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Cap and Trade: More Pollution for the Poor and People of Color

Food & Water Watch examined the environmental justice impacts of the Regional Greenhouse Gas Initiative (RGGI), a market-based cap and trade program encompassing nine Northeastern and Mid-Atlantic states that purports to reduce carbon dioxide (CO₂) emissions from power plants. Lower-income communities and communities of color, already overburdened by the disproportionate number of polluting facilities located in their communities, often lack the political influence to combat these inherently unfair market-based schemes. Under cap and trade, polluters are allowed to continue — or even increase — emissions that are hazardous to human health and the environment. An analysis by Food & Water Watch confirms that pollution trading schemes like RGGI compound the toxic burdens on disadvantaged communities.

Under RGGI, each state places an industry-wide “cap” on CO₂ emissions from power plants and then auctions off a set number of “allowances” to polluters based on this steadily reducing cap. Power plants must hold one allowance for each ton of generated CO₂ emissions in order to be considered in compliance with the program. Power plants can also choose to bank excess allowances for future use or sell them to other polluters.¹

Food & Water Watch analyzed the communities that experienced either aggregate increases or decreases

in CO₂ and toxic fine particulate matter (PM_{2.5}) emissions from RGGI power plant facilities by comparing the average change in emissions from 2011-2013 to 2014-2016, before and after a reduction in the RGGI cap. The results of the analysis found that:

- RGGI operates in areas with extreme underlying environmental justice disparities — areas with RGGI power plants had disproportionately more people of color, more poverty, lower incomes and lower rates of educational attainment than areas without RGGI power plants.

- Neighborhoods that experienced CO₂ emission increases over the study period had disproportionately more people of color, more poverty and lower median household incomes compared to neighborhoods that experienced decreases in CO₂ emissions.
- Neighborhoods that experienced increases in both CO₂ and PM_{2.5} emissions over the study period displayed even wider disparities — with higher proportions of people of color and lower median household incomes — compared to neighborhoods that experienced decreases in both of these pollutants.

These results provide concrete evidence that cap and trade programs like RGGI disproportionately harm people of color and low-income communities, exacerbating underlying disparities such as the concentration of polluting facilities in vulnerable neighborhoods.

Cap and Trade Puts Profits Over People

Cap and trade schemes are commonly proposed by those who oppose directly regulating pollution and instead advocate for a more “free market” approach to environmental problems. This pay-to-pollute scheme is a radical shift in how environmental regulation works. Traditional environmental regulation relies on permission, prohibition, standard setting and enforcement to meet environmental ends.² Under a regulatory approach, pollution limits are set based on a comprehensive and periodic review of the scientific literature so that they adequately protect public health and welfare, as outlined by environmental laws like the Clean Air Act.³ In contrast, cap and trade attempts to create markets in actual or potential

pollution so that polluters can efficiently allocate pollution control costs — firms that can easily reduce their pollution sell their credits to firms that cannot.⁴ As a result, financial incentives drive pollution control rather than strict standards for protecting human health and the environment.

Cap and trade programs have been implemented for a number of pollutants, ranging from greenhouse gases to nutrient pollution in water. One such program is the Regional Greenhouse Gas Initiative

(RGGI) that encompasses 9 (soon to be 10, with New Jersey re-joining in 2020) Northeast and Mid-Atlantic states. Like other cap and trade programs, RGGI is a market-based, pay-to-pollute scheme that permits pollution increases under the guise of market efficiency. Proponents claim that RGGI allocates pollu-

Toxic emissions from industrial facilities and power plants impose an unequal pollution burden on socially and economically disadvantaged communities, including communities of color and lower-income, less-educated and rural communities.

tion control to the polluters who can most afford it.⁵ However, Food & Water Watch’s analysis found that the program only masks disproportionate negative impacts on low-income communities and people of color.

