

# Preventing Increased Air Pollution in Pennsylvania's Environmental Justice Communities

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<https://doi.org/10.38126/JSPG180407>

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Keywords: environmental justice; air pollution; health disparities; climate policy; cap-and-trade; RGGI; Pennsylvania

**Executive Summary:** Air pollutants are known to cause serious health impacts, and historically marginalized groups are disproportionately exposed to these risks. Other hazardous pollutants often accompany carbon dioxide emissions during fossil fuel combustion, and therefore reductions in greenhouse gas emissions from climate policy can also improve air quality. However, although these policies may reduce pollution overall, existing programs have often increased local emissions levels – particularly in the most overburdened neighborhoods. The adverse health effects caused by a redistribution of emissions must be considered as Pennsylvania plans to join the Regional Greenhouse Gas Initiative. We recommend the Department of Environmental Protection include an annual impact assessment of their cap-and-trade program on vulnerable communities using both the available carbon dioxide emissions data and additional local air quality measurements.

## I. Statement of issue

### *i. Air pollution is particularly harmful to Environmental Justice communities*

Pennsylvania's long history of using coal and natural gas for power generation has not only contributed to carbon dioxide (CO<sub>2</sub>) pollution but has also expelled significant amounts of other pollutants (Clean Air Council, n.d.). These pollutants include NO<sub>x</sub>, SO<sub>x</sub>, VOCs, PM<sub>2.5</sub>, and air toxics<sup>1</sup>, and are known to contribute to adverse health effects (Clean Air Council, n.d.; Abelsohn and Stieb 2011; Wellbery 2017). Sources of air pollution are often located in resource-constrained and racially segregated areas, causing disproportionate health effects for marginalized groups ("Tracking and Evaluation of

Benefits and Impacts of Greenhouse Gas Limits in Disadvantaged Communities: Initial Report" 2017; California EPA 2017; Cushing et al. 2018; "Cap and Trade: More Pollution for the Poor and People of Color" 2019; FWW 2021; Miranda et al. 2011). These communities that face disproportionate exposure and increased vulnerability to environmental harms, including air pollution, are called overburdened communities or Environmental Justice (EJ) communities (US EPA 2016). Their well-being, in the context of new Pennsylvania (PA) climate regulations, is the focus of this analysis.

The negative health impacts of air pollution exposure can manifest more severely in individuals who are vulnerable due to extrinsic factors, such as ethnicity

<sup>1</sup>NO<sub>x</sub> (Nitrous Oxides), SO<sub>x</sub> (Sulfur Oxides), VOC (Volatile Organic Compounds), PM<sub>2.5</sub> (Particulate Matter 2.5 μm)

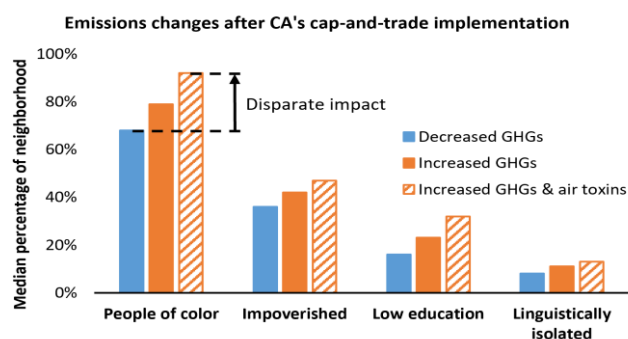
or socioeconomic status (Ostro et al. 2006; Solomon et al. 2012). For example, these vulnerable groups may have less access to preventative healthcare, to fresh food, and to residences located away from major emitters (Tung et al. 2017). As a result, overburdened communities experience short-term (exacerbation of pre-existing respiratory and cardiovascular conditions) and long-term (development of new respiratory and cardiovascular disease, harm to fetal development, and increased mortality) health impacts of air pollution (Abelsohn and Stieb 2011; Smith et al. 2013; Wellbery 2017; Backes et al. 2013). These underlying conditions are also co-morbidities of the current COVID-19 pandemic, putting additional strain on these communities (Wu et al. 2020). Even within regulatory limits, several of the air pollutants responsible for these negative health effects can have a quantifiable impact (Di et al. 2017). As these pollutants correlate with CO<sub>2</sub> emissions, it can be beneficial to address EJ air pollution concerns simultaneously with climate regulations targeting greenhouse gases (Cushing et al. 2018; Ostro et al. 2006; Burney 2020).

As Pennsylvania moves to enact a CO<sub>2</sub> Budget Trading Program and join the Regional Greenhouse Gas Initiative (RGGI), the state should consider strengthening the EJ considerations in the bill. Some states who already participate in RGGI have needed to take post-factum action to address an uneven air pollution reduction that has disadvantaged EJ communities. In the following sections, we discuss the implications of an inequitable cap-and-trade system, the current status of the rulemaking in question, and our recommendations for how to move forward in a just way.

