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A Just, Sustainable Transition at Fordham University

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A Just, Sustainable Transition at Fordham University

Ethan Shepard

Abstract

This paper takes a deeper look at Fordham University's environmental impact and concludes with a strategy outline that works towards a just, sustainable future on the university campus and surrounding areas. New York City is an area already facing the adverse effects of climate change, and there are several threats that have the potential to cause grave consequences moving forward. Prior to constructing a climate action plan, it is integral to understand the past and present status of The Bronx under a socio-environmental lens. Chapter One focuses on the current status of Fordham's Rose Hill Campus from a sustainability perspective and why action must be taken, given New York City's unique situation. Chapter Two covers how Fordham's environmental impact affects the surrounding communities of The Bronx, an area that has been stricken with environmental injustice for decades. More specifically, this chapter delves into how minority groups are disproportionately exposed to unsafe environmental conditions and health risks. Next, Chapter Three explores sustainable college campuses across America, including Fordham University itself, and delves into how different universities are making plans for a campus design that is green and resilient. Chapter Four builds off the latter, discussing the politics and processes that go into building out a sustainable college campus. This chapter studies Fordham's own experience on this front, as well as other universities leading the charge across America. Finally, Chapter Five concludes with policy suggestions for Fordham University's Office of Sustainability that are conscious of environmental injustice while aiming to make the Rose Hill Campus a more environmentally friendly and sustainable place for students.

Keywords: Fordham, sustainability, college campuses, environmental justice, sustainable design

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Introduction: My Fordham Sustainability Story

As I began to plan out my college search as a junior year in high school, it was clear that I wanted to be somewhere that was accessible to a major city but still be surrounded by nature, as being outdoors made up most of my early life. Fordham University was a school that piqued my interest, and when the time came to take a tour, I immediately knew that the diamond in the rough that is the Rose Hill campus was the place for me. Despite being a twenty-minute train ride away from the heartbeat of America's largest city, the campus is filled with green spaces, blossoming gardens, and towering oak trees that form a canopy over the campus walkways. Unlike many other universities across the country, the Rose Hill campus offered a taste of the great outdoors and an escape to the fast-paced lifestyle of a major city.

Around this time, I started narrowing down what I wanted to study at the next level, which was not easy. I had been taking AP Environmental Science throughout the school year. The course eventually introduced me to the topics of urban planning and sustainability, and my interest in these grew exponentially for the remainder of the academic year. While still deciding between schools, Fordham's Environmental Studies program became a frontrunner, allowing me to choose which environmental disciplines I could prioritize while earning my degree. Learning more about environmentally conscious production, renewable energy sources, and sustainable city design, I realized that this degree would allow me to cover a wide breadth of environmental topics in a city drastically impacted by climate change's effects.

Nearly a year and a half later, and I am beginning my first year at Fordham and taking introductory courses for the Environmental Studies program. In the past, sustainability has merely been a buzzword I would come across in readings or informational pieces, but it is now at the forefront of many of my studies. The importance of sustainability to ensure prosperity for

society's current and future generations inspired me to learn more and take action. The urgency and severity of the climate change issues that sustainability aimed to remediate and solve really resonated with me, and for the first time, I found a field that I was motivated to pursue for my life's work.

In my first year as a student at Fordham, I became increasingly interested in how the administration approached sustainability, specifically on the Rose Hill Campus. Throughout my time at Fordham, I joined student groups on campus, including the Climate Impact Initiative and the United Student Government Sustainability Committee, which have allowed me to play a part in making smaller-scale changes to make campus life more sustainable. However, as I begin my senior year, I have been presented with the opportunity to work as an intern in the university's Office of Sustainability, which was established in November of 2022. This internship opportunity covers several different aspects of sustainability, ranging from renewable energy, waste management, and materials sourcing. Working alongside the Office of Sustainability, I plan to devise my own sustainable policy recommendations for the university moving forward, which is the basis of this thesis.

However, before creating my sustainable solutions, it is essential to understand the Rose Hill campus and its place in the environmental world. Chapter One introduces Fordham University's progress thus far from a sustainability standpoint. The chapter also touches upon how New York City as a whole is being affected by climate change and the different environmental dangers that threaten the city. From a more social perspective, Chapter Two delves into the widespread issues of environmental injustice in the Bronx and the implications Fordham's development over time has had on the surrounding community. Chapter Three explores the sustainable design plans and projects of fellow college campuses nationwide to

draw inspiration for future strategy at Fordham. Chapter Four explains the politics behind the sustainability movement on college campuses and the struggles of making such drastic changes. Finally, Chapter Five combines all of the aspects of previous chapters to form a sustainable strategy and policy suggestions for Fordham to implement to help reduce environmental harm and support the local population.

Chapter 1: Fordham's Sustainability Status

This chapter sets the foreground for the following chapter by introducing New York City from an environmental standpoint with an emphasis on ecosystem services and their socioenvironmental impacts. Then, the focus switches to Fordham University's Rose Hill Campus in an environmental context. These sections will provide a brief overview of the campus, university sustainability plans, and its current environmental status.

Ecosystem Services of New York City. Before New York City was the concrete jungle that it is today, many centuries ago, it was an untouched, sprawling natural landscape called "Manhatta" by native groups (Sanderson 2009, 10). Manhatta was a thriving environment and scientists estimate it was home to more ecological communities per acre than Yellowstone, more native plant species per acre than Yosemite, and more birds than the Great Smoky Mountains National Park (Sanderson 2009, 10). Biodiverse with an abundance of different plant and animal species, Manhatta featured a variety of unique ecosystems and, thus, a diverse range of ecosystem services. Ecosystem services are defined, in basic terms, as "the benefits people obtain from ecosystems," which come in many different forms and are often separated into four main categories by scientists: supporting, regulating, provisioning, and cultural services (Fisher et al. 2008, 2051). In its natural state, Manhatta's marine ecosystems were comprised of billions

of oysters, clams, and mussels filtered by the local water supply for the native Lenape groups that inhabited the area (Sanderson 2009, 10). The vast land also provided this group with various food sources via hunting, fishing, and planting crops like corn, beans, and squash (Sanderson 2009, 10-13). The natural wonders and thriving ecosystems that defined Manhatta are far removed from what is now Manhattan and New York City today after years of human settlement and development that degraded the local environment. However, in the present day, there are more and more efforts that aim to restore some of these ecosystem services that help merge the built environment of New York City with the inherent ecological landscape that it is built upon.

The first wave of European settlers that came to New York City were the Dutch, who arrived in the 1620s (Roberts 2008). Following land purchase by the Dutch in 1626, settlement rates in the New York area skyrocketed, and it became one of America's most established areas (Roberts 2008). Fast forward to 1776, New York was the second largest city in the American colonies, with more than thirty thousand inhabitants (Sanderson 2009, 43). With this population growth came developments that led to the unfortunate degradation of Manhatta's ecosystems and the services they provided. Conservation biologists describe human influence as the most important factor constraining the planetary ecology today as it can result in habitat destruction, biological fragmentation, and the introduction of invasive species, all of which threaten the environment from operating as it did in its natural state (Sanderson 2009, 32). There are various instances that showcase the implications of human influence on the New York City environment, especially amidst the increasingly vulnerable conditions brought on by the climate crisis.

The urbanization of areas like New York City can result in climate change effects that can impact the local area as well as the entire globe. (Solecki and Marcotullio 2013, 486). Climate specialists have explored the environmental impacts of urban growth in New York for a

long time, and the consensus is that there are a few primary ways that the development of the city has contributed to climate change on a local scale (Solecki and Marcotullio 2013, 486). As a result of urban development, many of the naturally occurring ecosystem services that thrived during the era of Manhatta have either been disrupted or lost over time, leading to these localized climate issues. Urban heat island, a term used to describe routinely above-average temperatures in urban areas, results from the modification of radiation, energy, and momentum exchanges stemming from the built form of the city, together with the emission of heat, moisture, and pollutants from human activities (Solecki and Marcotullio 2013, 486). In terms of ecosystem services, Manhatta's plethora of trees and other vegetation likely provided a canopy that prevented surface temperatures in the area from rising, which would be considered a "regulating" ecosystem service. Data reflects the impact of the urban heat island effect as local temperatures are at historic highs, and climate scientists project that they are projected to increase between two and four degrees by the 2030s and between five and thirteen degrees by 2100 (Maldonado 2024). Another local climate issue New York City faces is increased rates of precipitation, which is also caused by the disruption to regulating ecosystem services. Factors that contribute to heavier, more frequent precipitation include high surface roughness that enhances convergence, UHI effects on atmospheric boundary layers and the resulting downstream generation of convective clouds, and generation of high levels of aerosols that act as cloud condensation nuclei sources (Solecki and Marcotullio 2013, 487). Scientists predict that average annual precipitation will increase by as much as ten percent by the 2030s, fourteen percent by the 2050s, and up to thirty percent by 2100 (Maldonado 2024). The third main impact of urbanization on climate is air pollution, which will be intensely covered in later chapters in relation to New York City. In short, cities are the sources of significant air pollution as they are the location of intense fossil

fuel consumption and land use changes in typically densely populated areas (Solecki and Marcotullio 2013, 487). Similar to the previous two urban climate effects, air pollution in New York City is made worse by the removal of plants and trees, which provide the regulating ecosystem service of cleaning the air through photosynthesis and respiration.

The loss of ecosystem services due to urbanization in the New York City area plays a considerable part in the local climate change issues the city currently faces. However, in recent years, the city and its inhabitants have become increasingly involved in developing strategies that seek not only to remediate these changes to local ecosystems but also to adapt to the unique local impacts of climate change. The following sections in this chapter focus on these New York City-based issues and provide a brief overview of how Fordham University has begun addressing climate change on its own Rose Hill Campus in the Bronx.

Why Do NYC and Fordham Need to Change? As explained earlier, scientific research on climate change has continuously revealed that major cities, like New York, are some of the most vulnerable areas when it comes to suffering the effects of global warming. The New York Panel on Climate Change (NPCC) is a group of climate scientists that gather information to help New York City understand the impacts of climate change and develop strategies to adapt to these changes (NYC Mayor's Office of Climate and Environmental Justice 2023). In 2015, the NPCC produced a report to share recent climate change-based findings and the effects such could have on the city's population (NPCC 2015, 9-11). In addition to the climate change effects described in the previous section, the NPCC predicts the city will face various other issues based on current climate trends. Some of the most consequential climate change impacts include temperature increases, precipitation, and rising sea levels (NPCC 2015, 9-11). While these issues regarding global warming effects are generally widespread, New York City is more vulnerable than other

locations. The NPCC states, “the frequency of heat waves is projected to triple by the 2080s,” and that projects that sea level rise in New York City will be between eleven and twenty-two inches by the 2050s and eighteen and thirty-nine inches by the 2080s (NPCC 2015, 11). While some of the effects of climate change are already being felt in New York City, the NPCC uses the reports to warn residents, government officials, and others based in the city that the time to develop comprehensive response strategies is now.

