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Coastal Cities: How Efficacious are Climate Change Policies in Urban Settings? Examining New York City:

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Coastal Cities: How Efficacious are Climate Change Policies in Urban Settings?

Examining New York City:

Senior Project to be Submitted to

The Division of Social Studies

Bard College

By:

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Annandale-On-Hudson, New York

May 2022

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Introduction:

The World at Risk:

In examining climate change and the potential risk to cities around the globe, it can be difficult to grasp the magnitude of change, especially considering the myriad of distinct consequences that encompass global climate change. Although all consequences as a result of human-generated climate change can alter the fabric of society around the globe, perhaps no consequences are as devastating to the international community as sea-level rise. Due to the various economic and ecological advantages offered by building cities along the coastlines, nations throughout history have strived to own ever-important coastal cities, resulting in coastal cities becoming the nation's most important assets. As the world economy has embraced globalization, mega-urban sprawls located along coasts have pushed themselves to the forefront of innovation and international trade via its agglomeration of goods, services, and capital. On account of globalization, the agglomeration of goods and services in coastal cities has only expanded the role of major port cities even further as cities such as Shanghai, Mumbai, and New York City reap the rewards of enormous profit. Yet, as a consequence of their vital role in both the domestic and international economy, any shock to the system, let alone increasingly worsening natural disasters due to climate change, has the potential to wreak havoc on citizens and disrupt international trade. For such an important economic and world trading center that is New York City, both

domestically and internationally, existential threats to the citizens and the part that NYC plays in the globalized economic world must be contended with and avoided at all costs.

The effects of climate change on New York City and the world are not a twenty-first-century problem as noted by climate scientists, humans have been affecting the world and its climate since the industrial revolution. In the case of New York City, since the industrial revolution, the sea levels have risen faster than over the last thousand years, culminating in an average sea level rise of 1.2 inches per decade since 1900, with that average only worsening with time.¹ This level of sea rise puts many communities, public and private investments, and infrastructure critical to New York City and international trade networks at immediate risk. Yet, analyzing quantitative data does not quite hit home for most people; how can the sea level increasing by a few inches be categorized as a catastrophe? Currently, projections for the 2020s in New York City have the sea level rising locally anywhere from four to ten inches; the unmitigated tragedy that would be brought about from this increase can be seen in image #1 below.² A rise in sea level of even the minimum prediction would be catastrophic for New York City. Yet this is not the only effect of climate change, there is also the chance for worsening and more frequent storms around New York City. Specifically, New York City experiences two major forms of storms, Nor'Easters, and tropical cyclones, (though these are much rarer). These storms, coupled with a heightened sea level, do even more damage and their effect can be felt further inland as storm surges rise higher and higher.³ New York City learned this painfully after Hurricane Sandy made landfall in

¹ "Responding to Climate Change in New York State: The CLIMAID Integrated Assessment for Effective Climate Change Adaptation in New York State." *Annals of the New York Academy of Sciences*, vol. 1244, no. 1, 2011, pp. 2–649., <https://doi.org/10.1111/j.1749-6632.2011.06331.x>.

² Esri. "Arcgis Storymaps." *ArcGIS StoryMaps*, <https://storymaps.arcgis.com/>

³ Esri. "Arcgis Storymaps." *ArcGIS StoryMaps*

2012, causing up to \$70 billion in damages and potential business losses.⁴ Researchers and scientists alike have attributed much of Sandy's damage to the fact that Sandy made landfall in New York City right as it was high tide, allowing Sandy to have an even greater reach than it should have.⁵ As New York City and the United States contend with the existential issues that arise as a consequence of climate change, questions arise on just how governments effectively respond to natural disasters.⁶ Previously, the United States Federal government has played a major part in state and municipal government recovery plans by acting as the financier for disaster recovery projects. Yet this system where the federal government delegates funds to cities and states to then decide how to rebuild leaves the federal government isolated from the local communities and the direct victims of disasters. This disconnect between individuals and the governments that are intended to represent them is further insulated as once cities and states receive funding, there is little dialogue between public officials and disadvantaged communities that desperately need the aid, not only for disaster recovery but also for mitigating future disasters. Additionally, cities and states are not just contending with the physical ramifications of increasing sea levels, but also combating the culture of Americans who have become apathetic to the consequences of climate change and sea-level rise. Due to the myriad of issues facing New York City and the United States, there exists no panacea or silver bullet remedy; facing climate change and sea-level rise will require a multi-faceted approach that requires the formation of a coalition between the public and private sectors to create innovative strategies to combat climate change. As such,

⁴ Radley Horton, et al. "NYAS Publications." *The New York Academy of Sciences*, John Wiley & Sons, Ltd, 16 Feb. 2015, <https://nyaspubs.onlinelibrary.wiley.com/doi/full/10.1111/nyas.12593>.

⁵ Horton et al. *The New York Academy of Sciences*

⁶ "New York Factsheet - the Nature Conservancy." *Climate Change Impacts in New York*, https://www.nature.org/media/initiatives/new_york_factsheet_5.pdf.

governments at local, state, and federal levels are forced to have multi-faced solutions to the plethora of problems arising from climate change.

Essentially, the focus of my research identifies how the public sector at all levels of government, in coordination with the private sector, combats the plethora of issues stemming from sea-level rise, using New York City as my ultimate case study. In studying this issue, I will be examining the series of climate action policies in New York City and tracking its evolution from PlaNYC 2030 (2007), to OneNYC 2050 (2015-2016), and the establishment of the Governor's Office of Storm Recovery (GOSR, 2013). Furthermore, I will be examining the increasingly direct role the United States Federal Government has taken utilizing 'blueprints' of an international model derived from the Netherlands. To this end, I will be exploring the decisive switch the federal government undertook to revamp exactly how the United States currently and due to its success, will respond in the future to progressive worsening natural disasters. In lieu of a disaster recovery plan that separated victims from their elected representatives who allocate funding for recovery, the United States has strived to create new initiatives that break down the barrier between the public and private sectors by including community leaders and utilizing private foundations such as the Rockefeller Foundation.⁷ This is not to say that the United States federal government is subverting the authority or autonomy the federal system affords to cities and states, but rather that the federal government under the stewardship of then-Secretary of HUD, Shaun Donovan and in coordination with Water management liaison for the Netherlands, Henk Ovink, sought to form 'coalitions' of interdisciplinary experts and community leaders in recognition of the

⁷ Henk Ovink, and Boeijenga Jelte. *Too Big Design: A Transformative Approach to Climate Change*. nai010 Publishers, 2018.

interdependencies of communities that are present in major urban sprawls.⁸ The successful coordination of the public sector and incorporation of the private sector proves to be critical in determining how effective New York City's response to climate change would be.

Initially, as New York City's municipal government began recognizing the existential threat of climate change and sea-level rise to the city, in 2005-2006 the NYC municipal government began exploring an unprecedented climate change policy initiative for international cities. This would take the form of PlaNYC 2030 and would come into full legal effect in 2007. Although PlaNYC 2030 was advertised to the people of NYC as an end all be all climate policy that would help deliver NYC into a new age, much of the promises did not take into account the various communities in NYC. Furthermore, plans that were described as innovating and improving infrastructure, especially water supply infrastructure, were in actuality only the municipal government doing their job. For example, one of the water supply networks connected to NYC had not been cleaned since its introduction in the early 1900s;⁹ in PlanYC 2030, this work was marketed as cutting edge climate change policy but in reality, they were only catching up on work that should've been done decades previously. Simply put, there was a lack of resources and social outreach conducted for this initiative which doomed it from the start. This failure from the municipal government to decisively act on climate change would come to a head when Hurricane Sandy made landfall in 2012, causing upwards of \$70 billion in damages. With Hurricane Sandy came extensive inland flooding, leaving thousands without housing and what temporary housing the

⁸ Ovink, and Jelte. *Too Big*

⁹ "PlaNYC 2030 - A Greener Greater New York." *PlaNYC 2030 - A Greener Greater New York*, <https://www.adaptationclearinghouse.org/resources/planyc-2030-a-greener-greater-new-york.html>.

government could provide, were destitute and lacked basic life amenities. Problems such as failed promises and lack of community outreach plagued PlaNYC 2030 until, just eight years later (2015-2016), the 2030 plan was shelved for a new plan with a longer 'end-date' in mind, OneNYC 2050.

Considering the failures and the lack of true innovation that PlaNYC 2030 would produce, OneNYC 2050 received an increased amount of emphasis not only because it was the new and expanded climate change policy that focused on social justice and community outreach, but also due to the 2016 national election. Following the election of President Trump, the federal administration quickly removed climate change initiatives and any mention of it from all their resources and actively denied its existence. For people living in NYC, this could not be farther from their reality; it is impossible to deny climate change when its consequences are outside your window. Due to this, pressure on the municipal government to create and implement a plausible climate change became ever important. As such, the creation and implementation of a climate change program that did not focus solely on infrastructure and also offered social justice reforms in the form of better community access for disadvantaged people who have been left out of prior plans and thus, harbor distrustful sentiment towards all levels of government. In particular, social justice in the form of better housing, more accessible and cleaner water supplies, and access to education have become the mainstays of climate plans.¹⁰ With that said, truly transformative climate change policies can not limit their view to only critical infrastructure and protecting major economic businesses, instead, as New York City demonstrates, to truly handle the massive consequences of climate change in a city completely interconnected through

¹⁰ "The Plan for a Strong and Just City." #OneNYC, <https://onenyc.cityofnewyork.us/>.

globalization, involving and supporting local communities is vital not only in adapting life to climate change but also for the viability and legitimacy of the municipal government. Climate change is not just adapting to different seasonal temperatures, but a complete change to everyday life and the ecosystems that surround us. To effectively 'grapple' with climate change, municipal governments cannot only address this problem as a one-time issue. Rather, governments must be ready to accept and adapt to a more community-oriented focus climate change policy that is centered around social justice.

Countries & Their Coastal Cities Contending with Climate Change:

Before delving into the various communities that make up New York City, it is important to recognize that, of course, New York City is not the only city experiencing climate change. Thus, the success and failings of one city or another can help New York City government officials to produce the most efficient policies for New York City. Most, if not all countries that have a border with the ocean, have seen the rise of an urban center on/near the coast due to the vast economic potential that lies with having a port. Many of the largest and most important cities along the coastline are positioned at an estuary further enhancing growth capabilities and trade, these cities are usually referred to as 'delta cities'. The rise in trade and economic activity coincides with population growth in these increasingly important port cities making them reliant on access to the sea to gain wealth not only for individuals and private businesses but for their respective cities and country as well. Due to the ease of growth for coastal cities, populations in countries throughout the world have gravitated towards these urban centers, creating

metropolises that states and countries increasingly rely upon to be their financial center and trading ports. The threat of climate change, however, threatens to overwhelm each and every coastal metropolis due to a various number of threats, most notably: rising sea levels, increasingly frequent weather-related disasters, lack of clean water, land subsidence, and entire cities sinking into the ground. In attempting to realize the cost economically of climate change, the PNAS, (Proceedings of the National Academy of Sciences in the USA), has figured mitigation policies for climate change and subsequent actions could cost up to \$100 billion annually by the end of the century.¹¹ These various issues beg the question, how do coastal cities respond? What are effective policies for cities to hinder the worst effects of climate change? What is the toll of not responding to climate change promptly? What part do national policies/the national government play in creating policies for cities/states? In an attempt to answer these questions, I plan to examine Rotterdam and the Dutch national policies developed to protect cities and how this major, (though not to scale with NYC), coastal city has begun to respond to climate change relative to their topography and access to resources. Furthermore, as the Netherlands has possessed a historic need to alleviate the threat of encroaching water levels, the dutch society has acclimated to this reality, resulting in impressive coordination between the public and private sectors in instituting policies designed for mitigating climate change. Conversely, for a city such as Jakarta, there is a far more dire sense of dread in relation to ever-increasing sea levels. As the Indonesia and Jakartan governments have seemingly 'lost' the city to climate change by forcing through the creation of a new capital city located on another island, New York City's officials can

¹¹ Tim Radford, "Coastal Flooding 'MAY Cost \$100,000 Bn a Year By 2100'." *Climate News Network*, 19 Aug. 2015, climatenewsnetwork.net/coastal-flooding-may-cost-100000-bn-a-year-by-2100/

draw on lessons for how not to respond. Whether it be the seemingly successful Dutch policies or the ineffectiveness of Indonesian policies, learning from these cities can prove valuable in implementing a possible blueprint or guide that is viable relative to New York City's and the United States' circumstances.

While some national-level debates rage across the United States and other countries over whether climate change exists, some cities and countries lack the luxury of debate; this is especially true for a country such as the Netherlands. As cities have been built generally for generations along a coastline, the inhabitants and government officials cannot be surprised by encountering fluctuating water levels and responding to various natural disasters. With that said, climate change threatens rapid change that cannot be halted outright, but instead, life adapts around nature and climate change is thus mitigated. The Netherlands has no other choice but to take this course of action as 26% of all the land in the Netherlands is below sea level and 29% of all land is susceptible to river flooding.¹² As this is the Netherlands' natural problem, the Dutch people have actively worked to mitigate a problem the rest of the world is currently facing, rising sea levels. This includes the creation of a Ministry of Water Management and Infrastructure known as the 'Rijkswaterstaat' which creates policy on land reclamation and construction projects such as the Sand Motor. The Sand Motor is an interesting project which aims to take a 'Build with Nature' approach that typifies modern concepts of critical infrastructure in combating climate change. The idea is to not harm or destroy nature for the creation of physical infrastructure but instead support local

¹² "U.N. Climate Panel Admits DUTCH Sea Level Flaw." *Reuters*, Thomson Reuters, 13 Feb. 2010 www.reuters.com/article/us-climate-seas-idUSTRE61C1V420100213.

ecosystems and in turn, have those local ecosystems protect the land.¹³ Essentially, the sand motor operates by moving sand and sediment from places offshore and creates a sort of peninsular hook that extends out into the sea, thus serving as a paradoxical man-made natural defense for flooding that is serviceable as protection for a period of around twenty years (see Image #2).¹⁴ Not only is it defending the land from rising sea levels and possible flooding but it also doubles an effort to promote the natural growth of ecosystems in the area, further creating organic barriers that can be further extended by the Dutch Government. The results seen by the Sand Motor coupled with being relatively cheap (only 70 million Euros), the international world has been taking notes.¹⁵ Countries such as Sweden and even the United States took notice, though, to date they have not duplicated or replicated the sand motor from the Netherlands. Yet, it still proves as an effective policy that not only mitigates disaster but protects and even enhances the local environment it is built around.

Although, the ‘Sand Motor’ is only one of the recent water management initiatives to arise out of the Netherlands that gains international attention. A project known as Maeslant Barrier which was completed in 1997, supposedly protects the coast of Holland, (not the entirety of the Netherlands), from any storms considered to be a once in ten thousand years event.¹⁶ Cities such as Rotterdam, which is 90% under sea level, require such protection. Although the cost ballooned upwards to about 1 billion Euros, the premise was designed around dealing with the effects of climate change and asking

¹³ “Sand Motor – Building with NATURE Solution to Improve Coastal Protection along Delfland Coast (the Netherlands).” *Climate*, 2019, climate-adapt.eea.europa.eu/metadata/case-studies/sand-motor-2013-building-with-nature-solution-to-improve-coastal-protection-along-delfland-coast-the-netherlands.