Pollution Trading Compounds Environmental Injustice

Polluting facilities like power plants have long been disproportionately located near disadvantaged communities, including lower-income areas and communities of color that face higher pollution burdens than their more affluent and whiter neighbors. Toxic emissions from industrial facilities and power plants impose an unequal pollution burden on socially and economically disadvantaged communities, including communities of color and lower-income, less-educated and rural communities. Decades of academic studies and reports have

repeatedly found that exposure to pollution from petroleum refineries, power plants, garbage incinerators and toxic facilities disproportionately affects these disadvantaged communities.⁶

Marginalized communities often lack the resources or political power to ward off unwanted polluters, including toxic waste dumps, industrial facilities and power plants.⁷ Indeed, the racial composition of neighborhoods can be a strong predictor of where polluters locate their facilities, compounding the historical discriminatory zoning and land-use policies and practices that reinforced racial segregation.⁸ A 2005 study found that hazardous waste facility siting has followed a “path of least (political) resistance” for decades; as a result, disempowered communities have “borne a disproportionate share of the society’s environmental burdens.”⁹

Research has shown that cap and trade hurts vulnerable populations by incentivizing emission increases in frontline communities, undermining environmental justice and exacerbating the disproportionate burdens that these communities already bear. Air and water quality trading programs that target specific pollutants (such as carbon dioxide, CO₂) often overlook the localized impacts of multi-pollutant emissions from power plants or factories. These trading programs allow polluters to buy credits to increase their overall emissions of tradeable pollutants (like CO₂), but result in increased local concentrations of non-tradeable pollutants (such as particulate matter, ozone or heavy metals) that create hotspots that can harm human health and the environment.¹⁰

For example, in 2018 scientists found that facilities in California’s cap and trade program for greenhouse gases, which were predominantly located in vulnerable neighborhoods, exposed local populations to increased emissions from toxic co-pollutants like particulate matter, volatile organic compounds and more. And while statewide greenhouse gas emissions remained below the overall cap, more than half the facilities involved actually increased their greenhouse gas emissions since the program began in 2013. Alarming, neighborhoods that saw increasing pollution from California’s cap and trade facilities had larger shares of people of color and economically and

socially disadvantaged residents compared to areas that saw a decrease in greenhouse gas emissions.¹¹

Similarly, water pollution trading schemes have also been shown to have environmental justice implications. Chalk Point Generating Station is a massive coal-burning power plant near the predominantly African-American town of Eagle Harbor in Prince George’s County, Maryland.¹² Chalk Point racked up significant permit violations for pollutant discharges into the nearby Patuxent River. But instead of reducing discharges to comply with its permit, the plant proposed to buy “credits” from Maryland farms to raise its pollution allowance and cover its violations.¹³

While this trade would not have increased pollution into the Chesapeake Bay, it would have concentrated pollution discharges into the Patuxent and increased exposures for Eagle Harbor’s African-American residents. Food & Water Watch and the Patuxent Riverkeeper intervened in a lawsuit to prevent Chalk Point from including this trade in its pollution plan.¹⁴ The lawsuit successfully forced Chalk Point to implement technological upgrades to minimize discharges and prevented the power plant from using credits and offsets to poison Eagle Harbor and the local environment.¹⁵

Cap and Trade Harms Public Health

Power plants emit more than the handful of pollutants that are targeted by cap and trade schemes. That is why the disproportionate siting of hazardous power plants in low-income and minority communities exposes vulnerable groups to serious environmental health risks associated with harmful pollutants.

