

Sacrifice and Sustainability:
A Case Study of Columbia University and the Ironbound

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INTRODUCTION

“New York City rarely had a day in its history without waste” Martin V. Melosi proclaims in his book *Fresh Kills: A History of Consuming and Discarding in New York City*. The city, however, also has a more recent history of moving waste farther and farther from its producers. Before the onset of organized street cleaning in the late 20th century, trash in New York City was left out for scavengers, incinerated, fed to hogs, or dumped into the ocean either to fill land or discard into its vastness. By the turn of the 19th century, the filling of marsh and water lots had added 137 acres to lower Manhattan and destroyed previously plentiful oyster beds, polluted beaches and estuaries, clogged waterways, and – most importantly to city officials – reduced the depth of New York’s harbor, endangering its primary mode of revenue as a port city. Public health concerns after widespread disease epidemics of the mid-19th century – primarily in polluted and cramped working class neighborhoods in lower Manhattan – led to reforms in street dumping, hauling, and ultimately the creation of a government operated municipal waste service. The city’s population and industrial booms (by 1874, almost 64% of all American exports went through NYC’s port) fueled the surmounting waste problems. Through the 1880’s, 75% of NYC’s waste continued to be dumped into the ocean, a number which declined after the establishment of the Department of Street Cleaning, composting and recycling, and eventually, a 1931 court ruling officially banning ocean dumping. As waste became more streamlined, incinerators and landfills became the primary outlets for the refuse from the growing city. (Melosi, 2020)

As New York City’s waste problems grew, the city demonstrated a concerning trend of physically and visually isolating (and therefore co-locating) industries and people deemed “undesirable” on the eight islands acquired between 1828 and 1892. In 1857, the Board of Pilot Commission chose Oyster Island (now Ellis and Liberty Island) as the city’s first official dumping ground. (Melosi, 2020). Following the opening of the nation’s first municipal incinerator on Governor’s Island in 1885, another incinerator was built 15 years later on a now decommissioned landfill on Ellis Island. (*Municipal Solid Waste History*, 2016) (Melosi, 2020). This was the same site as an operating immigrant processing facility which had been relocated to the island out of concern for the crime, disease, and behavior new immigrants could inflict on NYC residents. The incinerator burned waste through 1954 as the facilities beneath it received about 5,000 immigrants a day. (*Immigration and Relocation in U.S. History*). Islands further up the East River received similar treatment, as South Brother Island housed animal feces and carcasses hauled from city streets and adjacent North Brother Island was developed into a hospital for patients with infectious and contagious diseases. The further use of Blackwell’s, Rikers, and Wards Island to isolate poor, ill, and incarcerated people continued what historian Martin Melosi deemed “an eerie similarity between [the use] of islands as a dumping ground for troubled and undesirable people and [the use] of some of the islands as disposal sites for waste.” (Melosi, 2020).

As waste moved out of the physical and visual proximity of most city dwellers, the city’s banking and finance sectors boomed, with Wall Street housing the most Fortune 500 companies

of any city in the world (Burleigh, 2024) and upscale shopping districts forming as heavy industry concentrated in Lower Manhattan or moved to other boroughs. Following the introduction of the first zoning laws in the country in 1916, which divided land into residential, commercial, and “unrestricted,” low income/public housing projects were deliberately developed near industry in “unrestricted” areas to provide “advantageous opportunities for walking to work” that also consistently co-located residents with hazardous pollutants (Checker, 2017). As the city’s industry began to decline in the 1950s, NYC pivoted its economic priorities by encouraging FIRE (Finance, Insurance, and Real Estate) industries. To draw in further corporate investment, the city began implementing large-scale re-zoning projects to encourage commercial development and adjacent residential communities to house employees while much of the remaining heavy industry was moved into other boroughs or out of NYC entirely. By this time, the city’s waste crisis had increased so dramatically that a “temporary” landfill was sited in Fresh Kills, Staten Island – then not directly connected to NYC’s other boroughs – which would subsequently serve the city for over 50 years. (Melosi, 2020)

In order to achieve the ‘urban renewal’ necessary to attract wealthy residents and commercial ventures (particularly those within FIRE sectors) after years of “white flight” in the 1960-70s, there became a need to address the burgeoning public concern for environmental pollutants and health now codified into the Clean Air Act (1963). In addition to its relocation of heavy industry out of Manhattan and desirable Brooklyn neighborhoods, NYC banned the remaining 2,200 apartment-house incinerators in 1989. (*Incinerator ban*, 1989). As Environmental Justice movements gained national traction, some long-fought goals began to materialize for New Yorkers including the teardown of the final municipal incinerator in the Bronx in 1999 after over 500 violations of its permit. A New York Times article cited the reasoning for this teardown to be “environmental problems, particularly disposing of the ash, along with the steep capital and operating costs, made incinerators less attractive by the mid-1980s” - city officials promoted recycling and environmental groups stated that incinerators did not have a role “at this point in the city’s environmental and economic life.” (Martin, 1999). This statement was echoed by a state bill in 1996 that simultaneously barred city plans to build further large-scale incinerators (the first in Brooklyn Navy Yards) and ordered the shutdown of Fresh Kills after advocacy led to a near-succession of Staten Island from New York City. (Melosi, 2020). While factors such as waste transfer facilities continued to perpetuate spatial injustice in New York City, it seemed that the burden of its ever-increasing trash problem was to be largely exported across state lines. A 2020 Politico study found that trash was being shipped out of state and into landfills and incinerators disproportionately located near low income communities and communities of color.

Columbia University’s policy has an outsized impact given its international prestige and its role as the largest private landowner in New York City. The Morningside campus is vast – in 2022 was home to at least 31,203 students, 4,739 full-time faculty, and 20,012 staff, all of whom consume and produce waste (*Undergraduate Enrollment*) (*Full-time Faculty*) (*Full-time Employees*). This waste is then hauled by the New York Department of Sanitation (DSNY), with

municipal solid waste (landfill-bound waste) traveling across the Hudson to an incinerator located in the predominantly Black and Latino/Hispanic, immigrant, working class community in the Ironbound neighborhood of Newark, NJ (*Wasted Potential*, 2020) (McKee, 2023).

