step in NYISO's process of effectively ensuring resource adequacy is to set locational energy requirements[20] for specified zones throughout New York. Setting these requirements provides the signal to regional utilities within those zones to secure the specified amount of energy for their estimated peak energy demand for that coming year. This is when "capacity payments" are triggered.

18 New York State has its own electric reliability organization known as the New York State Reliability Council ("NYSRC"). The NYSRC is a not-for-profit organization that promulgates reliability rules and monitors compliance with those rules on the New York State Power System.

19 Once a year, the NYSRC establishes the statewide Installed Reserve Margin ("IRM") to maintain resource adequacy. The IRM is denoted as a percentage equal to the difference in deliverable or prospective resources and net internal demand, divided by net internal demand. For example, an IRM of 16.8 percent suggests that an excess energy capacity of 16.8 percent will be needed to maintain reliable operation while meeting unforeseen increases in demand (e.g., due to extreme weather) and unexpected outages of existing capacity.

20 Locational energy requirements are known as Locational Minimum Installed Capacity Requirements ("LCRs"). Established for certain zones in New York, LCRs signal the amount of energy designated zones need to procure to meet reliability standards.

## HOW CAPACITY MARKETS BENEFIT PEAKER PLANT OWNERS

To ensure that each zone procures enough energy capacity for the coming year, NYISO operates a "capacity market." Unlike NYISO's "energy markets" where electric energy is bought and sold by electricity utility companies, electricity marketers, and competitive power providers to meet electricity demand, the capacity market ensures that a certain amount of energy will be able to be provided at a later time when electricity demand is at its highest. In New York, peak demand occurs during the summer when heat waves prompt greater widespread use of air conditioning, on top of normal electricity usage.

Many New York City power plants are too old and inefficient to make a profit within NYISO energy markets, which procure energy in the cheapest possible manner. However, due to transmission limitations into certain areas within New York City, many of these uneconomical, highly polluting power plants are being sustained through capacity payments to provide energy during those peak demand occurrences and to ensure resource adequacy. It is important to note that capacity payments to peaker plant owners are *in addition* to the revenues that the power plant owners receive by selling the energy generated by the peakers into the energy market. This means that all peaker plants in New York City collect millions of dollars every year just to be "on standby" to produce very little energy[21] —sometimes for only a few days each year.[22] This is explained in Figure 3.

FIGURE 3: **How a Peaker Power Plant Works**


**Peaker Plants**
Fossil-fueled peaker power plants are built to provide occasional power when regular power plants cannot meet customer electricity needs during times of exceptionally high demand.

**High Demand**
Weather-related incidents (heat waves or extreme cold) and other factors can put excessive demands on the grid, particularly in constrained areas like NYC. If the grid cannot deliver enough power to meet localized demand peaks, it must call on peaker power plants.

**Dirty Energy**
Peaker power plants in NYC are fueled by natural gas, oil, or even kerosene. When these costly and inefficient peaker plants are turned on, they expel harmful pollutants, like $NO_x$ and $SO_x$ and particulates, into the surrounding communities.

**Big Money**
Because peakers are paid to be available but are rarely called on to produce energy—often running no more than a few hundred hours each year—peaker plants are the most expensive sources of electricity in the power system.

**Sit and Wait**
When they are not needed, peakers are paid hundreds of millions of dollars each year to sit and wait for peak energy demand events. Plant owners make most of their money through ratepayer-funded capacity payments, even when peakers are not producing energy.

21 How much energy power plants generate is often measured by its "annual capacity factor." Capacity factor is the percentage of electricity actually generated based on what would have been generated if operating at maximum power. For comparison, according to the NYISO's Annual Grid & Markets Report "Power Trends 2019," most peaker plants in New York City have an annual capacity factor of 15 percent or less, while solar and wind systems in New York have annual capacity factors of 14 percent and 26 percent respectively.

22 "Opportunities for replacing peaker plants with energy storage in New York State," Physicians, Scientists, and Engineers (PSE) for Healthy Energy, *http://psehealthyenrg.staging.wpengine.com/our-work/energy-storage-peaker-plant-replacement-project/new-york*, (accessed March 18, 2020). This page contains a section on "Individual Plan Operational View" to view operational hours for listed power plants.

Many of New York City's peaker plants have bilateral contracts with utilities for capacity payments that are not made public. Capacity payments comprise a portion of the commodity charge on each utility customer's bill. In other words, all New York City electricity customers ultimately make payments to peaker owners for these harmful power plants to exist. Capacity payments to peaker power plants comprise about 5 percent of each customer's total bill in New York City, accounting for approximately 10 percent of the energy commodity charge. So, New York City electricity customers pay an extremely high cost to keep fossil fuel peaker power plants online, for very little actual energy generation.

To shed light on the amount of money New York City ratepayers have likely been paying in capacity payments to polluting peaker plants, public data from the NYISO cleared capacity prices was reviewed.[23] In order to calculate the expected revenue received (or equivalent value) by each of the peaker plants located in New York City that had capacity factors of 15 percent or less in 2018, Strategen Consulting was hired to analyze historical NYISO capacity market prices over the last decade (see Appendix for the full analysis).[24]

## ESTIMATED CAPACITY PAYMENTS TO NEW YORK CITY PEAKER POWER PLANT OPERATORS

Owning and operating peaker power plants in New York City is a highly lucrative business. We estimate that peaker plants have collected, on average, more than $450 million a year over the past decade to run their peaker plants no more than a few hundred hours a year. These revenues to private equity and hedge funds come directly from ratepayers' utility bills, including the bills of low-income ratepayers who live near polluting plants. These payment streams are summarized in Table 2.

Between 2010 and 2019, our analysis estimates that about **$4.5 billion** in capacity payments have been paid to the public and private peaker plant owners, ultimately at the expense of New York City electricity customers. Our analysis estimates that the three private owners (ArcLight Capital, NRG, and LS Power) have likely collected over $3.9 billion in capacity payment revenue over a ten-year time period from 2010 through 2019.

Adding more context to these findings, in 2018, over $87 million in capacity payments were paid to five power plants that operated one percent of the time or less that year—less than 90 hours over the entire year. Peaker plants operating less than 10 percent of the time received over $251 million that year, out of a total of $338 million in capacity payments. The year 2018 had the lowest total capacity prices in the 10 years analyzed. In 2015, $156 million was paid to the same five low-capacity power plants, and $471 million was paid to plants with capacity factors of less than 10 percent.

23 A NYISO cleared capacity price is the price of the unit of capacity at which the energy capacity supplied is equal to the capacity demanded, also called the equilibrium price. The capacity market clearing price is set three times, during the Capability Period Auction, Monthly Auction, and Spot Auction.

24 Due to restructuring, most LSE's in New York do not own energy generation facilities. However, in some unique cases certain LSEs, including ConEd and the New York Power Authority, have retained ownership of generation resources. In these cases, there may be no actual capacity payment, however the resource still retains capacity value as if it were contracted to other LSEs.

