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Community Engagement and Adaptive Regulation in Sustainable Urban Change: Assessing New Jersey's Cumulative Impacts Program

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ABSTRACT:
Cumulative impact assessment has been widely endorsed by governments, scientists, community organizations and environmental groups as an important framework for addressing environmental injustice in communities that are overburdened with multiple sources of pollution. In 2020, the first state cumulative impact legislation within the United States was passed in New Jersey, which has served as a potential model for other states and cities. Finalized in April 2023, New Jersey's cumulative impacts regulations adopt a community-engagement approach before approving permits for major pollution-generating facilities and uses a community-level mapping tool providing localized environmental and public health data to enable cumulative impacts assessment.
Through a case study of this regulatory program, the paper will assess the legislative and regulatory program's strengths and weaknesses in achieving overall reductions in pollution levels within overburdened communities in furtherance of Sustainability Goal 10. The purpose of the study is to provide guidance to other states and cities also seeking to adopt cumulative impact programs.

Keywords: Environmental Justice, Cumulative Impact Assessment, Sustainable Urbanism

1. Introduction

For over two decades, U.S. environmental policy makers have recognized the need to better understand the cumulative effects of pollution from multiple sources. Environmental laws such as the Clean Air Act and Safe Drinking Water Act have traditionally evaluated the exposure risks and effects of a single pollutant or facility in isolation. New approaches are gradually being developed, however, which take into account the fact that communities are often exposed to multiple polluting facilities or health-harming pollutants on an ongoing basis.

Community organizations, environmental groups, governments, and scientists, have been the primary drivers in calling for the adoption of cumulative impact assessment as a more comprehensive framework for environmental planning, facility siting and permitting that better protects against environmental degradation and injustice in overburdened communities (National Environmental Justice Advisory Council [NEJAC], 2024). U.S. legislation mandating the analysis of cumulative impacts has so far been adopted only at the state and local level as a way to address environmental justice concerns. The focus of these environmental justice efforts has primarily been on increasing public

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engagement by involving communities in decisions that impact them regarding land use, environmental planning and permitting. For example, in states such as California, Vermont, Massachusetts, and Washington, the analysis, disclosure and consideration of cumulative impacts by various administrative agencies is mandated procedurally within a larger set of policy objectives (Gerard & McTiernan, 2023). In furtherance of these efforts, these states have developed digital mapping tools to track cumulative environmental and health data that can inform and set priorities. However, these tools serve to inform agency decision making with no clear mechanisms for their integration into regulatory tools such as permitting, standard setting or enforcement (Torres-Soto, 2023).

While policymakers and community groups are provided with cumulative data for evaluating the risks and impact of pollution sources on the environment and public health, the systematic integration of cumulative impact analysis into agency decision-making raises its own challenges (Torres-Soto, 2023). The question remains as to whether and how cumulative impact assessment can be most effectively integrated into regulatory tools such as standard setting, permitting, rulemaking, cleanup, funding, state program oversight and the initiation of administrative or judicial actions.

On September 18, 2020, New Jersey was the first state to enact an environmental justice law which requires agencies to limit environmental and public health stressors within a cumulative impact framework (Gerard & McTiernan, 2023). Aimed at reducing pollution in areas historically burdened with high levels of stressors, New Jersey's Environmental Justice Law (the EJ Law) requires a cumulative impacts assessment when major pollution-generating facilities seek environmental permits in these communities. N.J.S.A. §13:1D-157, et seq. When reviewing permit applications and determining permit conditions, the state's environmental regulatory agency, the New Jersey Department of Environmental Protection (NJDEP) must take into account not just the impact of the particular project or facility at issue, but also the cumulative impact of other facilities and stressors on the host community.