This phenomenon is part of a larger national trend in which the consumption habits of whiter, wealthier urban cores are sustained through clustering of industrial activity that is located proximate to lower-income communities and communities of color. “I can’t call it anything else but a sacrifice zone...[where]...[our] lives don’t matter as much.” said Ironbound-based organizer Maria Lopez–Nuñez of her neighborhood. The Catch-22 of a “sacrifice zone” is that the crowding of harmful industry that produces detrimental impacts on community members who live there also makes it extremely difficult to hold any single company accountable for their impact (Winokur, 2020).

Here, I will consider disparities in pollution exposure, social access, and economic conditions faced by Ironbound residents alongside a history of clear exploitative action on the part of the Port Authority, Covanta, government officials, and scientists working at Columbia. By examining a myriad of historical and government documents, sociological theory, academic studies and literature, statements by local community groups, and Columbia’s policy, I will explore how Columbia’s relationship with the Ironbound manifests within the greater phenomenon of the Sacrifice Zone.

METHODS/DEFINITIONS

I have centered my research on Columbia University's Morningside Campus – despite originally hoping to include their subsidiary school Barnard College – because I was able to trace Columbia's waste through DSNY paperwork, whereas Barnard is hauled by a private carrier and that information is neither publicly available to me nor was it provided to me upon inquiry. Moreover, given barriers to access to elite and scientific spaces and a history of exclusion as outlined below by Bullard, Agyeman, and Brulle, I sought to write a paper that was not contingent upon my upholding the scientific burden of proof of harm for members of the Ironbound community. Instead, I aimed to investigate the relationship between Columbia and Ironbound by examining demographic data, government documents, community movement history, and public policy obtained via archival and online databases. I then analyzed the information I found in accordance with the principles of environmental justice scholars reviewed in this section.

History of Environmentalism + Social Justice

Until the late 20th century, environmentalism and racial/economic justice remained two movements distinct – and often at odds. The environmental movement centered primarily on the ideas of “wilderness and wildlife preservation, resource conservation, pollution abatement, and population control” and was led primarily by educated, wealthy white men. Given barriers to access and a history of racist, classist, and xenophobic policy by conservationist and preservationist movements (for example, the massacre and expulsion of Indigenous people from U.S. National Parks or the targeted bans on foraging that impacted immigrant communities), the struggle for civil rights, racial justice, and economic sovereignty in the United States was often alienated from the struggle for a healthy and safe environment. (Bullard & Wright, 1987)

While social movements may not have overlapped, there is a history– in New York City and the United States as a whole – of environmental harm primarily co-locating near low income, immigrant, and racially marginalized communities. The impacts of industrial pollution in urban low-income and immigrant neighborhoods had been widely understood in the middle and late 19th century, but it was not until the 1970s study by lawyer, activist, and scholar Robert Bullard that exposure to toxic pollutants and race was systematically examined. Bullard found a clear correlation between race and landfill siting, evidence which was used by his wife Linda Bullard in *Bean v. Southwest Waste Management Inc.* that hazardous waste siting was racial discrimination under the 1964 Civil Rights Act. Robert Bullard was among the first to name and study environmental injustice - the system wherein racial segregation and classism enable environmental hazards like waste sites to be disproportionately sited near racially, economically, or otherwise marginalized communities. Following national attention piqued by protests in the majority Black and low-income Warren County, NC against the siting of a dump filled with carcinogenic polychlorinated biphenyls (PCB), an “abundance of studies” between 1973-1990, including a landmark 1987 study by the United Church of Christ, demonstrated a correlation

between race, class, and increased exposure to pollutants and environmental stressors at home and work. The Commission for Racial Justice found that race was the most significant factor in determining proximity to commercial hazardous waste facilities, with racially marginalized communities 3 times more likely than white communities to be sited near hazardous facilities. (*Newark Environmental Resources Inventory (ERI)* 2021).

Despite decades of research and policy supposedly aimed to protect racially, economically, or otherwise marginalized communities from environmental harm, remnants of hazardous waste sites and pollutants are still disproportionately located in or near these communities. A review of 49 studies in 2005 found a similar trend; while class and environmental inequality are correlated, race is the strongest predictor of environmental injustice (Ringquist, 2005). As urbanization has increased, these trends have worsened, with a growing phenomenon of “sacrifice zones”: low income and racially marginalized, urban or semi-urban communities which bear the brunt of the polluting activities of their wealthier, whiter urban counterparts (Bullard et al, 2008). The term sacrifice zone originates from the farming practice in which ecological damage (trampling, waste, overgrazing, weather) is concentrated in small, often fenced areas of land to protect the health of the rest of the pasture (Juskus, *Sacrifice Zones*, 2023). While some have argued that the concept of a “sacrifice zone” connotes false borders that negate the reality that pollution and environmental degradation are not contained and have often have far-reaching consequences, (De Bruyn, 2023) I believe the concept of a sacrifice zone is useful to describe the specific phenomena of urban, low income communities of color bearing the industrial harms for the benefit of residents of wealthier, whiter urban centers. It is also the framework that local activists and community leaders, including Maria Lopez-Nuñez, actively reference to describe industrial activity in her neighborhood (Winokur, 2020).

Environmental Justice Framework

Definitions

In their collaborative article “Exploring the Nexus: Bringing Together Sustainability, Environmental Justice and Equity,” Agyeman, Bullard, and Evans argue that commitment to sustainability “cannot be simply a ‘green’ or ‘environmental’ concern,” but inherently necessitates a social component as “a truly sustainable society is one where wider questions of social needs and welfare, and economic opportunity, are integrally related to environmental limits imposed by supporting ecosystems.” Further, they emphasize that greater social and economic equity on a national and global level is necessary to alter high consumption lifestyles, writing that “the basis for [centering distributive justice and equity] is that sustainability implies a more careful use of scarce resources and, in all probability, a change to the high-consumption lifestyles exercised by the affluent and aspired to by others.” (Agyeman, Bullard, & Evans, *Exploring the Nexus* 2002). They assert that while creating consensus for change is difficult, centering justice is both a powerful motivator for privileged people to act and a necessity for marginalized communities whose livelihood is sacrificed to maintain consumption.