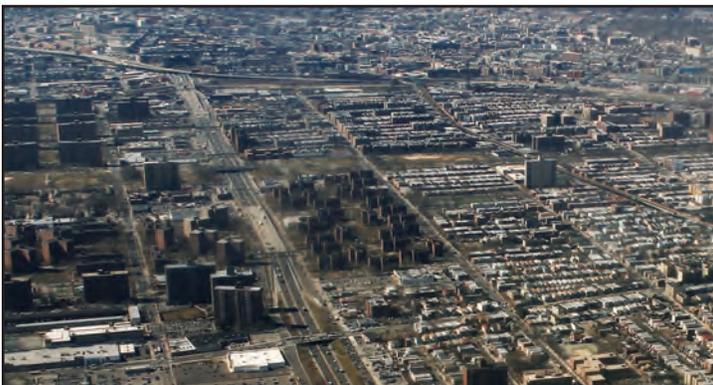
Power plants release air pollutants like mercury, particulate matter, sulfur dioxide (SO₂) and nitrogen oxides (NO_x).¹⁶ Exposure to these harmful air pollutants has been linked to a host of health complications including respiratory infections, certain types of cancer, bronchitis, asthma, heart disease and reduced life expectancy.¹⁷ Fine particulate matter (PM_{2.5}) is an especially harmful pollutant. Because PM_{2.5} is extremely small in size, these particles can easily travel deep into the lungs and bloodstream of

exposed individuals. $PM_{2.5}$ is associated with many harmful health effects including airway inflammation, asthma, lung infections, hypertension, cardiovascular diseases, diabetes and adverse effects in infants.¹⁸

Low-income and minority communities suffer disproportionate health consequences due to $PM_{2.5}$ exposure. African Americans are more likely to live in areas with the worst $PM_{2.5}$ levels than in areas with the best air quality,¹⁹ which compounds pre-existing racial health inequalities. Lower-income African-American children have a higher asthma risk than white children,²⁰ and African Americans suffer higher rates of hypertension and premature death from stroke compared to whites.²¹ There are about four times more $PM_{2.5}$ -related emergency room visits for asthma in high-poverty neighborhoods than in low-poverty neighborhoods.²²

Environmental justice communities bear the brunt of harmful health consequences through disproportionate siting decisions; RGGI could make it worse. A 2005 study of hazardous facility siting in Maryland found that communities with the highest proportion of African-American residents were three times more likely to face a high cancer risk due to air pollution exposure compared to communities with the lowest proportion of African-American residents.²³ In New York's Bronx County, people of color are exposed to 57 percent more air pollutants per mile than white county residents.²⁴

The well-documented history of unjust siting decisions is exacerbated by RGGI's flawed market-based design, which sets a cap on CO_2 emissions but fails to consider the dangerous health effects of co-pollutants that are released along with them.



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The Many Problems With RGGI

The RGGI cap and trade program rests on the myth that market forces can deliver the most effective and efficient solutions to societal problems. Programs like RGGI claim to reduce CO_2 emissions by allowing polluters to buy and sell pollution credits based on an industry-wide limit, or “cap,” on total allowable pollution. But there is no evidence that these programs significantly reduce carbon emissions; instead, they give polluters the right to continue — or even increase — polluting.

RGGI's inherently flawed and harmful approach has not been proven to reduce CO_2 emissions and has likely encouraged the shift to natural gas-fired power plants, increasing dependence on gas from the hydraulic fracturing (or fracking) of methane-rich shale formations. While RGGI claims the program brought about a 50 percent reduction in power sector CO_2 emissions since 2005, much of this is due to the transition to natural gas, a fossil fuel that primarily comprises methane.²⁵

The greenhouse gas methane is nearly 90 times more powerful at trapping heat than CO_2 over the short term and has become an increasingly important climate pollutant, with global increases in fossil fuel emissions now being driven primarily by emissions from shale gas.²⁶ Methane leaks, including those from natural gas power plants, contribute to climate change and are not captured under the RGGI program.²⁷ Science shows that even some of the lowest leak rates erase natural gas' purported “climate benefits.”²⁸

From the outset, RGGI has proven to be a weak program that allows power plants to pollute on a lax, business-as-usual basis. For the first five years of the program, the industrywide cap was on average about 60 percent higher than actual emissions.²⁹ This meant fossil fuel power plants did not need to do anything to meet the overly generous RGGI cap. In fact, this high initial cap allowed power plants to “bank” a substantial amount of unused allowances, amounting to 140 million tons of CO_2 . While the cap was eventually adjusted to address these saved allowances, this allowance surplus could continue to grow significantly

over the next few years due to a cap that continues to be higher than actual emissions, the purchasing of all available allowances, cost containment mechanisms and other factors.³⁰