TABLE 2: **Summary of Estimated Capacity Revenues Received by NYC Peaker Plants**[25,26]

| Parent Company | Plant Owner/Operator | Plant Name | Location | Capacity Revenue by Plant (2010–2019) | Total Capacity Revenue by Parent Company (2010–2019) |
|---|---|---|---|---|---|
| **ArcLight Capital Holdings LLC** | Astoria Generating Company L.P. | Astoria | Queens | $500,700,000 | $1,415,400,000 |
| | | Gowanus | Brooklyn | $603,500,000 | |
| | | Narrows | Brooklyn | $311,200,000 | |
| **Consolidated Edison Inc.** | Consolidated Edison Inc. | 59 Street | Manhattan | $17,100,000 | $271,800,000 |
| | | 74 Street | Manhattan | $38,500,000 | |
| | | East River | Manhattan | $183,000,000 | |
| | | Hudson Ave. | Brooklyn | $33,100,000 | |
| **LS Power Group** | Helix Ravenswood LLC | Ravenswood | Queens | $1,189,900,000 | $1,189,900,000 |
| **New York Power Authority** | New York Power Authority | Harlem River | Bronx | $79,400,000 | $329,600,000 |
| | | Hell Gate | Bronx | $79,400,000 | |
| | | Kent | Brooklyn | $45,800,000 | |
| | | Pouch Terminal | Staten Island | $45,400,000 | |
| | | Vernon Blvd. | Queens | $79,400,000 | |
| **NRG Energy Inc.** | NRG Power Marketing LLC | Arthur Kill | Staten Island | $865,300,000 | $1,318,900,000 |
| | | Astoria GT | Queens | $453,600,000 | |
| **Total Capacity Revenue for All NYC Peaker Plants** | | | | | **$4,525,500,000** |

Source: Strategen Consulting

How profitable capacity cost revenues are compared to the average cost of electricity is also telling. For example, in 2018, the Gowanus Gas Turbine Facility had an energy output of just 18,200 megawatt-hours (MWh)—equivalent to about 30 hours of time operating during the entire year. If the capacity costs were allocated according to this output, that would translate to a per-unit cost of approximately $2.51/kilowatt-hour (kWh). For comparison, the average retail price of electricity in New York ranged from $0.17-0.19/kWh.[27]

Energy from the ArcLight-owned Gowanus Gas Turbine Facility effectively costs 1,300 percent more than typical sources of electricity in New York. The cost of energy from the Gowanus peaker plants to New York City's ratepayers represents one of the highest-priced electricity purchases in the country.

25 Indicates current plant owner. Ownership of some plants has changed over the period analyzed, and thus the current owner's cumulative capacity revenue may be less than the total indicated. However, this total is indicative of what all the plants owners (past and present) would have realized for plants held by the current owner.

26 As these are the best derived estimates from public materials, when much of this information is hidden in private contracts, we welcome any corrections from the plant owners if these numbers do not perfectly reflect their capacity payment revenues. We welcome more public information from these companies on how these significant sources of ratepayer public funds are deployed by these private owners, or any other related information outlined in this report.

27 *Monthly Average Price of Residential Electricity*, NYSERDA (March 6, 2020), *https://www.nyserda.ny.gov/Researchers-and-Policymakers/Energy-Prices/Electricity/Monthly-Avg-Electricity-Residential*.

**Via Verde housing development showcasing clean energy technologies in The Bronx.** PHOTO: BRIGHT POWER

# Clean Energy Alternatives to Peaker Plants

Fossil peaker peaker plants in New York City are perhaps the most egregious energy-related example of what environmental injustice means today. Throughout one of the most diverse and technologically developed cities in the world, numerous polluting oil and gas peaker plants in the City are sited in low-income communities and communities of color. These environmental justice communities continue to bear the brunt of the harmful impacts from dirty energy and industrial infrastructure that pose significant public health and environmental hazards. At the same time, private companies receive billions of dollars to keep this polluting infrastructure in place.

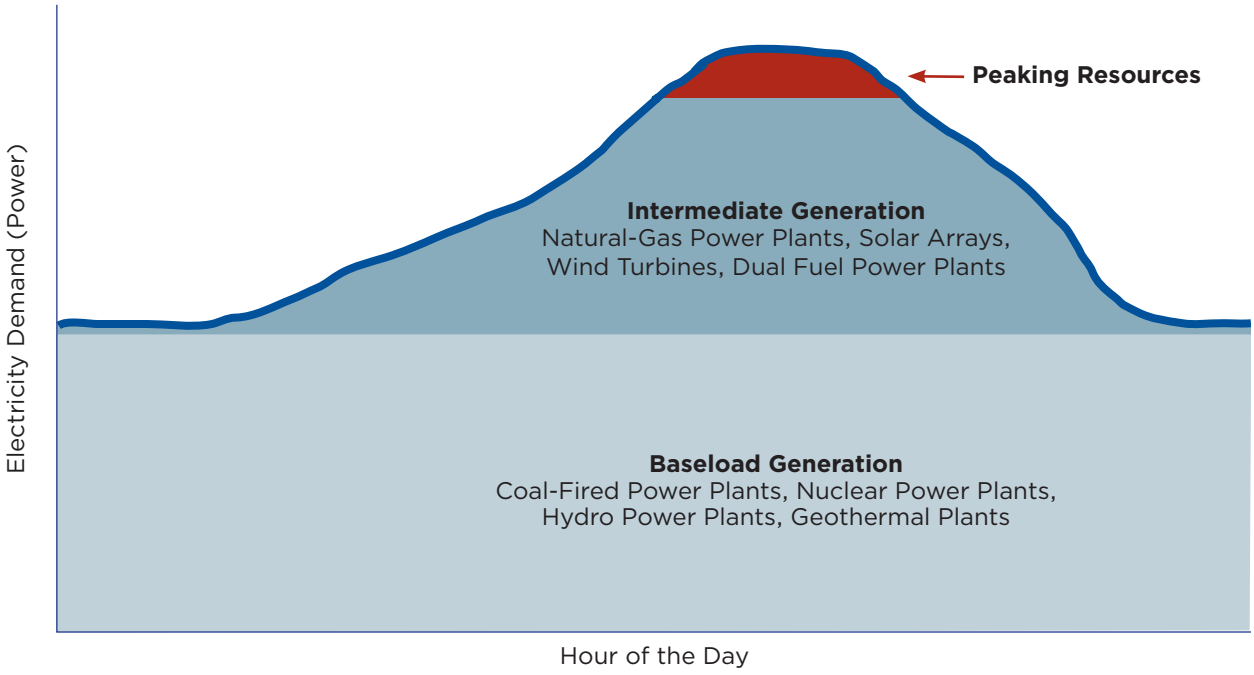
Replacing peaker plants with renewable and clean energy alternatives offers a major opportunity to improve public health in New York City. It is also a critical first step to achieving New York State's newly mandated zero-emissions energy sector by 2040 under the innovative *New York State Climate Leadership and Community Protection Act.*

However, solar and wind power alone cannot replace peaker plants, because the power they produce cannot be dispatched on command, and they have limitations on when they generate energy (e.g., solar photovoltaic (PV) systems can only generate optimal energy amounts on sunny days). For this reason, wind and solar energy systems are known as variable renewable energy sources. Combining battery storage technologies with renewables can address this limitation. Replacing peaker plants with batteries has now become a viable and profitable solution, due to the rapidly declining cost of energy storage systems. Ideally, the batteries replacing peaker plants would be charged with local, renewable energy resources.

For these reasons, utilities and investors are now turning to batteries, for both large-scale systems and for aggregations of smaller distributed resources, to replace fossil fuel peaker plants. Batteries are best known for versatility in their application uses. Different types of batteries suit different uses, depending on characteristics such as power rating, energy rating, ramp rates, etc. Understanding a battery's performance characteristics is paramount to successful integration in the grid or in performing a specific service.

Peaker plants are able to serve the time-specific need of providing a large amount of energy quickly during peak electricity demand events when conventional, slower, baseload or intermediate energy sources are already at maximum capacity, or where there is a lack of energy in a particular area due to transmission limitations. See Figure 4.

FIGURE 4: **What Is Peak Demand?**




Source: Clean Energy Group

**Different types of power plants have traditionally served different functions on the grid. Large coal and nuclear plants typically provide about the same level of power all the time, filling the role of baseload power. Intermediate power plants, or load-following power plants, operate less consistently, ramping their power generation up and down as system demand gradually fluctuates over time. Intermediate power is often provided by large combined-cycle gas plants. Peaking resources are called upon when demand rises above the level baseload and intermediate power plants can provide, such as on very warm days when air conditioning use is high. Peak power has been traditionally served by combustion turbines and reciprocating engines fueled primarily by natural gas and oil. Low-cost renewables and battery storage are now disrupting this legacy system.**

Because of this specific need to meet energy demand peaks, the fast-acting capability of most battery storage systems is the natural replacement. Market analysis and industry trends have shown that battery storage and renewable energy technologies are poised to displace the more than 1,000 fossil-fueled peaker plants operating across the country. Experts have found[28,29]—and real-world examples have proven—that battery storage and renewable generation may be less expensive to develop and manage than the rarely used but heavily polluting fossil fuel power plants, while also meeting or exceeding the same performance standards.