Institutions across the city have begun to take that fight against climate change and its potentially devastating impacts. Participation in sustainable, climate-adaptive strategies ranges from environmental advocacy groups to private corporations, as managing the effects of climate change is a significant task that requires involvement and commitment from the masses, not only the city’s government and politicians. As a New York City community member, Fordham University has its own part to play in the city-wide mission of reducing its environmental impact and contributions to global warming. While Fordham has already taken action on this front, as shown by the dangers outlined in NPCC reports, there is an urgency to expand programs and strengthen plans to successfully combat present-day climate change effects and the threats it poses moving forward.

Introducing the Rose Hill Campus. Fordham University’s main campus, Rose Hill, is located in the northwest of the Bronx borough of New York City. The campus is home to around 7,000 undergraduate students, who inhabit the 85-acre campus from late August to early May each year (Fordham University 2020). The site of the Rose Hill campus itself has been used for higher education since 1838, though since then, the institution has changed names, and the campus landscape has changed dramatically (Yerrabelli 2022). The following chapter features a more in-depth background of the history of Fordham, primarily through an environmental lens.

Fordham University is one of twenty-eight Jesuit colleges in the United States, but the only one located in New York City, which is a source of pride for students, alums, and faculty. Since becoming a Jesuit university in 1907, Fordham's enrollment and campus structure has evolved rapidly due to the implementation of graduate programs, the construction of dormitories for students, and many other changes during the twentieth century (Fordham University 2016). However, with this massive growth and expansion came dramatic environmental changes to the original Rose Hill Manor that Fordham University still sits on today.

Understanding Environmental Footprint on the College Campus. Like Fordham, many colleges and universities nationwide saw massive growth during the last century and continue to expand today. This phenomenon of rapid development does not apply solely to academic institutions but to much of the globe. As a result, society faces high-paced global climate change stemming from human activity, mainly greenhouse gas emissions. Scientists, political leaders, and many more address that one of the first steps to mitigating the effects of climate change is to understand our environmental footprint, whether on an individual, institutional, or municipal level. Once it is better understood how our human activities affect the surrounding environment, it is possible to develop efficient and adequate strategies to reduce our impact and remediate the damages that have already been caused.

In recent years, the importance of understanding environmental impact amongst academic institutions has spread across the nation. Now, more than ever before, there are resources available for universities to learn more about their footprint, climate sciences, and guidelines to follow to minimize impacts. Organizations like The Association for Advancement of Sustainability in Higher Education (AASHE) and the Association of University Leaders for a Sustainable Future (ULSF) are designed to help universities achieve sustainable change. AASHE

provides universities with resources to become leaders in sustainability and equips them to be eligible for assessment under the Sustainability Tracking, Assessment & Rating System (STARS), their self-reporting framework for colleges and universities to measure their sustainability performance (AASHE 2006). According to AASHE, three hundred and fifty-one schools globally currently hold a STARS rating, and two hundred and ninety-one of those institutions are located in America (AASHE 2023). This widespread participation from schools nationwide indicates that guidelines like STARS are leading administrators to engage in sustainability efforts, a precedent that generates optimism for future climate progress. However, these metrics just scratch the surface of what many call the "university greening movement" or the push for sustainability across American college campuses, which will be detailed in a following chapter. With that being said, Fordham University is one of the hundreds of schools in the U.S. that actively participates in sustainable initiatives and has its own detailed approach to managing its environmental impact during this crucial time in the fight against climate change.

Fordham's Sustainability Status. The Laudato Si' Action Platform is a plan Fordham University adopted after its creation by the Catholic Church in response to Pope Francis's call to action on Earth Day of 2022 (Gaffney 2022, 2). Pope Francis's vision is built on the widespread issue of environmental degradation and the social justice consequences created (Gaffney 2022, 3). The action platform has seven goals that inspired Fordham's ecological action plan: A Fordham Green Plan. Amongst the seven goals are "Response to the Cry of the Earth," "Adoption of Sustainable Lifestyles," and "Community Resilience and Empowerment" (Gaffney 2022, 4). As mentioned, these goals devised by Pope Francis and the Catholic Church laid the groundwork for Fordham's Green Plan, which is currently in place for the next seven years. The Green Plan comprises three main goals, the first of which is titled "Educate Students as Global

Citizens and Transformative Leaders for Justice in the Innovation Age" (Gaffney 2022, 9). This goal focuses on incorporating ethical and humanistic concerns in the various academic programs to help solve local and global challenges. The second goal is to "Excel Across the Natural and Applied Sciences and Allied Fields to Promote Social Change and Equity," which outlines a STEM program focused on justice and sustainability while expanding research opportunities on this front (Gaffney 2022, 9). Fordham's Green Plan's third and final goal is to "Cultivate a Diverse, Equitable, Inclusive, Caring, and Connected Community that Promotes each Member's Development as a Whole Person" (Gaffney 2022, 9). In simple terms, this goal aimed at achieving higher inclusion rates between the student body and the surrounding communities to build a tightly-knit relationship for future generations. Through *Laudato Si'*, Fordham's Green Plan has provided the necessary guidelines for making a community within and around the university that is sustainable, inclusive, and united in the mission for environmental change.

However, Fordham's environmental mission did not begin with the *Laudato Si' Action Platform*. In 2022, Fordham University released its *Climate Action Plan and 2021 Annual Report*. The report lists areas of environmental impact that Fordham is committed to addressing, including energy efficiency, waste management, construction, and transportation (Gaffney 2022, 4-5). Each of these areas of interest is accompanied by goals and targets that university administrators have set that they believe will help Fordham become more environmentally friendly moving forward. For example, the *Climate Action Plan* details a sustainable construction approach. In the plan, Fordham pledges that any future buildings on campus will be designed and constructed to be eligible for the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) New Construction Silver rating (Gaffney 2022, 4). As green buildings are an integral part of a sustainable university campus, this topic is discussed in greater

detail in the following chapter. By establishing ambitious goals as such, Fordham sets a precedent for a new era of sustainable campus design that aims to minimize environmental impact in the long run.

While the *Climate Action Plan and 2021 Annual Report* mainly cover strategies Fordham hopes to implement in the near future, they also highlight some of the university's successes in recent years. Fordham has signed on to many other pledges, including the New York City Carbon Challenge, under which they committed to reducing carbon emissions by forty percent before 2030 (Gaffney 2022, 5). Since signing on in 2007, the university has reduced its carbon emissions by just under thirty-two percent, according to the *2021 Annual Report* (Gaffney 2022, 5-6). While Fordham is undoubtedly on track to achieve forty percent reductions by 2030, the report also shares that to reach this target, the electrification of heating and cooling systems is a leading priority (Gaffney 2022, 7). In addition to Fordham, seventeen other schools have joined the New York City Climate Initiative, which has seen tremendous progress across the board since the initiative took form fifteen years ago (NYC Mayor's Office of Climate and Environmental Justice 2023). According to the Mayor's Office of Climate and Environmental Justice, twenty-one participants have already met the goal of thirty percent, and nineteen universities, hospitals, and commercial offices have expanded their commitment to a fifty percent or higher reduction by 2025 (NYC Mayor's Office of Climate and Environmental Justice 2023). City-wide initiatives, as such, can work in tandem with individual goals from different institutions to drive sustainable progress quickly and generate higher participation levels.

Outside of significant emissions reductions, Fordham has also made changes of various proportions on the campus that play a part in shaping a more environmentally friendly campus. While seemingly insignificant, Fordham has converted all lighting to LED, which the

administration projects is capable of reducing four percent of 2017 emissions levels by 2030 (Gaffney 2022, 9-10). There are also plans to convert all lighting used for athletic facilities to LED soon, which will substantially contribute to the energy used for lighting (Gaffney 2022, 10). Renewable energy has also been a focal point of the University's early efforts to create a more sustainable Rose Hill Campus. In recent years, the University has implemented three new photovoltaic energy generation systems on the rooftops of campus buildings (Gaffney 2022, 9). The larger of the three is located on top of the campus' parking garage, capable of generating over nine hundred fifty kilowatts; this is the largest, in terms of capacity, of any locally installed solar system at an institution of higher education in New York City (Gaffney 2022, 9). The parking garage installation came seven years after Fordham installed a rooftop solar array at Walsh Library in 2012, which has a capacity of two hundred and fifty kilowatts (Gaffney 2022, 9-14). The smallest of the three solar systems on campus is located at Campbell Hall and has a capacity of just under eight kilowatts (Gaffney 2022, 14). Aside from solar, the University also views geothermal energy as a potential renewable energy source that may soon implemented on campus and is currently being considered for installation at ten Rose Hill buildings (Gaffney 2022, 10). Like participating in the NYC Carbon Challenge, Fordham joined the New York City Department of Environmental Protection Department of Environmental Protection (NYCDEP) Water Challenge in 2018, inviting higher education institutions to help reduce citywide water demand (Gaffney 2022, 11). While Fordham's Lincoln Center Campus was selected as the University's representative, participation in the event led to a commitment to installing submeters on both campuses, allowing for more adequate water usage measurements. The wide variety of sustainable strategies adopted thus far at Fordham University aims to limit its

environmental footprint across different areas, which is a necessary approach to encompass what it means to make a sustainable transition.

Fordham has made tremendous strides in the past decade or so in recognizing its environmental impact and developing strategies that seek to create a sustainable future on its Rose Hill campus. By participating in city government initiatives, Fordham has showcased its dedication to reducing its carbon and water footprints and has already seen significant results in both of these areas. With various infrastructure-based initiatives designed to reduce Fordham's carbon emissions in the coming years, the University is on the doorstep of reaching the impressive benchmark of being a carbon-neutral campus long before New York City's ideal target of 2050. However, most impressive of all is that the Laudato Si' Action Platform and the Climate Action Plan have set the foundation for the start of a sustainable transition at Fordham University that aims to support the surrounding community in addition to the students and faculty that call Fordham home. The following chapters will detail the environmental history of Fordham and its home of the Bronx, what sustainable design on a college campus looks like, and the political mechanisms that allow a sustainable transition to be made. Finally, this thesis comes to a close and combines all of these elements to create additional comprehensive, equitable, and environmentally beneficial strategies that will enable Fordham University to accomplish its mission of making a just, sustainable transition in the coming years.

Chapter 2: Rose Hill’s History and Environmental Injustice in the Bronx

This chapter details the history of the Rose Hill campus and the evolution of the plot of land on which the campus is situated. As the university transformed over time, the Bronx underwent large-scale social and environmental changes that resulted in the phenomenon of

environmental injustice. Understanding the impacts of environmental injustice in the Bronx is essential for constructing an equitable transition at Fordham University.

