The Health and Environmental Justice Impacts from Peaker Power Plants in Boston, Philadelphia, and Detroit

August 16, 2022
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Clean Energy Group (CEG) works at the forefront of clean energy innovation to accelerate an equitable and inclusive transition to a resilient, sustainable, clean energy future.

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WEBINAR SPEAKERS

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Project Director, Clean Energy Group

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President and Executive Director, Clean Energy Group
Why this report?
Health Findings
City Highlights
Why this report?

1) Fossil peakers are some of the dirtiest plants on the grid and they disproportionately impact low-income communities and communities of color.

2) Because peakers are usually located near load, there tend to be more in urban areas.

3) New York City’s PEAK Coalition has proven that data-driven community-led efforts can be successful.
# Table 1
Peaker Distribution and Emissions: Low-Income Percentiles

<table>
<thead>
<tr>
<th>Percentile</th>
<th>Number of peakers</th>
<th>Population within a 3-mile radius</th>
<th>Low-income percentage of population</th>
<th>Average nitrogen oxide (NOx) emission rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–25th</td>
<td>86</td>
<td>2.3 million</td>
<td>0–16%</td>
<td>9.9 lb/MWh</td>
</tr>
<tr>
<td>25th–50th</td>
<td>307</td>
<td>13.1 million</td>
<td>16–29%</td>
<td>12.0 lb/MWh</td>
</tr>
<tr>
<td>50th–75th</td>
<td>538</td>
<td>28.6 million</td>
<td>29–46%</td>
<td>19.5 lb/MWh</td>
</tr>
<tr>
<td>75th–100th</td>
<td>217</td>
<td>12.3 million</td>
<td>46–100%</td>
<td>16.2 lb/MWh</td>
</tr>
</tbody>
</table>

Two-thirds of peaker power plants in the U.S. are located near communities with a higher percentage of low-income households than the national average, represented by populations where at least 29 percent of household incomes are less than or equal to twice the federal poverty level. On average, nitrogen oxide emissions rates are higher for peakers located near these lower-income populations. These findings are based on Clean Energy Group analysis of data from the U.S. EPA’s Power Plants and Neighboring Communities mapping tool.

**Source:** Clean Energy Group

[cleanegroup.org/webinar/peaker-mapping-tool](http://cleanegroup.org/webinar/peaker-mapping-tool)
### Table 2

**Peaker Distribution and Emissions: People of Color Percentiles**

<table>
<thead>
<tr>
<th>Percentile</th>
<th>Number of peakers</th>
<th>Population within a 3-mile radius</th>
<th>People of color percentage of population</th>
<th>Average nitrogen oxide (NOx) emission rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–25th</td>
<td>346</td>
<td>2.9 million</td>
<td>0–13%</td>
<td>14.6 lb/MWh</td>
</tr>
<tr>
<td>25th–50th</td>
<td>304</td>
<td>8.0 million</td>
<td>13–31%</td>
<td>16.4 lb/MWh</td>
</tr>
<tr>
<td>50th–75th</td>
<td>348</td>
<td>28.3 million</td>
<td>31–65%</td>
<td>14.2 lb/MWh</td>
</tr>
<tr>
<td>75th–100th</td>
<td>150</td>
<td>17.1 million</td>
<td>65–100%</td>
<td>23.8 lb/MWh</td>
</tr>
</tbody>
</table>

The majority of Americans impacted by peakers live in communities with higher percentages of people of color. Some of the country's most racially diverse communities, where at least 65 percent of the population identifies as a race other than non-Hispanic White, are disproportionately subject to higher levels of toxic peaker emissions than other communities, with nitrogen oxide emissions rates that average more than 60 percent higher than populations with low percentages of people of color. These findings are based on Clean Energy Group analysis of data from the U.S. EPA's Power Plants and Neighboring Communities mapping tool.

**Source:** Clean Energy Group

[cleanegroup.org/webinar/peaker-mapping-tool](http://cleanegroup.org/webinar/peaker-mapping-tool)
In New York City, peaker plants were contributing 94 percent of the state’s NOx emissions on high ozone days despite providing as little as 36 percent of the gross energy load.
PM2.5
2.5 micrometers in diameter

Human Hair
50-70 micrometers in diameter

Alveoli
200 micrometers in diameter
American Lung Association – Zeroing in on Healthy Air
2020-2050 Impacts

Boston metro area: **2,070 avoided premature deaths**, $22.7 billion in health benefits

Philadelphia metro area: **3,760 avoided premature deaths**, $41.1 billion in health benefits

Detroit metro area: **2,690 avoided premature deaths**, $29.2 billion in health benefits
Fossil Peakers in the United States by ISO