In another sign of RGGI’s ineffectiveness, the program’s seemingly most attractive feature as a state revenue raiser for clean energy and affordability initiatives has consistently been undermined. States regularly raid these funds to reduce budget deficits. New Jersey has been the worst offender in this regard. While New Jersey was in RGGI from 2009 to 2011, \$65 million, or 57 percent of the money raised from the sale of allowances during this period, was redirected to allay the state budget deficit.³¹

These significant deficiencies show that cap and trade is ineffective at best. At its worst, cap and trade harms vulnerable communities. Food & Water Watch has shown that these unbalanced transactions are an inherent symptom of ineffective market-based policies that put industry profits ahead of public health and the environment.³²

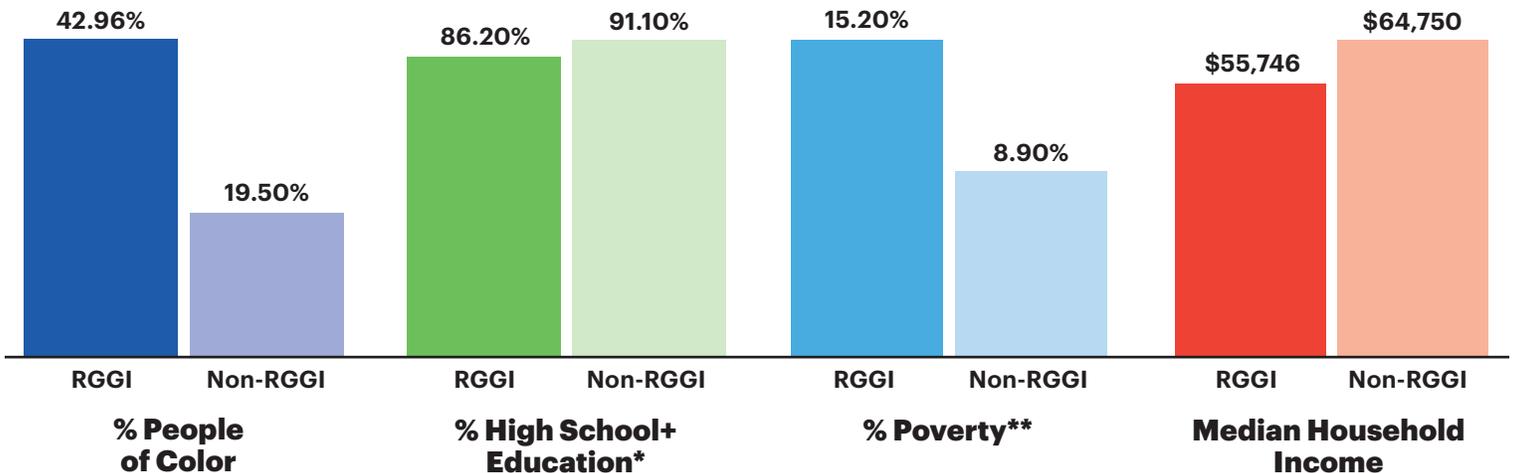
Key Findings

Food & Water Watch analyzed the locations of the power plants that participated in RGGI and compared the differences in demographics of neighborhoods that experienced an aggregate increase in average CO₂ and PM_{2.5} emissions to those that experienced an aggregate decrease in average emissions from

2011-2013 to 2014-2016, before and after a reduction in the RGGI cap. The findings indicate underlying environmental justice disparities in the placement of power plants, which are disproportionately located in poorer, less-educated neighborhoods and in communities of color. Furthermore, neighborhoods that experienced CO₂ emission increases under this program have lower median household incomes and higher proportions of people of color than areas that saw decreases in these CO₂ emissions. This disparity widened even further when the analysis included changes in both CO₂ and PM_{2.5} emissions.