Rose Hill's Origins and Environmental Transformation. While Fordham University at Rose Hill was not established until 1841, the earliest records of the land on the present-day campus date back to the 1730s. However, the title "Rose Hill" did not enter the picture until 1787 when Robert Watts, who purchased the land, decided to name it after his family's Scottish homestead (Yerrabelli 2022). The property switched hands multiple times from the 1730s into the early 19th century but ultimately landed in the possession of John Hughes in 1839. Hughes, a coadjutor-bishop then, purchased 100 acres of land, including Watts' Rose Hill Manor, for $29,750. He would go on to open St. Joseph's Seminary in 1840 and then, a year later, founded St. John's College, which became the first Catholic institution of higher education in the Northeast (Yerrabelli 2022).

Within the next century, St. John's College changed in several ways, none more apparent today than the Jesuit influence and, of course, the new title of Fordham University beginning in 1907. However, the original plot of land Hughes bought also changed dramatically during this period. Around the same time Hughes handed over the college to the Jesuits, the City of New York acquired roughly twenty-six acres of the property via eminent domain for just over $9,000. This piece of land, which extended from the Bronx River to Webster Avenue, would later be used for the New York Botanical Garden, a present-day biodiversity hotspot in The Bronx.
In the days of St. John's College, the Rose Hill campus was a nature-filled escape from the hustle and bustle of New York City, in the same sense many of its students consider it to be today. The campus featured sprawling green lawns, clusters of small forests, and a plethora of farmland, some of which remained active agriculturally until the early twenty-first century (Gilbert and

Wines 1998, 1-2). Throughout the late nineteenth and early twentieth centuries, as the school began to grow, the infrastructure of the campus started to evolve as well. "Wooded hills" once covered the area on which Fordham's landmark building, Keating Hall, was built before its construction began in the 1930s (Gilbert and Wines 1998, 2). Small crops and a pasture for cows once ran along what today would be the back of the campus near Fordham Prep, and the athletic facilities stand today (Gilbert and Wines 1998, 2). Southern Boulevard and East Fordham Road were eventually built where students once crossed through a wooded area to swim in the nearby Bronx River during the summer months and ice skate in the winter. In the latter half of the twentieth century, Rose Hill transformed and began to take the shape of today's campus (Gilbert and Wines 1998, 2). With fourteen residence halls, facilities to service twenty-two varsity sports teams, and academic buildings that fill the campus, the days of pastures and woodlands at Rose Hill have come and gone.

Environmental Changes in the Bronx. Despite being the second smallest borough in square mileage, the Bronx is considered New York City's "greenest borough" as it has the most space across all five boroughs (McIntyre 2010, 28-29). Coincidentally, much of that green space is concentrated in the northern Bronx near Fordham, including the neighboring New York Botanical Garden, the Bronx River banks, and the city's largest park: Pelham Bay Park (McIntyre 2010, 28). However, today's Bronx's environmental state comes after years of degradation, followed by successful advocacy campaigns and widespread remediation to help restore the borough's land. As the population in New York City began to rise during the late 1800s and early 1900s, New Yorkers began to move north into Westchester County. To capitalize on this mass shift, railroad companies began to build train tracks that cut through the Bronx and out of the city, which, unfortunately, is one of the starting points of the Bronx's

history of environmental degradation. The development of railways cut through green spaces of the Bronx exposed residents to air pollutants from coal engines. These projects also required the natural course of the Bronx River to be altered, which was detrimental to local ecosystems (de Kadt 2011, 58).

In a similar fashion, the Cross Bronx Expressway is a six-lane wide highway that cuts directly through the central Bronx and connects New York City to New Jersey and Connecticut. The project was the country's first highway built through a dense urban environment when it was completed in 1963 by famed architect Robert Moses. Although many consider it an engineering marvel, the Cross Bronx Expressway created a multitude of socio-environmental issues that impact the Bronx to this day (Pocock and Palin 2021, 21).

From an environmental standpoint, the construction of this project required considerable changes to the natural landscape of the Central Bronx, including redirecting parts of both the Bronx and Harlem Rivers and blasting through rock formations (Pocock and Palin 2021, 21). As a result of the many vehicles that use this route daily, air pollution in the South Bronx is an issue that has plagued the area for the last century. In this area, asthma rates are the highest in the city and three times higher than in the rest of the nation, according to a 2018 Institute for Civil Infrastructure Systems report (Pocock and Palin 2021, 21). The final construction plan displaced five thousand families despite an alternative proposal that would have only resulted in one hundred families needing to vacate (Pocock and Palin 2021, 21). Ultimately, over 600,000 Bronx residents were forced to leave their homes, only being notified a while before the neighborhoods' demolitions began (Carter 2006, 49). Following the completion of the project, middle to upper-income residents headed to the North Bronx and New York suburbs, and those who could not afford to move from the South Bronx saw their property values plummet (Pocock and Palin

2021, 21). The physical and symbolic division created by the Cross Bronx Expressway quickly became a driving force behind the environmental injustice that has troubled the Bronx for decades.

Environmental Injustice in the Bronx. Before exploring how large-scale changes, like the construction of the Cross Bronx Expressway, have created environmental injustice throughout the Bronx, it is critical to understand what environmental injustice is. Author and environmental sociologist Dorceta Taylor provides a simple definition stating that "environmental injustices arise from the distribution of these hazards and risks that leave the poorest people—those least able to adapt—quite vulnerable" (Taylor 2014, 95). Taylor goes on to explain that the different environmental hazards and risks she discusses come in three primary forms: factors that make people or places vulnerable to extreme natural events, resistance to or resilience in the face of hazards, and exposure to hazards (Taylor 2014, 95). Despite these issues existing in minority-dense communities in the U.S. for a very long time, large-scale acknowledgment and awareness of environmental justice did not come about until the second half of the twentieth century (Taylor 2014, 1). The Environmental Justice Movement in the U.S. was sparked by minority groups taking a stand against environmental inequalities that their communities faced but still struggled to catch on across the nation. However, in the early stages of outcry about these inequities, advocacy leaders could recognize the connection between environmental inequalities, tie them to racially-backed and other social inequalities, and then frame these issues regarding rights to safe and healthy environments (Taylor 2014, 1). This approach gave the Environmental Justice Movement the traction it needed to garner more attention on the national scale and allowed for the movement to blossom around the start of the 1990s (Taylor 2014, 2). However, many of the deeply entrenched environmental issues of the past cannot be solved over a thirty-

year timeline. As a result, many of these problems still persist today. To put this into perspective, Taylor explains that the two most prominent arguments made historically by the Environmental Justice Movement are that hazardous facilities are concentrated in minority and low-income communities and that these communities are exposed to inordinate amounts of environmental hazards (Taylor 2014, 1). Unfortunately, in the case of the Bronx, these two issues have been intensely covered by environmental justice researchers, and there is a plethora of evidence that they are still substantial problems today.

Infrastructure developments that fragment existing communities and create point sources of pollution, like the Cross Bronx Expressway, have been sited in the Bronx disproportionately more than areas with white, affluent populations. While the Bronx as a whole is generally diverse, the South Bronx is home to large populations of blacks and Latinos (Pocock and Palin 2021, 21). In this area of the Bronx, more than half of the population lives at or below the poverty line, and more than twenty-five percent of residents are unemployed (Carter 2006, 48). Despite numerous campaigns and advocacy efforts against environmental injustice in the Bronx, historically, a majority were unsuccessful for several reasons that all connect back to the overarching issue of systemic racism that has existed in the United States for centuries now. In turn, government agencies and private corporations recognized the Bronx's vulnerability and identified it as an area commonly referred to as a "sacrifice zone" in environmental justice discourse. Generally, this term refers to an area commonly populated by residents of lower socioeconomic status, typically people of color, and considered more suitable for activities that have a substantial environmental impact but generate economic benefit for those in power (Lopez de Souza 2020, 220-224).

Historically, the Bronx has been treated as a sacrifice zone in several instances, the Cross Bronx Expressway being a glaring example. Waste management is a very polluting industry that affects the South Bronx and other areas across the city with dense minority populations. To put things into context, in 2004, sixty-six waste transfer stations handled over 47,000 tons of waste each day (Sze 2007, 1941). Thirteen of these waste transfer stations were located in the South Bronx (Sze 2007, 2042). When approached for comment, nearby residents, specifically children and the elderly, shared that they could not breathe because of the truck and garbage fumes (Sze 2007, 1941). The high concentration of waste transfer stations in the South Bronx is a direct example of what Dorceta Taylor outlines when discussing the pattern of hazardous facilities tending to be located in minority-dense areas. Furthermore, the previous statements from residents reaffirm that the sites, despite a potentially unassuming appearance, create health risks that disrupt the community and prevent a higher quality of life.

Manufacturing facilities are another source of air pollutants that contribute to the poor air quality found in the South Bronx. Like waste transfer stations, there is a disproportionate amount of manufacturing zones or "M-Zones," according to environmental researcher and New York native Juliana Mantaay. Mantaay's research reveals that in the period following the construction of the Cross Bronx Expressway, M-Zones became increasingly more popular within minority communities across the Bronx. By 1990, roughly eighty-seven percent of Bronx communities with a dense minority population were located in areas that fall under Mantaay's criteria, substantially higher than predominantly white areas like Manhattan and Staten Island, which yielded around thirty-eight percent and thirty-three percent, respectively. Across the five boroughs, the Bronx experienced the highest increase of larger-scale M-Zones from 1960-1990, with eight new sites out of the twenty-two citywide in 1990. High-level research like Mantaay's

publicized a clear correlation between environmentally threatening facilities located in the Bronx's minority-dominated areas. These research efforts have provided quantitative data regarding public health effects that fueled the growth of environmental justice movements across the borough.

Environmental Justice Advocacy in the Bronx. Since the Environmental Justice Movement emerged in the final decade of the twentieth century, several Bronx-based environmental justice campaigns and groups have played a critical role in bringing awareness to local issues and fighting to solve them. Coinciding with the growth of the national movement, local activists like Maria Torres and Paul Lipson began focusing on improving the overall environmental well-being of the Bronx and addressing significant environmental justice issues (Jonnes 2022, 458). One of the first landmark environmental justice campaigns in the Bronx fought against the Browning Ferris Industries (BFI) medical waste incinerator, which opened in 1993 in the Port Morris neighborhood (Jonnes 2022, 458). The siting of the incinerator alone was enough to create environmental justice concerns; however, in the case of BFI's incinerator, there were over four hundred emissions violations in the four years following its opening in 1998 (Johnson 1998, 2). The campaign against the BFI united the South Bronx community and led to the eventual closure of the incinerator in 1997 (Jonnes 2022, 458). Throughout the nineties and leading into the turn of the century, several other environmental injustice issues in the Bronx received much-deserved attention from city politicians thanks to local advocacy efforts. Showcasing the trend in the issue of waste transfer locations in the South Bronx, in 1998, American Marine Rail proposed the construction of a barge-to-rail waste transfer site that aimed to take in over 5,000 tons of waste daily (Jonnes 2022, 458). Again, as a result of community outrage and collective advocacy efforts against the development of this project, American

Marine Rail pulled out of the proposed plans (Jonnes 2022, 458). While activists like Torres and Lipson were able to introduce an era of environmental justice advocacy in the Bronx, several other issues persisted, and it was evident that there was a long way before environmental injustice would be eradicated from the Bronx.