New York, Connecticut and Minnesota have since enacted laws similar to New Jersey which integrate cumulative impact analysis into the review of permit applications, but have yet to adopt their regulatory programs to implement these laws (Coming Clean, 2024). As state governments take the lead in determining where and how cumulative impact analysis should be applied in the U.S., the objective of this paper is to present a case study assessing New Jersey's regulatory program in reducing the disproportionate impact of environmental, social and health burdens that low-income and minority communities face from the pollution of air, water, and land, particularly in urban areas. As mechanisms for integrating cumulative impact assessment into policymaking are only new being developed and implemented, this study is necessarily limited. Further comparative research will be needed as other states develop new regulatory mechanisms for incorporating cumulative impact assessment into decision making. Nonetheless, by examining initial outcomes of New Jersey's model, this paper hopes to highlight tensions and potential areas where its application as a regulatory tool may be improved.

2. Cumulative Impact Assessment

Cumulative impacts can be defined as the "totality of exposures to combinations of chemical and nonchemical stressors and their effects on health and quality-of-life outcomes" (EPA, 2024, p.2). Similarly, cumulative impact assessment has been defined as a "process of evaluating both quantitative and qualitative data representing cumulative impacts to inform a decision" (Office of Research & Development [ORD], 2022, p. vii). Community advocacy groups from the environmental justice movement have been the most vocal proponents of incorporating this approach into agency decision-making as a way of protecting communities disproportionately burdened by multiple sources of pollution (Chowkwanyun, 2023). Since at least 2004, the National Environmental Justice Advisory Council, a federal advisory committee to the EPA, has recommended that cumulative impact assessment be integrated into agency processes to avoid or mitigate disproportionate exposures to environmental hazards, increased health risks and impacts, and adverse effects on quality of life experienced by historically overburdened communities (2024).

California in 2000, followed by the EPA in 2010, began to develop various screening tools to measure cumulative impacts which track by geographic area a range of environmental data such as proximity to known pollution sources and air quality measures along with health and/or demographic factors. New Jersey's EJ Law provides for the tracking of environmental pollution sources and identifies as illustrative examples "concentrated areas of air pollution, mobile sources of air pollution, contaminated sites, transfer stations or other solid waste facilities, recycling facilities, scrap yards, and point-sources of water pollution including, but not limited to, water pollution from facilities or combined sewer overflows; or conditions that may cause potential public health impacts, including, but not limited to, asthma, cancer, elevated blood lead levels, cardiovascular disease, and developmental problems in the overburdened community." N.J.S.A. 13:1D-158. This open-ended approach provided by the statute allows the NJDEP to evaluate new stressors under its cumulative impact regulations as new data becomes available.

New Jersey's mapping tool known as Environmental Justice Mapping Assessment and Protection (EJMAP) uses demographic and other localized data to map out 23 environmental pollution and public health stressors, based on relevance and data availability for its cumulative impact evaluation. Eight stressors correspond to various sources of air pollution including vehicles, air toxics, diesel and other fine air particulates, and ground level ozone. Seven cover proximity to high risk or known contaminated sites, including solid waste and scrap metal facilities, sites where hazardous chemicals are used and stored, or known water pollution sources from surface water and combined sewer overflows. Six cover more difficult to measure impacts on public health such as pollutants in drinking water, potential lead exposure, flooding, and the existence of heat islands. Finally, two cover social conditions known to impact public health, specifically unemployment and education levels (New Jersey Department Environmental Protection [NJDEP] 2025, 2023).

Numerical values for each stressor are calculated for every census block group in New Jersey. These stressor values are then compared to the median value for the same stressor in the state and the respective county where the census block is found. If a stressor

value at a census block is higher than the lowest median value, it is considered adverse for that community. The total number of adverse stressors at a census block is calculated to create a combined stressor total. This combined stressor total for the census block along with the contributions of the proposed facility is also compared with median combined stressor totals in the state and applicable county. If higher than the lowest median value, the census block is considered subject to adverse cumulative stressors. This finding affects how permit applications within that census block are reviewed (NJDEP, 2023).

3. New Jersey's Cumulative Impacts Law

Since 2017, a broad coalition of community and environmental organizations led by a social services organization known as the Ironbound Community Corporation (ICC), the New Jersey Environmental Justice Alliance and Clean Water Action, have advocated for environmental justice reform in New Jersey. In 2020, this alliance finally succeeded in enacting of New Jersey's EJ Law (Clean Water Action, 2023). The EJ Law incorporates changes advocated by the environmental justice reform movement, including enhanced community engagement, cumulative impacts assessment through a digital mapping tool, and the application of this analysis into the state's environmental permitting process for major polluting facilities located in overburdened communities.