Finding 1: RGGI facilities are disproportionately located in more disadvantaged communities. The starkest environmental justice disparity exists from the disproportionate placement of power plants in vulnerable communities, a widespread trend that has long existed and is also true for the RGGI region. Food & Water Watch found that RGGI facilities are located in neighborhoods with higher proportions of people of color, lower proportions of high school graduates, more poverty and lower median household incomes than areas that contain no RGGI power plants. This problem is not limited to RGGI — it exists nationwide.³³ But these findings show that cap and trade schemes like RGGI not only operate in vulnerable neighborhoods already experiencing environmental injustice, but, as the subsequent analyses reveal, serve to *exacerbate* these preexisting inequities (see Fig. 1).

FIG. 1: RGGI vs. Non-RGGI Census Tracts



All values are medians of census tracts based on data from the American Community Survey 2012-2016 five-year estimates.

* High School+ refers to the percentage of people older than 25 years who have a high school education or higher

** Poverty refers to the percentage of people living below the federal poverty level.

Finding 2: CO₂ emission increases from RGGI facilities occurred in areas with disproportionately more people of color and poverty and lower median household incomes. In other words, the characteristics of neighborhoods that experienced increases in aggregate CO₂ emissions after the cap was lowered had much higher proportions of people of color, as well as slightly higher proportions of poverty and lower median household incomes than neighborhoods that experienced decreases in aggregate CO₂ emissions during the same period of time. A pattern was not as strongly discernable for education (see Fig. 2 on page 6).

characterized by even higher proportions of people of color and lower median household incomes. When taking into account PM_{2.5} emissions, the environmental justice disparity widens further. Neighborhoods that experienced aggregate increases in *both* CO₂ and PM_{2.5} had even higher proportions of people of color and lower median household incomes than those that experienced aggregate decreases in both these emissions. Trends also indicate that increased emissions of CO₂ and PM_{2.5} occurred in areas that had slightly less educational attainment and slightly more poverty than areas that experienced an overall decrease in these emissions. These patterns underscore the potential health impact of programs like RGGI in vulnerable communities (see Fig. 3).

Finding 3: Neighborhoods that experienced increases in both CO₂ and PM_{2.5} emissions were