#### *ii. Cap-and-trade systems could exacerbate disparities in air pollution exposure*

Cap-and-trade systems, such as RGGI, are a market-based tool for reducing anthropogenic sources of greenhouse gases in a particular region by setting a limit on CO<sub>2</sub> emissions and requiring emitters within that region to purchase an allowance for every unit of CO<sub>2</sub> that they emit. Allowances are either bought at regular auctions or traded between regulated facilities. By design, the total CO<sub>2</sub> emissions in a cap-and-trade region should decline with time, as was observed in the current RGGI states (RGGI 2019) and California (CA) (CARB 2019), which has its own cap-and-trade system. However, the redistribution of

emissions in a cap-and-trade region can lead to winners and losers at the local level. In fact, several studies on both the RGGI (Chan and Morrow 2019; FWW 2021; McKeown 2020) and CA (Cushing et al. 2018) cap-and-trade systems identified that emissions of CO<sub>2</sub> and its co-pollutants increased from many facilities near EJ communities after the introduction of the cap-and-trade system (Figure 1). We note that the literature on the EJ consequences of CA's cap-and-trade system is mixed, with other reports showing positive outcomes in the state (Hernandez-Cortes and Meng 2020) or being inconclusive (California EPA 2017).



**Figure 1:** Correlation between demographics and emissions changes after the implementation of California's cap-and-trade system. Data is from reference (Cushing et al. 2018) Table 3 on neighborhoods within 2.5 miles of a regulated facility. (GHGs = greenhouse gases)

Existing regulations and programs of the United States Environmental Protection Agency (EPA) are unlikely to mitigate disparate impacts resulting from a cap-and-trade system. As mandated by the Clean Air Act, the EPA regulates air quality across the country by setting national ambient air quality standards for criteria pollutants and monitoring pollution levels at state-operated air quality testing stations (CFR 40.50). However, the relatively low spatial distribution of air quality monitoring stations does not effectively detect local "hot spots" (Fowlie et al. 2019) of air pollution and can lead to under-regulation or over-regulation of certain regions by the EPA (Hsiang et al. 2019; Fowlie et al. 2020; Carlson 2018). In PA, which has sixty-five total air monitoring stations operating in thirty-eight of sixty-seven counties (Wolf and McDonnell 2020), local pollution hot spots potentially generated after cap-and-trade implementation might not be detected nor trigger a regulatory response by the EPA. Local testing and community monitoring of air quality can be crucial to filling in this missing data (Solomon et al. 2012; Fowlie et al. 2020; Snyder et al. 2013).

The EPA is actively working towards improving EJ outcomes (EPA 2021) and continues to fund innovative projects to investigate creative solutions to state and tribal pollution issues (US EPA ORD 2020a). For example, the EPA is partnering with the New Jersey Department of Environmental Protection to study the effectiveness of a low-cost air sensor network monitored by citizen scientists for detection of air pollution hot spots (US EPA ORD 2020b). Rather than wait for stronger EJ guidelines from the EPA or the federal government, some states are moving ahead with EJ legislation of their own.

In order to address EJ concerns in CA, the state passed Assembly Bill 617 in 2017 (Garcia 2017). AB 617 takes a community-focused approach to combating air pollution in vulnerable neighborhoods by identifying regions with high cumulative exposure to air pollutants and empowering their local air district to build out local air quality testing capabilities and develop and execute a community emissions reduction plan (Garcia 2017). While still too early in its implementation for proper evaluation, AB 617 has put a spotlight on EJ in CA and how it relates to local air quality testing and community involvement (Fowlie et al. 2020). PA could also consider taking a similar, state-level approach to protect overburdened communities from increased air pollution as the state joins RGGI.

## II. Political and legal status

On October 3, 2019, Governor Tom Wolf signed an executive order (Wolf 2020) that required the Department of Environmental Protection (DEP) to develop a proposed rulemaking package to join RGGI and present it to the Environmental Quality Board (EQB). The Wolf administration claimed to have the authority to join RGGI under the Clean Air Act (Clean Air Act 1970), but many politicians viewed this action as executive overreach. In response, the PA General Assembly then passed House Bill 2025 (PA HB20205 2019) which stated that legislative approval is required to enact a price or fee on carbon, therefore effectively preventing the Wolf administration from joining RGGI unilaterally. The Governor vetoed this bill on September 24, 2020 (Wolf 2020), and the General Assembly did not have the required two-thirds majority in each chamber to override the veto. Legal challenges to the regulation are also expected, but legal scholars anticipate the Governor's authority would be upheld (Morris 2020).