¹⁴ “Sand Motor – Building with NATURE” *Climate*, 2019,

¹⁵ “Sand Motor – Building with NATURE” *Climate*, 2019,

¹⁶ “Sea Change: How the Dutch Confront the Rise of the Oceans.” *CBS News*, CBS Interactive, 21 May 2017, www.cbsnews.com/news/sea-change-how-the-dutch-confront-the-rise-of-the-oceans/.

new questions.¹⁷ Instead of asking how can we [government/people] better respond to natural disasters, the Dutch government implemented a plan for preventing climate disasters rather than responding after the fact with increasingly complex insurance policies. Though this policy does not help in creating a better local environment such as is found with the sand motor, it still offers little environmental damage while offering 'mythical' protection for the coast of Holland. The Sand Motor and the Maeslant barrier highlight the absolute best policies and attention a government can give to climate change and its various consequences. Nevertheless, the Dutch government and its cities are predisposed to commit significant parts of their budget to this research and engineering as their survival for the past few centuries has depended upon it. Not all countries nor cities will have the financial power/capabilities to implement ideas as complex as one of the largest man-made moving objects in the world in the form of the Maeslant barrier.

While the Netherlands' active steps to mitigate climate change and adapt to the changing climate have been positive, (at those policies which were introduced in this short paper), not all countries have had the same success. The Netherlands represents net positive work done for climate change, but conversely the capital of Indonesia, Jakarta has not been able to adapt and mitigate climate change with the same success. In modern times, Jakarta has been encountering numerous problems concerning the well-being of the city, chief among them being the continuous extraction of groundwater underneath the city of Jakarta. This in turn leads to the rapid sinking of the entire city and its urban populations, thereby making the city more susceptible to flooding, while

¹⁷ "Sea Change *CBS News*, 21 May 2017,

also draining a finite resource.¹⁸ Of course, the most vulnerable population resulting from these devastating actions is the city's most destitute population, as they can only afford real estate in the flood-zone areas.¹⁹ This main problem, along with many others including pollution, overcrowding due to lack of space, and already high susceptibility to natural disasters has forced officials in the city in a drastic decision, to remove 'essential' governing bodies and business in the city and relocate to another island, Borneo, (see image #3).²⁰ There are major advantages to using the island of Borneo as the site for the new capital, such as, due to Borneo's location, the island is buffered from the Island of Java and does not face as many natural disasters as their former island (Java).²¹ Furthermore, the capital of governance would be more central in Indonesia and far more accessible, which most certainly is a benefit but not one of critical importance. While the city faces a chance for a fresh start, relocating one of the world's largest cities by population density has its consequences. One of the most critical of the myriad of consequences deriving from their decision is similar to the problems the government faced on Java, deforestation, and defaunation. For example, the island of Java faced 40% total deforestation and a loss of 42% of species within the next decades.²² Unless the transition is managed effectively, these same problems will not disappear but only shift to the island of Borneo, which already faced extreme deforestation and wildfires.²³ In preparation for the city and its population to be relocated, (currently, 1.5 million

¹⁸ Paige Van de Vuurst, Luis E. Escobar. "Perspective: Climate Change and the Relocation of Indonesia's Capital to Borneo." *Frontiers*, Frontiers, 1 Jan. 1AD, www.frontiersin.org/articles/10.3389/feart.2020.00005/full.

¹⁹ Hendricus Andy Simarmata, Gusti Ayu Ketut Surtiari. *Adaptation to Climate Change: Decision Making and Opportunities for Transformation in Jakarta, Indonesia*. UNRISD, 2020, KARTA---Transformative-Adaptation-Coastal-Cities-2020.pdf.

²⁰ Van de Vuurst, Paige, and Luis E. Escobar. Relocation of Indonesia's Capital to Borneo

²¹ Van de Vuurst, Paige, and Luis E. Escobar. Relocation of Indonesia's Capital to Borneo

²² Van de Vuurst, Paige, and Luis E. Escobar. Relocation of Indonesia's Capital to Borneo

²³ Van de Vuurst, Paige, and Luis E. Escobar. Relocation of Indonesia's Capital to Borneo

government workers are to be relocated by 2024), deforestation and defaunation, (heightened loss of animals in a given region), will only be exacerbated, leading to extensive ecological damage.

These examples of climate policies from the Netherlands and Indonesia serve opposites on the spectrum of effective climate policy and planning. For the Netherlands, the government, in an effort to protect cities and their country formed a policy of 'building with nature' to have natural barriers created to protect their coastline which is mostly already under-sea level, to begin with. Though they do not just rely on projects to help the ecosystem protect the coastline such as with the Sand Motor. They also construct water pumping systems of astronomical size and cost known as the Maeslant Barrier to redirect excess water back out to sea rather than having it flood the interior. These policies/constructions are designed to prevent disasters from ever happening rather than trying to mitigate the damage done and have seen the Netherlands prosper for it. With that said, not all countries/cities have the centuries-old culture of staving off encroaching seawater as the Dutch have adopted due to necessity. Conversely, the city of Jakarta and Indonesia have had to completely change the location of Jakarta due to being unable to effectively limit the impacts of climate change. Essentially restarting on another island comes with consequences for both islands in the form of serious deforestation and defaunation leading to a destroyed ecosystem for both islands. Yet, what choice does the government in Jakarta truly have? They will be experiencing far more frequent storms and flooding that have only been increasingly worse and much of their population, (the poor), are living in destitute houses in flood zones with no positive change in sight, except relocation. The only plausible answer to these problems seems

to fall in line with the Dutch thinking; instead of mitigating disasters, governments focus on attempting to outright prevent them from happening in the first place. Though this seems to be basic logic; yet, putting an effective plan into place that continuously guarantees safety for people and ecosystems is a difficult task to handle. With that said, actively working to prevent climate-related disasters has been the Netherlands' forte for centuries and can serve as an example to the United States and New York City on methods by which governments can take immediate action to save their cities, ports (and thus economic trade), and people.

One of the primary methods by which the United States can utilize the Netherlands' plans is by increasing the involvement of the federal government in how cities and states spend recovery funds following natural disasters. For cities and states in the United States that have enjoyed a clear separation of powers from the federal government and local governments, resulting in an increased sense of autonomy, allowing the federal government increased control is a difficult subject to broach. To combat this perhaps justified distrust of the federal government, the public sector in the United States must facilitate new relationships that are inclusive of local communities and become rooted in grassroots efforts. Disaster recovery at the national level has for too long been held in the hands of bureaucrats that are disconnected from the people they are intended to serve. To achieve this, the United States, at all levels of government, has had to scrap its previous form of disaster recovery policies that were deemed too reactionary, by which I mean former policy was predicated upon short-term 'band-aid' fixes that isolate the government from the people and do not prepare for

future disasters.²⁴ In-essence, any buildings or critical infrastructures that were damaged by a storm or natural disaster are built exactly where and how it was built before, leaving them just as susceptible as before the storm came. In the place of this policy, the United States government has utilized international blueprints, generally drawn from the Netherlands, to create a progressive policy that utilizes forward-thinking by mitigating disasters before serious damage can occur. Furthermore, progressive policy entails forming 'coalitions' between the public and private sectors, abandoning the previous model which entailed bureaucrats who are disconnected from victims and their constituents alike.²⁵ At the municipal level, his switch to progressive policies is manifested in the definitive climate action initiatives such as PlaNYC 2030 and OneNYC 2050. While at the State level, NY State coordinates with the federal government and Dept. of HUD via initiatives such as Rebuild by Design and the GOSR. In examining the evolution from reactionary to progressive climate mitigation policies, I will be using a project originating from Rebuild by Design known as the Billion Oysters Project, or Living Breakwaters. This climate change initiative epitomizes modern climate change policy as it seeks to incorporate private actors in the form of community leaders and private foundations in decision-making processes, while also creating critical green infrastructure for New York City. Furthermore, I will make use of another project based in New York City, known as Project Uplift, which serves as a home elevation project for disadvantaged communities that employ the use of a private non-profit, the St. Bernard Project. Without utilizing international models such as the policies found in the

²⁴ "A New Approach to Disaster Relief Funding? The Disaster Recovery Reform Act's Promise for Pre-Disaster Mitigation." *Harvard Law School*, 13 Apr. 2022, <https://eelp.law.harvard.edu/2021/01/a-new-approach-to-disaster-relief-funding-the-disaster-recovery-reform-acts-promise-for-pre-disaster-mitigation/>.

²⁵ Ovink, and Jelte. *Too Big*

Netherlands, the United States could not have made the switch from reactionary policies that have insulated the government from its constituents, blinding them to its inefficiencies and missteps. Most critically, the international blueprint offers greater representation for the private sector, which comes in the form of foundations, non-profits, and private citizens. With a greater voice and representation for the private sectors comes an opportunity to express their issues concerning climate change and rising sea levels more directly to those in power in public office. Of course, increased voice and representation in climate change for the public sector is only relevant so long as the officials are listening.

Chapter 1:

Climate Change Policies in New York

PlaNYC 2030: NYC's Initial Response to Climate Change:

For the past decade, population trends in one of the largest cities in North America, New York City, have been predicting the population to continuously decrease. Surprisingly, even considering COVID-19 and its still lingering effects on society, the population rose by almost six hundred thousand people. To put that into perspective, New York City added the same population of nearly 1.5x that of Miami, (Miami has a population of about 450,000).²⁶ While it is mostly a net positive in not having a declining population, such an increase in population raises a myriad of macro-level questions concerning ALL of the city's inhabitants including what space are people occupying? How will New York City ensure citizens' access to equitable funding for disaster relief or in preparation for sea-level rising? What are their effects on the environment at a micro and macro scale for New York City? These problems have been constants for cities for an innumerable amount of years, yet, these problems coupled with increasingly worse effects of climate change make these questions that much more important to answer

²⁶ Correal, Annie. "New York City Adds 629,000 People, Defying Predictions of Its Decline." *The New York Times*, The New York Times, 12 Aug. 2021, <https://www.nytimes.com/2021/08/12/us/new-york-city-population-growth.html>.

effectively. To respond to these increasingly difficult questions to answer, New York City-funded, (through the main Climate Change initiative, PlaNYC 2030 in 2007), and created the New York City Panel on Climate Change, or NPCC for short. This panel was modeled after the IPCC at the UN, (Intergovernmental Panel on Climate Change), and grew in significance after Hurricane Sandy along with the Trump Administration's decision to withdraw from the Paris Climate Accords. It is through this body and through executive plans, such as PlaNYC 2030 (2007), with recommendations from the NPCC that New York City plans to revitalize and adapt its city to the growing needs of people burdened by climate change. I will be examining some aspects of NYC's 2007 plan, PlaNYC 2030, such as examining water supply readiness for NYC and creating 'greener' infrastructure. With that said, PlaNYC 2030 is not the most recent long-term climate change policy introduced by the New York City government; the most recent, (and actively pursued), a significant policy introduced by NYC is known as OneNYC 2050 (2015-2016). I will be examining PlaNYC 2030 intending to continue onto OneNYC in the future to better grasp how NYC initialized its climate change mitigation policies. With that said, while I am examining the climate policies put into place through PlaNYC 2030, I also plan to display the misgivings of this earlier policy that needed to be revamped into One NYC 2050 nearly a decade later.

Primarily, before understanding specific regulations and how they are implemented, I believe it is important to understand the structure of how the laws and regulations are passed. This 'chain of command' that has survived to today can be seen below in image #4. Although this accurately describes the political chain of command of

the municipal government in NYC, it does not specifically enumerate what the NPCC specifically does. The particular power/responsibility given to the NPCC is as follows:

- 1: Create climate change projections for the New York City region;
- 2: Develop planning tools to help guide stakeholders in their adaptation planning and strategy-creation process;
- 3: Examine how the regulatory environment influences infrastructure-related decision making; and
- 4: Produce a summary report on climate change adaptation for New York City that outlines major themes and best practices to be included in a comprehensive adaptation program²⁷

Essentially, the NPCC in the grand scheme of political power does not have too much say in how regulations are implemented but instead draws up reports and data to then be sent to higher-ups such as the office of the Mayor to then be decided upon. It is through this process that PlaNYC 2030 came into effect in 2007 through significant influence from the NPCC.

The lifeblood of all communities, whether it is a metropolis or village is their continued access to freshwater supplies. With climate change worsening, many cities, including NYC, face the threat of their water supply becoming salinated. Water scarcity is perhaps the most vital problem that needs to be addressed by the city government as supporting nearly ten million people with an adequate water supply will only become increasingly more difficult as climate change rages into the future. With continuous droughts expected across the United States in the coming decade, cities are acting now

²⁷ Rosenzweig, C. and Solecki, W. (2010), Introduction to *Climate Change Adaptation in New York City: Building a Risk Management Response*. Annals of the New York Academy of Sciences, 1196: 13-18.

before they may lose out on one of life's greatest necessities. One of the immediate steps taken by the municipal government in New York City was to gain access to the Catskill and Delaware aqueducts to add three hundred and sixty million gallons of water coming into NYC as the Delaware aqueduct is to be permanently closed by 2021.²⁸ At face value, this decision alone will only 'kick the can down the road' to have the exact same problem, NYC lacking a sustainable water supply.²⁹ Thankfully, this was not the only decision taken at this time and New York City invested nearly eighty million dollars in various projects such as repairing only water tunnels and creating new water mainlines to increase the efficiency of water usage. This decision was made to be completed by 2016 and aimed to divert millions of gallons of water to a city in dire need of water, but it could not be their only decision to help the city, as this is but a patchwork fix to a greater problem. While these steps will be useful for residents in New York City, most of their investments seem to be long overdue and they are now being passed off as effective infrastructure policy carried out by the government. For example, one of the water tunnels New York City had repaired for Brooklyn, had not received any repairs or fixes to it since it began operation in 1917.³⁰ It was only with significant pressure that water infrastructure as critical as water main lines was given the funding it needed. By promoting the government's ability to clean water piping for the first time in a century, this epitomizes the NYC government's lack of understanding of just how modern climate change mitigation policies should take form. Instead of transforming inequalities in societies and speaking directly with the private sector, as will be discussed later in this paper, the NYC government instead promotes basic cleaning for the first time in a

²⁸ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

²⁹ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

³⁰ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

century. It is due to the lack of general awareness on just how far-reaching climate change and sea-level rise are that would require the PlaNYC 2030 to be scrapped only seven to eight years into its lifespan for a more proactive approach.

After further research completed by the Water Demand Management Plan, (created by the NYC municipal government), it was found that the strain done to New York City's water supply is mostly a result of high residential usage of their total water supply. In total, the residential sector accounts for eighty percent of all water consumed per day in New York City, or three hundred and twenty-five million gallons of water per day.³¹ Due to this fact, New York City outlined a few initiatives to rein in the use of water for all the residents in the city. Interestingly enough, one of the main inefficiencies in daily residential life in terms of water usage is toilets (see image #5). In an attempt to take proactive measures, the Water Demand Management Plan did not create a new policy (at least in regards to what they saw as one of the greatest inefficient uses of water in NYC), but instead had increasingly relied on past policy to guide them recently. This past policy was created in 1994 known as the Toilet Rebate Program, where thousands of family homes throughout the Bronx had new more efficient toilets installed in their homes.³² This seemingly small policy helped eliminate around ninety million gallons of water used per day by the city. This expense was mostly shouldered by the city which offered rebates for all the households that installed one or multiple toilets. In 2013, the city took the nearly exact same approach in removing inefficiencies across households in NYC with voucher programs aimed at promoting efficient water use via toilets.³³ Once again, this policy has its merits and certainly is not hurting the city in the

³¹ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

³² 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

³³ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

long run as they are better prepared for climate-related disasters and have a safer and ready supply of water. Yet, at the same time, these policies reflect how the municipal government and NPCC view climate change consequences and infrastructure projects as not-so-significant problems. By reusing old policies (that were truly just unfinished), New York City in the early 2010s displayed that they truly do not see Climate change as one of the main challenges of this generation and future generations to come. Instead, basic actions that should have been completed and are the responsibility of government officials are being marketed as climate change initiatives and as 'victories' for the citizens of New York.