## TRANSITIONING AWAY FROM PEAKERS

The clean energy transition away from fossil fuels is not theoretical. Around the country, utilities have selected battery storage and renewable options instead of fossil fuel power plants to meet peak energy needs, based on competitive prices and the ability to deliver electricity efficiently. Below are a few examples of some recent projects:

- In December 2019, the New York State Energy Research and Development Authority (NYSERDA) approved a 20-megawatt (MW) battery storage project in Ulster. The battery will replace a gas peaker plant that was initially proposed as part of the project.
- In July 2019, the State of New York, through NYSERDA, selected two projects from its first competitive offshore wind solicitation. The projected combined capacity of these two projects is 1,696 MW, the single largest renewable energy procurement by a state in U.S. history
- In October 2019, the New York Public Service Commission (PSC) approved the development of a 316-MW, 8-hour-duration battery at the Ravenswood Generating Station in Long Island City. This is the first of many approvals needed for the battery to be built in a section of the facility currently occupied by peaker units. If the project moves forward, the batteries will provide peak capacity, energy, and ancillary services to the New York City grid, offsetting dirty peak generation.
- In June and July of 2019, East Bay Community Energy, a community choice aggregator in Northern California, entered into two contracts to replace an aging jet-fuel peaker in Oakland's Jack London Square. The first contract was for a 20-MW battery system. The second contract was with the residential solar and storage company Sunrun, for an additional 500 kW of 4-hour–duration battery storage, paired with solar, at multifamily affordable housing properties.
- In December 2018, the Nevada Public Utility Commission approved three solar-plus-storage agreements proposed by NV Energy for a total of 401 MW of solar and 100 MW of 4-hour–duration battery storage, all with power purchase agreement prices of less than $0.03/kWh.
- In June 2018, California utility Pacific Gas & Electric entered long-term contracts for over 567 MW of 4-hour–duration battery storage resources, with the intent of replacing three gas peaker plants.

28 Strategen Consulting, "New York City's Aging Power Plants: Risks, Replacement Options, and the Role of Energy Storage," static1.squarespace.com, September 27, 2017, *https://static1.squarespace.com/static/571a88e12fe1312111f1f6e6/t/59c3d46ae9bfdf16412f8b7e/1506006147665/Strategen+-+NYC+Power+Plants+and+Energy+Storage+9.20.2017.pdf.*

29 Paul Denholm, et al., "The Potential for Battery Energy Storage to Provide Peaking Capacity in the United States," nrel.gov, June 2019, *https://www.nrel.gov/docs/fy19osti/74184.pdf.*

- In May 2018, Arizona's largest electric utility, Salt River Project, entered a 20-year contract for a 10-MW, 4-hour–duration battery to provide peaking capacity during periods of high demand.

The example most relevant to the PEAK Coalition's goal and proposed solutions in New York City is the replacement of NRG Energy's 262-MW Puente Power Project in Oxnard, California. Opponents of the proposed new gas peaker plant—including local community and environmental justice groups, environmental organizations, and elected officials—contended that a combination of energy efficiency, demand response, renewable energy generation, and energy storage could do the job of the proposed gas plant.

Despite local objections, the power plant regulators at the California Public Utilities Commission approved NRG's contract in June 2016. The final regulatory step NRG needed before commencing construction was certification from the California Energy Commission. The California Energy Commission is mandated to evaluate the environmental impacts of power plants approved by the California Public Utilities Commission, with the California Independent Service Operator (CAISO) advising based on its expertise.

After grassroots organizing[30] and public letters[31] in opposition from numerous state senators, the California Energy Commission rejected NRG's proposal after the region's electric utility announced that it had received 341 proposals[32] in its request for energy alternatives. Based on that response, the utility advised NRG Energy that its plant was no longer needed. The request for proposals ended with local utility Southern California Edison seeking approval of a 100 MW/400 MWh-battery storage project with a portfolio of smaller battery projects, ranging from 10 MW to 40 MW, including a 14-MW contract for aggregated residential battery systems.

**Joseph J. Seymour peaker plant in Brooklyn, New York.**
PHOTO: NYC ENVIRONMENTAL JUSTICE ALLIANCE

30 Wendy Leung, "Protesters short circuit Oxnard power plant meeting," *VC Star* (January 10, 2017), *https://www.vcstar.com/story/news/local/communities/oxnard/2017/01/10/commission-presents-final-report-oxnard-power-plant/96324364*.

31 "CA Legislators Sign Joint Letter of Opposition to PPP," Change.org (February 22, 2017), *https://www.change.org/p/california-energy-commission-no-on-the-puente-power-project/u/19523450*.

32 "Testimony of Southern California Edison Company (U-388E) In Support of Its Application for Approval of the Results of Its 2018 Local Capacity Requirements for Requests for Proposals," California Public Utilities Commission (April 22, 2019), available at *http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/11D80C3CF6F46FEF882583E5000118BE/%24FILE/A1904XXX-PUBLIC%20SCE%20Testimony%20in%20Support%20of%20Appl%20for%20App%20of%20Results%20of%202018%20LCR%20RFP%20SCE-01.pdf*.

# Benefits of Replacing Peaker Plants with Renewable Energy and Battery Storage

Replacing peaker plants with renewable energy and battery storage, if done right, brings a host of benefits in addition to efficient, clean, dispatchable electricity.

## RESILIENCY AND BACKUP POWER

A transition toward renewable energy and energy storage technologies can provide energy resiliency, backup power, and other benefits at the local level. Properly designed solar-plus-storage systems installed throughout a community could be called on to run during the hours needed to meet peak demand, like current fossil plants—but the cleaner alternatives also could deliver benefits year round. Along with local, clean energy, batteries can provide residents in affordable housing and community service providers access to power for critical services when the grid goes down in a storm. In New York City, many environmental justice communities and peaker plants are located in and around significant maritime and industrial areas that are disproportionately and increasingly vulnerable to sea-level rise, flooding, and storm surge during extreme weather events—further highlighting the need for community and energy resiliency.[33]


**Battery storage installation that is paired with rooftop solar at Marcus Garvey Apartments affordable housing complex in Brooklyn.** PHOTO: ENEL X

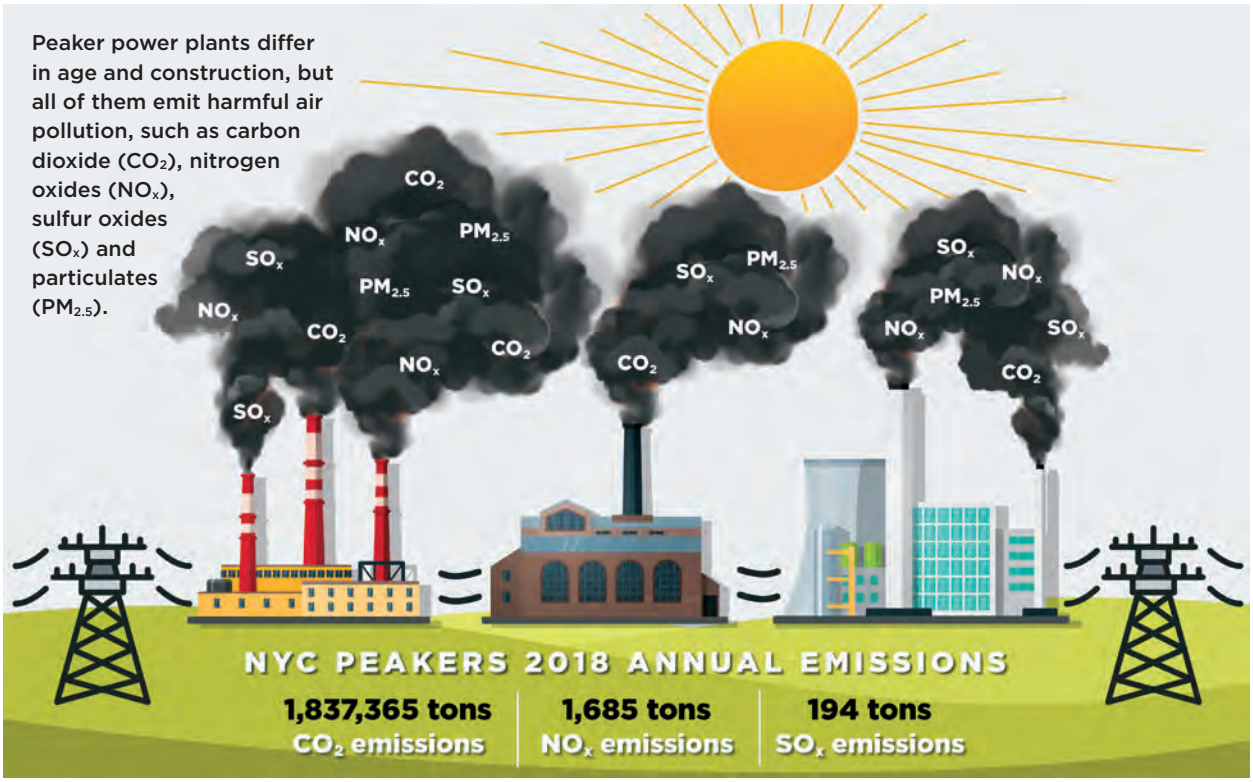
33 "NYC Climate Justice Agenda 2018," New York City Environmental Justice Alliance (April 2018), available at *https://www.nyc-eja.org/wp-content/uploads/2018/04/NYC-Climate-Justice-Agenda-Final-042018-1.pdf*.