Developed through an extensive stakeholder process involving communities, environmental and public health advocates and businesses, the regulations to implement the EJ Law were finalized several years later in April 2023 (EJ Rules). N.J.A.C. 7:1C. Prior to their adoption, however, the NJDEP issued an interim Administrative Order No. 2021-25 (the AO) which requires permit applicants to engage with the affected community, determine its impact on environmental and public health stressors, and implement appropriate control measures to minimize these impacts in the overburdened community. New Jersey Department of Environmental Protection AO 2021-25 (2021). Applications that would have been subject to the EJ Rules but were deemed complete before their adoption, must comply with the AO. Together, the EJ Law, AO and EJ Rules are designed to incorporate cumulative impact assessment to protect public health in overburdened communities and achieve a more equitable approach to sustainable development.

The EJ Law applies to environmental permit applications meeting three criteria. First, the proposed new or existing facility must be one of eight types of major polluters: (i) a "major source" of air pollution regulated under Title V of the federal Clean Air Act; (ii) an incinerator or other resource recovery facility; (iii) a sludge processing facility; (iv) a sewage treatment plant with a capacity greater than 50 million gallons per day; (v) a transfer station, solid waste or recycling facility that receives at least 100 tons of recyclable materials per day; (vi) a scrap metal facility; (vii) a landfill; or (viii) a medical waste incinerator. N.J.A.C. 7:1C-1.5. Second, the permit applicant must be seeking an environmental permit for a new or expanded facility, or for the renewal of a "major source" air pollution permit. Third, the facility must be located or proposed to be located in an overburdened community. N.J.A.C. 7:1C-1.5. Overburdened communities (OBCs) are identified according to census block groups, the smallest geographic area for which data is tabulated annually by the U.S. Census bureau. An overburdened community represents any census block where at least 35% of households qualify as low-income; at least 40% of the residents

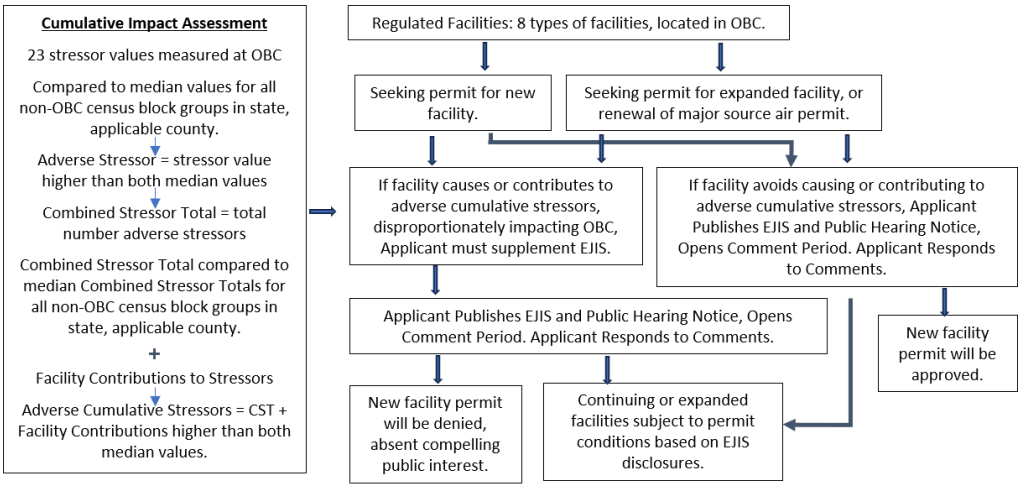
identify as minority; or where at least 40% of households have limited English proficiency. N.J.S.A. §13:1D-158.

If the EJ Law applies, the permit applicant must submit a Compliance or Environmental Justice Impact Statement (EJIS) which must identify existing stressors at the OBC, any adverse stressors, the combined stressor total and whether the OBC is subject to adverse cumulative stressors. In addition, the applicant must identify, the potential stressors to be contributed by the facility and whether the facility creates or contributes to adverse cumulative stressors at the OBC. N.J.A.C. 7:1C-1.5.