FIG. 2: CO₂ Emissions Increases vs. Decreases in RGGI Neighborhoods

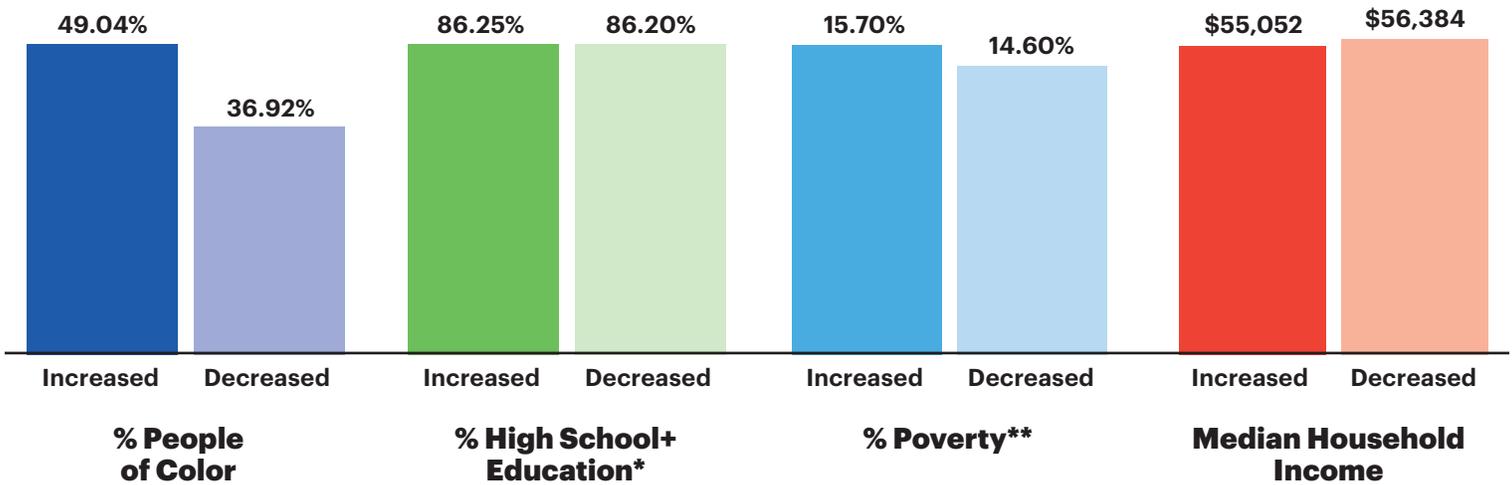
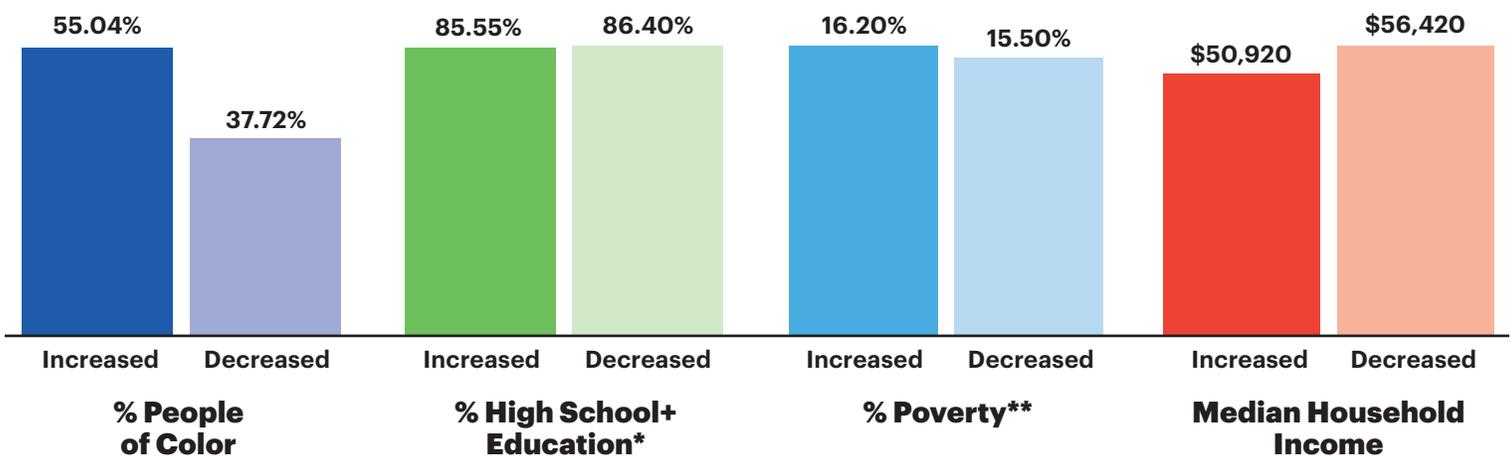


FIG. 3: CO₂ and PM_{2.5} Emissions Increases vs. Decreases in RGGI Neighborhoods



All values are medians of census tracts based on data from the American Community Survey 2012-2016 five-year estimates.

* High School+ refers to the percentage of people older than 25 years who have a high school education or higher

** Poverty refers to the percentage of people living below the federal poverty level.

Conclusion

Cap and trade schemes harm environmental justice and are not sufficient replacements for regulation. Food & Water Watch's analysis of the environmental justice implications of RGGI highlight the stark disparities in the types of neighborhoods that experience increases and decreases in CO₂ and PM_{2.5} emissions, providing concrete evidence that ineffective market-based programs like cap and trade hurt vulnerable communities. The environmental injustice of RGGI is not a fluke, but rather an inherent symptom of market-based programs that value profits over people and the environment.