Although I have only covered a markedly small set of examples of policies concerning PlaNYC 2030, the policies outlined above substantiate that New York City's original plan for combating climate change lacked any meaningful long-lasting policy. Rather, many of the policies enacted by New York City serve only as patchwork policies that cannot create a long-lasting solution to problems brought about by climate change. Without transformative policies that take into account the destitute situations communities face, PlaNYC 2030 was doomed from the start. While increasing water supply from outside regions and improving the efficiency of toilets throughout the residential sector of New York City will give the city some relief, these plans could never be a sustainable all-encompassing climate change policy through 2030. Much of the policy in PlaNYC 2030 serves only to fix problems the city has been experiencing before and should have been remedied years if not decades prior to its implementation in 2007. This is seen in the form of rehashing the same policy from 1999 concerning toilets and cleaning/repairing one of the main water lines for the city for the first time since its

implementation nearly a century prior. These policies/actions, especially the latter of the two, are part of the city's duties in ensuring clean and steady water supplies and only further demonstrate the lack of truly climate-oriented policy that could mitigate climate change. Small actions can add up over time, yet the time for responding to climate change incrementally was long before now and even before PlaNYC 2030's implementation. Policies concerning encroaching sea levels, land subsidence, and better preparations for worsening storms were surprisingly lacking as these are some of the direct threats a plethora of coastal cities will face in the coming years if they are not already. Clearly, the need for a better plan, which came in the form of OneNYC, was absolutely necessary; not only to replace PlaNYC 2030 and its misgivings but also as a response to the then Federal administration under Trump who actively denied climate change. A city as vital to the world economy as New York City cannot have such a shortsighted outlook and expect to prosper in the 2020s and into the future where climate change only continuously worsens.

Failures of PlaNYC 2030

Introduced in 2007 by Mayor Bloomberg, PlaNYC 2030 was marketed to the public as a pathway to a better and greener future for the city of New York. Throughout the plan, New York City is referred to as a city that is under threat from the growing catastrophe that is climate change, going so far as to declare some if not a majority of New York City's infrastructure is among the oldest in the nation. This increased emphasis on infrastructure is somewhat hypocritical, only in the sense that

infrastructure repair/upgrades that were well overdue were being marketed to the citizens of New York City as the newly refurbished climate policy New York City desperately needs. Although the municipal government of New York City is somewhat hypocritical in this aspect, a more direct focus on infrastructure is sorely needed in the city, not only to repair/re-optimize existing infrastructure but to be better prepared for the climate crisis to come. This message was relayed to the people of New York City as New York City building back better with the local community's taken into account, although, in practice, this turned out to be untrue. In lieu of the marketing, instead, the city government focused on policy that would create expansive growth in the wake of climate policy and adaptation, severing communities from the help they needed and deserved. With that said, not all of the policy was for naught. Instead of starting from scratch as they did in PlaNYC 2030, the municipal government could focus on a genuine effort to combat climate change through infrastructure. Furthermore, PlanNYC 2030 importantly recognized the need for coastal 'defenses' to prepare for storms and continuously rising sea levels and how 'hard' and 'soft' measures are applied in this aspect of climate change.³⁴ While the municipal government was able to identify several areas that required vast amounts of repair/upgrading to be ready for a continuously worsening climate crisis, especially that of crumbling infrastructure, PlaNYC 2030 fell far short of expectations compared to what the municipal government sold it to the people as. With that said, drawing focus to the problem allowed for the later plan, OneNYC 2050, to have a better chance of success due to an increased emphasis on the areas the previous plan failed in.

³⁴ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

In beginning to understand how PlaNYC 2030 failed and how it succeeded, it is important to recognize from where city planners created their policy and to what effect. At the onset, many of the policies that would be enacted through PlaNYC 2030 are relative to projections for how the city will grow and what will be the population numbers. These projections are vital to how the city government will react and make decisions as to the city (by 2030), which could easily grow city-wide or stay relatively stagnant in population but increase in population density. To find this answer, the New York City municipal government turned to the NYC Department of City Planning; in answering this question quantitatively, researchers were forced to look into the past population trends of New York City to attempt to find a theoretical answer. In doing this, they happened to select trends from the 1980s - to 2005, which happens to be one of the largest growth periods in New York City's history in an attempt to illuminate future population trends of the city.³⁵ Because of the overwhelming positive population trends from this period, the projections reported to the municipal government were to prepare for at least another million residents by 2030. Of course, this number was reflected in their overall policy decisions for the city but this raises an issue if a city uses the same population projection rate only a few years removed from the then present, is it not also recommending that same pace at which development in the city must/has to grow by? Because of this decision, instead of increasing the quality of life of the people who are currently in the city, the municipal government of New York City was far more focused on creating land/real estate to be available for an increased population density. This is indicative of an overall trend of cities utilizing neoliberal policies that push forward the

³⁵Tom, Angotti "Plan NYC 2030." *Gotham Gazette*, 6 Feb. 2007, <https://www.gothamgazette.com/index.php/development/3476-plan-nyc-2030>.

speculation of land and property in their cities to push for ever-increasing economic growth. Of course, this is done at the expense of improving the quality of life for communities that desperately need help in the face of climate change. Other coastal cities, such as Jakarta also employed similar neoliberal policies that disregarded their poorest populations for finance and global investment and paid a price so heavy the city is relocating to another island as Jakarta is seemingly 'abandoned' to its fate. It is through this focus that marginalized groups and communities desperately needing help to combat climate change and increase their quality of life are left to drown, metaphorically and literally. As such, the plan becomes: "It, [PlaNYC 2030], is a utopia for large scale real estate developers, who would be the beneficiaries of increased high-density growth, and completely ignores the utopias of the majority of residents who live in neighborhoods facing poor housing, poverty, displacement, and gentrification."³⁶ This economic idea has sometimes been referred to as a 'growth machine', wherein large-scale real estate developers or local businesses with leverage, continuously push for planned urban development to generate new customers rather than optimizing what already exists.³⁷ From this decision alone, it is clear the municipal government in NYC's focal point was not necessarily to create a sustainable utopian-like city as they attempted to market to the citizens of New York but rather to prepare for the possibility of increased migration to the city and the economic benefits of rising population trends.

One of the chief reasons PlaNYC 2030 continued to fall far short of expectations largely falls at the feet of their marketing, or rather, a failure to live up to their grandiose expectations set up due to their own marketing. Throughout PlaNYC 2030, the authors

³⁶ Angotti, "Plan NYC 2030."

³⁷ Angotti, "Plan NYC 2030."

of the plan made sure to note the difficulties faced by the populace and that some of their policies may even change the fabric of communities to ensure their continued survival. In response to this, it is noted throughout the plan that everyday citizens of New York City will have a voice and that the city is considering numerous ideas offered by citizens. This is typified by the quote:

Over the past three months, we have received thousands of ideas sent by email through our website; we've heard from over a thousand citizens, community leaders, and advocates who came to our meetings to express their opinions; we have met with over 100 advocates and community organizations, held 11 Town Hall meetings, and delivered presentations around the city. The input we received suggested new ideas for consideration, shaped our thinking, reordered our priorities³⁸

For such an expansive policy concerning the makeup of the city both in the short-term and in the long-term, a minuscule amount of town halls and presentations cannot genuinely equate to having the minds and opinions of the populace of New York City heard. Without a standing solution to this problem of maintaining public outreach, all urban plans, not just PlaNYC 2030, will find them at odds with the city's inhabitants as climate policy affects the very social fabric of communities and entire cities.³⁹ If the policy fails to make any significant public awareness-building, it will lack the support of the people and communities it wishes to forever alter, for better or for worse. By leaving New Yorkers out of the loop, the municipal government of New York City's awareness campaign might as well be a marketing campaign. The statements in the plan do not

³⁸ Yosef, Jabareen, "An Assessment Framework for Cities Coping with Climate Change: The Case of New York City and Its Planyc 2030." *Sustainability*, vol. 6, no. 9, 2014, pp. 5898–5919.

³⁹ Yosef. Jabareen, "An Assessment Framework for Cities Coping with Climate Change: pp. 5898–5919.

reflect any genuine attempt to discover what people needed but rather serve as political jargon.

Although the projections of population trends and lack of public outreach for PlaNYC 2030 appear to have guided the municipal government towards erroneous decisions to focus on increasing growth rather than improving sustainability/adaptation to climate change, that does not mean that all the policies offered by PlaNYC 2030 were ineffective nor worthwhile. One of the main positive aspects to come about as a result of this plan is the emphasis from the municipal government on protecting coastlines through a series of measures that can be best defined as ‘hard measures’ and ‘soft measures.’⁴⁰ Yet, what exactly constitutes what is a hard measure? A hard measure offered through PlaNYC 2030 can be thought of as a man-made object placed along the shoreline to deter storm surges, examples of hard measures offered by PlaNYC 2030 include: groynes (or low scale coastal barriers), jetties, sea walls, or piers.⁴¹ Despite their initial effectiveness when used, over time many of these projects, especially sea walls, have the long-term consequence of having the land underneath them be slowly eroded over time, therefore forcing the city to constantly maintain them for fear of collapse. As such, hard measures in terms of climate policy are not to be taken lightly by city officials. There can be long-term economic and social costs as not only do cities have to worry about the upkeep, but also the effect placing large sea walls can have on communities located on the shoreline. In contrast, softer measures do not require the placement of man-made objects on shorelines. Instead, soft measures seek to restore

⁴⁰ William Solecki, “Urban Environmental Challenges and Climate Change Action in New York City.” *Environment and Urbanization*, vol. 24, no. 2, 2012, pp. 557–573.,

⁴¹ William Solecki, “Urban Environmental Challenges and Climate Change Action:” pp. 557–573.

the ecosystems surrounding coastlines to combat rising sea levels for humans.⁴² These measures can consist of wetland restoration, beach nourishment, and restoring what is known as “blue belt” systems. By ‘blue belt’ system upgrades, the measures essentially keep the maintenance of natural areas, such as wetlands, that have not already been destroyed by encroaching water levels.⁴³ By maintaining these natural defenses, the city's ecosystem seemingly ‘protects itself.’ Just as with hard measures, soft measures, such as helping the “blue belt” systems, also requires constant upkeep and maintenance. With that said, the effort to actively pursue these policies by the municipal government not only helped in the short term of the city but also helped in the long-term as the precedent for climate action concerning deterring rising sea levels has been set. These series of policies would set the stage for the refined climate change policy initiative, OneNYC 2050, to further enhance the effectiveness of these policies while also attempting to limit some of the long-term consequences.

PlaNYC 2030 offers a series of policies to combat climate change while also offering a sense of environmental justice throughout the plan in a series of policies that could not be summed up within. Instead, I have been focusing on the macro-level failures that seemed to have plagued the plan from the onset such as the lack of the public’s voice as well as the apparent desire to form the city’s long-term life around the possibility of expansion rather than improving the standard of life of the current inhabitants. Despite these systemic failures in the climate initiative, there are still some positives that can be taken out of PlaNYC 2030 such as the heavy emphasis on protecting the coastlines of New York City both with man-made structures and through

⁴² William Solecki, “Urban Environmental Challenges and Climate Change Action:” pp. 557–573.

⁴³ William Solecki, “Urban Environmental Challenges and Climate Change Action:” pp. 557–573.

maintaining the surrounding environment. Although they have the downside of not taking in the communities' own opinions, setting the precedent of emphasizing the importance of creating and maintaining natural environments to protect coastal communities set a precedent that the much needed refurbished plan, OneNYC 2050, would carry on.

A New Plan: OneNYC 2050:

With New York City's growing issues related to climate change only growing increasingly worse in the early 2000s, the New York City municipal government signed off on the creation of PlaNYC 2030 (2007). Despite the government's touting of PlaNYC2030 as a plan that was supposed to be a long-term initiative, (at least for 23 years), designed to revitalize the city and grow accustomed to the new needs of a twenty-first-century city grappling with climate change. Coupled with their newfound sense of environmentalism came stats and figures that actually predicted the city would lose population as New York City entered the 2020s.⁴⁴ Yet, even considering the pandemic no one could have planned for, the city included around 600,000 new arrivals to the city, (as of Aug. 2021).⁴⁵ This 'unexpected' population boost gives rise to the serious problems New York City faces. Where will they find space when all of NYC's coastlines are experiencing rapid sea-level rise? As sea levels rise, how can the State and Municipal governments equitably offer relief, and in what form will relief come in? T. Although the PlaNYC 2030 was a start in the right direction, it needed to be far more detailed and exhaustive than the few policies it had such as replacing toilets. Following

⁴⁴ Annie Correal, "New York City Adds 629,000 People, Defying Predictions of Its Decline." *The New York Times*, The New York Times, 12 Aug. 2021, <https://www.nytimes.com/2021/08/12/us/new-york-city-population-growth.html>.

⁴⁵ Correal. "New York City Adds 629,000 People"

its release in 2015, OneNYC promised to be the exhaustive plan that NYC needed to have better storm infrastructure, reduce greenhouse gasses, and halt the progress of rising sea levels. One of the most important changes that forced New York City's hand into recreating a new and better policy was the election of the Trump Administration to the office of the Executive in the United States. As the federal government seemingly turned its back on the City's approach as they altogether refused to believe in climate change, the city was required to forge its own path and commit itself to the Paris Climate Change Treaty as the United States pulled out collectively.⁴⁶ While this action was mostly symbolic, it did give rise to greater emphasis to be placed on OneNYC 2050.

Before analyzing some of the policies put into effect through the OneNYC 2050 plan, it is important to understand the chain of events concerning New York City's climate policy. More specifically, why does New York City need a new plan for 2050 when there was already a climate plan advertised for up until 2030? While the failures of PlaNYC 2030 were absolutely felt and the necessity for a new plan was already in the works (2015), I feel that answer somewhat lies at the feet of the Trump Administration due to the fact that under his administration, the federal government actively removed information pertaining to the veracity of climate change and even refused to give funding to some cities about climate change over other political squabbles. As a result of Trump removing the United States from the Paris Accords, this forced cities and states who do take climate change seriously to sign their own separate agreement that

⁴⁶ Cities, C40. "OneNYC 2050: New York City's Green New Deal." *Medium*, Medium, 28 June 2019, <https://c40cities.medium.com/onenyc-2050-new-york-citys-green-new-deal-4b44380d2dbe#:~:text=It%20was%20just%20two%20years,to%20confront%20our%20climate%20crisis>.

adheres to the Paris Climate Deal.⁴⁷ Through the office of the Mayor, New York City followed suit and committed itself to meeting goals set by the international treaty independently from the United States. Though this is not to say that New York City would be refusing federal funding nor working with the Dept. of HUD as programs originating under the Obama Admin, such as Rebuild by Design would still carry on, rather that this action outlines the beginning of a much more serious approach to climate change action especially as OneNYC 2050 was launched and progressed during the Trump Administration taking over in 2017-2021.