Resiliency planning is particularly important for critical facilities throughout the five boroughs, including hospitals, evacuation centers, cooling centers, and food distributions hubs.[34] For example, in Hunts Point the NYC Economic Development Corporation, with support from the federal government and in response to community advocacy from THE POINT CDC, is installing a solar-plus-storage system on a public school that also serves as an evacuation center during an emergency. The installation includes a 450-kW DC ballasted solar PV system and 125kW/274kWh of lithium-ion energy storage with microgrid capabilities.[35] These resilient systems will also offset grid energy consumption and could be used to reduce higher charges for energy use at peak demand times in buildings, saving building owners and tenants money off their electric bills.

## REDUCED AIR POLLUTION AND PUBLIC HEALTH BENEFITS

Using renewable energy to charge batteries eliminates greenhouse gas emissions. Statewide, it is estimated that adding 1,500 MW of energy storage would avoid one million tons of $CO_2$ emissions, contributing to the reductions in greenhouse gas emissions imperative to avoid catastrophic climate changes. See Figure 5.

FIGURE 5: **Total Cumulative Peaker Plant Emissions in 2018 in New York City**




Source: Clean Energy Group (based on analysis by PSE Healthy Energy using EIA 2018 data).

34 "NYC Climate Justice Agenda 2018," New York City Environmental Justice Alliance (April 2018), available at *https://www.nyc-eja.org/wp-content/uploads/2018/04/NYC-Climate-Justice-Agenda-Final-042018-1.pdf*.

35 New York City Economic Development Corporation and NYC Mayor's Office of Resiliency. Hunts Point Resiliency Advisory Working Group Meeting, April 11, 2019

In addition, the New York State Department of Environmental Conservation (DEC) estimates that replacing pre-1986 peaker plants with newer fossil fuel technologies would achieve a 10 percent reduction of $NO_x$ emissions on high-ozone days from the entire electricity generation sector in the New York-New Jersey-Long Island metropolitan area, which currently fails to meet U.S. Environmental Protection Agency (EPA) standards for healthy ozone levels.[36] Replacing the plants with entirely renewable generation and storage would have an even greater impact, since renewables have no emissions.

With over 1.2 million New Yorkers living within a one-mile radius of a fossil fuel peaker plant,[37] the reduction of air pollutants from peaker plants would have a significant impact on the health and quality of life of people living in the five boroughs of New York City.

Emission reductions may be particularly valuable in neighborhoods such as the Hunts Point and Longwood community in the South Bronx, where childhood asthma hospitalization rates of 432 per 10,000 are nearly double the average New York City rates.[38]

## ADDRESSING THE ENERGY BURDEN ON UNDER-RESOURCED COMMUNITIES

According to a New York City Mayor's Office 2019 report, *Understanding and Alleviating Energy Cost Burden in New York City,* the energy cost burden in New York City disproportionately impacts low-income people. The Governor and the Public Service Commission have identified six percent as the energy affordability threshold for low-income New Yorkers. Over 609,850 families pay greater than six percent of their annual household income toward their energy bills, the majority of whom are living below 200 percent of the federal poverty level.[39] Compounding this issue, almost five percent of the typical utility customer's electricity bill in New York City—or about $4.50 per month—goes solely to pay for these outdated fossil fuel peaker plants. This means that over the past decade, the average customer would have paid $530 to support burning of fossil fuels across the five boroughs.[40] To help address these energy cost burdens and the harmful impacts of polluting peaker plants, New York City utility customers could benefit from participating in community solar projects that can provide an estimated 10 percent reductions in their energy bills. For example, UPROSE's Sunset Park Solar at the Brooklyn Army Terminal will be New York State's first cooperatively-owned community solar project to bring these benefits to

36 "High Ozone Values During 2019," NYS Dept. of Environmental Conservation, *https://www.dec.ny.gov/chemical/38377.html* (accessed April 27, 2020).

37 "Opportunities for replacing peaker plants with energy storage in New York State," Physicians, Scientists, and Engineers (PSE) for Healthy Energy, *http://psehealthyenrg.staging.wpengine.com/our-work/energy-storage-peaker-plant-replacement-project/new-york*, (accessed March 18, 2020). This page contains a section on "Individual Plant Demographics" to view population data for listed power plants.

38 *Community Health Profile 2018: Hunts Point and Longwood,* New York City Department of Health and Mental Hygiene (2018), available at *www1.nyc.gov/assets/doh/downloads/pdf/data/2018chp-bx2.pdf.*

39 *Understanding and Alleviating Energy Cost Burden in New York City,* New York City Mayor's Office for Sustainability and Mayor's Office for Economic Development (August 2019), available at *https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/EnergyCost.pdf.*

40 Strategen Consulting, "New York City's Aging Power Plants: Risks, Replacement Options, and the Role of Energy Storage," static1.squarepace.com, September 27, 2017, *https://static1.squarespace.com/static/571a88e12fe1312111f1f6e6/t/59c3d46ae9bfdf16412f8b7e/1506006147665/Strategen+-+NYC+Power+Plants+and+Energy+Storage+9.20.2017.pdf.*

low-income ratepayers. Localized renewable energy and equitable energy efficiency efforts are a key part of addressing energy burden and decreasing emissions, as well as reducing peak demand.[41]

## INVESTING LOCALLY TO BENEFIT LOCAL COMMUNITIES

Instead of capacity payments going to private hedge funds or equity firms that own fossil fuel peaker plants, billions of dollars in ratepayer funds could instead be used to invest locally in publicly-owned and community-owned, distributed renewable and battery storage alternatives in New York City. The time is right to repatriate those dollars to serve local community needs rather than to enrich fossil fuel companies and out-of-state power plant owners. See Figure 6.

In order to meet the *New York State Climate Leadership and Community Protection Act* (CLCPA) targets, New York City must prioritize creating in-city renewable electricity generation with bold, ambitious, innovative, and equitable projects. For example, in 2019, a broad range of community stakeholders came together to support a renewable and regenerative vision for the future of Rikers Island, a notorious jail complex scheduled for closure.[42] Environmental justice advocates are exploring how the island's 413 acres of land can be used for large-scale local renewable energy generation and battery storage that could help replace peaker plants. Initial projections of generation and battery storage capacity on Rikers Island are promising. For example, looking at the currently unused land on the island, using just 35 acres

FIGURE 6: **A Better Way to Meet Peak Demand**

**Peaker Plant Alternatives**
Due to significant cost declines for renewable generation and energy storage technologies, fossil-fueled peakers can now be economically replaced by cleaner technologies.