As new developments or projects that posed environmental justice threats emerged in the Bronx, so did new grassroots organizations and groups that aimed to dismantle these projects and improve local environmental conditions. In 2012, Mychal Johnson, a resident of Mott Haven for over a decade at the time, organized South Bronx Unite, a neighborhood advocacy group aiming to improve and protect the social, environmental, and economic future of the South Bronx (Jonnes 2022, 458-459). Johnson created South Bronx Unite in response to an agreement that brought a FreshDirect warehouse to the area (Jonnes 2022, 458-459). FreshDirect is a large-scale online grocery delivery service that caters to those living in the New York City area, and its warehouse would result in an estimated two hundred and fifty distribution trucks running through the South Bronx on a daily basis, contributing to the already poor air quality (Jonnes 2022, 458). The decision to bring the warehouse to the South Bronx was made by Bronx Borough President Rubén Diaz Jr., who urged FreshDirect to develop in the Bronx and did not hold any public hearings on the matter before making the agreement with the corporate giant (Jonnes 2022, 458-459). Johnson and many other residents of the South Bronx were outraged with this decision and the matter in which the deal was conducted, arguing that developing a waterfront park would have brought immense benefits to the communities of this area (Jonnes 2022, 459). Johnson and South Bronx Unite challenged the FreshDirect deal in after-the-fact hearings and later in court, but would need all the help he would get in this uphill battle (Jonnes 2022, 459).

For support in the campaign against FreshDirect, Johnson and South Bronx United he looked to partner with Marjora Carter, a decorated environmental activist from Hunts Point who had spent years on campaigns to revive the Bronx River, against waste sites in the Bronx, and other local environmental issues (Jonnes 2022, 459). Like Johnson, Carter also created her own grassroots organization to fight environmental injustice in the Bronx, Sustainable South Bronx, which focused on rebelling against industrial polluters, investing in new green spaces, and creating green jobs for nearby residents (Jonnes 2022, 459-460). Carter had been the face of environmental justice and sustainability efforts in the South Bronx for almost two decades and played a massive role in the environmental progress the area had seen since the nineties. Prior to Bronx River restoration campaigns led by Carter and other local activists, a majority of riverbanks were fenced off, overshadowed by riverfront factories, and home to metal scrap yards and warehouses (Jonnes 2022, 463). Seeing the potential and former beauty in the river and surrounding area, Carter led the Bronx River Working Group, which set the foundation for a decade of intensive restoration efforts beginning around the start of the century (Jonnes 2022, 463-469). Ranging from massive cleanup events to the development of Hunts Point Riverside Park that led to the expansion of projects in the 2010s, the Bronx River has transformed radically in the past two decades and today is the only freshwater river in New York City (Jonnes 2022, 468-470). Carter, along with many local environmental groups like the Bronx River Alliance, led the Bronx community to arguably its most significant environmental victory to date.

However, when Johnson reached out to Carter to explore a potential partnership, he and the rest of the South Bronx Unite community learned that she had agreed to endorse FreshDirect (Jonnes 2022, 460-461). Carter's alignment with the corporation made the warehouse development a more divisive issue and signaled that this would likely be a loss for those against FreshDirect

moving into the Bronx. Today, the FreshDirect warehouse located on St. Ann's Street in Hunts Point remains in operation despite residents' persistent public outrage and disapproval. During persuasion efforts made by leaders at FreshDirect and President Diaz Jr., they promised that FreshDirect would transition to electric vehicles (EVs) by 2019 and other commitments to sustainability (Jonnes 2022, 461-462). Despite these pledges, FreshDirect did not transition to EVs by the promised date of 2019, and the New York Post articled FreshDirect's "poorly planned and executed move to The Bronx" in October of the same year (Jonnes 2022, 462).

The case of FreshDirect tells a larger story about the history of environmental injustice in the Bronx. For decades, companies like FreshDirect opted to develop in the Bronx and thus exposed the minority communities in the area to copious amounts of environmental hazards. Corporate companies have been able to sway government officials like President Diaz Jr. and even community leaders like Majora Carter on the prospects that development will bring new jobs and support the local economy, which has trumped the potential environmental consequences (Jonnes 2022, 458-461). Many of the recent cases of environmental injustice have further unified the Bronx community to fight against these issues and have sparked the creation of groups like South Bronx Unite and Sustainable South Bronx. Community leaders like Maria Torres, Mychal Johnson, and Marjora Taylor have been able to lead impactful, effective campaigns that have helped solve some of the most pressing socioenvironmental issues that the Bronx has faced for a very long time. While environmental injustice is still a significant problem, thanks to the efforts of these local organizations and activists, the Environmental Justice Movement has undoubtedly improved environmental conditions in the Bronx and laid the foundation for long-term environmental progress and success in the area.

Chapter 3: The Sustainable College Campus

This chapter explores the growth of sustainability movements on campuses across the United States and how academic institutions are implementing climate-conscious practices and developments. More specifically, it provides an understanding of the origins of this movement, how it began to spread, and what changes the campuses of today are making in terms of topics like sustainable design and environmental education. The chapter also looks at Fordham University through this lens and details the sustainable status of the Rose Hill campus.

Origins of Campus Sustainability. Towards the end of the twentieth century, environmental awareness and advocacy became a growing priority across the U.S. and institutions of higher education began to play a major role in furthering the reach of this movement. To many, colleges and universities have served society as leaders and innovators in areas like research and social responsibility, thus becoming leaders for environmental responsibility, sustainability, and campus sustainability aligned with the traditional role of these institutions (Emanuel and Adams 2011, 4). As private and public schools alike played a part in this mission, the U.S. began to require state and federally-funded universities to include environmental education in curriculums and incorporate sustainability practices into campus design and daily operations (Emanuel and Adams 2011, 3). In the earlier twenty-first century, this movement would only continue to grow, not only in the U.S. but globally as well. Former United Nations Secretary-General Kofi Annan shared the importance of academic institutions' role in widespread environmental education at World Environment Day in 2000, leading up to the U.N. General Assembly announcing 2005-2014 to be the "Decade of Education for Sustainable Development (ESD)" (Blackburn 2016, 1). The "Decade for ESD" was a call to

action for colleges and universities worldwide and was a driving force behind implementing sustainable development on campus, which is now commonplace amongst today's institutions. As sustainability became a more widespread, familiarized term, universities worldwide slowly began adopting sustainable practices to improve their environmental impact. Schools would often act according to basic guidelines designed to combat general environmental issues, such as recycling or avoiding harmful materials (Martin et al. 2012, 3-6). However, throughout the early 2000s, the scope of sustainability on academic campuses grew tremendously. During this period of growth, it became clear that more organization was needed to help facilitate the spread of the university greening movement, whether that came to fruition via regulations, benchmarks, or a different form (Martin et al. 2012, 7). In 2008, AASHE, a leader in the sustainability movement, first introduced "STARS," a first-of-its-kind performance-tracking system for sustainability in academic institutions (Martin et al. 2012, 7).

While there were several popular sustainability rankings at the time, AASHE thoroughly developed STARS to "provide a clear road map for a campus to reach a benchmark level at any time. In contrast, a ranking system provides no clear target" (Martin et al. 2012, 7). This unique manner of measuring performance significantly impacted how university administrators approached sustainable progress. During this time, sustainability standards were award-focused, which oftentimes led to universities completing one-off tasks that would allow them to score higher amongst competing institutions (Martin et al. 2012, 7). The STARS rating system places emphasis on developing systems that aim to achieve long-term sustainable success, which generally creates comprehensive solutions to environmental issues (Martin et al. 2012, 7). Following the growth of sustainability on campuses in the early twenty-first century, AASHE

STARS was not only able to create guidelines for universities to follow but also helped reshape their approach and set the foundation for the next era of sustainability in higher education.

The Sustainably Designed Campus. Since the spread of sustainability on academic campuses, there has been a multitude of new ways institutions have implemented sustainability into their campus design and operations. The College Sustainability Report Card, created by the Sustainable Endowments Institute in Cambridge, Massachusetts, in 2009, established four different areas for sustainable integration within the modern campus (Emanuel and Adams 2011, 5-7). "Ecological" is the first of these four categories and focuses on reducing the environmental impact of pre-existing infrastructure and operations, specifically food/recycling, green buildings, and transportation (Emanuel and Adams 2011, 6). The second area, "Economic/Financial," emphasizes the importance of endowment transparency and investment prioritization, mainly concerning renewable energy and community development (Emanuel and Adams 2011, 6). The "Institutional" category is broken down into three subcategories. "Administration" examines sustainability policies and commitments by administrators; "student involvement" focuses on student engagement in sustainability initiatives and the support for such by administration, and "shareholder engagement" looks at shareholder proxy voting practices and the potential opportunities for student, faculty, and alumni participation (Emanuel and Adams 2011, 6). The final section, "Energetic," analyzes energy efficiency, conservation, commitment to emissions reductions, and use of renewable energy on campus (Emanuel and Adams 2011, 7). Generally, many updated sustainability tracking metrics for academic institutions follow the same principles as the College Sustainability Report Card, which was one of the first sets of guidelines to be commonly followed.

This chapter will highlight sustainability pertaining to the "Ecological" and Energetic" categories, focusing more on the environmental design elements rather than the political side covered in the following chapter. With calls to action and the establishment of guiding principles originating over a decade ago, many academic institutions have already begun to take substantial steps to build a more sustainable campus for its students, faculty, and nearby communities. As the modern university campus is composed of buildings with varying purposes, ranging from academics to housing to athletics and many others, green buildings are a focal point of sustainability strategies across the world. The U.S. Green Building Council (USGBC) has helped play an extensive role in bringing more environmentally friendly, sustainably-operated buildings to schools across the country. In 2014, the USGBC published a comprehensive report that provided a framework for green building projects on campuses titled "LEED Campus Guidance." For clarity, LEED, which stands for Leadership in Energy and Environmental Design, is the world's most popular rating system for sustainable buildings.

The guidelines and scoring criteria echo similar areas of emphasis shared in the College Sustainability Report Card but expand on many of the general points made (USGBC 2014, 4). With a primary focus on green buildings, the framework dedicates a section to "Materials and Resources" used in the construction and everyday operations of campus buildings. In this section, a LEED Campus requires items like construction waste management planning, a reuse plan for furniture and furnishing, and sourcing directives for renewable, multi-use resources that are regionally located (USGBC 2014, 16-17). The USGBC also provides an abundance of other resources to help spread sustainability onto university campuses, including educational courses for administrators on sustainable planning and tools to learn more about sustainability reporting, explicitly focusing on LEED.