OneNYC 2050, touted as New York City's Green New Deal by Daniel Zarrilli, New York City's Chief Climate Policy Advisor, One NYC 2050 represents a modernized conception of how critical infrastructure must be integrated into the urban communities they are designed to serve.⁴⁸ From the onset, looking at the plan for OneNYC 2050, not only is the plan more exhaustive, but it is also covering a far more wide variety of subjects with organized initiatives to meet said goals. This is much unlike the previous plan which outlined some goals to be met but lacked any meaningful/proactive policy to accompany it. Currently, the plan that New York City has devised is known as the 80 x 50 initiative, or rather, the city plans to reduce emissions by 80% by 2050. Reducing emissions is a noble goal that any city, state, or nation can commit to, but what are the actual policies fueling positive change? In a somewhat confusing turn, outlined in the OneNYC 2050 plan, is another plan that serves as a subsection of OneNYC known as *A City Built to Last*.⁴⁹ It is this plan that outlines specific actions to be taken by the

⁴⁷ "Mayor De Blasio Signs Executive Order to Adopt Goals of Paris Climate Agreement for New York City." *The Official Website of the City of New York*, 2 June 2017, <https://www1.nyc.gov/office-of-the-mayor/news/386-17/mayor-de-blasio-signs-executive-order-adopt-goals-paris-climate-agreement-new-york-city#/0>.

⁴⁸ Cities, C40. "OneNYC 2050: New York City's Green New Deal."

⁴⁹ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

municipal government in reducing the carbon footprint of New York City. In particular, the plan focuses on a select few sectors that need to adapt in the coming years, power, transportation, and buildings. In terms of power, in order to reach this goal of reducing greenhouse gas emissions or GHG by 80% has to be met by reducing the strain people put on the power grid every day. To achieve this, New York City is funding the placement of solar panels on public buildings in an attempt to relieve the electric grid of some strain. Furthermore, these solar panels are meant to serve as backup generators for public buildings such as shelters in the event of a storm/blackout. Though this may seem like a small endeavor, in actuality, this plan aims to save New York City \$8 million a year in energy while also helping the populace at large if storms such as Ida or Sandy are to come again.⁵⁰ The shift to focus on more clean energy is an important signal that not only is New York City concerned with energy grids as climate change worsens but that they are also taking 'green' measures for backup solutions designed to eventually overtake GHGs as the main energy source for New York City.

In terms of the impacts of climate change, we often think of the devastation caused by more frequent terrible storms, rising sea levels, lack of clean water sources, and many other devastating problems. Yet, one problem which can fly under the radar is that of air quality. Through the extensive use of GHGs that our livelihoods depend upon, in such a condescending area such as the metropolis of New York City, problems arising about air quality, and thus, the health of the city naturally arise. Though this issue can be entirely over the City's head to 'fix' there are measures that the city has taken to combat issues such as worsening air quality. For starters, New York City has begun to retrofit all diesel cars within the municipalities 'fleet' to meet the updated

⁵⁰ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

emission standards for cars. Furthermore, the city has plans to create an electric fleet of cars; this plan is somewhat similar to the pledge offered by President Biden in ensuring that half of the US's auto fleet will be electrically powered by 2030.⁵¹ Of course, New York City can only truly control its own public fleet, changing the car industry and consumption habits of private citizens is a much harder task to commit to. With that said, though difficult, it does not mean that the municipal government is ignoring it. One of the best ways to convince private industries/people to change their industry/lives is through incentive programs. By offering rebates in return for truckers to voluntarily have their trucks retrofitted to reduce emissions, a successful policy that reduced 450 trucks' worth of GHGs by 2015 is now being implemented across other industrial sectors.⁵² Convincing private citizens and industries to change their lives and industry will of course present difficulties and hardships for the person being regulated and regulators alike, yet, it is through policies that offer economic compensation via the municipal government that can facilitate the adaptation of the overall city to a greener approach. Though these actions are not entirely in line with mitigating climate disaster, it represents the city's and state's desire to change how life operates on a day-to-day basis. In becoming more environmentally conscious by train seemingly small steps, the municipal and state governments are slowly but surely altering the culture around climate change and the myriad of consequences it presents. This has been one of the greatest challenges that all sectors of government have been contending with; changing the culture of millions of citizens to face such an existential crisis as climate change

⁵¹ Person, and Jeff Mason David Shepardson. "Biden Seeks to Make Half of New U.S. Auto Fleet Electric by 2030." *Reuters*, Thomson Reuters, 6 Aug. 2021, <https://www.reuters.com/business/autos-transportation/biden-set-target-50-evs-by-2030-industry-backs-goal-2021-08-05/>.

⁵² 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

cannot happen via a 'quick-fix' law, but requires time and an overhaul of how problems are presented. By attempting to create a greener environment in the city through 'small' government processes, the municipal and state governments are bringing a greener mode of living to the forefront of citizens' everyday life. Yet, the most effective way in adapting the culture surrounding climate change is through education. Of course, education initiatives do not produce results, but over decades as new generations that will face ever-increasingly worse climate change consequences receive their education. New York City in coordination with the Federal government would come to realize this through the Rebuild By Design Program which is to be discussed later as transforming the relationship people have with nature and water is essential in attempting to have a coordinated response to climate change.

Adapting the energy grid and creating a cleaner environment through retrofitting diesel cars/trucks are certainly pushing the city towards a more sustainable future. Yet these policies do not have any consequence concerning perhaps the greatest threat posed by climate change, the loss and lack of space. For still growing metropolises such as New York City, having space to grow for residential areas and industrial areas is vital in ensuring the city prospers. Having a lack of space for residents can cause a myriad of health problems especially when this problem is coupled with unsanitary environments. As such, the NPCC or New York City Panel on Climate Change identified a problem in the city known as 'Brownfields' that if helped, could alleviate pressing issues related to land loss and use. These 'brownfields' refer to over 3,000 residential and industrial sectors designated by the city as under mandatory environmental review; nearly 40% of these areas are underused/vacated due to the substantial amount of

ecological damage that was done/left untreated in these areas.⁵³ Of course, these areas are not found in the richer parts of Manhattan, but are generally on the fringes of the city, disproportionately hurting the most unfortunate of the city. To combat this social issue, the city once again turned to economic stimulus as a means to clear up space for the city in the long run. Through the Land Cleanup and Revitalization Initiative, New York City began funding areas that were designated as 'brownfields' in cleanup efforts and rebuilding efforts in low-income areas.⁵⁴ By creating an efficient policy that better uses the land that the City has rather than expanding outwards, not only is New York City creating a cleaner environment, but they also open up these 'brownfields' for economic prosperity. Whereas before these areas in the city were depopulated and in some cases left vacant, under the new revitalization act designed to clean up these areas from toxic waste/crumbling infrastructure, economic opportunities offer themselves up. It is estimated that from this cleanup, up to 5,000 new units of affordable housing coupled with \$14 billion in private investment could be the result of efficient land usage.⁵⁵ Once again, to facilitate such massive cleaning drives throughout the city, the municipal government turned to offering tax credits and subsidizing efforts to clean brownfields done by private companies. Although this may seem rudimentary, when this program initially started in the mid-2000s, it was the first initiative in the US by the city to fund these projects without outside funding (such as the Federal government).⁵⁶ The idea of using private entities to revitalize economic and land development has and will become an ever-important theme in how the US responds to climate change. The

⁵³ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

⁵⁴ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

⁵⁵ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

⁵⁶ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

brownfields project represents the first in a long series of climate change initiative policies to be actioned at the municipal, state and federal level of the public sector in the United States.

In fighting against the worst aspects of climate change, an effective policy backed by economic help seems to be the path forward for New York City and perhaps other coastal cities. It is through economic revitalization programs such as the brownfields program that couple as environmental projects that serve as effective climate change adaptation policy. Furthermore, funding the brownfields and air quality policies mentioned only through municipal budgets can offer insight into the future of coastal cities. Perhaps New York City is lighting the way in cities becoming more independent and less reliant on state/federal funding to meet climate goals. Though, this is not to say that cities should not be funded, rather that cities can take proactive measures for the betterment of their own citizens with or without a compliant federal government such as was seen under the Trump Administration. The pledge from the office of the Mayor to continue to meet the Paris Climate accords deadlines typifies this further as it displayed New York City has the will/ability to commit to climate adaptation independently. With that said, committing to international accords despite being just one city is indicative of an overall shift in cities to be more in tune with international norms. Whereas during this time period the Trump administration was seemingly pushing toward a more isolated United States that looked inwards rather than outwards, New York City instead moved to reaffirm their international ties and committed to international standards and proceeds, not entirely beholden to domestic goals.

Chapter 2:

Modernizing Perspectives of Climate Change

Governor's Office of Storm Recovery & NYRCR:

As global climate change and its consequences have been exacerbated by inaction and unkempt promises by multinationals and countries alike, the world is coming to grasp that generally held notions of infrastructure are mostly ineffective at halting the various consequences of climate change. At the micro and macro level, governments are beginning to follow the success of other international models in averting the worst of climate change. This includes steering away from regarding nature as a conservation effort/sanctuary to critical infrastructure that has even become referred to as paramount to national security.⁵⁷ As traditional infrastructure such as piping, roads and dykes are proving inadequate, communities and governments alike are turning towards 'green solutions.' With past infrastructure no longer meeting all the needs of communities, countries including the United States have begun to reconceptualize how states interact and support communities through natural infrastructure. Yet natural infrastructure is exceedingly broad and requires adaptability from the government to determine what is effective and cost-efficient and what is not. This amount of power/flexibility in such an undefined realm inevitably leads to the politicization and possible monetization of the U.S's ecosystems. Furthermore, with the

⁵⁷A. Marissa Matsler, "Making 'Green' Fit in a 'Grey' Accounting System: The Institutional Knowledge System Challenges of Valuing Urban Nature as Infrastructural Assets." <https://www.sciencedirect.com/science/article/pii/S1462901118310797>

introduction of private-public partnership competitions, such as the United States Rebuild by Design plan, projects whose purpose is to serve local community/city interests by protecting the coast and promoting wildlife, must pay multinational corporations their dues for investing in the form of an advisory role. Although the Rebuild By Design project taking place along the NYC coastline markets itself as a shining example of a balance between private and public projects, the main private investors tend to be large corporations with capital enough to guide and influence politicians and projects. To avert these issues of politicization and monetization of ecosystems critical to life, transparency from both the government and watchdogs/NGOs is of the utmost priority. It is through mediums such as independent journalism and grassroots efforts that will not necessarily eliminate all corruption, but surely hamper it. As the benefits of natural infrastructure are potentially vital successes, green infrastructure will continue to become increasingly popular to meet the needs of communities not only in NY/NYC but across the U.S. as well.

In the face of the potential destruction of major urban centers due to climate change, such as New York City and a multitude of small communities throughout New York State, New York State needed to respond to climate change and the host of interrelated problems climate change brings with it. Following the increasingly worsening storms experienced by New Yorkers at the turn of the decade such as Hurricane Irene (2011), Tropical Storm Lee (2011), and then Superstorm Sandy (2012), New York State finally took direct action at the executive level in the shape of forming the Governor's Office of Storm Recovery, also known as GOSR (2013). As a series of major storms had recently come to devastated many New York communities, at first, the

initial goal of this project was to provide aid and support for those affected. With that said, the GOSR was not set up to be an office that responds only to emergencies, but also an 'office' that plans to reinforce communities' resilience and mitigate any serious storm threat before it arrives on the NY State or NYC coastline. Funding for this office of building resilience in New York City following SuperStorm Sandy's effects mostly came in the form of the Dept. of HUD. Specifically, a little bit over \$15 billion was allocated to New York State to promote resilience and recovery efforts. Although the funding was not given to the state without conditions, nor all at once. Alternatively, the Dept. of HUD utilized a system of releasing funding in small packages, (but still worth billions), to ensure that conditions set by the Federal government were being met. Among the most prominent of the conditions for funding created by the HUD was the requirement that at minimum, 50% of all HUD funding must be directed towards low-middle income housing/communities to ensure a semblance of equity in the recovery program.⁵⁸ Furthermore, 80% of all funding must be directed towards nine specific counties that saw some of the worst of Sandy's destruction. This list includes the Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, and Westchester.⁵⁹ The conditions set by the Dept. of HUD additionally require funding to be allocated towards building resiliency among communities and mitigation policies. This includes funding allocated by the HUD for New York State required to be spent on projects that were selected through the Rebuild By Design initiative. By releasing funds intermittently, the federal government could better track where, when and to whom funds were being sent

⁵⁸ *Stormrecovery.ny.gov*. 2013, https://stormrecovery.ny.gov/sites/default/files/crp/community/documents/20220202_NYS_Consolidated_ActionPlan_APAs%201-30.pdf.

⁵⁹ *Stormrecovery.ny.gov*. 2013,

to for storm recovery. Yet, from the perspective of the State, managing and handling the requirements set forth by the federal government would prove to be a managerial nightmare without its own form of bureaucracy. To this end, the Governor's Office of Storm Recovery, (2013), was created to ensure the requirements set by the Federal government would be met by the State to ensure the steady flow of allocated funds for disaster relief. To fail to meet some of these marks might have entailed communities recently affected by SuperStormSandy to not receive critically needed funding. Per the GOSR, the money the State receives is allocated to NY communities to react/prepare for four primary issues based along the lines of building climate change resilience: Housing Recovery, Helping Small Businesses, Community Reconstruction, and Infrastructure.⁶⁰ These primary general goals set by the GOSR are achieved through a number of public-private partnerships, (created through competition), and direct federal funding. In deciding on community-oriented competitions and where federal funding is needed most, the GOSR created and implemented a plan known as New York Rising Community Reconstruction (NYRCR), otherwise known as 'New York Rising.' Through the GOSR and New York Rising plan affiliated with it, New York State plans to diversify its preparedness for storm recovery by not being completely oriented by recovery, but also promoting destitute communities and laying the foundations for creating a durable NYC and NY State, relatively safe from the effects of climate change.

In creating a plan that is supposedly designed and implemented for local communities by New York State, how does the GOSR through the New York Rising plan incorporate communities into their initiatives so as not to cut them out? Primarily, this is

⁶⁰ *Stormrecovery.ny.gov*. 2013.

done through a committee known as the NYRCR Planning Committee which is composed of 'established local leaders' in what is regarded as traditionally underrepresented areas. Furthermore, public hall-type meetings are set up as information updates on projects moving forward in the regions headed by the 'established local leaders.' While, on paper, this sounds as if there is community representation with the NYR, communities being unable to select their own local leaders to represent themselves in this significant infrastructure initiative can be viewed as corrupt. If New York State is selecting these 'established leaders' this leaves the door for corruption and self-serving interests to take priority as there appears to be little transparency within this 'community oriented' initiative.

To create effective policy for New York State and New York City concerning mitigating the effects of climate change following the devastation caused by Superstorm Sandy, then governor Andrew Cuomo created the Governor's Office of Storm Recovery in 2013. While initially the GOSR was primarily focused on recovery and supporting those whose lives were destroyed or affected by the series of storms that hit NYC between 2011-2012, moving forward, the primary goal of the GOSR is to build the foundations of climate change 'resilience' and to mitigate the effects of climate change before the damage can be felt.⁶¹ To this end, under the GOSR, New York State created an initiative known as the 'New York Rising Community Resilience' plan, otherwise known as the NYRCR or more simply, NYR. Undeniably, climate change's effects on coastlines and communities in and around NYC can be catastrophic not only to the people living there at the moment, but climate change can also alter the habitability of

⁶¹ New York State *NYRCR, NY Rising Community Reconstruction Plan*, NY State, 2012.

coastlines. With rising sea levels inching higher every year, the GOSR through the NYRCR seeks to build up local communities to avoid this fate. Action is taken through the NYRCR, with funding coming from both the US Dept. of HUD and New York State itself. In particular, between 2012 - and 2015, NYRCR has funded over \$500 million in renovation designed to upgrade and renovate deteriorating houses in communities that are most affected by climate change.⁶² This includes an 'elevation initiative' which was created with rising sea levels in mind as some communities sit too low relative to sea level to be considered 'protected' from the inevitable rising coastlines.⁶³ Furthermore, the GOSR, through the NYR initiative, also began construction throughout the NYC metropolitan area of community buildings known as the 'New York Rising Community Centers'. these community centers were built at the direct request of many of the communities that the GOSR is attempting to aid and offer critical help and information that people require in the event of disaster/storm emergencies. Help/information can range from offering immediate necessities to people such as food/water/shelter to counseling services designed to ensure children continue education and families can potentially find new housing.⁶⁴ Although these community centers are not exactly 'critical infrastructure' such as transportation via highways, metro, or Amtrak, the building of the NYR community centers displays the willingness of the GOSR planners to listen and respond to the needs and requests of the communities they aim to help. Plans such as building community/information centers at the request of the local communities reflect NY State's ability to adapt its climate change policies from one of 'cookie cutter'

⁶² "Ny Rising Community Reconstruction Plans." NY Rising Community Reconstruction Plans | Governor's Office of Storm Recovery (GOSR), <https://stormrecovery.ny.gov/nyrcr/final-plans>.