**Local Renewables**
Renewable resources, both large-scale solutions like offshore wind and small-scale solutions like rooftop solar systems, can be installed in many locations where local energy generation is needed most.

**Battery Storage**
Battery storage technologies can save electricity generated by wind and solar to be used during times of high demand—delivering critical peak power when the grid needs it most and providing lucrative revenue opportunities for battery system owners.

**Community Power**
Local renewable resources and battery storage can be combined and aggregated to provide a cheaper, cleaner, and more efficient alternative to fossil-fueled peakers. Unlike big power plants, these distributed resources offer opportunities for community ownership and local wealth creation, providing benefits to communities instead of causing them harm.

41 Eddie Bautista et al., "A Just Transition for New York: Achieving Clean and Renewable Energy Equity for Environmental Justice Communities," 30:1 *Environmental Law in New York* 1 (2019), available at *https://www.nyc-eja.org/wp-content/uploads/2019/01/Energy-Law-in-New-York-010419.pdf*.

42 Office of Costa Constantinides, Chair, New York City Council Committee on Environmental Protection: The Case for a Renewable Rikers.

in the first phase of construction can provide 14.6 MW of solar power and generate 17.3 gigawatt-hours annually. Additionally, just four acres of land can host 380 containers of 1-MW batteries, creating a system with 380-MW of storage capacity.[43] This local "Just Transition" vision requires advocacy and political will to ensure that the development plans for Rikers Island abide by community priorities for renewable power systems and local, targeted workforce opportunities.

# Policies to Advance the Transition

Policymakers at all levels of government in New York State have advanced groundbreaking climate and environmental laws that should lead to accelerated peaker plant replacement in the city. Additional policy changes can ease the transition and ensure that renewables and storage can be economically viable and safely and easily sited within the city.

New York State's 2019 CLCPA, which mandates the end of fossil fuel power generation in New York by 2040, also requires that the law be implemented in a way that reduces environmental burdens for

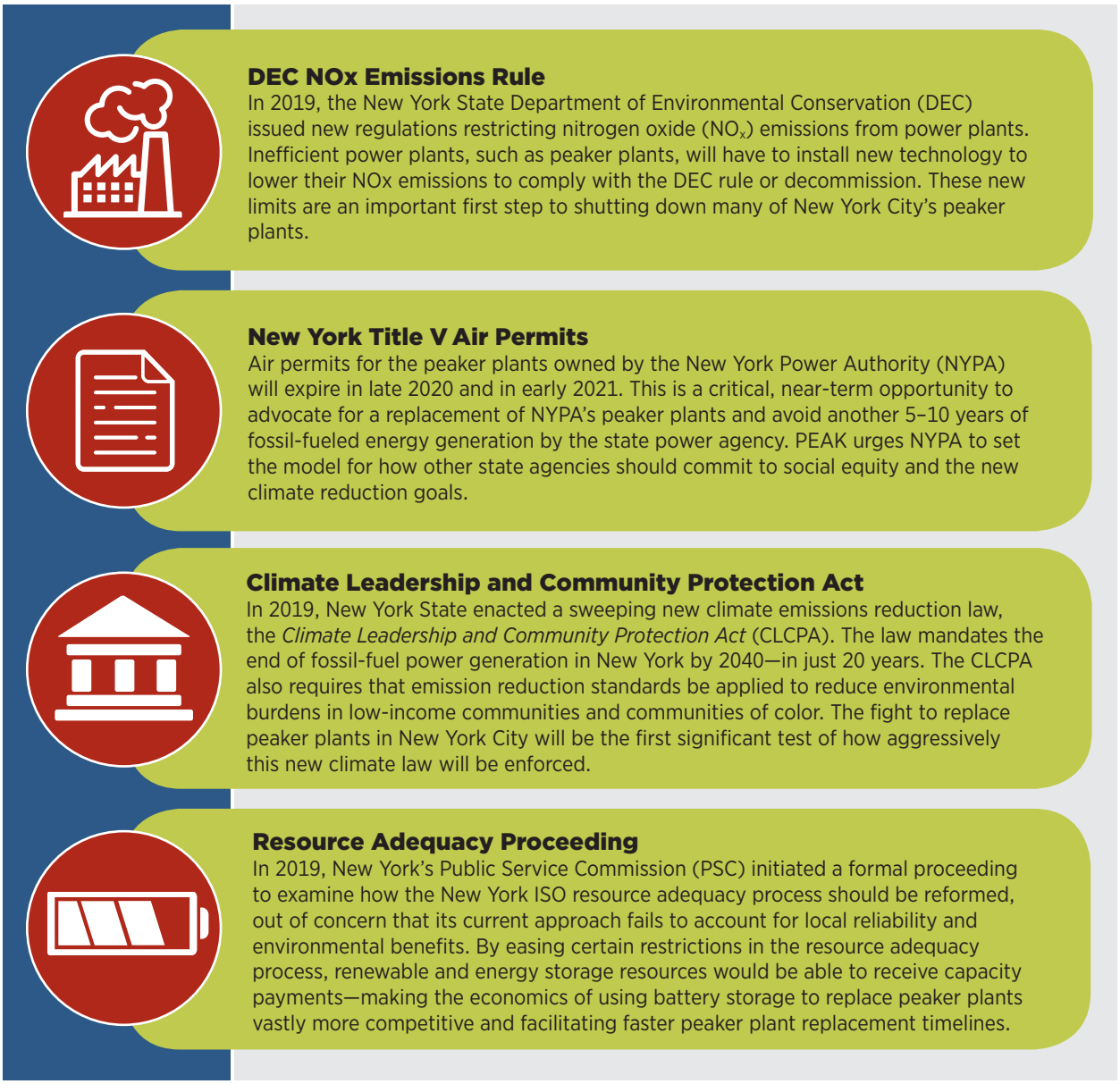
**Rendering of Rikers Island Renewable Energy Future.** PHOTO: LIPPMAN COMMISSION REPORT

43 Sustainable CUNY of The City University of New York: Rikers Island Solar + Storage System Options (forthcoming)

low-income communities and communities of color. The fight to replace peaker plants in New York City constitutes the first major test of how vigorously this new climate law will be implemented and enforced. It will also show how the state will live up to the goal of prioritizing greenhouse gas and co-pollutant reductions in overburdened communities. See Figure 7.

Community groups can use the CLCPA as a tool to challenge companies seeking to renew air permits or otherwise authorize peaker plant siting and operations. For example, all peaker plants require Title V air permits from the New York State Department of Environmental Conservation (DEC), under the *Clean Air Act.* These permits are typically granted for a period of up to five years and must be renewed upon expiration. The CLCPA now requires that all state agencies, when granting permits, entering contracts

FIGURE 7: **Policies and Laws Impacting Clean Energy Generation in New York City**



or otherwise authorizing activity, must ensure that the activity is consistent with the law. As many peaker plant air permits are set to expire over the coming years, communities can leverage the new law to argue that simply renewing current permits, which allow significant greenhouse gas (GHG) and co-pollutant emissions in environmental justice communities, is not consistent with the spirit or substance of the CLCPA.

In addition to the CLCPA, the DEC enacted new statewide regulations at the end of 2019 to set lower NOx emissions limits for peaker plants. The lower emissions limits phase in, starting in May 2023. Due to their age and inefficiency, many New York City peaker plants currently emit NOx at levels that far exceed the new limits. To comply with the new NOx regulation, peaker plants will have to install new emissions controls, cease operating during the high-ozone season (an unlikely scenario, since peaker plants are mostly needed during June through August, which coincides with high ozone season), or install enough energy storage or renewables on-site or nearby to reduce the facility's $NO_x$ emissions rate per MWh. While the state may grant a two-year compliance extension to peaker plants deemed a "reliability resource by the NYISO or transmission owner," many of the oldest peaker plants are expected to either shut down or repower with completely new facilities.