As the effects of climate change worsen, states have been increasingly viewing schemes like RGGI as a way to combat greenhouse gas emissions. New Jersey will officially re-join the program at the start of 2020.³⁴ Pennsylvania Governor Tom Wolf issued an executive action to initiate the process of joining the program.³⁵ But those who look to RGGI to help solve the climate crisis will be sorely disappointed. The only real way to protect environmental justice communities and combat intensifying climate change is through bold, systemic change.

Continued investments sunk into fossil fuel infrastructure harm vulnerable populations and lock us into a dirty energy future in defiance of climate science. The way out must be an immediate end to the use of fossil fuels and a rapid shift to zero-emission, genuine renewable power, accompanied by widespread deployment of energy efficiency measures and battery storage. The goal of 100 percent clean, renewable energy by 2030 is achievable. We must demand strong government policies that reject market-based schemes and commit to aggressive action now.

Methodology

Data Sources

Facility and carbon emissions data were downloaded from the RGGI website. Facility location data were obtained from the U.S. Energy Information Administration and crosschecked with Google Maps, the U.S. Environmental Protection Agency's

(EPA) ECHO database and company websites. PM_{2.5} data were downloaded from the U.S. EPA's National Emissions Inventory (NEI) website. Crosswalks between the two datasets were provided by the U.S. EPA. Demographic data (race, education, poverty and median household income) were obtained from the 2012-2016 five-year American Community Survey. Race variables were non-Hispanic whites and people of color (defined as all others: total population minus non-Hispanic whites).

Analysis

The analysis was based on Cushing et al. (2018), which examined the neighborhood characteristics surrounding facilities that chose to increase or decrease their carbon and particulate matter emissions while participating under the California cap and trade program. Specifically, Cushing et al. aimed to determine whether there was a relationship between neighborhood demographics and facilities that on average increased or decreased their carbon emissions after the initiation of the cap and trade program.

This analysis uses a similar approach. To summarize, we took the three-year averages of the years before and after the reduction of the RGGI cap at the start of 2014. We chose to take three-year averages to account for year-to-year variability. We examined differences between the 2011-2013 and 2014-2016 periods rather than before and after the program's initiation to account for any variability due to the 2008 recession and to examine the impact of a lowered cap that more closely aligned with actual emissions.

Like Cushing et al., we calculated aggregate changes in emissions within a neighborhood that contained one or more RGGI facilities. A neighborhood is defined as the grouping of census tracts whose centroids (mid-points) fall within a three-mile buffer surrounding RGGI facilities. We defined neighborhoods based on census tracts because they contain around the same population sizes and because they are relatively small in area compared to other spatial units.³⁶ Centroid containment is a common technique used in environmental justice analyses. We chose to use a three-mile buffer since this fell within the range

used by many environmental justice studies, in addition to Food & Water Watch's environmental justice report, *Pernicious Placement of Pennsylvania Power Plants*.³⁷

Once we defined neighborhoods and linked them to aggregate emissions changes from their host facilities, we then combined this with demographic data. We did this by taking the median values of all census tract centroids that fell under the three-mile buffers around RGGI facilities that were labeled as either experiencing aggregate increases in average CO₂ emissions or aggregate decreases in average CO₂ emissions and had demographic data available from the American Community Survey.

The same analysis was done for the PM_{2.5} data. Because the NEI releases data every three years, we only had PM_{2.5} data for 2011 and 2014. We took the difference in emissions for these years for each RGGI facility and assigned the direction of change accordingly. We performed the same analysis for neighborhoods that experienced aggregate increases in both CO₂ and PM_{2.5} emissions and compared them to neighborhoods that experienced decreases in emissions of both these pollutants. Similarly, we calculated and compared median demographic values for census tracts/neighborhoods that did or did not fall under the three-mile buffers around RGGI facilities.

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