While there is contention on how to define environmental justice, there is also debate on the subject of how to address it. In “Environmental Justice: It’s More Than Waste Facility Siting,” Bullard argues that environmental injustice is broader than simple racism, and that research on environmental inequalities must include the social, political, geospatial and physical history of the land to understand how injustice evolved regionally. Bullard defines environmental racism as one form of the larger systemic inequality of environmental injustice, which “embraces the principle that all people and communities are entitled to equal protection of environmental and public health laws and regulations” and is in response to industry and government policy and practices and resulting conditions deemed unfair and unjust. These policies and practices include “(1) unequal enforcement of environmental, civil rights, and public health laws, (2) differential exposure of some populations to harmful chemicals, pesticides, and other toxins in the home, school, neighborhood, and workplace, (3) faulty assumptions in calculating and assessing risks, (4) discriminatory zoning and land-use practices, and (5) exclusionary policies and practices that limit some individuals and groups from participation in decision making.” (Bullard, 1996). I will use this framework to assess injustice occurring in the Ironbound community. There is also a rich body of work interrogating how institutions and individuals are obligated to act in order to combat environmental injustice. I will use the framework laid by a number of authors including Bullard, Agyeman, Young, Frasaer, Brulle and Pulid, in which accountability as well as targeted and community-informed action are centered to assess the implications of Columbia’s existing policy and practices.

Taking Action

Bullard also argues that combating the issues of environmental injustice requires action that is informed by the history of apartheid and political negligence, prioritizes prevention, and promotes an economy in which people do not have to sacrifice their health to be employed. He argues that polluters must bear the burden of proof to ensure that facilities are safe before they are created and that a public health model of prevention, in which polluters take “targeted action” informed by metrics such as risk assessment, is necessary to redress impact on marginalized communities (Bullard, 2001). The use of science and scientific experts in environmental justice discourse, Brulle also argues, can operate “as part of a system of oppression and domination [as] without access to experts of their own, some local community activists see scientific discussions as a means of keeping their viewpoints and concerns from being addressed by government officials. As a consequence, environmental justice groups challenge the authority of scientific experts to adequately express community concerns.” (Brulle, 2014)

The necessity of action that targets the promotion of social and economic justice is echoed by scholars Pulid and De Laura, who argue that environmental justice must include “the abolition of a capitalist order that has always been racial.” (Pulido & De Lara, 2018). Both Young and Fraser affirm that the first step towards these actions is for individuals and institutions to acknowledge the “why” and recognize their privilege and role in the systems of oppression that fuels environmental injustice. The failure to do so, Young argues, is an injustice because it

perpetuates the containment and harm of impacted communities and is the “foundation of distributive injustice.” This acknowledgment is not just a “thing” to be done but the beginning of a relationship and social norm in which the needs and rights of polluted communities are to be centered.

THE IRONBOUND

History of Newark and the Ironbound

Newark is the largest city in New Jersey, with a recorded population of 311,549 in 2020. Originally situated in a meadowland ecosystem home to the sovereign indigenous nation of the Munsee Lunaape people, the town was established in 1666 by Puritans and remained a small village until the turn of the 19th century, where it boomed as a transportation and trade hub on the path to the burgeoning mercantile metropolis of New York City. A neighborhood previously known as Dutch Neck at the Northeastern edge of the city became known as the “Ironbound” in reference to foundries and railways development in the 1830s that borders its edges. An abundance of manufacturing jobs (for commodities like jewelry and leather) continued to draw immigrants to Newark, with the city population rising from 71,941 on the eve of the Civil War to 350,000 by 1910. Newark built itself up as a manufacturing city, with the newspaper *Daily Adviser* writing “We are only a workshop, a community of manufacturers rather than merchants.” (Tuttle, 2009).

Although the industrial boom at the turn of the 19th century carried Newark’s physical, numerical, and economic expansion, the fall of American Industry following WWII and the Great Depression marked the beginning of an economic decline and a new reputation for Newark of crime and government corruption. White residents gradually moved away – the white population of Newark decreased from 402,200 in 1930 to 72,800 by 1980 – and the Great Migration brought large numbers of Black residents, further motivating white residents who wanted racial segregation to relocate into different neighborhoods or out of the city altogether (Tuttle, 2009). The Ironbound neighborhood was targeted by racialized “slum clearance” policy, and was redlined as grade D in 1939 given housing structures and because “sales have been made...to negros.” At the same time, Newark’s population was growing, with an influx of immigrants from Latin American countries settling in the Ironbound alongside existing black communities (Redlining & Manufactured Decline).

Meanwhile, a number of factors put the Ironbound residents at increasing risk of toxic exposures. Newark continued to suffer from a lack of investment and old infrastructure, including lead pipes, contributing to consistently high lead levels for children. (Faherty, 2020) (Joselow et al, 1974)(Stratton et al, 2022). The area adjacent to the Ironbound – long an industrial area – became a prime target for major chemical companies, and currently, there are two superfund sites in the Ironbound.

The first of these superfund sites is the Diamond Alkali Chemical, a plant that was the largest producer of the pesticide known as “Agent Orange,” a byproduct of which is the bioaccumulative carcinogen dioxin. Following the discovery of high dioxin levels by the EPA in 1982 in Times Beach, Missouri, documents of previous tests at the Diamond Alkali site showing high dioxin levels (double the amount at Times Beach) were “rediscovered” by the state government. A state of emergency was declared, and workers in hazmat suits descended upon Ironbound, finding additional high levels of mercury and PCP in the soil, air, and water in the neighborhood and adjacent areas, some of which remain today (Belton, 2011). The Diamond Alkali superfund site remains at risk due to its location in a flood zone that has carried hazardous water into the homes of Ironbound residents; it is considered one of 74 sites nationally that are “not only vulnerable to the effects of climate change but [that also] contain uncontrolled toxic wastes that could damage human health” (Ortiz, 2020). The second Ironbound superfund site is Pierson’s Creek, which is the result of a mercury leak into the stream from a plant now operated by Troy Chemical Corporation (*Pierson's Creek Site Profile* 2017).

In addition, the area is surrounded by major highways, which are linked to increased respiratory illness due to their production of PM_{2.5}, NO_x, and SO₂, and location next to a major airport, where lead from the jet fuel is released into the air as it is combusted. Today, 24% of families in Newark live below the poverty line – double the national average of 12% and nearly triple the number in NJ as a whole (9%) (Census, 2020). One-third of cargo entering the U.S. comes through Newark’s Port, bringing in large daily numbers of diesel trucks (and their emissions) through the Ironbound and adjacent highways (*ERI* 2021).