As it stands, the DEP is expected to submit the final regulation to the EQB and Independent Regulatory Review Commission for approval by the end of 2021, and Pennsylvania is on track to join RGGI in 2022. While participating in this regional cap-and-trade system will benefit PA air quality through the reductions of CO<sub>2</sub> emissions and increased revenue for the Clean Air Fund, the regulation currently does not include language to mitigate any adverse impacts on vulnerable communities that could arise from the program. It is urgent to take protective measures to address the potential EJ concerns while the final regulations are still malleable.

## III. Policy options

The following policy options focus on 25 PA Code Chapter 145 Section 306, which establishes standard requirements for the CO<sub>2</sub> Budget Trading Program.

*i. Option 1: No changes to proposed rulemaking*  
§145.306 would be implemented as currently drafted in the proposed regulation, without any revisions.

### *Advantages*

Not having additional reporting requirements reduces the regulatory burden on emitters and the administrative responsibilities of the DEP. This could translate into money saved for both investors and taxpayers. Less regulatory oversight and market intervention could also allow CO<sub>2</sub> credits to be traded more freely, so that the carbon market can run efficiently and generate the lowest prices.

### *Disadvantages*

Neglecting to require any assessment of the impacts of the cap-and-trade program on air quality fails to address the potential EJ issues caused by this regulation. Marginalized communities could experience increased air pollution without a method to identify and rectify the situation built into the regulatory infrastructure. This could result in detrimental and long-term effects on public health.

*ii. Option 2: Annual air quality impact assessment using CO<sub>2</sub> emissions data*

Amend §145.306 to include an annual assessment determining whether any regions are disproportionately affected by increased air pollution as a result of the cap-and-trade program. The DEP would use the CO<sub>2</sub> emissions measurements recorded and reported to them by existing procedures to

assess these impacts and publish their findings to the public. This approach is already being considered by the DEP following a public comment period (McDonnell 2021).

#### *Advantages*

This reporting requirement would help address the EJ concerns of RGGI by monitoring its impact on an annual basis. If alarming trends do arise, the public would be aware of the issue and remedial action could be taken. This option would use the CO<sub>2</sub> emissions data that is already being reported in the proposed rulemaking, so the additional regulatory burden on emitters would be minimal. CO<sub>2</sub> is well-correlated with other harmful pollutants so the report would be based on a descriptive, yet coarse, data set (Cushing et al. 2018; Ostro et al. 2006; Burney 2020).

#### *Disadvantages*

This annual report would increase the administrative responsibilities of the DEP, which would demand more government resources to complete. It also increases the likelihood of market intervention, which could result in the carbon market underperforming economic theory and modeling (PA DEQ 2020). Furthermore, only using CO<sub>2</sub> emissions data from the budget sources may not adequately resolve the real effects of air pollution on surrounding communities.

#### *iii. Option 3: Annual air quality impact assessment with expanded testing*

Amend §145.306 to include the annual assessment from Option 2, with the additional requirement that the DEP identify a selection of overburdened communities and facilitate local air quality testing of co-pollutants in those communities to supplement the CO<sub>2</sub> emissions data.

#### *Advantages*

In addition to the advantages of the annual air quality

impact assessment discussed in Option 2, the local air quality monitoring in pre-selected, vulnerable areas will allow for improved spatial resolution and accuracy in the determination of air quality near RGGI-regulated facilities. This policy option incorporates aspects of CA's AB 617 to better inform the DEP on remedial modifications to the cap-and-trade policy, if necessary. Low-cost (Caubel et al. 2019; Lin et al. 2020) or mobile air quality sensors (Apte et al. 2017) and the leveraging of citizen scientists (Commodore et al. 2017) make execution of this plan more realistic than in the past. These local testing efforts can be funded by EPA innovation project grants or RGGI auction proceeds since each state has discretion over its own program revenue (RGGI 2020).

#### *Disadvantages*

Potential government intervention in the carbon market could have unintended consequences, as already mentioned in the disadvantages of Option 2. The additional regulation of identifying vulnerable areas and implementing local air quality monitoring would further increase the administrative responsibilities of the DEP and demands on government resources. Lastly, many view local air pollution and climate change mitigation as two separate problems that could both be better served by their own policy approaches (Fowlie et al. 2020).

#### **IV. Policy recommendation**

We recommend that the Department of Environmental Protection incorporate **Option 3** into the final rulemaking of their CO<sub>2</sub> Budget Trading Program (25 PA. CODE CH. 145). Pennsylvania's imminent entry into the Regional Greenhouse Gas Initiative poses a risk to the health of Environmental Justice communities in the state. Now is the time to incorporate meaningful safeguards for the most vulnerable populations in PA and set an example for other RGGI states.

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**Disclaimer**

The authors declare no conflicts of interest.