This map shows all of the peaker plants across the U.S., with ISO territories shown on the base map. Size indicates the capacity of the plant (larger circles mean higher generating capacity). The colors indicate the capacity factor, or utilization. The closer to red a circle is, the lower its utilization. This is one factor that can be used to identify peakers that can technically be replaced by non-combustion alternatives. SOURCE: STRATEGEN
All Boston metro peakers

Source: Strategen

Boston high-impact peakers

Source: CleanEnergy Group
Boston – M Street Jets

Photo: Google Earth
All Philadelphia metro peakers

Philadelphia high-impact peakers

Source: Strategen
Philadelphia – Schuylkill Combustion Turbine

Photo: Google Earth
All Detroit metro peakers

Detroit high-impact peakers

Source: Strategen
Detroit – Dearborn Industrial Generation Gas Turbine

Photo: Google Earth
Inflation Reduction Act?

Tax credits for battery storage

Direct pay option for certain tax-exempt entities such as states and political subdivisions

Transfer of credits to another taxpayer

How can this report help?

Identification of the peakers located closest to low-income communities and communities of color in Boston, Philadelphia, and Detroit

Sharing of the tools, data sources, and strategies for identifying dirty peakers impacting these vulnerable communities in other locations
Shelley Hudson Robbins
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ERIN CHILDS
Director

+ Leads projects relating to emerging technology commercialization, economy-wide decarbonization, and stakeholder engagement.
+ Provides deep expertise in long-duration energy storage, green hydrogen, and urban clean energy planning.
+ Previously worked at SoCal Edison on topics including energy market strategy, clean energy policy, utility decarbonization, and utility business model.
+ B.A. in Mathematics & Environmental Economics from Pomona College.

ELIASID ANIMAS
Consultant

+ Works on policy and business strategy leveraging experience on energy storage, peak energy, DER integration and resource adequacy.
+ Previous work as a consultant across the development sector focused on city planning, mobility and energy efficiency.
+ B.A. in City and Regional Planning from UNAM.

Strategen is a globally connected, impact driven firm on a mission to decarbonize energy systems.
Peaker retirement creates both market and non-market benefits

+ **Health & Mortality Benefits**
  - Local emissions from the peaker fleet in NYC cost the State an estimated $43 million annually (increasing to $50 million by 2030)

+ **Climate Change Mitigation**
  - CO2 emissions of the peaker fleet cost the world about $332 million annually (increasing to $377 million by 2030)

+ **Resiliency**
  - Potential to prevent up to $2.5 billion in business interruption losses in a super storm event (like Sandy)

+ **Job Creation**
  - Jobs per MW of energy capacity are significantly higher for storage and DER than for traditional peaker plants.

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**Energy Storage Cost Effectiveness**

- Health & Mortality Benefits
- Climate Change Mitigation
- Resiliency
- Job Creation
- Energy Market Revenues

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**Not all benefits are captured in traditional energy cost-effectiveness tests**
Storage is a must-have to replace peakers

- Storage has faster ramping capabilities than peakers to integrate renewables.
  - Can integrate intermittent resources and avoid unnecessary use of fossil fuel power plants.

- Storage has a small physical footprint, perfect for urban areas.
  - Can help alleviate load pocket constraints without producing local emissions.
  - Can be deployed in diverse configurations, from residential and community to utility scale.

- Storage can provide faster response voltage and local reliability services.
  - Faster response services can improve the quality of regulation and voltage support, specially at the distributed level.

Energy storage can address grid services historically provided by peakers.
What we're seeing now: urban storage applications

New York City
LS Power's 316 MW (8-hr) battery to replace Ravenswood oil and gas peaker plant
- Expected to be online 2022-2024
- Approved & waiting contractor

Los Angeles
SoCal Edison is using 195 MW of 4-hr batteries to replace Puente Gas Power Plant (262 MW)
- Decision followed the push-back of community & environment advocates

The Bay Area
East Bay CCA replaces Oakland peaker with 20 MW (4-hr) battery and home solar+storage
- 2 MWh of batteries on 500 low-income units in the area before 2022.

Backed by renewables, storage is already replacing urban peakers around the country
Strategen and CEG used a top-down approach to quantify the impact of peakers across the country

+ About 217 GW of fossil-fueled peaker capacity.
+ Utilized ~5% of the time.
+ Causing disproportionate damage to communities.
+ Emit close to 42,000 metric tons of NO\textsubscript{X} and 7,000 metric tons of SO\textsubscript{2} every year.
+ Almost 32 million people living up to three miles from a peaker.