History of the Incinerator

Government Inaction Towards Concerns of Pollutants

On the momentum of the 1986 Newark riots, the Ironbound Community Corporation (ICC) was founded in 1969 as a nonprofit serving residents who lacked affordable childcare. Following the publication and superfund designation in 1981 of the Diamond Alkali plant, residents founded the related Ironbound Community Against Toxic Waste (ICATW) in 1982 to advocate against industrial pollution. (Baptista, 2024) Following successful campaigns to prevent the construction of a municipal waste incinerator in wealthier, whiter neighborhoods like Montclair, the Port Authority proposed the siting of the incinerator in the Ironbound (Winokur, 2020). While governmental officials promised that this incinerator would be one of many built in the state to serve New Jersey’s burgeoning waste crisis, it was actually one of only two that were built at the time – the other was in Camden, another lower-class neighborhood with a majority black population (Weiner, 1993).

Members of the Ironbound community were opposed to incinerator siting from its inception and skeptical of its safety. (*Newark Environmental Resources Inventory (ERI)* 2021) Residents organized marches, testified in public hearings, and filed multiple lawsuits. EPA

officials attempted to assuage concerns, emphasizing that similar toxic emissions are found in cars and heating systems, citing the “proven track record” of mass-burn technology, and promising that “the temperatures would destroy virtually all the potentially hazardous elements in the garbage and scrubbers would reduce the stack emissions.” (Narvaez, 1988) At a hearing in 1984, ICC community organizer Nancy Zak emphasized that the Ironbound understood the harm caused by pollutants including dioxin (the primary concern from Diamond Alkali). “These incinerators are not safe because they produce dioxin,” She stated to a panel of government and industry officials. “Nobody has shown us contrary to that, that they don’t produce dioxin. They do produce dioxin. We know what we’re talking about and you can’t fool us anymore.” Regulations limiting hazardous emissions were not implemented until the 1990 Maximum Achievable Control Technology (MACT) regulations (after the building of the incinerator), and it was not until 2016 that more advanced “bag” scrubbers were retrofitted on the incinerator (*Development of MACT Standards*, 2015)(*Christie Administration*, 2016). Uncontrolled waste incinerators are the “worst culprits” of dioxin emissions according to the World Health Organization (*Fact Sheet Dioxins* 2023).

In addition to negating the risk posed by pollutants, officials also ignored concerns about the track record of Browning Ferris – a partner of American REF- Fuel, the incinerator manager and parent company of Covanta. (Solnik, 2005) According to Micheal Gordon, a lawyer for the Ironbound Committee Against Waste, Browning Ferris’ history of repeated environmental violations “should make it impossible for them to get a license.” (Romano, 1990b) Covanta has since been found to have falsified tests at another incinerator and was repeatedly around the country for violating its emissions controls. (*State of New York v. Covanta Hempstead Co.* 2024)

Officials attempted to persuade residents to stop protesting, utilizing tactics that Bullard describes as “economic blackmail” – a phenomenon in which residents of communities facing environmental injustice are forced to choose between their economic well-being and physical health – emphasizing the need for the jobs the facility would create (despite only providing 60 permanent ones) and stating that each month of delay “will cost Essex County taxpayers about \$4 million to \$5 million.” (Narvaez, 1988) In Feb 1988, 100 people demonstrated as ground was broken for the incinerator, following the EPA granting the permit for operation of the facility - this permit has since been violated hundreds of times –including over 900 times from 2004 to 2009, violations that Covanta officials have argued that occurred only for small periods of time “blips.”(Narvaez, 1988)

The Ironbound incinerator is the largest single source emission for NOx – a pollutant that forms smog – in Essex county. There have been multiple reported incidents of pink and purple-colored smoke stacks resulting from improper burning of chemicals, at which point the ICC, Earth Justice and the Vermont Law School’s Environmental Advocacy Clinic threatened to sue the state should they not intervene. Upon subsequent investigation, it was found that the incinerator was burning iodine, which the NJ Department of Health defines as a “hazardous substance” that can cause respiratory damage and irritation when inhaled as well as impact kidney and liver functioning at high levels. (Press, 2022) (*Iodine* 2016) Yet, the NJ Department

of Environmental Protection has continued to allow the permitting of new industrial facilities in the area, – even after a 2023 law requiring them to assess the impact on overburdened communities, – with a fourth power plant permitted in 2024 - that the government promised only will operate as a “backup during power outages” (Solomon, 2024). In 2022, the EPA was sued again by the ICC for not updating its emissions regulations for the facility (Press, 2022) (*Complaint*, 2022). The ICC now leads “toxic tours,” in which members narrate the history of industry while on a bus that travels to the “Chemical Corridor” (Doremus Avenue), the sewage treatment plant, fat rendering plant, natural energy center, and garbage incinerator which are all clustered less than a mile from Ironbound’s dense residential center (Winokur, 2020).

Misleading of the Public

While the Essex County incinerator was marketed to Newark community members as a cheaper method of discarding waste, residents became skeptical after seeing the planned 2,300 ton processing capacity. (Romano, 1990a) In 1985, Ironbound Committee Against Toxic Waste member Arnold Cohn stated in a New York Times article that he believed the incinerator to be deliberately oversized because American Ref-Fuel intended to solicit sales outside of the community. (Romano, 1990b) This suspicion was supported by an amendment to the official plan in April 1987 (three years before the facility was to be built) which authorized REF-FUEL to take waste from “beyond the needs of Essex County” should “excess disposal capacity exist,” indicating officials had doubts about capacity being met despite what they were telling the public. Additionally, the EPA Commissioner Rick Dwelling noted on the then-passed amendment that in order “to ensure the economic viability of the project,” the facility would be allowed to accept waste from outside the state if “county solid waste be insufficient to meet the needs of the facility, and if acceptable waste is not available from other New Jersey districts.” (Richard, 1987). He also mentioned that the commission that had passed the bill failed to properly notify the public and hold hearings. If the incinerator was only intended to serve Essex County, why would officials have such detailed contingency plans years before its construction?