⁶³ "Ny Rising Community Reconstruction Plans." NY Rising Community Reconstruction Plans

⁶⁴ "Ny Rising Community Reconstruction Plans." NY Rising Community Reconstruction Plans

rebuilding to laying the foundations for communities to have access to education and funds to create plans that work within their own local environments.

With the shift in climate change policy, New York State has changed from focusing on rebuilding critical infrastructure as fast as possible to having policies oriented to mitigating the damage before it ever arrives. In essence, NY State has departed from focusing on only critical infrastructure to community building and new forms of 'infrastructure'. One of the most profound strategies developed by New York State to combat the ever-growing threat of climate change is the development of private-public enterprises that are chosen through a competition originally designed by the U.S. Department of Housing and Urban Development. As it is designed by the Dept. of HUD, this project, known as 'Rebuild by Design' is not limited to NY State and has undergone optimization so as to create its operation, (under the Dept. of HUD).⁶⁵ This idea of using private-public partnerships chosen through the competition was not a wholly original idea from the then-Secretary of U.S. Dept. of HUD, Shaun Donovan, as the then-Secretary of Dept. of HUD met with the Netherlands' then-acting director of spatial planning and water affairs.⁶⁶ This meeting was set almost immediately following the destruction caused by Superstorm Sandy in NYC and other parts of New York State in 2012. The goal? To find a better approach to dealing with climate change and disaster responsiveness in the United States and New York State. Previously, much of the United State's response to disasters, whether caused by climate change or not, was to rebuild almost exactly what was there before the disaster, without thought to how the

⁶⁵ "Ny Rising Community Reconstruction Plans." NY Rising Community Reconstruction Plans

⁶⁶ How a Design Competition Changed the US Approach to Disaster Response." *The Guardian*, Guardian News and Media, 18 Jan. 2017, <https://www.theguardian.com/cities/2017/jan/18/rebuild-by-design-competition-disaster-respone-climate-change>.

area would respond when, not if, another similar disaster came around. According to Donovan, this meeting, (and others), helped the United States Federal Government reimagine the role it plays in disaster management from a total responsive government to a government that prepares in anticipation, (see image #6 for the disaster management process).⁶⁷ The result? A plan is known as the 'Rebuild by Design' project which initially started with over a \$1 billion budget for which the Dept. of HUD can designate resources to the state or directly to projects for communities.⁶⁸ Although, the 'Rebuild by Design' portion of the HUD's plan is almost entirely built around private-public partnerships that aim to reinforce NY State communities through solving 'local stakeholders' issues concerning climate change and infrastructure.⁶⁹ Solving the issues of local community leaders is primarily done through a series of competitions sponsored by NY State GOSR with the collaboration of the U.S. Dept. of HUD. The process for determining what projects are given Federal + Private funds, (generally from large foundations such as the Rockefeller Foundations), is lengthy and requires months of research and collaboration with local community 'stakeholders' and leaders to first identify problems.⁷⁰ Then they propose solutions that keep local ecosystems and ecology 'in mind'. In total, following the implementation of the plan, seven projects are designed to work within their local ecosystems and benefit community leaders in the area.⁷¹ These projects, in a sense, are re-imagining how the State and communities interact with their environment and view infrastructure. The line between the two is becoming increasingly blurred as the use of the environment as infrastructure is

⁶⁷ Kelly Meaghan, "4 Phases of Disaster Management Explained (The Easy Way)." *BlackText-FullColor*, 14 Apr. 2020, <https://home.akitabox.com/blog/4-phases-of-disaster-management>.

⁶⁸ "How a Design Competition Changed the US Approach to Disaster Response."

⁶⁹ "Ny Rising Community Reconstruction Plans." NY Rising Community Reconstruction Plans

⁷⁰ "Ny Rising Community Reconstruction Plans." NY Rising Community Reconstruction Plans

⁷¹ "Ny Rising Community Reconstruction Plans." NY Rising Community Reconstruction Plans

spreading across the United States due in part to the success of the Billion Oysters Projects originating from the Rebuild by Design competition.

Importing International Models in the U.S:

Rebuild By Design:

With the 21st century global economy predicated on the idea of globalization or rather, a series of interdependencies that link people across the globe cultural, socially, and economically, progressively worsening natural disasters throughout the world as a result of climate change can threaten not only the region of the world where it strikes but the entire global system of moving capital internationally. Super Storms such as Sandy served as an alarming reminder of how interconnected communities are both internationally and domestically. Storms that are capable of damaging critical infrastructure such as a major port or transit systems directly harm the inhabitants of the region but also indirectly can severely damage world trade, thus negatively affecting the victims of the storm twofold, destroying physical capital/infrastructure and halting economic activity. For the United States, following a massive storm similar to SuperStorm Sandy, there has existed an overall emphasis by the United States government to focus on rebuilding exactly what was destroyed, with little concern for if/when a storm/disaster of equivalent magnitude could come again, forcing the government to waste money once again. This cyclic disaster management protocol utilized by the US government, both at the Federal and local level has had disastrous consequences as critical infrastructure and communities rebuild with the same issues intact as before the storm.⁷² Without progressive thinking, the reactionary protocol used

⁷² Justin Shapiro-Kline, "THE IMPACT OF THE PUBLIC PROCESS IN REBUILD BY DESIGN." *Graduate School of Architecture, Planning and Preservation Columbia University*, May 2014

by all levels of government will steadily worsen the quality of life as the consequences of disasters will only become ever-increasingly dire. Communities that only rebuild exactly as before leave them vulnerable to future disasters that will exacerbate existing issues within those communities. As major urban areas such as New York City serve not only its regional population but the United States as a core city that competes economically and culturally at an international level, the United States must take progressive policies that protect all the interconnected communities, especially those most disadvantaged as they are often the most vulnerable. Although in the United States the word 'progressive' is generally politically charged, in the context of disaster recovery/disaster management, being progressive entails having policies that are designed to prevent catastrophes before they ever occur. To achieve this, there must be a high level of coordination between the public and private sectors as previous policy, deemed reactionary, has only ever truly relied on a public sector insulated from the private sector. While each country and how it adapts to progressive policies will be unique as they build within their topography/societal norms, the Netherlands is able to have far more national government control than could ever be allowed in the United States; the United States's progressive policies concerned with climate change have utilized Dutch models of increased federal 'intervention' via fostering a closely-knit relationship between public and private sectors. With that said, changing from a reactionary to progressive policy in terms of natural disasters is not a matter of a simple change or the construction of physical infrastructure, but an overall incremental cultural change in how the United States and its citizens view its relationship with nature and communities. To facilitate the altering of the American perspective of nature and

recovery, the United States has drawn from the Dutch model of governance on water management and disaster recovery/management. Whereas previously the United States federal government would respond to a natural disaster via a drawn-out process of the national legislature drawing up a new bill for every disaster that inevitably succumbs to some form of political squabbling, delaying much-needed aid. This is a broken process that delays necessary aid and only seeks to rebuild as exactly before the disaster, keeping the same vulnerabilities in place. Recognizing the futility of such policies, the United States, specifically the Dept. of HUD utilized Dutch models of governance to create an interdisciplinary team of researchers and experts that worked to form a coalition between the United States national, state, and municipal governments and the private sectors of those most affected/most vulnerable to natural disasters.⁷³

The process utilized by the United States federal government for storms such as Katrina, known as disaster recovery, is an unending cycle centered on having the quickest and fastest response to inevitable disasters. The idea of creating an efficient recovery process for destructive storms is of course important, but it has guided the United States down a path where recovery was the sole goal of governments, small or large, in managing inevitable disasters. Yet, the path of creating efficient recovery programs for the aftermath has somewhat blinded governments across the United States as the question was never raised, what if storms/disasters and the destruction they bring, such as Superstorm Sandy, could be mitigated to the point there was no 'recovery' phase of the storm. This question has been at the center of revolutionizing the United States's National, State, and Local governments' conception of responding to

⁷³Ovink, Jelte, *Too Big*

ever-increasingly worse climate disasters. At the center of this revolution in policy changes, is New York City, more specifically, a New York City in 2012- 2013 which was still reeling from the effects of SuperStorm Sandy. As New York City aided and rebuilt communities, then Head of the Department of Housing and Urban Development, Secretary Shaun Donovan, had been touring the Netherlands and meeting with high-level officials associated with the Netherlands' national water infrastructure and disaster management teams.⁷⁴ It is from this international meeting that the question of, what if cities eliminate, or at least hinder the effects of increasingly worse storms, rather than having reactionary approaches? The meeting between transnational parties to find a solution for the domestic issues the US had been experiencing marked a significant point in how the United States would end up conducting its climate change policy; Secretary Shaun Donovan concluded that the United States needed to radically change its reactionary approach to one of mitigation, similar to the Dutch process. It is from these talks and further coordination between the Dutch and other international communities that the new initiative that utilized federal management and resources to implement climate change mitigation at local and state levels was born from. It is through international cooperation and coordination that the United States has been able to transform its disaster relief strategy from one that was isolating the public and private sectors from each other, leading to inefficiencies and ineffective relationships. The resulting distrust severely hindered any attempt from the United States government to act in good faith with disadvantaged communities. Rebuild by Design sought not only to change how money was spent in coordination with everyone involved, from the President of the United States to a victim of a storm but to also alter how Americans

⁷⁴Ovink, Jelte, *Too Big*

viewed and interacted with their environment with respect to climate change and rising sea levels. Primarily, this was done through fostering relationships with local communities by incorporating them into any recovery/mitigation plan following a storm. Yet also, education programs were set up via the projects selected to change the infrastructure/landscape of communities. These institutions are vital for altering the perspectives of younger generations who inherit the issues of generations passed. While using international models derived from the Netherlands, a country that has 1/3 of its total landmass under sea level, appears to be a productive idea in facilitating participation among local communities and the public sector, what exactly have leading Dutch experts on water management and disaster prevention, such as Henk Ovink, influenced in the Rebuild By Design Program? For starters, completely reimagining the issue of rising sea levels and increasingly worse disasters was one of the primary goals of Secretary Donovan. This involved changing the notion of 'resisting water' and seeking to push it back from the coast, to living comfortably with water. Furthermore, Henk Ovink, who became a special envoy for the Dept. of Housing and Urban Development, strived to help Americans involved with disaster management realize the failure of their reactionary responses.⁷⁵ Specifically, Henk Ovink, after examining efforts to rebuild sea walls destroyed by Hurricane Sandy, noted they were rebuilding the same walls exactly as they were before they broke. When asked what the engineers would do if another Hurricane Sandy equivalent were to arrive, they replied: "We'll build it again."⁷⁶ These actions and responses epitomize how the United States has generally been addressing disaster relief throughout the country. This never-ending cyclical

⁷⁵Ovink, Jelte, *Too Big*

⁷⁶ Russell Shorto, "How to Think like the Dutch in a Post-Sandy World." *The New York Times*, The New York Times, 9 Apr. 2014, <https://www.nytimes.com/2014/04/13/magazine/how-to-think-like-the-dutch-in-a-post-sandy-world.html>.

thought process can only lead to further damage down the road for New York City as storms will only have increasingly terrible wrath to dispense to coastlines as climate change inevitably worsens. In a country such as the United States that has an exceedingly vocal amount of its population actively working against and denying climate change, revising how the United States, for both everyday people and government sectors views its relationship with climate change and water is paramount to the future success of possible climate change mitigation practices that 'spring up' due to Rebuild by Design's success. Some programs/projects that have received a green light from the Rebuild by Design initiative have included a provision/program designed to combat the ignorance or naivety that is prevalent among the United States populace, even amongst urban centers known for their more progressive thinking.

The plan, Rebuild By Design, is committed to revolutionizing how the United States public sector interacts and values the private communities. This is not to say that the United States copy and pasted' the Dutch model of governance, rather, the United States has created a blueprint that embraces the complexity offered in globalized urban spaces and seeks to build a cultural sense of resilience contrary to the current apathetic view towards climate change that currently exists in the United States.⁷⁷

With natural disasters worsening, SuperStorms such as Sandy put on display how 'forgotten'/disadvantaged communities are; their ecological, economic, and social vulnerabilities are interconnected. Damage to the highway or metro system in Queens produces a shock to all communities in the area and can even produce inefficiencies and disrupt international trade in major urban centers such as New York City. In the event of such a catastrophe, generally, the United States's disaster

⁷⁷Ovink, Jelte, *Too Big*

management/recovery has been centered on a series of inefficiencies in the federal government concerning appropriating aid that can leave aid hanging dangling over the heads of those most vulnerable/damaged. To quickly oversimplify the inequities of the disaster recovery process, this process administered by the federal government has operated dysfunctionally and completely isolated from those they are attempting to give relief. This is a primary example of change RBD sought to revolutionize, administrators cannot be isolated from their constituents for effective policy to take place⁷⁸ For example, in the case of a natural disaster, a new bill must be created and worked through the various committees in the US Congress, surviving ‘riders’, and other various political absurdities. Once this bill is finally through the red-tape and political maneuvering, it then needs the signature of the executive to have funds moved to the Community Development Block Grant Disaster Recovery Funds, (known as the CDBG-DR), under the HUD.⁷⁹ Yet, even then, aid can be withheld from areas that desperately need them following a natural disaster, (see Puerto Rico in 2017 under the Trump Administration).⁸⁰ When this process ‘works,’ it involves states and cities vying for funds within the CDBG-DR that they perceive as their rightful money.⁸¹ To access said funds, cities and states must prove the extent of damage they received from the disaster, thereafter the government appropriates the money based on percentages of just how damaged the areas vying for funds are. With little federal government oversight, the cities and states are given money and decide themselves to whom and where the money will be placed, generally rebuilding exactly what was destroyed in

⁷⁸Ovink, Jelte, *Too Big*

⁷⁹Ovink, Jelte, *Too Big*

⁸⁰ “New Probe Confirms Trump Officials Blocked Puerto Rico from Receiving Hurricane Aid.” *NBCNews.com*, NBCUniversal News Group, 23 Apr. 2021, <https://www.nbcnews.com/news/latino/new-probe-confirms-trump-officials-blocked-puerto-rico-receiving-hurri-rcna749>.