70% of the peaker plants in the U.S. are located close to or within an urban area
Peaker evaluation Methodology leveraged publicly available data

Define Peaker plants

Use publicly available data to locate them and quantify their impacts

Use demographic data to characterize impacted communities

Identify cities or communities of interest

Look for replacement opportunities based on peaker characteristics, operations permits, local policy and market rules.

There are multiple paths to replace polluting power plants, so local action is needed to identify and carry on a replacement plan.
Case Studies: Community Action

Marriele Mango, Clean Energy Group
"I've been going door-to-door and pointing to the smokestack next to where the current peakers are. Until this winter, when the site was clear cut, the generators were hidden from view. People seemed oblivious to what's there, what they're building, and how it will impact them."
— Susan Smoller, Breathe Clean North Shore member
GreenRoots Chelsea:
- 2007: Coalition that stopped the development of a 250-megawatt diesel-powered peaker power plant.
- Opposition focused on the impact peaker emissions would have on air pollution and health in a community already suffering with high asthma rates —Chelsea has the fourth highest asthma rate in the state.

Breathe Clean North Shore
- Opposition group formed against Peabody Peaker - gas and oil-fired peaker would be sited near two existing peakers located in an EJ community within Peabody.
- 2022 analysis by CEG and Strategen found “energy storage is not only a viable replacement option for the needed capacity but is also preferable from an environmental perspective and results in significant benefits for consumers, including cost savings and environmental justice issues.”
MCAN:
- Opposed Mass peakers – including Peabody Peaker - in statewide forums and published articles
- Demands environmental and health impact assessments of peakers

Slingshot:
- Supporting BCNS in developing a campaign strategy, outlining tactics, and expanding their reach through rallies, petition drives, and webinars.
- Broader efforts to overhaul the regional energy grid through the Fix the Grid campaign.
Philadelphia

Featured Group:
Clean Air Council

“…we must rapidly transition away from using fossil fuels for generating power and on to renewable energy supported by things like battery storage, energy efficiency, and smart programs that balance energy supply and demand.”

— Matt Walker, Advocacy Director, Clean Air Council
CAC supports community-based organizations in their efforts to:

- Oppose Invenergy’s proposal to build the Allegheny Energy Center, a 639-megawatt gas-fired power plant in Elizabeth Township in southwest PA.

- Oppose building a new 1,026-megawatt gas-fired power plant in Renovo, an environmental justice community in central PA.

- Advocate for a new health risk assessment requirement for major sources of air pollution in Philadelphia – one that includes cumulative risks of pollution from these facilities on air quality and public health.
Detroit

Featured Group:
Michigan Environmental Justice Coalition
Soulardarity
Highland Park Crisis Coalition

“We need state policies that slash toxic emissions by accelerating plant closures in EJ communities, prohibiting the construction of new gas-fired power plants, and supporting community owned renewables.”
— Bridget Vial, Energy Democracy Organizer, MEJC
Michigan Environmental Justice Coalition:
- Works to expose the cumulative impacts of emissions on environmental justice communities.
- Helped launch “Work for me DTE!” campaign with EJ groups mobilized community members in opposition to DTE’s 15-year Integrated Resource Plan, leading with a vision of a healthy, affordable, and community-based energy system.

Soulardarity:
- Builds community awareness about energy-related health concerns.
- Implements clean energy strategies, oftentimes as part of a broader coalition of nonprofit organizations, citizen-led groups, and city agencies.
- Member of the Highland Park Crisis Coalition - works to uplift and empower Highland Park residents through social, economic, and ecological justice.
Lessons Learned: New Orleans

Featured Group:
Together New Orleans
Feed the Second Line
Alliance for Affordable Energy

“"The 2021 and 2022 hurricane seasons put a spotlight on how vital resilient energy solutions are, as the leading cause of death for both years was loss of grid power, both directly due to extreme heat impacts and from carbon monoxide poisoning when families turned to fossil fueled generators. It is time to follow community leaders who know what they need to stay safe.”

— Logan Burke, Executive Director, Alliance for Affordable Energy
Timeline:

Community led opposition against proposed 126 MW gas plant in New Orleans

CEG supported independent analysis from Strategen that stated s+s could provide same services to the grid and would cost significantly less than the gas plant over time – with no emissions.

City Council approved plant - sold on Entergy’s claim that the peaker would be able to jump-start the grid in the event of a grid outage

The first major storm to hit after the completion of the New Orleans Power Station, Hurricane Ida —the peaker plant failed to come online.
Contact

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Thank you for attending our webinar

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- Advancing Solar for Manufactured Homes through Community Solar (9/14)

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