The Port Authority’s role in the project provides additional evidence that Arnold Cohn was correct. In the 1990 New York Times article “Port Authority's Incinerator Role Questioned,” the question is posed as to why an interstate agency operating in the joint interest of NY and NJ would invest \$300 million in a facility intended only to serve the population of Essex County. (Romano, 1990a). After the incinerator was built in 1990 to handle 2,500 tons of trash a day (recent reports now put this number at 2,800 tons), Essex County was able to provide only half of the 1,800 tons amount it had been required to pay for – costing taxpayers and subsequently prompting a long term deal to receive waste from other NJ counties (Yi, 2018) (Newman, 1999). With the closure of the Fresh Kills landfill in Staten Island, the Ironbound incinerator began to take 1,700 tons of Manhattan's excess waste in 1999, which made up over 73% of the waste processed at the facility). This reliance was supposed to remain in place “until a long-term program using trains and barges is developed.” (Newman, 1999). The incinerator was later sold

to Covanta (now Reworld) in 2002, and in 2012, the DSNY signed a contract to re-increase the quantity of waste sent to the incinerator to approximately 1680 tons per day (most of the incinerator's capacity) now called the Covanta-Essex RRF (Resource Recovery Facility), with environmental analysis paperwork neglecting to consider the welfare of those living there. (*Declaration of Significance* 2012)

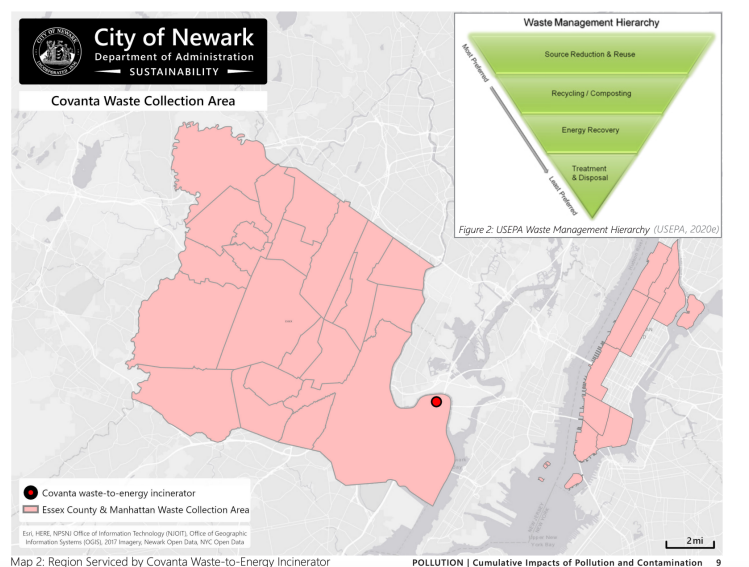


Fig 1. Areas that currently collect waste for the Essex County Resource Recovery facility, as modeled by the City of Newark in the 2021 ERI

The Ironbound Demographics and Community Impact

The Ironbound neighborhood now has 60,000 people as well as the U.S.'s second biggest seaport, biggest incinerator and sewage treatment facility, an airport, rail yards, and hundreds of polluting industries. It is also the most densely populated section of Newark (*Toxic Sites in Newark* 2020). The railroads bordering the Ironbound that give it its name are the only border between homes and schools to separate them from the “Chemical Corridor”(Figure 1). Residents are predominantly Portuguese, Brazilian, Central American and African American. Poverty and unemployment rates in the Ironbound are high when compared to national numbers, but within Newark are not the highest poverty. Ironbound is a working class neighborhood, and the high percentage of Hispanic/Latino immigrants explains why the neighborhood experiences high levels of linguistic isolation (Fig 2), defined as the lack of at least one adult or child over 14 that speaks English “very well.” This may hinder understanding of government documents and self-advocacy for residents who face some of the highest rates of exposure to air toxins (Fig 3) and resulting risks of cancer (Fig 4). Despite heightened exposure to harmful toxins, Ironbound

residents are also all within the 95-100th percentile for lack of health insurance (*ERI* 2021) (EJscreen 2024).

Is there a measurable impact of environmental toxin exposure on the Ironbound community? It can be difficult to isolate the health impacts of living near a municipal incinerator given the often-colocated pollution of nearby sited industry, highways, and agricultural chemicals. There are also the additional issues of delays in symptom exhibition, including “latency for carcinogenicity, subacute/delayed reproductive and intergenerational effects” along with the mobility of populations, which can further hamper the tracing of toxic exposures and exposed individuals. Despite these challenges, multiple studies have demonstrated that living near municipal incinerators does have a significant impact on community health, most evidently on respiratory function and cancer incidence but also congenital abnormalities, hormonal defects, and skin irritation. (Sharma, *The impact of incinerators*, 2013) (Coppeta et al., *Pulmonary functionality*, 2019). It should be noted that Newark also has among the highest childhood asthma rates in the country, with 1 in 4 children diagnosed with asthma. (Johnson, 2015). Childhood hospitalizations for asthma in Newark are 30x the national rate, and asthma was found in a 2016 report to be the leading cause of children in Newark missing school (*Showing up matters* 2016).

Adverse health impacts can also translate into economic harm, as the social stigma associated with living near incinerators has been demonstrated – like many hazardous industries – to decrease the property values of those living near it. Given that the Ironbound is an area that has historically been redlined, the incinerator acts as a further deterrent to wealth building for families living in the neighborhood. Studies have not only correlated incinerator location to the presence of low-income and racially marginalized communities, but the proportion of immigrants located near incinerators has also been found to increase with higher emitting facilities (Schwarz et al, 2015).

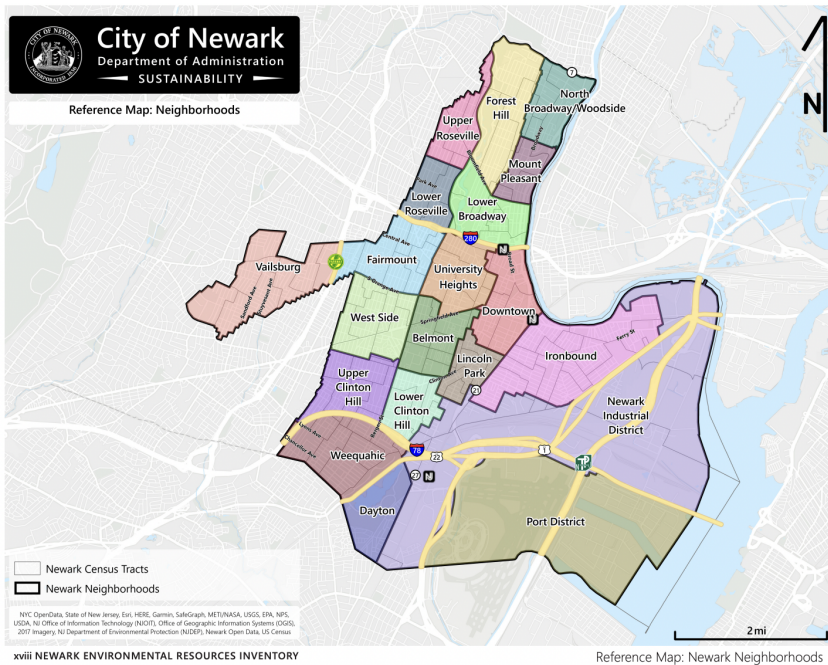


Fig 1. Reference map of neighborhood and census tract divisions in Newark, with the Ironbound in light pink. Heavy industry, including the incinerator, is located in the light purple industrial area. From the 2021 NRI by the City