⁸¹Ovink, Jelte, *Too Big*

exactly the same place, with little to no changes nor regard for future storms/disasters.⁸² This process is quite convoluted and not only leaves the federal government, who is deciding on the amount of relief to be sent to states/cities isolated from those affected but also states and cities are left with considerable funds with little to no government oversight on the how/why relief funds are spent in their areas. This entire system leaves much power to the states and the city without any checks and more importantly, disregards anything being said/voiced by victims of the disaster itself. The public sector insulating itself from the private sector and creating an air of separation from the victims is the reasoning behind Secretary Donovan's revolutionary models of governance adapted from the Netherlands for the United States. Due to the power of the states and cities in the United States, Donovan and Ovink knew that they could not generate a model for the United States directly reproduced from a Dutch model that utilized strong nation-state controls. Instead, to break the above-described system of convoluted inadequacies, a new initiative would have to be molded that fit into cultural and legal frameworks set up in the United States. This initiative, Rebuild by Design, did not seek to hand newfound powers to the federal government, but instead to include all levels of people involved in the process of recovering from disasters to have a more equitable approach to disaster management that did not necessarily change the legal landscape.⁸³ Instead, RBD built relationships and the culture of how Americans view climate change mitigation between all levels of the public and private sectors involvement.

⁸² Justin Shapiro-Kline, "THE PUBLIC PROCESS IN REBUILD BY DESIGN."

⁸³Ovink, Jelte, *Too Big*

To facilitate this revolutionary new initiative, Rebuild by Design was not marketed as a new legal structure by which the United States would uniformly follow; rather, Rebuild by Design was created as an international competition for innovation to the direct benefit of those most affected by SuperStorm Sandy. Specifically, the Rebuild By design sought to reorient just how the federal government and states/cities interacted not only within the public sector but also in the private sector. This of course entailed many working parts as levels of the public and private sectors, such as the national, state, and local governments were now in direct conversation with not only each other but also large private foundations, civil organizations, and citizens themselves.⁸⁴ Reorienting the legal framework under which Congress and thus, the United States federal government operates is no easy task. To incorporate all the necessary parties, at the suggestion of Henk Ovink, the rebuild by the Design team desired to alter the federal government's response from just handing out funds to becoming far more involved and a part of the process to decide which projects receive money. This came in the form of the structure of RBD, wherein the federal government would essentially choose projects originating from RBD for states and cities to implement, rather than having states and cities decide what to do *after* they received funds from the CDBG-DR.⁸⁵ To balance the increased authority given to the national government, local community leaders, local and state governments, and private foundations/businesses that gave their support in the form of funding, (on top of the HUD's funding), would be involved at near every decision step along the way in finding what exactly works best for each individual community in mitigating climate changes effects, with a special focus on

⁸⁴Ovink, Jelte, *Too Big*

⁸⁵ "Community Development Block Grant Disaster Recovery Funds." *HUD Exchange*, <https://www.hudexchange.info/programs/cdbg-dr/>.

sea-level rise and its various consequences it brings about. To enable this newfound collaboration between the private and public sectors, the United States HUD decided to approach this issue as the national government in the Netherlands does. For RBD to be as inclusive as possible, the power structure had to be bottom to top rather than top to bottom. To ensure this, instead of relying only on urban planners or architects to plan the recovery process, as would normally be done, the initial RBD team leaders sought to change this and utilize an interdisciplinary board of experts from varying backgrounds.⁸⁶ Among these professionals and leading experts in their field was the Director of the Institute of Public Knowledge, New York University, Eric Klinenberg, who was tapped to be a Research Director for RBD.⁸⁷ Despite Klinenberg's career being associated with the field of social science and not within any urban planning/architecture context, (as was the previous norm for his position in RBD), his research on inequality exacerbated by extreme events proved invaluable to the team as he brought a perspective that previous policy was clearly lacking. Klinenberg would echo the sentiment that Ovink desired to foster in RBD by stating:

Any design should do more than simply protect a place from extreme weather or another shock, it should also improve the quality of life every day. That requires an approach that is not just about designing engineering systems or structures, but also about how people will use them, be affected by them, and how people will reshape the structures as they come together⁸⁸

The idea that climate change mitigation policies should revolve around the people the structures are directly affecting was surprisingly missing from previous US policies

⁸⁶Ovink, Jelte, *Too Big*

⁸⁷Ovink, Jelte, *Too Big*

⁸⁸Ovink, Jelte, *Too Big*

concerning natural disasters. This can partially be blamed on politicians insulated from the greater public who had only used engineers to make any plans, therefore plans for recovery only centered around the effectiveness of the structures to be built without any emphasis on the people it was supposed to protect. By incorporating a social scientist such as Klinenberg, an important perspective was lost in any and all policy decisions concerning disaster relief/recovery. By being based on a grassroots effort, Henk Ovink believed that the national government could begin the process to overcome the distrust in the federal government held by a plethora of people, especially those in disadvantaged communities who feel forgotten/fear these projects would only be another step towards gentrification. To create a truly encompassing climate change policy, Ovink sought to begin the RBD initiative from the bottom up, starting with experts in their fields interacting and forming 'coalitions' with local communities and leaders before ever considering possible long-term mitigation projects.

To form the coalitions between public and private sectors, the RBD, headed primarily by Secretary Donovan and Ovink, designed an overarching general plan for four general phases of RBD, Talent → Research → Design → Implementation.⁸⁹ The process is outlined in Ovink's book, *Too Big*: For the first phase, Talent, the RBD initiators had to create a team of interdisciplinary experts as an alternative to only employing engineers to plan and bureaucrats to disperse funding; the RBD team had to 'call for talent' from across the globe.⁹⁰ Teams would be comprised of sociologists, lawyers, engineers, bureaucrats, and water management experts both domestic and international. In doing so, instead of having an echo chamber of people within the same

⁸⁹Ovink, Jelte, *Too Big*

⁹⁰Ovink, Jelte, *Too Big*

profession, a plurality of viewpoints and perspectives could be assessed. This stage of the RBD is perhaps the most critical as, during the Talent stage, the array of professionals gathered were not allowed to even discuss possible designs or initiatives. This stage, coupled with the 2nd phase, Research, is purely to gather and assess systemic problems facing disadvantaged communities. For the 2nd phase, Research, the RBD teams, equipped with the myriad of experts from various fields gathered from the first phase, investigated first-hand in collaboration with local community leaders to see what work should be prioritized in storm recovery and what issues are specifically plaguing the locals.⁹¹ This process involved assessing a region's vulnerability and the different interdependencies that occur specific to disadvantaged/vulnerable communities. It is only with grassroots collaborations that research teams can then propose potential ideas for further research and investigation in the next stage. The 3rd phase, Design, is allotted to community leaders, private stakeholders, and a team of diverse experts to collaborate on the creation of implementable plans that can mitigate climate change and offer a positive societal impact. Specifically for the Billion Breakwaters project, this involved incorporating the Rockefeller Foundation's President, Dr. Judith Rodin, in designing and implementing designs. For a private foundation such as Rockefeller Foundation, not only are they gaining valuable input into critical infrastructure projects but they are also afforded the ability to control narratives on how the private sector will view RBD. With the funding and reach of such an influential organization working for the Rebuild By Design team, the RBD team gains legitimacy from the private sector. From this phase arose 148 possible community-oriented designs originating from design teams that represented thirty-five countries for the

⁹¹Ovink, Jelte, *Too Big*

federal government to scrutinize down to an eventual number of ten designs.⁹² It is in the fourth, and final step, Implementation, where the HUD must make a decision concerning which projects will receive funding for cities and states to realize in coordination with the private sector, whether it be a large foundation or a local community leader.⁹³ Of the ten winners given the go-ahead by the federal government for states/cities to fund, seven of which are located in New York, two in New Jersey, and one in Connecticut. For the purpose of this project, I will be examining one such project located in the New York Harbor, the Billion Oysters Project, sometimes referred to as Living Breakwaters. This project is one of the most prominent of the ten projects selected via the Rebuild by Design process outlined above as it represents all levels of the public sector in the United States forming a 'coalition' with the private sector to create modern green infrastructure.⁹⁴ This modern green infrastructure that proves critical to ensuring the safety of the New York City coastline from natural disasters and sea-level rise took the form of oyster beds along breakwaters lining the New York City harbor. Furthermore, the Billion Oysters Project is not only a physical manifestation of modernized green infrastructure but the project also doubles as an education initiative that seeks to change the culture and relationship New Yorkers have with nature as the threats climate change poses for the world grows ever closer to home rather than being a theoretical and existential threat.

With climate change's consequences hitting ever closer to home for New Yorkers, the idea of having politicians who actively deny climate change, such as seen throughout the Trump Administration, seems utterly impossible. The Trump Admin and

⁹²Ovink, Jelte, *Too Big*

⁹³Ovink, Jelte, *Too Big*

⁹⁴ Ovink, Jelte, *Too Big*

like-minded politicians did not represent just the regression of disaster management policies from a path of progressive policies back to being reactionary, but outright denial of any problems, signifying little to no aid will come to those in danger. On the other hand of this political spectrum, there is the population of people and politicians who recognize the disaster that awaits not only the populace of local areas but also the upending of the global economic order and normalized global trading norms. With the myriad of existential threats to human life brought about by human-caused climate change, governments and politicians have been increasingly turning towards biological/environmental solutions in either halting or limiting the effects of climate change. This idea to turn to the environment for solutions to human-created issues is not novel. The creation of parks and 'urban green spaces' as a sanctuary away from modern fast-paced urban life has existed since the 1850s with one of the most prominent examples being the creation of Central Park in New York City. Essentially, the environment was utilized by cities to benefit the populace as amenities in the form of parks. In modern times, with the threat of climate change hanging over the world, cities and their politicians have increasingly turned to environmentally based ideas to limit the repercussions of human-caused climate change. This includes viewing the environment, not in terms of conservation, but as infrastructure, commonly understood as environmental infrastructure/natural infrastructure. While previously environmental infrastructure was generally referred to as "the ecological conditions necessary for or conducive to a species' survival or movement across territory", recently, governments such as NYC have viewed the environment as 'disaster management'.⁹⁵ In New York

⁹⁵ Stephanie Wakefield, "Making Nature into Infrastructure: The Construction of Oysters as a Risk Management Solution in New York City." *Environment and Planning E: Nature and Space*, vol. 3, no. 3, 2019, pp. 761–785., <https://doi.org/10.1177/2514848619887461>.

City and New York State, ENGOs such as Robinhood actively lobbies politicians for the equitable distribution of funds to combat climate change while independent journalism such as the Village Voice helps expose inequalities/injustices that may occur.⁹⁶ Projects such as the Living Breakwaters and Project Uplift in NY State and City, which are to be discussed in greater detail, are just a few ways the state has begun to transform nature into critical infrastructure. The use of the environment as infrastructure is a far cry from how infrastructure is traditionally perceived. This blend of differing versions of infrastructure is depicted in image #7 below.⁹⁷ While there are certainly positives to this approach as the local environment receives much needed positive attention/action, there are also negative impacts as the State begins to view funding natural projects such as the Billion Oysters 'breakwater' projects as models for protecting existing economic markets and generating long-term economic growth. By changing perspectives from conservation/protection to disaster management/producing economic growth, New York City and State risk commercializing nature as just another economic cog in the economic global order. If the State is viewing the environment as a potential economic investment, this can corrupt the original purpose of supporting local ecosystems from a desire to protect environments to people, trying to gain economic benefits.

New York State's attempt to give relief to communities that are most at risk of the effects of climate change has come in various forms. This includes offering financial assistance to rebuild homes, and building new emergency disaster shelters throughout

⁹⁶ "Social Justice and the City: Citizen Action of New York Seeks Progressives." *The Village Voice*, 3 Feb. 2022, <https://www.villagevoice.com/2022/02/02/social-justice-and-the-city-citizen-action-seeks-progressives/>.

⁹⁷A. Marissa Matsler, "Making 'Green' Fit in a 'Grey' Accounting System."

the NYC Metropolitan area through implementing climate change initiatives such as PlaNYC 2030 (2007), and OneNYC 2050 (2015-2016). Perhaps most prominently, New York State collaborated with the US federal government to create a public-private funded competition designed to award the best environmentally conscious and beneficial environmental plan put forward by experts in consultation with affected communities.⁹⁸ The Rebuild By Design idea was created at the federal level during President Obama's term as a push to find creative and innovative methods that can use the environment and local ecology of threatened communities to their advantage. Following Rebuild by Design's implementation by the GOSR and U.S. Dept of Housing and Urban Development in NY State and NYC, several ideas were considered successful and received hundreds of millions of USD in funding to find new solutions to climate change rooted in the environment. While the initial Billion Oysters project was created for NYC, (and surrounding areas), the widespread success of the winning projects in NYC has led the other states along the East Coast, including NJ and CT, to also have adopted the Rebuild by Design approach.⁹⁹ For New York City, out of the seven initial winners, one project, the Billion Oysters project stands as a shining modern example of innovative infrastructure practices that are coupled with their local environments. To achieve this, the Billion Oysters project aims to build 'breakwaters' or a large series of concrete around NYC's bay to dampen the energy produced from waves following large storms. Furthermore, to promote NYC's local ecology, these breakwaters double as effective breeding zones for local oyster populations.

⁹⁸ "Ny Rising Community Reconstruction Plans." *NY Rising Community Reconstruction Plans | Governor's Office of Storm Recovery (GOSR)* <https://stormrecovery.ny.gov/nyrcr/final-plans>.

⁹⁹ "Rebuild by Design." *HUD.gov / U.S. Department of Housing and Urban Development (HUD)*, <https://www.hud.gov/sandyrebuilding/rebuildbydesign>.

Repopulating the local oyster population, which took a nosedive following decades if not centuries of overfishing and an overall lack of care for the surrounding environment is integral to supporting healthy coastlines.¹⁰⁰ By repopulating oysters, the overall health of the coastlines of NYC improves as oysters serve fundamental roles in their local ecosystems such as removing pollutants, serving as an extra barrier to dampen the strength of incoming waves which in turn, can diminish erosion rates for NYC. To date, this project has been wildly successful as New York City has seen an increase in oyster populations between the years 2012 - and 2021 of 47 million oysters, which is quite successful considering the last oyster bed in NYC was shut down in the 1920s.¹⁰¹ By using a previously successful international model in the public-private partnership, the US government and NY State government, for all intents and purposes, appear to have generated their own system for developing innovative ideas that utilize local ecosystems to their advantage. The process of the 'Rebuild by Design' program functions well as it serves as a medium for competition between rival ideas, allowing the most potentially prosperous and effective ideas to rise to the top and receive funding from private communities/investors and the State. This in turn not only positively affects communities as they receive critical infrastructure interwoven into their ecosystem but also benefits the State, (and the communities), as economic interests and expansion remain far more possible without the threat of climate change hanging over their head.

The benefits from the Rebuild by Design and one of the ten plans that will be examined, the Billion Oysters project, are abundant. Not only does New York City see the return of an essential native species to its ecosystem, but the breakwaters and the

¹⁰⁰ "How a Design Competition Changed the US"

¹⁰¹ "How a Design Competition Changed the US"

oysters themselves serve to clean the water along the coastlines and repel the devastating effects of climate change. In effect, the Billion Oysters project is serving as a form of critical infrastructure that protects communities, citizens, and perhaps most important of all to the state, economic interests at both the local and national level. As NY State and NYC in coordination with the Dept. of HUD develop local ecosystems to serve as essential blocks of sustaining and expanding communities in the face of climate change, governments at the local and national levels will become increasingly reliant on natural infrastructures to sustain communities. With such importance to everyday life and macro-economic plans comes the politicization of natural ecosystems. Already, in the State of California in 2016, legislation was passed that defined watersheds or areas where water drains/collects, as fundamental 'water infrastructure' necessary for the state to own and maintain.¹⁰² Opening up resources/capital for the improvement/upkeep of natural resources by the state at face value appears to be a climate change advocate's dream. Yet issues arise when the state puts resources towards nature as infrastructure, not for conservation. This important distinction in the relationship between nature and the state has an integral difference, economic potential. As the state funds natural resources to sustain life/prevent disaster, there exists an expectation that the resources diverted to projects such as the Billion Oysters project will pay off. As the money/grants put forward to projects involved with creating natural infrastructure are designed for such important and lofty roles as protecting communities; political fights over how budgets should be spent are sure to occur, only further politicizing local ecosystems.¹⁰³ Although there may be public/political arguments

¹⁰²A. Marissa Matsler, "Making 'Green' Fit in a 'Grey' Accounting System."