To aid the transition to renewables and storage, New York's energy regulators have been seeking to break down barriers that prevent renewable generation and storage from being compensated as capacity resources. In February 2020, the Federal Energy Regulatory Commission (FERC) accepted NYISO's proposed eligibility criteria and process for a renewable resources exemption that would allow renewable energy generators to bid into the capacity market. However, in the same ruling, FERC rejected the renewable exemption mega-watt cap proposed by NYISO and asked for a revision of its calculations. Without the economic incentive of these payments, the profitability of renewable energy systems in New York State will remain at a disadvantage. The state will have to move forward with creative solutions to keep energy storage competitive as a peaker plant alternative.

Additionally, in New York City, strict fire safety rules make it very challenging to install energy storage batteries in most buildings, though there are clear guidelines for siting these batteries outdoors. New measures, using lessons from other states that have safely adopted battery storage for use indoors, will be needed to expand the use of smaller-scale batteries in commercial and residential buildings.

# Conclusion

The need to transition from fossil fuels to renewable sources of energy has never been more clear in this era of climate crisis. Furthermore, the need to rapidly reduce air pollution that contributes to respiratory illness and heart disease disproportionately harming low-income communities and communities of color is a moral and public health imperative—ever more so now, with the devastating, rampant spread of the COVID-19, which is particularly deadly for people with respiratory problems. Replacing New York City's aging, fossil fuel peaker plants is a test case for how well New York will live up to its commitments on both of these fronts.

This report brings some transparency to the billion-dollar capacity payment system that subsidizes the existence of aging, polluting peaker plants in New York City. All New York City ratepayers pay for the continued use of outdated and polluting infrastructure. Transparency is the first step toward changing this unjust and costly system.

As the PEAK Coalition puts forward in this report, changing the system is possible.

Communities of color are asserting their right to a clean and healthy environment, and to stop the practice of polluting their neighborhoods with fossil fuel plants in order to keep the lights on for everyone else.

**Vernon Blvd. peaker power plant in Queens.** PHOTO: OFFICE OF NYC COUNCIL MEMBER COSTA CONSTANTINIDES

As the nation faces an unprecedented public health crisis with the COVID-19 respiratory virus, the historic and disproportionate environmental burdens imposed on the most vulnerable among us by burning fossil fuels can no longer be ignored as a serious public health threat. COVID-19 has cast a light on the existing health disparities and vulnerability in environmental justice communities. New research links the direct correlation between long-term exposure to air pollution and significantly higher rates of death in people with COVID-19, which we are seeing now in environmental justice communities long-plagued by health disparities and vulnerability due to the exposure to air pollution from peaker plants—nearly always sited in under-resourced communities.

New air pollution and climate laws have put the city and the state on a vital path toward a non-fossil-fuel future, with mandates that require state permitting and operating agencies to become models for implementing systematic change and developing new requirements to completely shift the energy sector away from fossil fuels in the next 20 years.

Advancing clean energy technology makes change possible, as renewables and battery storage now can provide the same services as well as outdated fossil peaker plants, increasingly at lower cost. New sources of clean energy resources such as offshore wind coming into the city demonstrate that New York City's power grid doesn't need to remain dirty forever.

With strong leadership from State and City government, in partnership with directly impacted community members and with assistance from leaders in the renewable and storage technology sectors, New York City can be on the forefront of developing innovative renewable energy and battery storage systems that will keep the lights on and deliver other critical public benefits: new local investments in clean energy infrastructure and greater control over energy resources within communities, added energy resilience to the grid to prevent or mitigate emergency blackouts, reduced energy costs, and improved public health—with all of the benefits that better health can provide for New York City's most vulnerable communities.

# APPENDIX

## What are the Costs of New York City's Power Plants?

*Prepared by Strategen Consulting for: Clean Energy Group, New York City Environmental Justice Coalition, New York Lawyers for the Public Interest, THE POINT Community Development Corporation, and UPROSE.*
*March 2020*

### *Background*

New York City is home to a large fleet of rapidly aging power plants. In 2017, Strategen conducted a detailed analysis of this growing challenge (see New York City's Aging Power Plants: Risks, Replacement Options and the Role of Energy Storage). Among the findings of this analysis was the fact that many of these plants run very infrequently. However, when they do run, they contribute significantly to local air pollution due to the lack of pollution controls. As a result, New York State Department of Environmental Conservation (DEC) revised its nitrogen oxide (NOx) emissions rules applicable to peaking power plants as a means to better limit their harmful effects. Not only do these peaker plants present a burden on New York residents in terms of their environmental effects, but they also pose a direct economic cost. In this briefing we explore some of these costs in more detail.

### *Estimation of Costs*

Strategen identified 15 peaking power plants[1] (identified in Table 1) located in New York City that had capacity factors of 15% or less in 2018, meaning they ran less than 15% of the time. In many cases, the capacity factors are much lower than this – some plants run at less than 1% of their potential output, and on average, they only run at 6.2% of their available capability. Despite the fact that these old and highly polluting plants seldom operate, they still function as a major source of revenue for the plant owners due to capacity payments. Every year, New York's retail electric providers like ConEd (also known as "load serving entities" or "LSEs") pay plant owners in the form of capacity payments in order to make sure that they have enough generation capacity on standby to meet their peak summer and winter demand according to reliability criteria established by the state.

Since New York City is densely populated, there is often much more localized demand than the grid can supply from outside resources. As such, the state's reliability council requires that a minimum amount of capacity resources be procured from generation located within the New York City load pocket. This also means that the cost of capacity resources located in New York City comes at a premium relative to other locations in the state, resulting in some of the highest capacity prices in the country. Over the past 10 years, capacity located in New York City has cost on average over 11 times as much as capacity located elsewhere in New York.

[1] This analysis identifies New York City peaker plants based on 2018 operational profiles - any power plant with an annual capacity factor of 15% or less is defined as a peaker plant. This definition of a peaker is based on how resources perform and dispatch in the market, and may identify different power plants than a definition based on plant technology type.

*Table 1. Peaker Power Plant Facilities in Zone J*[2]

| Plant | Ultimate Parent | Online Date (first unit) | Average Age (years) | Number of Units | 2018 Capacity Factor | Primary Fuel | Location |
|---|---|---|---|---|---|---|---|
| Astoria | ArcLight Capital Holdings LLC | 1954 | 60 | 3 | 6.4% | Fuel Oil No. 6 & Natural Gas | Queens |
| Gowanus | ArcLight Capital Holdings LLC | 1971 | 49 | 32 | 0.3% | Fuel Oil No. 2 | Brooklyn |
| Narrows | ArcLight Capital Holdings LLC | 1972 | 48 | 16 | 2.3% | Fuel Oil No. 2 | Brooklyn |
| 59 St. | Consolidated Edison Inc. | 1969 | 51 | 1 | 0.1% | Kerosene | Manhattan |
| 74 St. | Consolidated Edison Inc. | 1968 | 52 | 2 | 0.1% | Kerosene | Manhattan |
| East River | Consolidated Edison Inc. | 1955 | 65 | 1 | 12.0% | Natural Gas | Manhattan |
| Hudson Ave | Consolidated Edison Inc. | 1970 | 50 | 2 | 0.1% | Kerosene | Brooklyn |
| Ravenswood | LS Power Group | 1965 | 51 | 11 | 6.6% | Natural Gas & Fuel Oil no. 6 | Queens |
| Harlem River | New York Power Authority | 2001 | 19 | 2 | 5.0% | Natural Gas | Bronx |
| Hellgate | New York Power Authority | 2001 | 19 | 2 | 4.9% | Natural Gas | Bronx |
| Kent | New York Power Authority | 2001 | 19 | 1 | 13.0% | Natural Gas | Brooklyn |
| Pouch | New York Power Authority | 2001 | 19 | 1 | 14.5% | Natural Gas | Staten Island |
| Vernon Blvd | New York Power Authority | 2001 | 19 | 2 | 7.8% | Natural Gas | Queens |
| Arthur Kill | NRG Energy Inc. | 1959 | 54 | 3 | 12.1% | Natural Gas | Staten Island |
| Astoria GT | NRG Energy Inc. | 1970 | 50 | 12 | 0.8% | Kerosene | Queens |