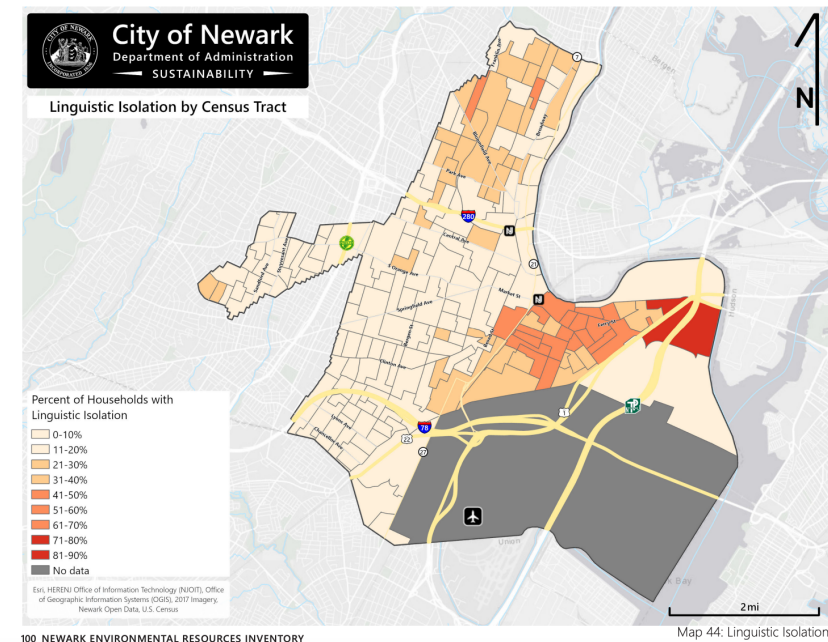


Fig 2. Linguistic isolation within the Ironbound is experienced by 20-70% of every population block, with the population tract closest to the incinerator having the highest level of linguistic isolation.

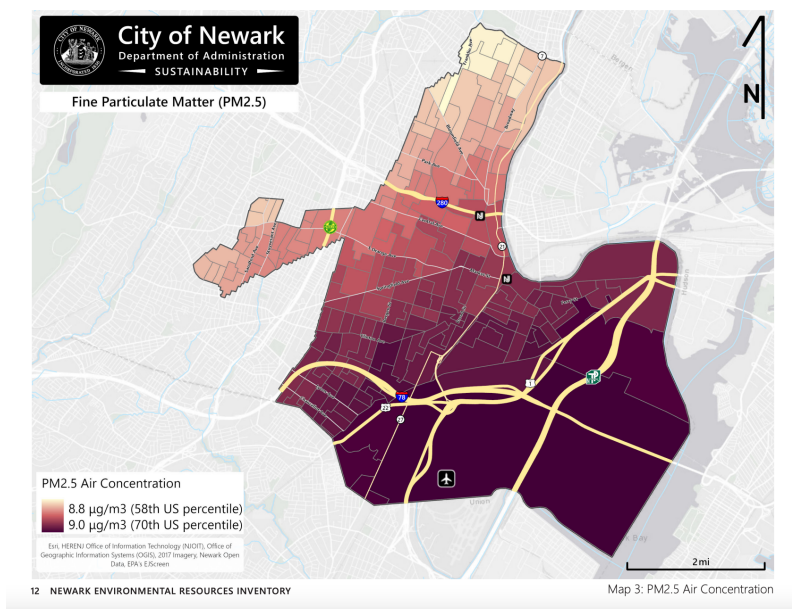


Fig 3.

Exposure to air toxics, defined as the 187 hazardous air pollutants— including lead, SO₂, PM 2.5 and NO_x that are regulated under the Clean Air Act. Much of the Ironbound is within the 80-90th percentile of exposure for NJ.

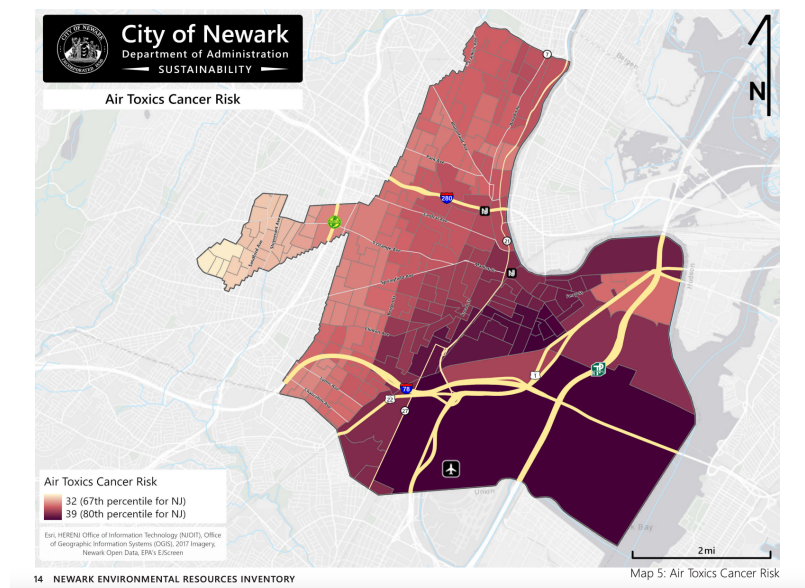


Fig 4.

Air toxics cancer risk, which is modeled using data from the EPA National Air Toxics Assessment. (*ERI 2021*) is above the 70th percentile for NJ in the Ironbound, with areas in the 80th notably closer to industry.