If the facility causes or contributes to adverse cumulative stressors, to cause a disproportionate impact on the OBC, the applicant will be required to include supplemental information as part of the EJIS. The applicant is then required to propose control measures at the facility to avoid or address any disproportionate impact. N.J.A.C. 7:1C-3. For new or expanded facilities that cannot avoid a disproportionate impact, the applicant must also provide a detailed comparison of reasonable design alternatives that allows for the independent evaluation of (i) the use of renewable energy resources at the facility; (ii) changes to reduce the facility's contribution to adverse stressors impacting the community; (iii) comparisons of their impact on any stressors in the OBC; and (iv) a consideration of undertaking no action or no project and the foreseeable consequences of this option. For facilities seeking renewal of their major source air permits, the application must include an analysis of possible control measures to avoid contributing to any adverse stressors. N.J.A.C. 7:1C-3.

After NJDEP reviews the EJIS for completion, the permit applicant must make the EJIS available on the OBC's municipality website, as well as provide 60 days advance notice and an opportunity for the public to submit written comments before holding a public hearing. At the hearing, the NJDEP reviews the EJIS and hears public comments. After the hearing, the public is given another opportunity to submit written comments. The applicant must respond in writing to these comments. The NJDEP waits 45 days after the hearing, before issuing a decision on whether the facility is authorized to proceed or whether to issue special conditions on the facility to avoid causing any disproportionate impact upon the OBC. N.J.S.A. §13:1D-160.

New Jersey's Environmental Justice Review Process



The EJ Law directs that a new facility permit be denied if the facility will cause or contribute to adverse cumulative environmental or public health stressors in the OBC. An exception is made where the new facility would serve a compelling public interest. N.J.S.A. §13:1D-160. This exception is narrowly defined. The applicant must demonstrate that the facility primarily serves an essential environmental, health or safety need of the individuals in the OBC, and there are no other means reasonably available to meet those needs. N.J.A.C. 7:1C-5.2-5.3. The EJ Rules further stipulate that a facility which directly reduces adverse stressors in the host community will be considered as serving an essential need within that community. An additional consideration is public feedback regarding whether a compelling public interest is demonstrated. N.J.A.C. 7:1C-5.3. Specifically, a significant level of public interest in favor of or against an application from the overburdened community. N.J.A.C. 7:1C-5.2-5.3. The NJDEP is permitted to seek input from the public whenever it determines the information will clarify whether the compelling public interest standard is met. If the standard is met, the NJDEP can attach conditions to reduce any adverse impacts. N.J.A.C. 7:1C-5.2-5.4.

For continuing facilities, the NJDEP is not authorized to deny either renewal permits or permits to expand existing facilities. Instead, the EJ Law enables the agency to impose conditions that would reduce the facility's contributions to any adverse stressors. N.J.A.C. 7:1C-6.2-6.3, 7.1, 8.2. No other guidelines are provided either in the EJ Law or Rules regarding how these conditions should be determined. The information provided during the EJ review, namely, the permit applicant's EJIS disclosures, the public hearing and NJDEP's review of written comments serve as the basis for determining these conditions. As demonstrated below, this significantly limits the effectiveness of the permit review process, despite its strengths in fostering ongoing discussions with the community.

4. Environmental Justice in the Ironbound Community of Newark

The first decision issued on July 18, 2024 under the AO, rather than the EJ Rules, approving a modification to a "major source" air permit for the Newark Bay Wastewater

Treatment Plant (WWTP), one of the largest wastewater treatment plants in the U.S. and the largest single power user in New Jersey. The modified permit authorizes the construction and operation of an on-site emergency Standby Power Generating Facility (SPGF) capable of supplying backup power to the entire WTTP (NJDEP PVSC EJ Decision, 2024).