Capacity resources can be procured directly from generation owners through bilateral contracts or through the organized capacity market administered by the New York Independent System Operator (NYISO), New York's grid operator. In either case, the generator receives a payment stream simply for being available as a capacity resource to meet the LSE's (e.g. ConEdison's) capacity requirements. Some LSEs own the generating resources they use to serve customers, so they may not participate directly in the market or make bilateral transactions. Capacity payments made by LSEs are in turn passed on to retail customers and comprise a portion of the commodity charge on each customer's bills. In other words, all New York City electricity customers ultimately pay a cost for peaking power plants to exist. These payments can represent up to 5% of the total customer bill, or about 10% of the commodity

[2] Based off data provided in NYISO Gold Book, 2019

charge on a NYC customer's electric bill. This means that an average residential customer in NYC[3], using around 550 kWh of electricity a month, would have paid $530 over the last 10 years to support the burning of fossil fuels in the middle of the city.[4]

Data provided by NYISO shows that the overall energy cleared in the market by load-serving entities is generally lower than their total obligation, so the balance is most likely made up by bilateral contracts with plant owners (or through LSE-owned generation where no transaction takes place). While the terms of any bilateral agreement may be confidential, the NYISO capacity market provides visibility into the likely value of these capacity payments through public information on cleared capacity prices. Using historical NYISO capacity market prices, Strategen determined the likely revenue received (or equivalent value) by each of the 15 plants over the last decade.[5] The payment streams are summarized in Tables 2 and 3 below. Between 2010 and 2019, approximately $4.5 billion has likely been paid to the plant owners, ultimately at the expense of New York City electricity customers. In 2018 alone, about $87 million was paid for capacity to five plants that used less than 1% of their capability, while plants with capacity values of less than 10% received $251 million that year, the year with the lowest capacity prices in the last 10 years[6]. Furthermore, ownership of these 15 plants is limited to just five entities, two of which are public utilities (ConEd and NYPA). The remaining three private owners (ArcLight Capital, NRG, and LS Power) have likely collected over $3.9 billion in capacity payment revenue over this time period.

*Table 2. Summary of Estimated Capacity Revenues Received by NYC Peaker Plant Owners*

| Plant Owner[7] | Sum of Estimated Capacity Revenue, 2010-2019 ($) |
|---|---|
| ArcLight Capital Holdings LLC | $ 1,415,390,596 |
| NRG Energy Inc. | $ 1,318,898,629 |
| LS Power Group | $ 1,189,873,479 |
| New York Power Authority | $ 329,554,275 |
| Consolidated Edison Inc. | $ 271,785,177 |
| Grand Total | $4,525,502,157 |

[3] NYSERDA estimates that the average household in New York uses almost 6,600 kWh of electricity a year, or around 550 kWh per month. https://www.nyserda.ny.gov/-/media/Files/Publications/Energy-Analysis/2001-2015-patterns-and-trends.pdf

[4] These cost estimates are based on a customer who takes electric service from ConEdison and are based on customers paying a pro-rata share of capacity costs. Costs for specific customer or customer classes may vary based on rate structures for Con Edison or other New York City electric service providers

[5] Due to restructuring, most LSE's in New York do not own generation. However, in some unique cases certain LSEs, including ConEd and the New York Power Authority, have retained ownership of generation resources. In these cases, there may be no actual capacity payment, however the resource still retains capacity value if it were contracted to other LSEs.

[6] In 2015, the year with the higher capacity prices in NYC, about $156 million was paid for capacity to the same five plants that used less than 1% of their capability in 2018, while the plants with capacity values of less than 10% received $471 million.

[7] Indicates current plant owner. Ownership of some plants has changed over the period analyzed, and thus the current owner's cumulative capacity revenue may be less than the total indicated. However, this total is indicative of what all the owners (past and present) would have realized for plants held by the current owner.

The three plants with the largest payment streams are Ravenswood (owned by LS Power), Arthur Kill (owned by NRG) and Gowanus (owned by ArcLight Capital), which together comprise more than half of the $4.5 billion. The capacity cost of these generators relative to the power they produce is significant. For example, in 2018, the Gowanus plant had an energy output of just 18,200 MWh – equivalent to about 32 hours of time operating (<1%) during the entire year. If the capacity costs of that year (the lowest in the 10-year period) were allocated according to this output, that would translate to a per unit cost of approximately $2.51/kWh. For comparison, the average retail price of electricity in New York ranged from $0.17-0.19/kWh.[8] Thus energy from this plant could be considered to cost almost 1,300% more than other typical sources.

*Table 3. Estimated Capacity Revenues for 15 Peaking Power Plants Located in New York City*

| | | | Estimated Capacity Revenues | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Plant** | **Ultimate Parent** | **Capability (Summer MW)** | **2010 ($)** | **2011 ($)** | **2012 ($)** | **2013 ($)** | **2014 ($)** | **2015 ($)** | **2016 ($)** | **2017 ($)** | **2018 ($)** | **2019 ($)** | **Total 2010-2019 ($)** |
| Astoria | ArcLight Capital Holdings LLC | 556.8 | $54,142,740 | $49,015,340 | $34,752,171 | $42,590,759 | $54,701,730 | $73,948,155 | $55,727,230 | $44,912,382 | $42,346,593 | $48,546,687 | $500,683,787 |
| Gowanus | ArcLight Capital Holdings LLC | 560.6 | $58,607,303 | $53,241,339 | $49,109,742 | $66,064,246 | $87,265,838 | $82,134,893 | $61,908,233 | $48,426,786 | $45,728,041 | $50,977,185 | $603,463,607 |
| Narrows | ArcLight Capital Holdings LLC | 287 | $30,215,340 | $27,457,725 | $25,289,912 | $34,032,414 | $45,075,370 | $42,445,361 | $31,993,241 | $24,957,644 | $23,570,063 | $26,206,132 | $311,243,202 |
| 59 St. | Consolidated Edison Inc. | 15.5 | $1,655,346 | $1,505,247 | $1,382,313 | $1,861,437 | $2,478,839 | $2,336,443 | $1,761,156 | $1,366,301 | $1,290,699 | $1,427,364 | $17,065,144 |
| 74 St. | Consolidated Edison Inc. | 37.9 | $3,755,340 | $3,402,852 | $3,175,078 | $4,259,983 | $5,508,476 | $5,164,741 | $3,892,338 | $3,111,892 | $2,935,272 | $3,340,324 | $38,546,295 |
| East River | Consolidated Edison Inc. | 182.5 | $17,845,895 | $16,160,349 | $15,122,655 | $20,276,486 | $26,076,391 | $24,424,812 | $18,406,785 | $14,798,888 | $13,955,097 | $15,963,080 | $183,030,439 |
| Hudson Ave | Consolidated Edison Inc. | 31.4 | $3,222,262 | $2,924,710 | $2,708,347 | $3,640,084 | $4,773,626 | $4,487,154 | $3,381,987 | $2,665,125 | $2,515,668 | $2,824,334 | $33,143,298 |
| Ravenswood | LS Power Group | 1230.6 | $121,450,577 | $110,029,471 | $98,158,484 | $131,672,753 | $169,988,973 | $166,789,386 | $125,697,273 | $100,662,909 | $80,139,555 | $85,284,099 | $1,189,873,479 |
| Harlem River | New York Power Authority | 79.9 | $7,748,644 | $7,013,901 | $6,575,646 | $8,812,935 | $11,294,600 | $10,572,506 | $7,967,368 | $6,428,598 | $6,060,997 | $6,955,737 | $79,430,932 |
| Hellgate | New York Power Authority | 79.9 | $7,748,644 | $7,013,901 | $6,575,646 | $8,812,935 | $11,294,600 | $10,572,506 | $7,967,368 | $6,428,598 | $6,060,997 | $6,955,737 | $79,430,932 |
| Kent | New York Power Authority | 45.9 | $4,468,810 | $4,045,856 | $3,789,741 | $5,080,169 | $6,521,410 | $6,106,325 | $4,601,733 | $3,706,703 | $3,495,036 | $4,004,800 | $45,820,584 |
| Pouch | New York Power Authority | 45.6 | $4,432,233 | $4,012,409 | $3,759,805 | $5,039,614 | $6,464,850 | $6,052,589 | $4,561,218 | $3,676,704 | $3,466,627 | $3,974,847 | $45,440,896 |
| Vernon Blvd | New York Power Authority | 79.9 | $7,748,644 | $7,013,901 | $6,575,646 | $8,812,935 | $11,294,600 | $10,572,506 | $7,967,368 | $6,428,598 | $6,060,997 | $6,955,737 | $79,430,932 |
| Arthur Kill | NRG Energy Inc. | 866.9 | $84,393,124 | $76,405,310 | $71,570,141 | $95,939,695 | $123,152,858 | $115,313,375 | $86,900,274 | $70,001,167 | $66,003,684 | $75,633,398 | $865,313,026 |
| Astoria GT | NRG Energy Inc. | 422.7 | $44,058,932 | $40,019,472 | $36,937,026 | $49,681,891 | $65,550,428 | $61,683,632 | $46,492,995 | $36,411,231 | $34,380,055 | $38,369,942 | $453,585,604 |
| **NYC Total** | | 4523.1 | $451,493,831 | $409,261,785 | $365,482,353 | $486,578,335 | $631,442,590 | $622,604,383 | $469,226,568 | $373,983,527 | $338,009,381 | $377,419,404 | **$4,525,502,157** |