Institutions of higher education are excellent places to implement sustainably designed green buildings as they are capable of creating a wide variety of benefits for campuses. Energy efficiency is a major selling point for constructing green buildings within universities (Yudelson 2010, 106). Former Director of Strategic Initiatives at AASHE, Judy Walton, advocates for green buildings as a primary mechanism in combating the projected rising energy costs due to improved efficiency measures (Yudelson 2010, 106). Alongside the environmental and financial benefits, investment in sustainable development on campuses can also help strengthen schools' reputations in a few different ways. As the landscape between different academic institutions is becoming increasingly competitive, those that market themselves as "sustainable" and "green" may become more appealing and grow in popularity among specific niches of prospective students (Yudelson 2010, 106). The same principle applies to faculty and certain professionals who may be more inclined to work for a university that is environmentally conscious and emphasizes the importance of both environmental and human health (Yudelson 2010, 106). As expectations for more environmentally friendly and climate-conscious continue to grow, sustainable campus design is becoming a much more prevalent aspect of determining an institution's desirability and trajectory for success moving forward.

Sustainable Campus Design in Action. Performance trackers and award platforms, like AASHE, have certainly helped boost participation amongst universities in campus sustainability efforts. University leaders have also become more educated about the benefits of incorporating sustainable design and practices into their daily operations. While many universities around the country are implementing sustainability strategies that will set them up for success in the long run, there are a variety of different ways that institutions have improved their sustainability involvement through offsets and credits. Though less directly impactful to the campus itself,

investing in carbon offsets and renewable energy credits is a route universities can take to express their support of the sustainability movement while administrators develop long-term solutions. Stanford University, which received a “Platinum” rating from AASHE STARS in 2022, has substantially invested in off-campus renewable energy in the midst of expanding its green energy portfolio on campus (Wakefield 2022). The university currently owns two solar stations in California that generate an equivalent or a higher amount of energy than the university’s annual consumption. (Skalnik 2023). To clarify, the energy from these stations is not used to generate any electricity used at Stanford’s campus in Palo Alto. Instead, it goes to the energy grid local to the California area. Though Stanford’s campus should not be praised for being “a hundred percent renewable, its investment in these solar stations limits the need for them to be used in the state of California, which is an impactful contribution regardless. More importantly, the university aims to further the development of solar energy infrastructure on its own campus in tandem with these offsets, which is a much more effective long-term solution for its campus community and is a direction that universities should head in to truly embody what it means to be a sustainably designed university.

In terms of developing sustainable, green infrastructure solutions on a college campus, the University of California, Merced (UC Merced) has created a built environment on campus that institutions around the world should look towards. A lesser-known school, UC Merced, was established in 2005 and prioritized developing its campus with sustainability at the forefront (USGBC 2021). Green buildings, in particular, are a focal point of UC Merced's campus located in the Central Valley area of California. Prior to opening its doors, the university promised that all newly constructed buildings would be required to meet LEED Silver standards, and with early success, the administration raised to a minimum to LEED Gold accreditation in 2009 (USGBC

2021). Fast forward to the 2020s, and UC Merced's campus is comprised of fourteen LEED Platinum buildings with nine others with LEED Gold certification (USGBC 2021). Author and environmentalist Jerry Yudelson explains that investing in campus green buildings is particularly effective as university buildings are in constant use typically over a long period of time and must be run efficiently to withstand the tests of time (Yudelson 2010, 8). Yudelson explains that new construction built following LEED standards can tremendously improve energy efficiency compared to conventional buildings and reduce energy consumption by twenty percent or more (Yudelson 2010, 14). As UC Merced has heavily invested in buildings that meet the highest LEED standard (LEED Platinum), the university has seen returns that are even more significant than Yudelson's projections. According to the USGBC, UC Merced's green building portfolio has resulted in a fifty percent decrease in university energy consumption, indicating how efficient green buildings can be (USGBC 2021). The substantial reduction in energy usage enabled UC Merced to achieve carbon neutrality in 2020, two years ahead of the university's proposed timeline (USGBC 2021). UC Merced is undoubtedly a pioneer for sustainable design on American college campuses. University administrators have created a model for schools worldwide to follow when successfully adopting a "from the ground up approach" to make a sustainable transition.

AASHE STARS is particularly beneficial as it encompasses a broad scope of different ways universities can adopt sustainable practices into their operations and campus life. As a result, most universities have their own unique approaches to sustainability, which sparks creative and innovative thinking, which is imperative to combat the varying impacts of climate change. In 2022, a fellow New York state school, Cornell University, was ranked second by the AASHE STARS report with a score of just over eighty-six on a scale of one hundred (Wakefield

2022). Cornell's focus on sustainability in curriculum and emphasis on sustainability-centric research are two of the leading factors contributing to its success on this front (Wakefield 2022). The Ivy League university is home to a "Sustainability Studies" graduate program that is administered by its very own Atkinson Center for Sustainability, which provides its students with a plethora of research opportunities and resources (Cornell University 2017, 1). Through this program, Cornell emphasizes the importance of partnering with non-academic organizations with the common mission of advancing sustainable products, practices, or policies (Cornell University 2017, 1). This approach has not only provided more opportunities for students of the program following graduation but has also spearheaded sustainable innovation throughout the university itself.

Reducing waste footprint and improving waste management practices have been a leading priority for Cornell over the past decade. Throughout the 2010s, the university participated in Recyclemania, a national competition that challenges universities to focus on recycling and waste reduction (Campus Sustainability Office 2019). In 2019 alone, Cornell was able to achieve several waste management goals, including the prevention of 533,757 pounds of mixed recyclables from entering landfills and 436,590 pounds of compost from food waste, which resulted in the elimination of 794 metric tons of carbon dioxide from its carbon footprint (Campus Sustainability Office 2019). In recent years, Cornell has adopted its own waste reduction campaign, Beyond Waste, which is a part of the Campus Race to Zero Waste national competition for academic institutions (Campus Sustainability Office 2019). The Beyond Waste campaign encompasses much more than advocating for recycling and sustainable waste management; but encourages students on campus to reduce their waste footprint and how they can become more environmentally-conscious consumers (Campus Sustainability Office 2019).

Cornell's participation in Campus Race to Zero Waste and Recyclemania signifies how vital collaboration is to achieving sustainability goals, as competition drives all involved schools to perform at a high level. Cornell's successes in waste management have helped its campus significantly reduce its environmental footprint while simultaneously involving the student body in sustainability efforts that equip them with knowledge and skills to make environmentally impactful decisions in the future.

Environmental Design of Rose Hill. While not at the capacity as the leaders previously mentioned, the Rose Hill campus at Fordham University has also incorporated environmentally beneficial design on its eighty-five-acre layout. Sustainable buildings, both for student housing and recreation, have recently come into the fold on campus. In 2010, Campbell, Salice, and Conley halls were completed on the west side of campus and, in that same year, received LEED Gold accreditation, the second-highest award presented by the USGBC (Gaffney 2022, 4). Following the installation of a 7.7 KW system in 2019, Campbell Hall became one of three buildings on campus with a rooftop solar array (Gaffney 2022, 7). This array is one of three rooftop solar systems currently on campus used to offset twenty percent of the campus' annual energy usage (Gaffney 2022, 6). The largest of Rose Hill's solar arrays is located on the campus parking garage, equipped with a 960 KW system that is the largest Community Solar project to be hosted by any academic institution in NYC, while the Walsh Library features a 250 KW system of its own (Gaffney 2022, 6-7). Two older buildings on campus, Duane Library, and Hughes Hall, which houses the Gabelli School of Business, are LEED Certified, which equates to the traditional bronze rating (Gaffney 2022, 7).

Ensuring all new construction projects are eligible as green buildings is a focal point of the university's *Laudato Si' Action Plan*. The McShane Student Center is one of the largest

projects to date on the Rose Hill Campus and was designed by architects HLW following LEED standards (Gaffney 2022, 4). A defining element of the new center being deemed a green building is its use of passive heating and cooling. The south-facing facade of the campus center features floor-to-ceiling glass windows on each of the three floors and a four-story high stairwell framed in windows from top to bottom. While the McShane Student Center partially opened in 2022, construction is expected to be fully completed in 2025, and it will not be eligible for LEED accreditation until then. The project is one of the first to be built after the *Laudato Si' Action Plan* of 2022 established that all new buildings will be designed to achieve at least a LEED Silver rating (Gaffnet 2022, 4). Additionally, under the proposed action of the *Laudato Si' Action Plan* titled, "Use Technology Responsibly," Fordham continues to make pledges for more green buildings on campus in the future. Aside from technology upgrades to boost energy efficiency, it is also stated that the university will "work toward LEED certification for each building, tripling current certification by 2030" (Gaffney 2022, 17). Ambitious goals aim to drive and accelerate Fordham's current strategy for a more sustainable future, of which green buildings and infrastructure on the Rose Hill campus will be a priority in the immediate future.

The university's Department of Transportation is another sector where Fordham has already implemented sustainable changes. As of 2018, the entire university vehicle fleet, which exceeds fifty vans, has been converted to run entirely on biofuels (Gaffney 2022, 4). This change saved an estimated 314,288 lbs of CO2 from being emitted into the atmosphere, which, aside from being environmentally beneficial, also helped the university achieve the NYC Carbon Challenge (Gaffney 2022, 7). Electric vehicles (EVs) are also a point of emphasis for the Department of Transportation, which has already added twenty EVs to the current fleet. Under the *Laudato Si' Action Plan's* fifth course of action, titled " Move Beyond Fossil Fuels and

Invest in a Clean Economy," one of the primary goals is to transform the entire Ram Van fleet to EVs by 2030. The university acknowledges that this transition will demand the expansion of EV charging infrastructure on campus from the limited chargers located in the university parking garage, which can be expected shortly.

Fordham has made considerable progress in expanding sustainable design and operations into its Rose Hill campus in recent years. With recent green building developments and plans in place to ensure this continues, an era of green infrastructure on campus is likely on the horizon. Fordham has also excelled in its renewable energy efforts, investing both in localized projects that offset its impact and incorporating several renewable energy solutions into the Rose Hill campus. When looking at competing schools, the university can maximize its sustainability efforts by emulating the practices of leaders for sustainability and becoming more involved with collaborative movements that drive sustainable growth across American campuses. Incorporating sustainability into the Rose Hill campus can come in various forms, and a diversified approach is a particularly effective way to manage the adverse effects of climate change that will have a prolonged impact on the New York City area and its communities.