Situated on 140 acres along Newark Bay, the WWTP serves over 1.5 million New Jersey residents in 48 municipalities, 200 significant industrial users and 5000 commercial users along the East Coast, including 15% of the wastewater from the City of New York. Processing an average of 330 million gallons per day, it is a critical part of the state's infrastructure and seen as a safeguard of public and environmental health by preventing disease, treating reclaimed wastewater to applicable water quality standards and maintaining the waterways into which the wastewater is discharged (NJDEP, 2024). The WTTP also serves a critical role in the treatment of drinking water since it is the primary disposal site for alum sludge generated by several regional drinking water treatment facilities (PVSC Compliance Statement, 2022).

The facility's operator, Passaic Valley Sewerage Commission (PVSC) submitted its application on January 27, 2020 to modify its "major source" air permit which establishes operating limits, monitoring requirements, and reporting obligations for regulated equipment and activities under Title V of the federal Clean Air Act (PVSC Compliance Statement, 2022). The proposed SPGF would ensure operation of the plant in case of an electrical grid failure or other loss of power and is the final part of a $600 million dollar Hazard Mitigation Project developed in response to the WTTP's operational failures following Superstorm Sandy, a hurricane which caused widespread damage and flooding along New Jersey's coastline. The project has been under construction since 2015 and is nearing completion, with the construction of the building to house the SPGF the last major component yet to be started (PVSC Response to Comments, 2022).

During the storm, a twelve-foot storm surge flooded the tunnels and equipment at the treatment plant, knocking out the plant's main power feeder lines, disabling the backup emergency generators and completely shutting down the plant for two days. Only through a coordinated effort with the Federal Emergency Management Agency (FEMA), the U.S. Environmental Protection Agency (USEPA), the United States Army Corps of Engineers (USACE), the New Jersey Governor's Office, and the NJDEP was the equipment for the primary treatment process restored within 7 days and for the secondary treatment process within thirteen days (PVSC Compliance Statement, 2022).

As a "major source" of air pollution regulated under the EJ Law, the WWTP is also located in the "Ironbound," a minority and low-income community in the eastern section of Newark surrounded by three natural gas power plants, an incinerator, Newark airport, and heavy truck traffic which serves Port Newark, warehouses and nearby industrial facilities. Many local and environmental groups strongly opposed the SPGF including the community and environmental organizations that advocated for years in favor of the EJ Law (Steele, 2021). On June 10, 2021, the PVSC announced it would reevaluate its proposal by expanding public engagement and exploring the use of renewable energy alternatives. The application was deemed complete on July 2, 2021, requiring PVSC to follow the more lenient environmental justice review procedure under the AO.

In its EJ Compliance Statement submitted on March 30, 2022, the PVSC identified the additional emissions that would result from the new facility, evaluated possible alternatives that could reduce emissions, and identified areas where emissions could be reduced on its primary facility. The SPGF would include three 24-MW combustion turbine generators (CTGs) using natural gas, two 2-MW black start engine generators using natural gas, and two 164-kW fire pump engines using diesel fuel (PVSC Compliance Statement, 2022). PVSC claimed the WWTP required a power source capable of continuously supplying 34MW over a two-week period, which is equal to 11,424 MWh and that no alternative energy source could provide that much power within the physical space available on-site. For example, PVSC represented that the Samsung SDI, a Lithium-Ion battery which represented the best energy storage solution currently available could not meet this need (PVSC Compliance Statement, 2022).

PVSC's power plant proposal faced years of fierce community opposition. A virtual public hearing was held on April 26, 2022 in which 202 members of the public attended (PVSC Response to Comments, 2022). A written public comment period was held open for over 60 days from April 1, 2022 through June 3, 2022. A total of 499 comments were received including 446 written comments and 53 oral comments. PVSC submitted a Response to Comments document to the NJDEP on September 9, 2022 which was made publicly available. The NJDEP provided additional comments on December 22, 2022 and PVSC submitted further "Response to NJDEP Comments" on January 11, 2023 which were also posted (NJDEP, 2022; PVSC, 2023).