¹⁰³A. Marissa Matsler, "Making 'Green' Fit in a 'Grey' Accounting System."

over the federal/state budgets, many of the recent infrastructure-based ecology projects in the nation, (including the Rebuild by Design Program), have been using a partnership with large non-profits/multinational corporations to reach funding goals. Incorporating multinationals/large corporations into natural infrastructure will certainly ensure budgets are kept, yet to entice these corporations, 'restoration' projects become monetized and businesses receive economic gains for their investment. This current framework that NY State, NYC and the Federal Government as a whole offers promise in developing local ecosystems that have long been ignored and abused and converting them into relevant critical infrastructure. For all that, if the process by which these projects are financed through private investors is for economic gain, then ecosystems in the United States will slowly become cogs in a capitalist economy. For such critical projects as climate infrastructure that involves communities' local ecosystems, transparency concerning investments and where money is being allocated must be of the utmost importance to avoid the potential corruption of ecosystems necessary for everyday life.

Chapter 3:

Revitalizing Community-Based Projects:

The Billion Oysters Project:

In the search for a new more progressive climate change initiative for the United States, the Dept. of HUD's then-Secretary, Shaun Donovan's last-second detour to the Netherlands to meet with water management teams, following the destruction left in Sandy's wake in 2012, proved to be invaluable. From these meetings arose the idea of implementing procedures that had been helping the Netherlands' 'win' in their constant struggle with the sea for centuries. This included having a more assertive and pronounced federal government involvement in disaster recovery whereas previously, the federal government acted merely as financiers. Although then-Secretary Donovan, in coordination with a special water management liaison, Henk Ovink, realized that the United States could not copy and paste the Netherlands' exceedingly prominent national government, they could utilize the framework as a blueprint. The United States has a long history of autonomy of states and cities from the federal government and no amount of advocacy and politics is going to change that relationship anytime soon. Instead, Donovan and Ovink sought to coordinate with the state and municipal government in New York for the implementation of any infrastructure projects so as to ensure the federal government keeps its main role as a financier. Furthermore, in establishing this blueprint, Donovan and Ovink produced a design that sought to enhance the relationship between the public and private sectors by incorporating the

private sector in the active planning and implementation of climate change mitigation initiatives. In incorporating the private sector in the process of saving communities in New York City, the Dept. of HUD strove to have community leaders in dangerous flood zones a part of the decision-making process. To this end, he sought to gain 'on the ground' knowledge and advice from private citizens to build infrastructure that was not based on economic principles or urban planning, but to instead base it off the communities it was meant to serve. The initiative, Rebuild By Design, after utilizing a myriad team of experts from a diverse set of backgrounds to assess problems in at-risk communities eventually supplied the coalition of local, state, federal, and private actors with 148 designs that could be applied to New York City to combat climate change and transform communities. Although the Dept. of HUD had upwards of \$60 billion in disaster relief aid, only a few billion was granted to Rebuild By Design as it was mostly an afterthought at its inception. Due to this, of the 148 designs originally presented, only ten were selected to be funded, with many of them designed to deliver protection to various parts of New York City, even extending to New Jersey Connecticut.¹⁰⁴ One of the most prominent of these ideas, both in the media and for the Rebuild by Design team, is the Billion Oysters Project. The Billion Oyster Project, or Living Breakwaters Project as it is sometimes referred to is a marquee example of the RBD process in utilizing the coalition of public and private sectors to create a series of flood mitigation breakwaters that served as critical infrastructure in halting rising sea-levels and mitigating the powers of storms as they hit the NYC coastline. This project also serves as a form of green infrastructure as the breakwaters also double as an animal

¹⁰⁴Karrie-Jacobs. "The Top 10 Post-Sandy Ideas from Rebuild by Design." *Architect*, 10 Apr. 2014, https://www.architectmagazine.com/design/buildings/the-top-10-post-sandy-ideas-from-rebuild-by-design_o.

conservation project. Attached to the breakwaters are oyster beds, Originally native to NYC harbors, but the population was destroyed due to the ever-increasing expansion of NYC since its creation as a colony in 1624. The oysters serve as an environmentally-friendly climate change mitigating factor as not only do they help in reducing the effect of waves but also naturally clean and depollute the NYC Harbor which has become notoriously filthy. Lastly, to ensure the Billion Oyster Project serves as more than a one-time infrastructure plan, incorporated within the project is also an education initiative that utilizes the NYC public school system to form a maritime career and technical (CTE) institute. As the RBD noted, one of the primary problems facing New Yorkers and the United States is the relationships people have with nature and thus climate change. This can partially be attributed to polarized politics in the United States as one of the major parties in the US actively platforms against Climate Change's existence. Yet, to combat this, the RBD team, through the Billion Oyster Project, created an education initiative that served to educate high schoolers on the dangers of climate change and also prepare them for careers in maritime biology, including working for the Billion Oysters Project. Thus ensuring the longevity of the Billion Oysters Project while also slowly but surely transforming the culture surrounding climate change in the United States.

In solving any problem, even one as difficult to conceptualize as climate change, the first step is to identify the problem. Concerning the sea-level rise that New York City is currently experiencing, sea-levels have risen faster than over the last thousand years, culminating in an average sea-level rise of 1.2 inches per decade since 1900, with that

average only worsening with time.¹⁰⁵ While this may seem somewhat insignificant and a problem that is perhaps centuries down the road, refer to image #8 to see an estimate of what New York City's shoreline would be after four decades at that average. Not only does climate change bring rapid sea-level rise, but also has the consequence of faster and worse rates of erosion along the coastline. For New York City, many communities along with the coast experience erosion of nearly one foot per year. Clearly, an increase of 1.2 inches per decade would decimate a vast area of NYC and would inevitably displace millions of people. To combat this possible future, drawing funds from the United States Department of Housing and Urban Development through the GOSR, New York was able to begin work on sustainable 'green' infrastructure throughout various communities in need. One of the ways environmentally based infrastructure has been realized is through the Billion Oysters project.¹⁰⁶ Although this project was originally designed with mostly Staten Island in mind as Staten Island has experienced especially terrible consequences due to rising sea-levels; the Billion oyster projects have spanned out across New York Cities' local coastline and have become a marquee asset to the State and symbolic of a new form of infrastructure, infrastructure based on the local environment.

While the idea of the Billion Oysters project is surely a positive effort toward developing climate resiliency whether by installing breakwaters 'equipped' with oysters or promoting climate-sensitive education, how does the Billion Oysters project hope to accomplish this open-ended problem? In terms of installing physical environmental

¹⁰⁵ "Responding to Climate Change in New York State: The CLIMAID Integrated Assessment for Effective Climate Change Adaptation in New York State." *Annals of the New York Academy of Sciences*, vol. 1244, no. 1, 2011, pp. 2–649., <https://doi.org/10.1111/j.1749-6632.2011.06331.x>.

¹⁰⁶ "About." *About | Governor's Office of Storm Recovery (GOSR)*, <https://stormrecovery.ny.gov/about>.

infrastructure, primarily, the Billion Oysters project builds infrastructure known as 'breakwaters' which consists of nearly 2,400 feet of pieces of rubble submerged near the coastline.¹⁰⁷ Far from being just some pieces of rubble, these breakwaters are described by the Billions Oysters Project as: "The breakwaters are rubble mound (rock) structures with a stone core, a base layer (bedding stone or marine mattress, depending on the breakwater) to protect against scour [erosion of the base structure], and outer layers consisting of armor stones and ecologically enhanced concrete armor units."¹⁰⁸ The 'rubble mound' used by the Billion Oysters project primarily serves two general purposes, to promote marine diversity and oyster populations but the breakwaters themselves also serve the purpose of mitigating the effects of storms, hurricanes, rising sea levels, and erosion. The area most impacted by their placement can be seen below in image #9.¹⁰⁹ The second purpose the breakwaters serve is as an 'anchor' for oyster bed populations along the New York City coastline. The benefits of oysters on local coastlines are numerous as oysters are native in the NYC harbor but experienced exponential loss due to overfishing and the increasing prosperity of NYC. Among the most important are oysters reducing the strength of waves that hit the shoreline, thereby reducing erosion. Furthermore, in terms of New York City's local ecology, oysters are native to the local ecosystems and help purify the ocean of pollutants; this provides the State of New York with a 'natural' solution to its problem without bringing in another non-native-species, which could potentially interfere with other small 'cogs' that function within New York City's greater ecosystem. With seemingly little to no drawback, the

¹⁰⁷ "Living Breakwaters Project Background and Design." *Living Breakwaters Project Background and Design* | Governor's Office of Storm Recovery (GOSR), <https://stormrecovery.ny.gov/living-breakwaters-project-background-and-design>.

¹⁰⁸ "Living Breakwaters Project Background and Design."

¹⁰⁹ "Living Breakwaters Project Background and Design."

Billion Oysters project has become a staple in creating environmental infrastructure to combat/mitigate the effects of climate change. Yet, there remain more macro-level issues with referring to these breakwaters as building up New York City's storm resilience. With such a profound impact on protecting the New York City coastline, potentially saving the city, state, and federal government billions in disaster relief funds, issues arise concerning how the public and private sectors should be treating green infrastructure. With such a positive economic impact, the success of the Billion Oysters Project has the potential of corrupting its original intent. If governments begin to view green infrastructure as projects necessary for the long-term economic viability of their cities/communities, this runs the risk of commodifying nature. Essentially, the Billion Oysters project serves as 'risk management' for New York State following Superstorm Sandy experienced in 2012.¹¹⁰ If New York City and the State of New York view the Billion Oyster Project and similar projects as marquee assets, that could possibly jeopardize its overall goal, to deliver necessary relief to endangered communities as economic priorities could supersede helping at-risk communities. Environmental infrastructure could be promoted and effectively used in the future due solely to the benefits it offers for both local communities and local ecosystems, but as of the creation of the RBD projects (2013 - present-day), environmental infrastructure is rarely put to use, even in environmental plans such as New York Rising, at least on a significant scale.¹¹¹ Without systematic change at a global scale in the production/distribution of goods and how the world views its ecosystems, the effects of climate exchange will only worsen, forcing cities into more 'risk management' rather than making environmental

¹¹⁰Stephanie Wakefield, "Making Nature into Infrastructure:"

¹¹¹"Communities." *Communities | Governor's Office of Storm Recovery (GOSR)*, <https://stormrecovery.ny.gov/community-reconstruction-program>.

infrastructure the foundation of economic growth moving forward. This is, of course, no fault of anyone, state, or nation but our collective failure as a species to sacrifice our collective ecosystems on the altar of economic growth, (especially as an extremely small portion of the population are the main benefactors of unrepentant growth).¹¹² With numerous benefits, such as mitigating climate change's consequences and sea-level rise, arising out of the completion of large-scale green infrastructure projects, their unmitigated success could also prove to be their point of corruption. As this problem I have proposed is entirely theoretical and speculative, there is no one true answer or panacea to stop the manipulation of green infrastructure to serve economic needs rather than the needs of the communities they protect. In ensuring that green infrastructure is not corrupted for economic goals, it is vital to maintain the relationships generated between the public and private sectors. Perhaps most importantly, keeping community leaders and private citizens 'in the loop' in preserving and creating green infrastructure projects can at least ensure some level of transparency, lest the public sector falls back to its original ways of never consulting private actors.

Although the Billion Oysters project is primarily concerned with mitigating the effects of rising sea-levels and its various consequences through building breakwaters, the Billion Oysters project also serves New York City and State communities through social programs. Among these social programs is an in-land infrastructure program designed to renovate critical drainage facilities and revamp other areas of critical infrastructure including ensuring backup generators are functional.¹¹³ This small-scale

¹¹²Trevor Hunnicutt, "Rich Get Richer, Everyone Else Not so Much in Record U.S. Expansion." *Reuters*, Thomson Reuters, 2 July 2019, <https://www.reuters.com/article/uk-usa-economy-expansion-contrasts-idUKKCN1TX0H3>.

¹¹³"Ny Rising Community Reconstruction Plans." *NY Rising Community Reconstruction Plans | Governor's Office of Storm Recovery (GOSR)*, <https://stormrecovery.ny.gov/nycrcr/final-plans>.

infrastructure renovation plan done through the Billion Oysters project is actually a small cog in a much larger plan known as the New York Rising Community Reconstruction plan or (NYRCR). This plan, the NYRCR, was designed to benefit and prepare communities across New York State but not by blanket standardized goals set by the state, but by creating individual plans for at-risk areas that reflect their ecology and history. Generally, what is included within these plans are funding for repairing dilapidated infrastructure, renovating critical drainage/storm-prevention infrastructure, and increased state funding for Community Based Organizations/Climate Change Education (refer to images #10 & 11).¹¹⁴ While somewhat lesser in importance in terms of funding, education and community initiatives are a vital aspect of modernized climate change policy that seek to build trust with communities that have felt left behind by the public sector. As such, it is within the public sector's best interest to include provisions that boost community based organization while still mainly focusing on building physical structures such as the living breakwaters. Yet the unparalleled success of the living breakwaters in NYC brings the potential for the corruption of its original goal. As New York City stands as one of the most expensive and highly prized areas in the world for real-estate, provisions that protect these areas, and thus economic interests are nearly invaluable. While the state is certainly interested in building up critical infrastructure and building relationships with the private communities, the state is also looking to sustain economic development if not have outright persistent growth in these communities following state 'intervention'. This could raise some problems like the possibility of these costs for communities being misconstrued as investments rather than necessary costs

¹¹⁴ "Ny Rising Community Reconstruction Plans." *NY Rising Community Reconstruction Plans* | Governor's Office of Storm Recovery (GOSR), <https://stormrecovery.ny.gov/nyrcr/final-plans>.

by the State government. Although economic development/growth is a positive outcome, it cannot be the primary goal of the public sector's climate policies to realize a profit. With that said, even with funding from the Dept. of HUD, environmentally friendly programs supported by the state are only able to fund a limited number of projects for a large swathe of communities that all desperately need attention/government funding for impending storms, regardless of good faith intentions or not.

The Rebuild by Design team initially identified this issue of failing to incorporate the private sector and sought to minimize this potential result by providing private communities and community leaders an opportunity to be involved in the plans and designs themselves. In increasing the participation and transparency for local communities, the Billion Oysters Project is predicated upon volunteerism/community action and creating education initiatives. By incorporating communities via volunteers, the Billion Oysters Project gains legitimacy and trust of the communities they are trying to protect. Thus, enabling the ability for further natural infrastructure projects designed around communities to be initiated. Yet what does community-based volunteerism warrant? For the Billion Oysters Project, volunteerism seems to fall into three distinct categories.¹¹⁵ First, in its most 'basic' form, volunteers can apply to be a part of helping maintain the oyster beds and breakwaters throughout the year. This includes removing some oyster beds for examination to ensure the oyster populations are healthy and remain unharmed.¹¹⁶ Of course, a concerned citizen can not just be selected for this process and training will be given to any who are accepted to the project. The second form of volunteerism that residents can apply for is to become an ambassador for the

¹¹⁵ "Volunteer." *Billion Oyster Project*.

¹¹⁶ "Volunteer." *Billion Oyster Project*.