Chapter 4: The Policies & Processes Behind Sustainable Integration

This chapter examines the current state of sustainability from a political perspective in the U.S. today and the political procedures necessary for implementing sustainable change. Three sections will focus on different levels of politics, beginning with federal, then state and city, and finally, closing with a deeper look at sustainability policymaking internally at Fordham University.

Origins of American Sustainability. Environmentalism has been tied to politics in the United States since the 1800s, but the nature of this relationship has drastically evolved over time to reach its state of today (Coglianese 2001, 88-89). At the turn of the twentieth century, much of the environmental movement was focused on improving the management of the nation's natural resources, specifically land, water, and wildlife (Coglianese 2001, 89). Progressives of the early 1900s advocated for increased regulation of these resources under the federal government. This movement culminated with Congress enacting legislation that set aside lands for reserves and establishing authoritative agencies to manage natural resources, including the U.S. Forest Service, the Fish and Wildlife Service, and the Bureau of Land Management (Coglianese 2001, 89). Legislation as such, designed to maintain the longevity of natural capital, is considered one of the earliest accounts of sustainability emerging into American national politics. At the time, this conservation-based aspect of American environmentalism coincided with the movement to improve living conditions in urban areas, which also pertains to some focal points of modern-day sustainability. Much of the focus in the mission to reform American cities during the time was based on improving waste management, reducing industrial pollution, and developing new drainage, sewage, and water systems (Coglianese 2001, 90). Many of these areas of emphasis are still at the core of urban sustainability today, displaying how influential the origins of American sustainability are in managing the socioenvironmental issues this country is currently facing.

Building a Sustainable America. Traditionally, a large portion of the American population is skeptical about sustainability and its place in national politics, which led to its formal integration into the political system taking longer than in other countries (Fiorino 2010, 578). Though the U.S. Federal government has had agencies that focus on environmental affairs for over a century now, the first directly related to sustainability came into the fold recently in

1994 when President Bill Clinton established the President's Council for Sustainable Development (PCSD) (Fiorino 2010, 578). Unfortunately, the PCSD did not have the influence of federal policymakers that Clinton and his administration had envisioned, which, according to Fiorino, was a common trend for sustainability in the public administration sector around the turn of the century (Fiorino 2010, 579). Clinton's presidency was followed by George W. Bush, whose two terms as president from 2001 to 2009 were rather turbulent regarding environmental policy decisions. During his tenure, Bush's most notable climate action was rejecting the Kyoto Protocol in 2001, which set the tone for the next eight years in office, where Bush's administration blocked any mandatory requirements for controlling greenhouse gas emissions (Vig and Kraft 2019, 99). Despite all presidents of this time dedicating a portion of their campaign towards environmental and sustainability efforts, the ideological turnover from each administration to the next was a substantial roadblock in creating continuity at the federal level.

This phenomenon is not an isolated occurrence, as something similar took place in Donald Trump’s presidency following Barack Obama’s two terms in office. Obama, unlike his predecessor Bush, was focused on reducing greenhouse gas emissions and had outlined a variety of different strategies to do so (Vig and Kraft 2019, 100-102). Despite encountering some barriers in his first term, Obama’s plans came to fruition in his second term when he made a joint agreement with China to lower emissions, with the U.S. pledging to achieve a twenty-six to twenty-eight percent from 2005 levels by the end of 2025 (Vig and Kraft 2019, 103). This substantial international agreement and Obama’s Clean Power Plan in 2015 paved the way for the Paris Agreement, which was signed in December of that year (Vig and Kraft 2019, 103). The Paris Agreement, considered one of the most influential climate policies of all time, created the framework for limiting greenhouse gas emissions around the world to limit global warming to

one and a half degrees Celsius by 2050. Similar to George W. Bush rejecting the Kyoto Protocol in 2001, shortly after being elected, Donald Trump withdrew from the Paris Agreement in 2017 (Vig and Kraft 2019, 107). Although 196 countries signed the agreement in 2015, Trump argued for "renegotiation" of the agreement or an entirely new deal that was "fairer" to the American economy and workers and subsequently opted out when his demands were not met (Vig and Kraft 2019, 107). This decision also ended contributions to the Green Climate Fund, which assists developing nations in meeting their pledges under the Paris Agreement, further isolating the U.S. in the global sphere of environmental diplomacy (Vig and Kraft 2019, 107).

While the focus on sustainability at the federal level has grown, primarily due to the impacts of climate change growing more apparent and severe in recent times, it is still far from the forefront of the current political agenda. As shown in the cases of Obama and Trump, the environmental progress made by one administration may not carry over to the next and may be completely reversed in some sense. Given the gravity of the consequences that climate change is capable of creating, the political leadership in the U.S. must continue to push for sustainable growth and environmental policies that seek to mitigate and adapt to these effects. In Daniel Fiorino's Sustainability as a Conceptual Focus for Public Administration, he considers four main routes of action that are capable of improving the focus on sustainability within the political landscape. As some political leaders, including Donald Trump, do not understand climate change's social and economic repercussions, he proposes that the three must be explained as a three-part, interconnected system of issues to be more appealing and digestible to such members of public administration (Fiorino 2001, 579). Since issues such as economic growth take priority over climate change, integrating the two and explaining the immense effects climate change can have on economic systems is a route that must be taken to give environmental issues more

visibility at the federal level. It cannot be denied that sustainability and climate change have received more attention in politics than ever before. However, actors in the current, very divisive political landscape must unite to tackle this issue across all parties and administrations and no longer leave the responsibility to local and state governments.

Sustainability in New York City. Like many other coastal cities worldwide, New York City is beginning to feel the effects of climate change-induced global warming. Some of the greatest threats of climate change, including rising sea levels and increased rates of severe storms, have already caused immense damage to New York City in recent years. Hurricane Sandy is evidence of such, as, in October 2012, the storm caused over $19 billion in damages by eroding shorelines, flooding communities, and destroying critical infrastructure across the five boroughs (Shweitzer 2014, 256). At the time, scientists predicted that this was only the beginning of storm surges wreaking havoc along coastal communities and cities, with the severity likely to worsen further into the century (Shweitzer 2014, 249). While the New York City Government had already developed a comprehensive climate adaptation plan under 2007's PlaNYC 2030 focused on risk assessment of local climate change vulnerabilities, Hurricane Sandy signaled the need for expanded climate strategy and policy (Schweitzer 2014, 246). In response, the City soon implemented "A Stronger, More Resilient New York," a resiliency plan focusing on expanding protection against coastal flooding and ramping up research on this front (Shweitzer 2014, 257).

While climate-change-based policy first occurred before the early twenty-first century in New York City, there have been substantial expansions to policy and government involvement on related issues. As mentioned before, PlaNYC 2030, published by the Office of Mayor Michael Bloomberg in 2007, was a starting point for modern climate action in the city. Under

this plan, Bloomberg set an ambitious goal of a thirty percent reduction of greenhouse gas emissions from 2005 levels by 2030 (Solecki 2012, 564). The Bloomberg Administration also created the New York City Panel on Climate Change (NPCC) in 2008 to advise the city on climate change science, potential impacts, and climate protection strategies specific to the city's essential infrastructure (Solecki 2012, 564). The NPCC consists of climate change scientists and legal, insurance, and risk management experts and serves as a technical advisory body designed to mimic the Intergovernmental Panel on Climate Change (IPCC), which has existed since 1988 (Solecki 2012, 564). The NPCC has been a mainstay of city climate strategy over the past decade, but PlaNYC has changed and transformed dramatically since its inception.

Bloomberg's PlaNYC stayed in place until 2015 when it was replaced by OneNYC, created by Mayor Bill de Blasio's administration when he was elected in 2014. In response to Hurricane Sandy's impact in 2012, de Blasio and OneNYC shifted priorities, integrating resilience alongside sustainability while emphasizing equity across all policies. This transformation expanded the sustainability plan to encompass the entire municipal government as part of a strategic initiative (Adams 2023, 13). In 2019, de Blasio and his administration launched OneNYC 2050 to kick off their second term in office. After the previous plans administered by the city government set targets for 2030, de Blasio set long-term goals and targets for 2050. Amongst efforts prioritized by OneNYC 2050 were building decarbonization under Local Law 97, the 2021 ban on gas hookups in new buildings, the creation of designated zones for commercial waste, and Executive Order 99, which established guidelines to decarbonize city government operations (Adams 2023, 13). With Mayor Eric Adams coming into office in 2022, it was time for his own sustainability plan to come into effect. He and his administration built on Michael Bloomberg's initial PlaNYC and launched PlaNYC: Getting

Sustainability Done in 2023. In the inaugural annual report, Mayor Adams introduces the general focuses and goals under his new adaptation of PlaNYC: "Building on the equity focus of the last plan, this plan centers environmental justice in all of our work, while focusing on taking concrete actions towards achieving our long-standing climate goals. Focus is essential for action and implementation, so this plan targets sustainability broadly defined as climate action, ambient air quality, water quality, and open space" (Adams 2023, 13).

In PlaNYC: Getting Sustainability Done, Eric Adams outlines what he believes a sustainable New York City may physically look like through climate-conscious designs that target the city's unique environmental issues (Adams 2023, 8-9). Additionally, this updated version of PlaNYC outlines strategies and roadmaps to solve problems unique to New York City, including frequent flooding, extreme heat spikes, and lack of green space. However, Adams and his administration shine in their analysis of the social impacts of New York's unique climate situation. Early in the report, Adams highlights an issue that was discussed earlier: the city's poor air quality, which disproportionately affects minority communities, not only in the Bronx but in areas of Brooklyn and Queens as well. While acknowledging that air quality has recently improved across New York City, Adams establishes that minimizing its health implications in "environmental justice communities" is a priority of his administration's strategy (Adams 2023, 22-23). In this section focusing on poor air quality and PM2.5 emissions, Adams does a fantastic job of spreading awareness of this critical issue and potential strategies he hopes to implement to eradicate it, including electrifying and retrofitting buildings, which can reduce GHG emissions and ultimately lead to cleaner air and more efficient properties (Adams 2023, 23). PlaNYC: Getting Sustainability Done similarly addresses the environmental effects of the Cross-Bronx Expressway, which, as mentioned before, has created immense damage to minority communities

located in the Bronx. This section of the report opens with a clear explanation of what environmental justice is and how it exists in New York City, which is imperative to educate the general public on an issue that has been historically overlooked (Adams 2023, 24). The breakdown of this initiative is complemented by an in-depth background of the Cross-Bronx Expressway and a plethora of data that genuinely displays how destructive it was to the local communities regarding increased levels of air pollution, heightened vulnerability to flooding, and exacerbated impacts from extreme heat (Adams 2023, 24). Adams concludes this area of the report by laying out the groundwork for how his administration plans to tackle this issue, mainly through the Environmental Justice NYC (EJNYC) Report set to be published in 2024 and the subsequent EJNYC Plan which aims to leverage State and Federal resources for the benefit of environmental justice communities in New York City and set a model for other cities around the world (Adams 2024, 24). PlaNYC: Getting Sustainability Done highlights the social impacts of climate change in New York City and sets a clear pathway for the city government to address the environmental injustice that has plagued the five boroughs for decades. Eric Adams and his administration make it clear that a sustainable transition that is just and equitable for all is a priority moving forward, setting the tone for not only the rest of New York City but for major cities worldwide.