In its EJ Decision, the NJDEP acknowledged that the combined stressor totals for the Ironbound community, the applicable county and the state were 23, 14 and 13 respectively. Adverse stressors included ground level ozone, fine particulate matter, cancer risk from diesel particulate matter, air toxics excluding diesel particulate matter, and non-cancer risk from air toxics. The NJDEP further noted that the host OBC was affected by adverse cumulative stressors, including a density of permitted air pollution sites more than five times greater than the relevant geographic point of comparison (NJDEP PVSC EJ Decision, 2024).

Environmental advocates and community groups disputed PVSC's claim that 34 MW were needed as the WTTP typically uses only 23 MW and can operate on as little as 11.5MW (Powers, 2025). They noted that the electric utility provider, PSE&G had invested heavily in strengthening the region's power grid from major storm events, and that this work spurred NJ Transit to cancel similar plans for a power plant in Kearny, New Jersey. Speakers also pointed out that the WTTP was offline for roughly two days in the aftermath of Sandy – yet PVSC sought to have a source of backup power capable of powering the facility for two weeks. The New Jersey Environmental Justice Alliance, as well as the ICC, argued that solar power and battery storage can meet PVSC's emergency needs at a fraction of the $118-$180 million power plant cost (Zanchelli, 2025).

State regulators indicated at the hearing however that they were likely to grant the air pollution permit for the project. The PVSC EJ Decision in July 2024 gave the PVSC approval to continue moving forward with the permit modification to construct a gas-fired SPGF onsite. The NJDEP found that not building the SPGF would compromise essential services provided by the WWTP during an emergency storm event which are vital to preventing disease, improving public and environmental health, and maintaining

waterways (NJDEP PVSC EJ Decision, 2024). The PVSC EJ Decision also cited the possibility of sewage in the streets of Newark as the reason for approval. "PVSC estimates that if it were forced to shut down again due to loss of power during a similar storm event, street-level flooding of raw sewage will likely occur in Newark, Bayonne and Jersey City, potentially impacting thousands of residents" (NJDEP PVSC EJ Decision, 2024, p. 2). In the event of a major storm, the SPGF would ensure that the WTTP prevents backup of raw wastewater in the collections systems and avoids discharging untreated wastewater to nearby waterways. Overriding public opposition, NJDEP appears to have relied on the fact that the facility serves critical environmental, health or safety interests of the general public and within the OBC. N.J.A.C. 7:1C-5.3.

It is unclear, whether a different outcome would have resulted if the EJ Rules rather than the AO had been applied. The EJ Rules but not the AO explicitly includes as a factor in determining the compelling public interest exception, "public input as to whether a compelling public interest is demonstrated." N.J.A.C. 7:1C-5.3. The NJDEP is also permitted to consider whether individuals in the OBC have come out in favor or against the application. N.J.A.C. 7:1C-5.3. The overwhelming opposition of the Ironbound Community could therefore have mandated a different finding. Further investigation into this component of the public interest exception would be helpful as new decisions are issued.

The NJDEP nonetheless accepted PVSC's representations that raw sewage would likely endanger the streets of the Ironbound Community if the WTTP were forced to shut down again. It further accepted PVSC's claims that 34 MW were required to support the WTTP during an outage and that this level of power would potentially be needed for a two-week period. Finally, the NJDEP's EJ Decision reviewed other areas identified by PVSC where the WTTP and proposed modifications could be upgraded to reduce emissions (NJDEP PVSC EJ Decision, 2024).

The critical nature of the services provided by the treatment plant led the NJDEP to override public opposition. Emphasizing the public importance of maintaining the safe and reliable treatment of sewage in the event of a storm emergency, the PVSC EJ Decision approved the proposed modification to PVSC's Title V Permit subject to special conditions designed to control emissions and ensure additional emission reductions that would address the community's concerns. Those conditions require the PVSC to only run the power plant a maximum of two days before a major storm event and during emergencies as a backup generator in the event of a power outage. One exception is made per month for test runs to ensure the power plant remains ready for any emergencies. PVSC must also install additional pollution controls such as removing or upgrading outdated equipment as identified by PVSC in its Compliance Statement. PVSC is also required to install a minimum of 5MW of solar with a minimum of 5MW of battery storage. With these conditions, the NJDEP claimed the result would be a net overall reduction of facility wide emissions of air pollutants under regular operating conditions. (NJDEP PVSC EJ Decision, 2024).