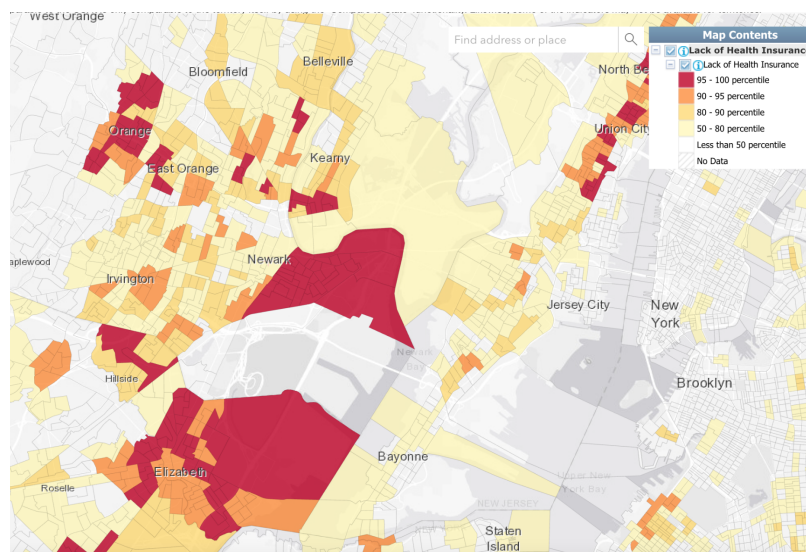


Fig 5.

Lack of health insurance is modeled using EJScreen, an EPA mapping tool that draws upon government collected data to identify communities facing environmental justice. All blocks in the Ironbound neighborhood are in the 95-100 percentile for lacking health insurance. This could be because the average household income is slightly higher than other areas of Newark, meaning that many household residents

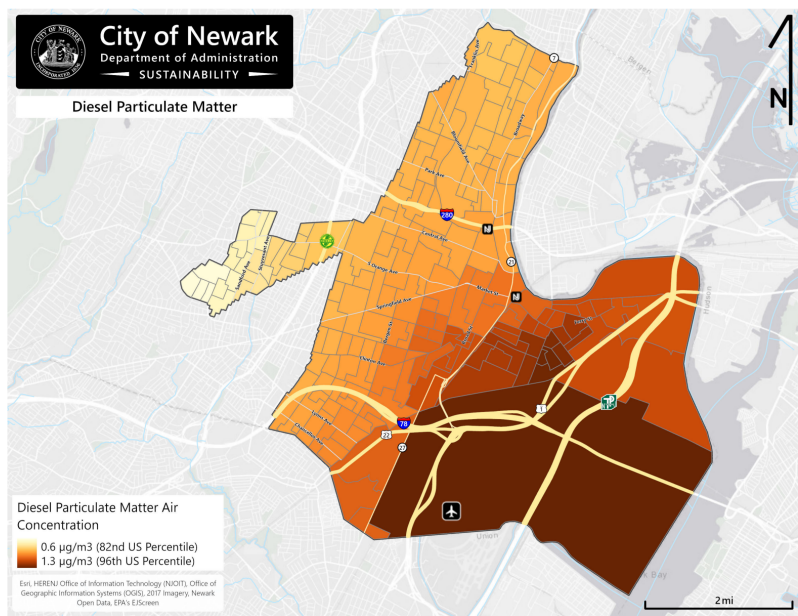


Fig. 6

Exposure to Diesel Particulate matter is modeled by comparing EPA data from various tracts from Newark to all U.S. data gathered. This map demonstrates the impact of the multiple highways and industrial trucking in the Ironbound, as much of the neighborhood is within the 90th percentile of exposure.

Map 11: Diesel Particulate Matter

POLLUTION | Cumulative Impacts of Pollution and Contamination 25

COLUMBIA UNIVERSITY

I was unable to obtain records of Columbia's campus waste production and diversion from the university, and therefore have to rely on the last public annual waste report on Columbia's Morningside campus, which is from 2018. In this report, the university recorded that of the 4,116.18 tons of waste produced on campus, 3,228.94 (or 78.5%) went to landfill. Only 78 tons (or 1.9%) of the waste that year was diverted to compost, 600.25 tons to recycling (14.6%), and 208.99 (5.1%) to donations or resale. (*Columbia University Waste Minimization and Diversion*, 2018).

Per Agyeman, sustainability cannot exist at Columbia without justice. Given Columbia's lack of action on diversion and reduction tactics, their funding of harmful science, and the failure to acknowledge the role they play in systems of environmental harm, Columbia perpetuates the racialized injustice and lack of safety experienced by those in the Ironbound.

Most focus on waste diversion, not reduction

2030 Plan

Much of Columbia University's reduction and diversion policy is planned in the Responsible Materials Management section of Columbia's 2030 plan, in which the university states that it "commits to achieve zero waste, execute a comprehensive sustainable events policy, and enforce science-based targets through coordinated sustainable procurement efforts" by 2030. The document then lists four action items to achieve these goals.

1. The university committed to expanding waste diversion programs, stating that their focus would be on reviving the organics program "which diverted hundreds of tons of waste from landfills and incinerators prior to COVID-19 pausing the program."
2. The university committed to implementing cross-campus "Senior Sustainability Advisory Committee (SSAC) and Working Group Members. This committee created sustainable event guidelines that emphasize waste reduction of single-use plastics and gifts along with composting and leftover food donations.
3. The university committed to ensuring their "retail tenant" is in accordance with all university sustainability standards, meaning that realtors who are tenants on Columbia University property – like Shake Shack or Joe's Coffee – would have an added sustainability clause. I have been unable to find any evidence or progress on this goal.
4. The university committed to creating "procurement specifications" that apply to all goods bought through the university that both "quantify and encourage the reduction of waste and emissions on campus." There is no evidence that these standards have yet been developed or implemented.

Existing Policy

Outside of the 2030 plan, existing policy includes organics collection of waste from dining halls in John Jay and Lerner halls, residential collection (which was cut following the pandemic and now is set to begin again in October). There are also two programs attempting to promote circular economy on campus; ReUse, a university owned office items program share, and the biennial “Clean and Go Green” event in which the university provides dumpsters for students which facilities and operations employees will sort into recycling and donations at the start and end of the school year. (*Reuse Program*) (*Clean + Go Green*) Columbia’s sustainability office provides guidelines on recycling electronic waste and batteries, and, in line with NYC policy, the campus features marked single-stream recycling bins with visual signage to aid proper sorting (*Responsible Materials Management*).