Politics of Sustainability at Fordham University. While *Fordham's Laudato Si' Action Plan* has already been detailed, it is vital to explore who and how the university's sustainability plan came to fruition. Creating a comprehensive strategy as such demands a network of different departments and staff members coming together to consider the various implications and externalities that will shape the Rose Hill campus moving forward. With sustainability coming to the forefront of Fordham's priorities for the coming years, the university recently launched its

own Office of Sustainability in November of 2022. The office is led by director Vincent (Vinny) Burke, who previously held the Director of Facilities Engineering role at Fordham since 2010 before the transition. Vinny is accompanied by Nelida (Neli) Labate, the office's Grants Proposal and Funding Manager, who has worked at Fordham since 2017. While the office covers both the Rose Hill and Lincoln Center campuses, a majority of the projects currently being worked on are based at Rose Hill. For the fall 2023 semester, the office created openings for student interns to work and learn under Burke and LaBate. I, along with three other Fordham students, was given the opportunity to work in sustainable administration at our own university and bring the student perspective to the department. After a successful first semester, the internship program expanded to over fifteen interns, ranging from undergraduate to graduate students with various academic backgrounds and areas of interest.

To learn more about the Office of Sustainability, I sat down with Burke and LaBate to ask a few questions and learn more about its origins and their expectations for the future. For years, Marco Valera, who is the current Vice President of Administration at Fordham, worked individually on sustainability projects when he was in a facilities management role until 2011. Burke, who became the Director of Facilities Engineering in 2010, was also interested in sustainability and began to help Valera with some of his endeavors. The two worked closely together for over ten years until 2022 on projects focused on solar, geothermal, and other renewable energy-related projects. In 2022, Valera was hired into his current position, and oversight of sustainability-centric projects fell into Burke's domain. Burke used this opportunity to partner with Neli Labate, whom he had worked with in Capital Projects at Fordham, to form the Office of Sustainability in the fall of 2022. Alongside integrating sustainability onto both Fordham campuses, one of the primary focuses of the office was to provide students with the

opportunity to gain experience with various aspects of sustainability, including project management, legal, and financial. Through the student internship program, both office leaders hope that students are better equipped to join the workforce in sustainability, energy, and other related fields. They hope the program's expansion continues, sharing that they would be open to employing over twenty students if their budget permits.

Information management is an area of the office that has needed some help within its short lifetime. In January 2024, it hired a recent Fordham graduate, Jasmine Petrov, as Information System Coordinator. The Office of Sustainability has partnered with Rise Energy Services and works closely with its director, Kevin George, to help manage sustainability information around energy use and footprint. Burke and LaBate have several plans and projects for the future of the office. Some upcoming projects include replacing the lighting system at Moglia Stadium at Jack Coffey Field and Houlihan Park, implementing geothermal heating and cooling systems at Martyrs' Court to replace seven gas-fired units, and installing a rain garden to aid flooding issues on campus courtesy of a grant from the New York City Department of Environmental Protection (DEP). Despite the different plans to improve sustainability and reduce the environmental impact on campus, at its core, the Office of Sustainability is in place to help interested students gain exposure to the different elements of sustainability and prepare them for the workforce when their time at Fordham comes to a close.

Across the world, one of the largest demographics that prioritize sustainability is college students, as studies have revealed that over sixty percent of students “want to help create a sustainable university, community, and world” and are willing to become involved in sustainability-based initiatives on their campus (Emanuel and Adams 2011, 14). Fordham University, specifically the Rose Hill campus, is no different, as multiple student groups focus on

environmental issues and sustainability. Rose Hill's United Student Government (USG) has a dedicated sub-committee for sustainability that identifies key sustainability issues on campus, oversees the implementation of sustainable changes, and tracks the progress and maintenance of these initiatives (Fordham United Student Government 2023). The committee meets weekly throughout the semester to develop proposals that aim to improve the socioenvironmental conditions and limit the environmental impact on the Rose Hill campus. Some recent successful proposals have helped bring native plants to campus landscaping and gardens and created incentives for students to use reusable plastic cups at the Starbucks location on campus.

The Climate Impact Initiative is another student group on campus that works with sustainability and environmental issues. As a part of the Social Innovation Collaboratory, students are leaders in sustainability efforts on campus, including leading Sustainability and Earth Week events (Fordham United Student Government 2023). Recently, group members have also begun to collect data for AASHE STARS accreditation alongside the Office of Sustainability. Students for Environmental Awareness and Justice (SEAJ) is a club at Rose Hill that helps spread awareness of major sustainability issues globally and in the Bronx and spreads awareness of climate events for social activism (Fordham United Student Government 2023). Given the history of environmental injustice in the Bronx community, having a group like SEAJ on campus is an excellent resource for educating the student body on what is occurring in their own backyard and how they can get involved to make a difference. Some other active student groups with an environmental focus include Fordham Sustainable Fashion, St. Roses Garden at Rose Hill, and the Outdoors Club. The Rose Hill campus has done a fantastic job creating extracurricular activities for students that help advance their education on environmental issues.

These activities work in tandem with the well-versed curriculum that continues to expand into connected topics like sustainability, environmental justice, and climate-change-centric science.

Chapter 5: The Rams Plans

This fifth and final chapter lays out some policy suggestions based on the previously covered material to help Fordham University become a more sustainable and equitable institution moving forward. The opening section focuses on reducing the Rose Hill Campus' environmental impact and developing strategies that allow for sustainable growth. This section is followed by suggestions for improving Fordham's socioeconomic standing in its surrounding communities and how the university can play a role in advocating for environmental justice.

Advancing Sustainability at Fordham. While Fordham University, specifically at the Rose Hill campus, has already achieved a lot in terms of sustainability and plans for more in the future, Fordham can expand its mission in various ways. The University has already laid a sustainability plan and strategy for the next five years with the Laudato Si': Fordham University Action Plan, which is based on a six-year timeline ranging from 2022 to 2028. Fordham should look to create a new one or re-write the current one, extending the current timeline to achieve long-term growth. As mentioned earlier, the current sustainability plan for the City of New York under Mayor Eric Adams, PlaNYC: Getting Sustainability Done, focuses on achieving substantial long-term goals, multiple of which are set for 2050 (Adams 2023, 146-167). Under this new plan, one of Mayor Adams' primary focuses is to increase engagement from private sector entities, which Fordham falls under. Aligning with citywide strategy and setting similar goals is an excellent way for Fordham to cement itself as a leader for sustainability in New York City while simultaneously driving change on its own campus.

Sustainability strategists and experts like Andrew Winston are also big proponents of setting long-term sustainability goals. Winston's book, The Big Pivot, covers various ways existing businesses and other entities can transform to become better equipped for a world enduring climate change. In his book, two consecutive chapters focus on the importance of setting long-term goals and creating ambitious goals based on scientific research on climate change and its effects. Winston argues that while short-term goals may be more attractive as they can lead to immediate returns, prioritizing larger goals for the future will help drive progress in the mission to solve an institution's overarching issues (Winston 2014, 1554-1560). Winston also emphasizes that because the issue of climate change is constantly evolving, current emissions benchmarks may soon need to be revised to achieve the generally accepted target of keeping the global temperature increase under two degrees Celsius by the year 2100 (Winston 2014, 1572). He follows up on this point by advocating for more ambitious goals that exceed current expectations, as they can act as insurance if conditions worsen. Additionally, following Winston's train of thought, setting more demand goals and targets can help accelerate progress and achieve current goals much faster.

Expanding Green Buildings. How can Fordham University adhere to Mayor Adams's goals under PlaNYC: Getting Sustainability Done while using strategies from sustainability specialists like Winston? Identifying key goals that can be re-structured in the pre-existing Laudato Si': Fordham University Action Plan is a great place to start. As previously discussed, under Fordham's current plans, incorporating green buildings on campus is a priority, with a firm goal of tripling current LEED certification by 2030 (Gaffney 2022, 17). This benchmark is an excellent short-term goal and can help bring some immediate change to the Rose Hill campus.

However, using Winston's approach to sustainability, this mission can certainly be expanded, especially considering there are currently only five out of thirty-five total buildings on the Rose Hill Campus with LEED accreditation. An ambitious goal for integrating green buildings and sustainable design on campus could look like a target of eighty percent of buildings being LEED-certified by 2050. Seeing that the current goal demands ten more buildings to gain accreditation before 2030, this goal is manageable and achievable under Fordham's current trajectory. In terms of garnering the administration's support, this goal will keep Fordham competitive with fellow Jesuit university Loyola University Chicago (LUC). LUC is viewed as a leader in sustainability amongst Jesuit schools, with several accomplishments in related areas, including twelve buildings on its campus with a LEED Gold or Silver rating as of 2022 (Gaffney 2022, 5). Expanding green building initiatives and demanding more LEED-rated buildings will minimize Rose Hill's environmental impact and provide Fordham with an opportunity to set the standard for sustainability amongst its Jesuit peers.

Environmental Education in Curriculum. Incorporating sustainability-related topics into education is another critical element of the current Laudato Si': Fordham University Action Plan. The current plan outlines two unique goals pertaining to education and curriculum, the first being to "Create a concentration or pathway that connects artificial intelligence and machine learning with sustainability and ecology goals. Build 5 new courses by 2030" (Gaffney 2022, 17). The second goal is more complex: "Partner with the Center for Community Engaged Learning on a cluster of 10 CCEL courses on environmental justice and environmental sustainability, including partnerships with organizations like Soul Fire Farms and the NYC Environmental Justice Alliance. Increase by five courses annually for 40 CCEL courses in this area by 2030" (Gaffney 2022, 18). Despite each goal having unique aspects, the two together clearly display their priority

of bolstering the university curriculum with sustainability and environmental justice courses. The current plan provides students with immense resources as these proposed courses involve artificial intelligence and partnerships with local groups, which can help students prepare for the professional world.

Looking at competing Jesuit schools again, LUC recently established its School of Environmental Sustainability in 2013. The school comprises six undergraduate degree programs and a Master of Science in Environmental Science and Sustainability program at the graduate level. Though most of LUC's 16,000 plus enrollees are concentrated at one campus, between Rose Hill and Lincoln Center, Fordham matches their enrollment with nearly 17,000 undergraduate and graduate students. Possible academic expansion of sustainability at Fordham does not necessarily require opening its own school like LUC, but Fordham could use their Jesuit counterpart as a model to follow. Currently, Fordham does not offer any undergraduate majors concentrated in sustainability. Given that Fordham College offers Environmental Studies and Environmental Science majors while the Gabelli School of Business offers a Sustainable Business minor, merging these two different elements to form a sustainability-centric undergraduate major has potential. Creating a joint major between the business and liberal arts schools may be difficult, but setting a long-term goal to have an undergraduate sustainability degree in place by 2040 is undoubtedly feasible, given that the administration has already established they hope to expand academic programs in this area. A goal similar to this, and potentially even one related to a graduate degree program, should be at the top of Fordham's priorities when creating a new sustainability plan when Laudato Si': Fordham University Action Plan expires in 2028.