One state legislator, Sen. Teresa Ruiz who was a sponsor of the state's EJ Law, pointed out the inconsistency between the NJDEP's decision and the intent of the EJ Law. Maria Lopez-Nuñez, a leader for the ICC and other advocates urged PVSC and the NJDEP to find a different way to bring backup power to the sewage plant (Warren, 2024).

The NJDEP however had assessed that a backup power system using entirely renewable power was not feasible because of the sewage plant's high energy demands (NJDEP, 2024).

In March 2025, PVSC's commissioners decided to delay the vote on whether to approve the project and accept the NJDEP's conditions to determine whether there have been any significant changes in technologies that would benefit this particular application other than constructing a fourth power-generating facility. In May, 2025, after the NJDEP published the final permit modification on April 2025, Earthjustice on behalf of the ICC filed an appeal of the NJDEP's decision to approve the permit modification. Despite continued widespread opposition following the PVSC EJ Decision, PVSC's nine commissioners voted on June 12, 2025 to move the project forward, accepting the NJDEP's conditions and awarding a $232.7 million contract to build the SPGF facility (Zanchelli, 2025).

5. Safety-Kleen Decision Under the EJ Rules

Only one decision has issued under the formal EJ Rules. An application was submitted by Safety-Kleen Systems, Inc. to modify air and solid waste operating permits for its Linden Recycle Center, a solid and hazardous waste management facility which Safety-Kleen, proposed to expand. The expansion proposal included a change in the types of regulated activities conducted at the 11.4 acres site (NJDEP Safety-Kleen EJ Decision, 2025).

Safety-Kleen was previously permitted to accept specific kinds of hazardous waste for storage and recycling and to accept up to 50 tons a day of solid, non-hazardous waste for storage or transfer off-site. For its proposed expansion, Safety-Kleen applied for a new permit which would allow it to process 200 tons per day of hazardous waste. Safety-Kleen requested modifying its permit to accept up to 99 tons of solid, non-hazardous waste,to process 84 tons per day of non-hazardous liquid waste and to store or transfer up to 15 tons of dry, solid non-hazardous waste each day. The proposed activities would be contained in a building with air pollution control devices resulting in only slight increases in air pollution from increased vehicle traffic at the site (NJDEP Safety-Kleen EJ Decision, 2025).

Safety-Kleen held a public hearing at the Linden Public Library where two people spoke in-person. Although the hearing was supposed to include a virtual component, Safety-Kleen had technical issues and therefore held a second hearing, in which one individual spoke in-person. A single comment letter was jointly submitted by two environmental organizations, Clean Water Action and Earthjustice (Safety-Kleen Response to Comments, 2024).

Environmental groups Clean Water Action and Earthjustice argued the proposed expansion altered the functions of the facility and should have been reviewed under the new facility requirements. They also sought further modifications including the use of clean energy vehicles and electric boilers at the site. Safety-Kleen countered these proposals were too costly or not suited to their operational requirements (Safety-Kleen Response to Comments, 2024).

NJDEP approved the permit applications subject to conditions that would reduce the impact on the Linden community. These conditions include the use of pollution controls in the enclosed building as part of its minor source air permit, the loading and unloading of all cargo trucks within the enclosed building, the use of ultra-low sulfur diesel fuel for all vehicles under Safety-Kleen's control, the maintenance of a 50 foot set-back from the site fence line where no site activity will occur, the adoption of an anti-idling program for all vehicles and equipment under its control, the retro-fitting of all vehicles to comply with the latest emissions standards and the creation of a community engagement plan (NJDEP Safety-Kleen EJ Decision, 2025).

6. Discussion: Community Engagement and Adaptive Regulation

Assessing cumulative impacts, the NJDEP now has the authority to impose permit conditions upon major pollution-generating facilities and deny permits to new facilities unless a compelling public interest is served in the affected community. Nonetheless, its first EJ Decisions highlight two limitations regarding these new regulatory functions.