[8] https://www.nyserda.ny.gov/Researchers-and-Policymakers/Energy-Prices/Electricity/Monthly-Avg-Electricity-Residential

Note 1. All 15 plants were observed to have capacity factors of 15% or less in 2018. Revenues were estimated by multiplying plant summer and winter capability ratings (as reported in the NYISO Gold Book) by historical NYISO Capacity Auctions market clearing prices for Zone J (NYC) in the corresponding winter and summer periods (compiled from NYISO). The cost of bilateral contracts was approximated assuming a 15% cost reduction as compared to Strip Auction prices. Plant sizes are indicated by summer capability rating in MW.

Note 2: This revenue analysis does not account for either a) any "going forward costs" (GFC) incurred by the plant owners, such as for operations and maintenance, or incremental capital expenditures; or b) any additional wholesale market revenues from energy and ancillary services (EAS) provided. NYISO's net revenue analysis suggests that GFC costs and EAS revenues for older gas turbines in NYC may be roughly equivalent.[9] If true, then the capacity payments shown here are roughly indicative of the profits received by the plant owner.

*Impact on Clean Energy Alternatives*

The NYISO Capacity Market is intended to ensure reliability of the grid by providing an incentive for either existing generation to be maintained or as a means to attract new investment. To the extent that payments are being made to existing fossil fueled generators like those analyzed here, these dollars are not going towards new investment in new, potentially clean energy resources like battery storage and off-shore wind. Additionally, continued support for fossil generation in the form of capacity payments helps to create situations in which new cleaner resources are unable to interconnect due to space limitations on the power grid.

[9] See page A-207 of NYISO's 2018 State of the Market report: https://www.potomaceconomics.com/wp-content/uploads/2019/05/NYISO-2018-SOM-Report__Full-Report__5-8-2019_Final.pdf

## ABOUT THE PEAK COALITION MEMBERS

### Clean Energy Group

Clean Energy Group (CEG) is a national, nonprofit advocacy organization working on innovative policy, technology, and finance strategies in the areas of clean energy and climate change. Since 1998, CEG has promoted effective clean energy policies, developed new finance tools, and fostered public-private partnerships to advance clean energy markets that will benefit all sectors of society for a just transition. CEG serves as a leading national proponent of battery storage and solar to replace fossil-fueled power plants, providing economic analysis on the economics of peaker plant replacement. Over the past several years, CEG's Resilient Power Project has been primarily focused on supporting solar-plus-storage development in disadvantaged communities, supporting solar-plus-storage projects in more than 60 communities nationwide. CEG has also worked on state energy storage policy and large-scale battery storage deployments. www.cleanegroup.org

### New York Lawyers for the Public Interest

New York Lawyers for the Public Interest (NYLPI) is a not-for-profit law firm founded in 1976 to help protect civil rights and achieve lived equality for communities in need. NYLPI combines the power of law, organizing, and the private bar to make lasting change where it's needed most. Staff attorneys, community organizers and advocates provide direct representation, advocacy and assistance to low-income New Yorkers in the areas of disability justice, environmental justice, health justice, immigrant justice, and community justice. NYLPI has used its legal and policy expertise in tandem with organizing and community partnerships for over two decades to address disproportionate environmental burdens in New York City's low-income communities of color. NYLPI brought a challenge to the development and siting of new peaker plants in the early 2000s, and is currently deeply engaged in local climate and renewable energy policy with a focus on environmental justice. www.nylpi.org

### NYC Environmental Justice Alliance

Founded in 1991, the New York City Environmental Justice Alliance (NYC-EJA) is a nonprofit citywide network linking grassroots organizations from low-income communities of color in their struggle for environmental justice. NYC-EJA integrates groundbreaking research, robust advocacy campaigns, policy analysis, and technical assistance for our members and allies. Many of NYC-EJA's campaigns focus on energy-related advocacy and planning by providing support to the local struggles of our members who are advocating for the displacement of polluting infrastructure from their communities. NYC-EJA also works with its members to concurrently develop renewable energy opportunities that optimize local health and economic benefits. NYC-EJA is committed to advancing energy resilience and just transitions in the energy sector through our leadership in power building efforts at both City and State levels. www.nyc-eja.org

### THE POINT CDC

THE POINT CDC is dedicated to youth development and the cultural and economic revitalization of the Hunts Point Peninsula of the South Bronx. After Superstorm Sandy, THE POINT mobilized elected officials, businesses, labor groups, and residents to inform the creation of the Hunts Point Lifelines Plan focused on building climate resilience. This input led Lifelines to receive a $20 million Rebuild by Design award from HUD and $25 million from the City towards the development of renewable, resilient energy systems and stormwater management infrastructure in Hunts Point. Additionally, THE POINT is currently in the pre-development stage for what will be one of the largest community solar projects in New York State with support from the New York State Energy Research Development Authority (NYSERDA). www.thepoint.org

### UPROSE

Founded in 1966, UPROSE is an intergenerational, multi-racial, nationally-recognized community organization that promotes sustainability and resiliency in the Sunset Park neighborhood through community organizing, education, indigenous and youth leadership development, and cultural/artistic expression. In the aftermath of Super-storm Sandy, UPROSE has established the Sunset Park Climate Justice Center, focused on engaging community residents and businesses to generate grassroots-led climate adaptation and community resiliency planning. For a quarter-century, UPROSE engages in advocacy around the siting and deployment of polluting power plants and the development of alternatives. UPROSE is also currently developing New York's first cooperatively-owned solar project. www.uprose.org

# DIRTY ENERGY, BIG MONEY

The PEAK Coalition—UPROSE, THE POINT CDC, New York City Environmental Justice Alliance (NYC-EJA), New York Lawyers for the Public Interest (NYLPI), and Clean Energy Group (CEG)—has come together to end the long-standing pollution burden from power plants on the city's most climate-vulnerable people. This Coalition will lead the first comprehensive effort in the US to reduce the negative and racially disproportionate health impacts of a city's peaker plants by replacing them with renewable energy and storage solutions. Our collaboration brings technical, legal, public health, and planning expertise to support organizing and advocacy led by communities harmed by peaker plant emissions. Together with communities, we are advocating for a system of localized renewable energy generation and battery storage to replace peaker plants, reduce greenhouse gas (GHG) emissions, lower energy bills and make the electricity system more resilient in the face of increased storms and climate impacts.

More information about the PEAK Coalition can be found here:
www.peakcoalition.org

CleanEnergyGroup
Innovation in Finance, Technology & Policy

NEW YORK CITY ENVIRONMENTAL JUSTICE ALLIANCE N·Y·C E·J·A 19 91

NYLPI
JUSTICE THROUGH COMMUNITY POWER

THE POINT CDC WHERE COMMUNITY AND CREATIVITY CONNECT

UPROSE