Green Energy Transition. Fordham currently has several different initiatives and goals outlined in the Laudato Si': Fordham University Action Plan that mark the beginning of a renewable energy transition. As the university looks to achieve a forty percent emissions reduction by 2030, there are some smaller-scale renewable energy projects that administrators can consider to help accomplish this target. The first of which is already being discussed amongst the Office of Sustainability members is utilizing unused real estate that the university owns. Fordham owns multiple different sites in close proximity to the Rose Hill campus that are currently uninhabited and have the potential to house renewable energy projects. One of these properties is located at 619 East Fordham Road, a 3,087-square-foot building that previously housed a car rental service (Office of Sustainability 2023, 3). The building features a flat roof ideal for expanding the university's solar array, which has been discussed in preliminary conversations between the Office of Sustainability and local service providers.

Energy storage is an additional form of renewable energy technology that is suitable for this site. Battery storage continues evolving technologically and is available in several different forms today. As electricity prices have continued to increase in recent years, the cost of energy storage systems has dropped significantly thanks to technological advances (Turner 2018, 18). Many renewable energy installations, like solar panels or wind turbines, are accompanied by energy storage systems to store energy for times when demand peaks and the nearby grid may not be able to support this heightened level of demand (Turner 2018, 18). As the local energy grid in New York City is primarily powered by fossil fuels, Fordham is becoming more dependent on its own grid by using an energy storage system, which is a fantastic way to fully transition to green energy (NYC Mayor's Office 2022). The leading form of energy storage systems utilizes a lithium-ion battery to store the energy received from a solar connection.

However, this technology has many disadvantages as well. In the case of the university-owned off-campus real estate sites, lithium-ion batteries usually need to be located in will in a fire-proofed area and are most often installed outdoors (Turner 2018, 19). As New York City's fire suppression laws are quite rigorous, Fordham would need to invest more in retrofitting their buildings' interiors to meet these requirements. Considering these factors, there are better fits for Fordham and its sites for energy storage infrastructure than lithium-ion batteries.

However, as battery energy storage technology has grown tremendously in the past decade or so, there are a number of alternatives to lithium-ion batteries that are becoming more commercially viable. One of these options that the Office of Sustainability at Fordham has already expressed interest in is what is called a “flow” or “flow state” battery. Flow batteries have a plethora of advantages, most notably the long lifetime this technology has, especially at a lower cost (Stauffer 2023, 1). The unique design of flow batteries separates the tanks where energy is stored from the reactor where the electrochemical reaction occurs, which is very rare amongst other types of battery energy storage systems (Stauffer 2023, 2). The separation of these two components allows for the capacity of the battery (how much energy it can store) and its power (the rate at which it can be charged and discharged) to be independently adjusted (Stauffer 2023, 3). This feature means that flow batteries can be specifically designed to fit Fordham’s demands and make for a more efficient and optimized energy storage system than competing technologies. Combining the flexibility of flow batteries with the fact that an installation would not require Fordham to invest in fire suppression upgrades makes this technology a great suitor as the university looks to expand and diversify its renewable energy resources.

Expanding Environmental Justice Efforts. The other significant aspect of developing an effective, sustainable, just transition plan for Fordham University moving forward is enhancing

its strategy surrounding environmental injustice. As discussed earlier, Rose Hill's location in the Bronx, an area plagued by environmental injustice and racism, has resulted in Fordham developing strategies to spread awareness and take action regarding these issues. The Laudato Si': Fordham University Action Plan lists over ten local organizations that are partners with Fordham's Center for Community Engaged Learning, of which environmental justice is a focal point (Gaffney 2022, 8). The plan also lists a few faculty and grant-funded projects at Fordham that pertain to environmental justice in the Bronx, including Project FRESH Air, which monitors air quality in the Bronx, and Project TRUE, which helps provide local high school students with research opportunities (Gaffney 2022, 8).

Initiatives similar to Project TRUE that help involve local residents, especially students, are excellent approaches to spreading awareness and education regarding environmental issues within the local communities. Considering Fordham's resources compared to other academic institutions of the Bronx, developing partnership programs with local schools or student groups should be explored when formulating Fordham's just transition plan. There are several different ways this can be approached, all of which work towards the same goal of boosting engagement within surrounding communities on environmental issues local to the area. A rather basic theoretical approach could be guest speaker events, where Fordham students and faculty with environmental justice backgrounds host seminars for groups or classes from the Bronx. Something more advanced could look like opening an internship position similar to the role currently offered by the Office of Sustainability for a qualified high school student interested in environmental-related topics. This partnership would provide a student who otherwise may need more resources to learn about sustainability with an opportunity to earn school credit while also gaining early career experience in their prospective field. As discussed earlier, there are different

routes to achieving a partnership with local students, but the overarching concept of using Fordham's resources to boost engagement amongst the Bronx youth should be a topic of discussion when outlining the University's next sustainability plan.

Investing in Community Projects. Outside of advocacy and education around environmental injustice, Fordham can help support environmental justice communities in the Bronx by investing in green infrastructure projects in the area surrounding the Rose Hill campus. The popularity of electric vehicles (EV) is skyrocketing across the country, and one of the main concerns that comes with this rise in popularity is that the development of EV charging infrastructure will not be able to pace these rates of rapid growth (Jacobs and O'Connor 2017, 2). The expansion of publicly accessible EV charging in the U.S. has shown substantial growth in recent years, with the national total surpassing 60,000 total stations as of April 2024 (NYSERDA 2024). However, the distribution of these charging stations is where environmental justice concerns come into play in less affluent, minority-dense communities like the Bronx. According to the New York State Energy Research and Development Authority (NYSERDA), which provides an interactive distribution map of EV charging stations, there are only four stations close to the Rose Hill campus (NYSERDA 2024). These places, in comparison to other areas of the city, have an abundance of charging stations in close proximity to one another and offer different types of technology and connectivity, increasing the flexibility for EV drivers (NYSERDA 2024).

As mentioned earlier in this chapter, Fordham owns a few different properties near the Rose Hill campus that are currently unused and being considered for various development projects. With the university looking to expand its renewable energy portfolio, pairing a solar carport canopy with EV charging stations underneath is a compelling option for servicing the

local community with much-needed EV infrastructure. By using photovoltaic solar panels to power charging stations, solar carports function as an ideal independent source of green energy supply that helps to reduce GHG emissions. (Fakour et al. 2023, 2). Not only would this project provide a valuable resource to EV drivers local to the Bronx, but it would also provide Fordham with many advantages. One of New York City's most prominent laws about climate change is Local Law 97 (LL97), which mandates that most buildings are required to meet new energy efficiency and greenhouse gas emissions limits as of 2024, with stricter limits coming into effect in 2030 (NYC Sustainable Buildings 2024). Renewable energy projects, including this potential solar carport, would entitle Fordham to deductions for their building emissions limit. In particular, this project would be eligible for Fordham to earn renewable energy certificates (RECs), which the city government defines as "certificates representing electricity generated from renewable energy sources" (NYC Government 2023, 1). By earning RECs through investment in new energy developments, Fordham not only has increased flexibility heading into the initial emissions audits under LL97 but also provides the nearby community with adequate green infrastructure, which it desperately needs to adapt to climate change moving forward. The city government explains that renewable energy projects can significantly impact citywide environmental justice communities, commonly found throughout the Bronx (NYC Government 2023, 3). Many of these areas in New York City are associated with poor air quality, mainly resulting from high levels of greenhouse gas emissions and air pollutants derived from fossil fuels (NYC Government 2023, 3).

However, energy injustice encompasses much more than disproportionate rates of air pollution caused by the combustion of fossil fuels in poorer communities. Authors Malcolm Eames and Miriam Hunt explain that the implications of this widespread issue can range from

higher energy prices, displacement of communities, and localized climate effects (Eames and Hunt 2013, 47-48). As Fordham has made it clear it wants to help address local environmental justice conflicts, investing in projects that tackle energy-specific problems should be a priority, given their severe effects on communities. Renewable energy projects that target specific communities rather than individual buildings or large-scale areas are capable of reducing carbon emissions, creating economic gains, and improving housing conditions while also generating more intangible benefits, such as community capacity-building, skill sharing, and citizen engagement (Bulkeley and Fuller 2013 2013, 66). However, managing renewable energy systems can be a substantial responsibility, and historically, government-funded projects can burden communities when they lack control or expertise and demand the need for particular skills, characteristics, or resources (Bulkeley and Fuller 2013, 67). As a private entity, Fordham has the capability to work closely with representatives from local environmental justice communities to develop and manage projects that fit the specific needs of each community. Forming partnerships and investing in community energy projects is a practical and direct approach to tackling the environmental and energy injustice problems that have conflicted areas of the Bronx for decades. As the university pledges to align institutional external priorities and legislative agenda with environmental and climate justice and to form strategic alliances with elected officials under the Laudato Si': A Fordham Action Plan Proposal (see Action 9: Advance and Grow Civic Engagement) collaborating with local politicians to sponsor and maintain community renewable energy projects is an excellent pathway to achieve Fordham's commitment.

Moving Fordham Forward. With the timeline created under Fordham's current Laudato Si': Fordham University Action Plan set to come to a close in less than five years (2028), there is

a tremendous opportunity to build on the significant sustainable growth Fordham has made in the past decade or so. With the immense resources at the university's disposal and an administration looking to expand its sustainability plans moving forward, the upcoming edition of the action plan must set ambitious goals that allow Fordham to enter the conversation as a leader in sustainability. To rise to the top amongst academic competitors, adopting strategies designed to strengthen and expand sustainability and climate change education in the university curriculum must be a focal point moving forward. To construct a more sustainable campus at Rose Hill, the university should consider following Andrew Winston's approach of setting ambitious, long-term goals when investing in green buildings and renewable energy infrastructure that transitions away from dependence on fossil fuels. Finally, to achieve its goal of supporting the Bronx community, which has suffered from environmental injustice for decades, Fordham can leverage its resources to empower local citizens in various ways. Ranging from partnerships with local advocacy groups to providing opportunities for students at nearby schools to investing in green infrastructure projects that fight energy injustice and mitigate the harsh health impacts of fossil fuel emissions, Fordham must prioritize supporting environmental justice communities in the Bronx to accomplish its mission of creating a just, equitable, and sustainable future for all.

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