First, as reflected by the PVSC decision, it is unclear what role community engagement has played in influencing NJDEP decision making. In both the PVSC and Safety Kleen decisions, facilities regulated by the EJ Law can request to modify or expand existing facilities rather than submit a permit for a new facility even when entirely different types of activities are proposed. For such permit applications NJDEP's authority is limited to the setting of permit conditions based on technical analysis provided by the permit applicant regardless of community opposition. Both decisions make clear that significant facility expansions or modifications are permitted that incrementally increased adverse stressors in the host communities. A lack of technical expertise also makes it difficult for advocacy organizations to successfully challenge the permit applicant's potentially biased view of viable alternatives. This weakness currently limits the efficacy of participatory justice in this type of adaptive decision making. Whether the EJ Law will reduce disproportionate impacts at facilities already operating in historically overburdened OBCs remains open.

Despite enhanced community engagement through the EJ review process, even widespread community opposition to these pollution sources can be outweighed by economic or infrastructural requirements. This balancing of the public health and economic or infrastructural needs of the state undercuts the purported objective of the EJ Law to reduce pollution in overburdened communities. While improvements in clean energy and pollution reduction technologies may eventually alleviate this conflict, the EJ Decision highlights this ongoing challenge to pushing forward environmental justice goals.

Second, the EJ decisions illuminate how the permit process could potentially provide an ongoing opportunity to impose more restrictive conditions on major polluters as technologies improve and reduce disproportionate impacts. Permitting conditions provide the NJDEP with a flexible, iterative regulatory approach capable of adapting alongside changing circumstances, technologies, and societal values. By requiring more stringent standards, permitting could provide an ideal mechanism for incentivizing innovation within these facilities. With technology, science, social conditions, and social

values changing significantly, this adaptive framework provides advantages such as reducing policy errors, overcoming political impasse, or avoiding the continued adoption of obsolete policy. But there can be disadvantages to such adaptive frameworks which require costly data collection and decision analysis while also fostering policy instability (Bennear & Wiener, 2019).

These weaknesses to adaptive regulation are evident in the NJDEP's EJ analysis for both its decisions to date. Despite providing the NJDEP with wide flexibility to determine what conditions to impose, the primary basis within this framework for establishing permit conditions comes from the applicant's EJIS and public comments. Under the EJ Law, much of the cost of this adaptive regulatory framework is therefore pushed onto the facility seeking the permit and the host community where the facility is to be located.

In relying upon permit applicants to assess potential alternative solutions and justify public need, regulated facilities may be more incentivized to identify potential obstacles rather than devise innovative solutions. For example, environmental groups were correct in pointing out that the operating parameters of 34 MW for two-weeks for providing backup power identified by the PVSC were extremely high and made it impossible to identify clean energy alternatives to meet that need. Permit applicants seeking to get past EJ review may not have the motivation to consider all available solutions. With this regulatory structure, it is unlikely, absent some other incentive, that these self-imposed assessments will promote innovation within these industries.

Alternative approaches may prove more successful in reducing pollution levels in overburdened communities. New York's cumulative impacts law, while modelled after New Jersey, is stronger in two respects. First, for new facilities, there is no compelling public interest exception. Second, permits for permit modifications or renewals of existing facilities may be denied (Gerard & McTiernan 2023). Minnesota's cumulative impacts law is also stronger. If a new or continuing facility imposes a substantial adverse impact on an environmental justice community, the permit application will be denied unless the applicant successfully enters into a community benefit agreement (Minnesota Pollution Control Agency 2025). By allowing for the denial of permits for new, continuing and expanded facilities, both laws could provide sufficient incentive for the permit applicant to adopt cleaner, more innovative solutions.

These laws place the burden of providing more innovative solutions on the permit applicant. Whether the burden is placed on community groups or the permit applicant, identifying experts who are best positioned to propose innovative solutions for major pollution generating facilities is needed. In either case, adaptive regulation through permitting entails a need to investigate and continually monitor the cost and feasibility of innovative clean energy technologies and pollution reduction controls given the rapid pace of advancements in this field. Further research comparing the relative success of these different approaches is needed as states develop and implement new regulatory programs.

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