Lack of specific, enforceable goals

While Columbia's 2030 plan lays out laudable efforts to reduce waste production, it suffers from a lack of specific targets and enforceable, measurable goals limiting the effectiveness of this effort. The 2030 plan, and subsequent sustainable events guidelines, lack any actionable target to reach this goal, while current composting and recycling efforts do not appear to have any target for scaling up. As Bullard wrote, a commitment absent of targeted action enables impacted communities to continue being exploited. A key question here is whether the Office of Sustainability possesses the ability to set and enforce reduction targets; if not, the university would need to find another means – whether through rulemaking or other procedures – to create, promote, and enforce specific, actionable goals across schools and campuses.

Reliance and Perpetuation of Harmful Science

Columbia University fails to consider the needs of the communities its waste impacts, in tandem with promoting their reliance on incineration as “landfill diversion,” writing that “despite a relatively stagnant diversion rate, the university now sends 95% of waste generated from academic buildings to a waste-to-energy plant, reducing the amount of waste sent to landfill to only 5%” (*Responsible Materials Management*). This statement justifies inaction on diversion rates by promoting incineration as superior to landfilling – a statement that is deeply contested in its climate impact, in addition to being extremely variable depending on positionality (*NY State Solid Waste*, 2023) (*Global Waste Management Outlook*, 2024). A 2019 study found that of the 72 existing incinerators in the U.S., a majority (58%) were located in “environmental justice communities,” defined as areas in which more than 25% of residents are low income, people of color, or both. (Baptista & Perovich, 2019). Promoting New York City’s reliance on the Ironbound incinerator as a diversionary effort may be beneficial for Sustainable Columbia’s progress updates, but the same can certainly not be said for residents of the Ironbound.

Similarly, Columbia University hosts the Global Waste-to-Energy Research and Technology Council (WtERT), a research body dedicated to bringing “scientists, engineers, and managers from industry, universities and government with the objective of advancing

Waste-to-Energy technologies worldwide” (WtERT, 2024). Its founder and President Nickolas J. Themelis, is also the founder and director of Columbia’s Earth Engineering Center out of which WtERT has operated. (Earth and Environmental Engineering) (WtERT 2024). As per this dedication, WtERT is partnered with waste-to-energy interest groups and corporations which manage incinerators, including Covanta/Reworld. In 2012, Themelis testified on behalf of Covanta/Reworld in front of Indiana’s regulatory committee, in a statement in which he argued that the incinerator there should receive further clean energy benefits. (Covanta Comments, 2012). Themelis has also co-authored studies that indicate that modern day incinerators do not pose health risks, (Dwyer & Themelis, 2015) which environmental organizations have disputed do not account for the less strict emissions criteria for existing incinerators like those in the Ironbound (Ewall, *Trash incineration fact check*). Columbia therefore does not only generate waste burned in the Ironbound incinerator but also funds research used to justify and perpetuate the presence of incinerators nationally and globally, including the Essex County Incinerator in the Ironbound.

These actions are enabled by the university’s reliance only upon vague, “science-based targets” to inform policy, which both Bullard and Bruelle affirm can reinforce the systems of oppression and injustice. Communities living in sacrifice zones, by virtue of the same systems of racial and economic disenfranchisement that have led to their exploitation, may remain overlooked by researchers or unrepresented/excluded from elite spaces where much of the scientific research guiding policy is being developed. It is therefore critical for Columbia to center the knowledge and policy recommendations that community groups – like the ICC – have been advocating for, which includes increased composting programming and centering waste reduction.

Lack of Acknowledgement of Privilege and Impact

The first step for institutions to end their complicity in systems of environmental injustice requires acknowledgment of their privilege, the communities they harm, and the importance of action. Absent from the commitments within the 2030 plan or the Sustainable Columbia website is any acknowledgement of why waste reduction is important, the communities impacted, nor the existence of systems of environmental injustice.

Columbia also refrains from mentioning its positionality as the largest private landowner in New York City – the epicenter of consumer culture and largest producer AND exporter of waste in the United States – and the outsized impact of their policies on local, regional, and global communities facing environmental injustice. The failure to acknowledge this privilege, Young and Fraser affirmed, allows the university to negate the importance of wielding it responsibly. Acknowledging privilege and harm is not a move simply to bolster public opinion – it provides a basis for educating community members and informing policy, while also serving as a building block for a relationship with communities like the Ironbound that are facing harm at the university’s expense.

Sustainable Columbia's lack of consideration of the systemic, often racialized environmental injustice they are complicit in is also notable considering that the office claims to follow the guidance of the United Nations Environment Programme (UNEP) "to establish principles and measurable targets" (*Sustainable Columbia*). The UN Environment Programme, however, has also repeatedly affirmed the importance of the right to a healthy and safe environment and emphasized in its 2024 Global Waste Outlook the importance of addressing "intragenerational and intergenerational inequalities" in the development of waste policy." (*Global Waste Management Outlook*, 2024)

DISCUSSION

Columbia University, as a major university and the largest private landowner in NYC, contributes to and normalizes the racialized and classist structure of the Sacrifice Zone in which the consumption habits of whiter, wealthier urban cores are sustained through industrial activity that primarily harms lower-income communities of color. Consequently, the university's lack of action towards the diversion/reduction of waste, acknowledgment of harm, and promotion of pro-incinerator science comes directly at the expense of the lungs and livelihoods of those living in the Ironbound.

The university has an obligation to act not only because it has committed itself to sustainability – which requires environmental justice – but also because of its position of influence in New York City and on the global stage. Instead of deferring to New York City's waste management policies – which have both historically underperformed and perpetuated injustice in the Ironbound – Columbia could instead take control of its waste strategy, moving beyond exclusionary "science" and centering the experiences of impacted communities as it makes specific, tangible plans to achieve reduction.

University campuses have stagnant, semi-insular populations that often live, work, and consume in one place. They can both educate and innovate simultaneously, empowering the entire university community to rethink their relation to consumption and waste (Ebrahimi & North, 2017). While Columbia's impact is substantial, it is not alone in its role as a major university situated in a wealthy, consumption-heavy, urban center. Although currently complicit in systems of harm, universities like Columbia have the potential to model the reduction methods and a localized circular economy that is crucial for both environmental justice and waste reduction.

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