Billion Oysters Project. While the first form of volunteerism can be relatively short-term and non-committal, the second form of volunteerism offered through the Billion Oysters Project allows for concerned citizens to become long-term ambassadors of the program.¹¹⁷ Of course, as this form of volunteerism is more serious and requires ambassadors to take a more leading role in the project, the Billion Oysters Project has to ensure that ambassadors are in it for the long haul. To this end, becoming an ambassador for the Billion Oyster Project requires that interested applicants participate in at least three public volunteering events to be considered. With that said, what exactly does being an ‘ambassador’ involve? For the Billion Oysters Project, being an ambassador can include a variety of roles but is not limited to:

- Lead[ing] or conduct[ing] local wild oyster surveys
- Lead[ing] public volunteer days on Governors Island
- Assist[ing] staff and students in the Harbor School hatchery and BOP greenhouse
- Engage others in the Billion Oyster Project’s work via community events, social media, and networking
- Help facilitate Oyster Research Station trainings with teachers¹¹⁸

This form of volunteerism requires active participants to be committed to the project and helps disseminate information concerning natural infrastructure and its benefits.

Furthermore, this program is designed to be inclusive and accessible to all interested citizens in New York as training would have been required to meet the requirements of having been a part of three separate volunteer projects connected with the Billion

¹¹⁷ “Ambassador Program.” *Billion Oyster Project*, <https://www.billionoysterproject.org/ambassador-program>.

¹¹⁸ “Ambassador Program.” *Billion Oyster Project*,

Oysters Project. Furthermore, training is offered for ambassadors for whichever of the few roles prescribed above entirely free of cost.¹¹⁹ In creating programs that are easily accessible for community members to be involved with critical green infrastructure, a sense of community togetherness to combat the effects of climate change, while simultaneously 'saving' their city is fostered. This type of effect on the community is invaluable to the RBD's and public sectors' overall goal to stimulate a cultural shift in the United States to include local communities and private actors in staving off the worst effects of climate change. With that said, further activism opportunities are represented within the Billion Oysters Project which requires interested participants to be trained community scientists or educators. While obviously necessitating education credentials limits the accessibility of these programs, their positive effect in transforming how everyday citizens view the sea and climate change is undoubted. As the role of an educator or community scientist involves a long-term commitment, the role they play in the overall Billion Oysters Project is critical. For scientists, roles can include being a part of the Oyster Research Station program which entails scientists managing their own portion of the oyster beds and gathering subsequent needed data.¹²⁰ Additionally, community scientists can play a similar role to educators in 'touring' or being employed at various NYC public schools to "engage students, teachers, schools, and community members in environmental restoration and stewardship at the water's edge."¹²¹ While the many roles of volunteerism for the Billion Oysters project all involve numerous roles of varying committal, all the roles offered play a critical role in transforming New Yorkers' cultural relationship with climate change. Instead of having citizens' only relationship

¹¹⁹ "Volunteer." *Billion Oyster Project*.

¹²⁰ "Community Science." *Billion Oyster Project*, <https://www.billionoysterproject.org/community-science>.

¹²¹ "Community Science." *Billion Oyster Project*

with climate change being that of tales of the doom of the world such as those found in the news, the Billion Oysters Project offers a real-world project by which volunteers of diverse backgrounds can come together to make concrete positive change in their city for the better. In changing the cultural outlook of New Yorkers, the RBD and Billion Oyster initiatives have undergone the difficult task of involving community members not only in the process of designing natural infrastructure projects but also through volunteer and activism initiatives involved with subsequent projects. As cultural shifts can take decades, if not centuries until the discernable change can be seen, volunteerism cannot be the only way in which communities are involved. Education can serve as the path to creating a new outlook for future New Yorkers in the long-term as the effects of climate change are not limited to our generations, but to the multitudes to come.

Transforming Culture via Education:

While there certainly exist doubts about how private businesses and governments can possibly corrupt the new form of environmental infrastructure utilized by communities to save themselves from climate change, the positive impact of projects such as the Billion Oysters Project cannot be thrown into doubt. As the Billion Oyster Project has brought a native population of oysters from the brink of extinction in the New York Harbor to become a flourishing population that protects NYC communities, the citizens and media of New York City took notice. With such media attention, inevitably, the desire to see quantifiable results as to the success of the project was paramount not only for the Dept. of HUD and private investors, such as the Rockefeller Foundation, but

also for the inhabitants of NYC who were being marketed that oysters were part of their salvation from climate disasters. As such, quantifiable results as to how successful the Billion Oyster Project is essential to the continued marketing of the Billion Oyster Projects and other Rebuild by Design projects for the citizens of New York City. With that said, quantifiable results in the form of how much money is being saved by citizens and the State/Federal government naturally are used as the indicators for success. Yet, the Billion Oyster project offers more than just quantifiable success; there also exists an education program that is designed to inform and train interested citizens in the surrounding New York City communities into being environmentally conscious citizens. While resources contributed to the education program that is coupled with the physical infrastructure are certainly quantifiable, the education and subsequent cultural shift slowly occurring in New York City via these programs are certainly not. As such, understanding the impact of the cultural shift is difficult to fully assess yet this cultural shift represents one of the most vital aspects of the Rebuild by Design initiative, spearheaded by Henk Ovink. Shaping the cultural fabric of how New Yorkers and Americans view their relationship with water is essential in molding the New York City populace to be better prepared for a future filled with increasingly worsening disasters. Communities cannot only rely on environmental infrastructure in the form of oyster breakwaters to avert every disaster, a level of preparedness has to be fostered with the 'hearts and minds of New Yorkers, coupled along with effective physical infrastructure.¹²²

¹²² "Urban Assembly New York Harbor School." *Billion Oyster Project*, <https://www.billionoysterproject.org/harbor-school>.

In commitment to fostering a new relationship with climate change and water in New York City, the Billion Oyster Project, which primarily was created and supported by the Rockefeller Foundation and the Dept. of HUD to serve as a new form of environmental infrastructure project, also doubles as an education program. Although a vast majority of the funds given to the project are of course for the infrastructure itself, the Billion Oyster project has also encouraged education on climate change and maritime life in New York City through the creation of the Urban Assembly New York Harbor School.¹²³ This school operates essentially as a high school and as a Career Technical Institute to help prepare interested students in careers pertaining to marine biology. Specifically, students work with and are exposed to the Billion Oyster Project and study the various benefits that environmental infrastructure offers. By exposing students fairly early in their educational career, (grades 9-12), the Rebuild by Design initiative, through the Billion Oysters project in New York City, creates not only a greater appreciation and understanding of the local environment but also gives students technical skills to become specialists.¹²⁴ Thereby creating a specialized workforce to continue work for the Billion Oysters project and other environmental infrastructure projects down the line. With that said, in the United States, the convenience of education and training for specialized jobs, generally, has not come cheap or without a price. All too often is education vaulted above lower class communities behind ever-increasing paywalls as tuition skyrockets. Yet, to combat this reality, the CTE school offered via the Billion Oyster Project does not operate as a private institution, but

¹²³ "Stem Education." *Billion Oyster Project*, <https://www.billionoysterproject.org/stem-education>.

¹²⁴ "Random Numbers in Admissions." <https://www.schools.nyc.gov/enrollment/enroll-grade-by-grade/how-students-get-offers-to-do-e-public-schools/random-numbers-in-admissions>.

instead, as a public school system integrated into the New York City lottery system. As demand for this school is high and not all who apply could be enrolled, using the lottery system already in place in New York City for public education offers a degree of accessibility for students to obtain technical skills in an exceedingly critical part of the United States response to climate change, environmental infrastructure.

Chapter 4:

Project Uplift & The Role of Private Actors:

The Role of Private Parties in the Development of Green Infrastructure:

An earmark of effective and efficient governance, at any level, throughout history, has been the state of infrastructure. Generally, infrastructure can be referred to as a conduit/medium necessary for sustaining or expanding communities. Throughout history, infrastructure has by and large referred to as roadways, underground piping, and waste services and has evolved as technology has evolved to include airstrips. Yet, with the fact that current levels/status of infrastructure, not just in New York but also in the entire U.S, are failing to sustain and protect communities in the face of the existential threat that is climate change, new innovative solutions are required by governments at all levels. As such, at the national, state, and local levels of government, there has been a decided turn away from traditional infrastructure practices and uses in the United States. This trend away from 'gray infrastructure', such as underground piping for delivering clean water and removing waste, has taken place due to the increasingly worrying threat that climate change has and will continue to be a threat to all communities for decades to come. As climate change and its general consequences are experienced by all communities one way or another, when an effective solution in the form of the 'Rebuild by Design' program mitigated the effects of climate change by promoting local ecosystems, governments at every level, domestic

and international, took notice. The success of the Rebuild by Design Program, which was initiated in 2013 - 2014 in response to SuperStorm Sandy, is typified by the current national administration's efforts to, what is referred to by FEMA as: “categorically shift[ing] the federal focus away from reactive disaster spending and toward research-supported, proactive investment in community resilience.”¹²⁵ This goal was set by the National and followed up by New York State Government & NYC through programs such as the OneNYC 2050, New York Rising, and the Rebuild by Design initiative, (the last of which is actioned through the U.S. Dept of HUD in coordination with the State and City), has seemingly defined the role of larger levels of government.¹²⁶ This role the national government has defined for itself is acting as a financier and regulator of green infrastructure. Laws/initiatives originating from the Federal Government, such as the Rebuild By Design project work with local governments and private actors to decide what action is best relative to their communities’ topography and where money from NY State and the Federal Government, such as funds from the Disaster Recovery Fund, will be most efficiently spent.¹²⁷ While projects such as the Billion Oyster Project have been highlighted previously, multiple other projects are also running concurrently that are not under the direct umbrella of Rebuild by Design, one of which being Project Uplift. While home elevation projects were considered as possible RBD initiatives, plans that focused solely on raising homes from dangerous flood zones did not make the absolute final cut but were still considered progressive and necessary.¹²⁸ This project is quite dissimilar to the

¹²⁵ “Building Resilient Infrastructure and Communities.” *FEMA.gov*, 8 Mar. 2022, <https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities>.

¹²⁶ Ovink and Jelte. *Too Big*

¹²⁷ “Community Development Block Grant Disaster Recovery Program.”

¹²⁸ Ovink and Jelte. *Too Big*

Billion Oysters project as money is not utilized by the public sector in coordination with the private, but instead given, (almost), directly to individual households/communities. While money is not directly put into individual households' bank accounts, a non-profit disaster relief foundation, the St. Bernard Project, acts as an intermediary between individuals in the community and the public sector. Through the various private sectors, whether it be multi-nationals, large foundations, business leaders, or private individuals, governments at the local and national levels are not just keeping green infrastructure as a responsibility solely managed by the government, but instead have opened the door for private actors to assert their influence in and handle responsibilities traditionally handled by the government that are critical to the survival of at-risk communities.¹²⁹

In utilizing an international blueprint to form new and effective climate change policy, projects concerning implementing infrastructure at the Federal, State, and local levels have begun to include private actors, most of these private actors come in the form of large foundations/corporations who are disengaged from the greater population. This often leaves private individuals on the periphery of climate infrastructural deals who, at best, can possibly be a part of an advisory board, (That is, if the state accepts their application), or consulted in the initial stages of any RBD project. Otherwise, actions concerning the implementation of critical green infrastructure have gone through private actors that are above the head of everyday citizens. This leaves out the many private citizens who feel the effects and take the most of the burdens associated with rising sea levels and climate change's consequences.¹³⁰ As such, the State has asked

¹²⁹ Kolstad, Ivar, and Tina Søreide. "Corruption in Natural Resource Management: Implications for Policy Makers." *Resources Policy*, Pergamon, 5 June 2009, <https://www.sciencedirect.com/science/article/pii/S0301420709000221>.

¹³⁰ "Experience Stern: Faculty & Research." *NYU Stern*, <https://www.stern.nyu.edu/experience-stern/faculty-research/catalyzing-green-infrastructure-on-private-property>.

itself, how does it incorporate everyday private households into green infrastructure plans?¹³¹ To directly supply individual households with money intended for climate infrastructure following Superstorm Sandy, a project known as Project Uplift was created in 2016 through the GOSR in New York State to the benefit of residents along the New York City coastline (see images #12 & 13 below for the area in question). Project Uplift's goals, unlike the Billion Oysters project, was not to run as a continuous project but to give immediate relief to coastline communities that were directly or indirectly affected by Superstorm Sandy & that fell between the cracks of other assistant based programs.¹³² The reasoning behind this decision to create a pilot program was essential to 'test the waters' and see how successful a small-scale program could be while larger programs would need far more funding could be formulated through the OneNYC 2050 plan, NYRCR, or, GOSR. Unlike other programs/initiatives, Project Uplift was designed to give funding directly to households and families considered vulnerable/damaged by SuperStorm Sandy.¹³³ Specifically, funding targeted low-income families that were unable to meet the property & safety requirements set out by NY State and New York City. As these communities/households are disadvantaged, without directly receiving funding to meet these laws, households would only fall into further disrepair, further increasing their susceptibility to climate change and threatening New York City as a whole. With that said, State funding is not directly put into these households' bank accounts, but actually, households whose applications are accepted by the state work with a renowned non-profit working in disaster relief programs, The St. Bernard Project.

¹³¹ Christopher Flavelle, Christopher "Billions for Climate Protection Fuel New Debate: Who Deserves It Most." <https://www.nytimes.com/2021/12/03/climate/climate-change-infrastructure-bill.html>

¹³² Project Uplift: Rockaway, New York: SBP USA." *SBP*, <https://sbpusa.org/index.php?p=where-we-help%2Frockaway-ny%2Fproject-uplifasdasdt>.

¹³³ Project Uplift: Rockaway, New York:

This non-profit was formed in 2006 and helped work to provide assistance following Hurricane Katrina, giving it domestic notoriety.¹³⁴ Though it was formerly known as the St. Bernard Parish during its time working in New Orleans with disaster victims of Katrina in 2006, the role members of the St. Bernard Parish (or SBP as it is now called), was vastly contrasting to the work that is being completed via Project Uplift. In 2006 when the SBP was working to provide relief following Hurricane Katrina, efforts were almost completely following the traditional model of disaster relief. Instead of working to eliminate problems before they exist, all of the SBP's effort was spent in offering what aid and recovery options, such as creating public housing, they could to victims. This further revealed how out of touch the traditional disaster recovery model for the United States was and how vast transformations were necessary at all levels of the public sector to right the wrong. Sixteen years onwards from Hurricane Katrina, the role that the St. Bernard Project acts within is far more inline with contemporary disaster relief programs. Whereas previously the SBP could only offer aid to victims, for Project Uplift, workers in this project complete far more tedious work, but help in preventing the need to disperse aid to victims in the first place. In completing this objective, the role of the St. Bernard Project is essentially to help in processing applications and then grant money to projects/houses passing through the GOSR application process. Furthermore, once applicants have been processed and accepted, the St. Bernard Project is one the main actors who then helps implement and oversee construction/renovation. However, the St. Bernard Project is just one non-profit organization with only a limited amount of funding and resources at its disposal, the drudgery of raising housing elevation from flood zones is not entirely left to their team. Instead, the St. Bernard Project is partnered with

¹³⁴ Project Uplift: Rockaway, New York:

Americorps, an independent government agency that is considered an essential part of the natural disaster response team created to prepare and respond to national disasters/emergencies.¹³⁵ Despite Americorps being created in 1993, and thus operating under the framework of traditional reactionary disaster relief programs, with the success of progressive policies in climate change mitigation, such as the RBD initiative, the role of Americorps has transformed to be a progressive response team.¹³⁶ As recently as 2021, a federal level bill, sponsored by Senator Markey (Mass.) and Representative Ocasio-Cortez sought to formalize the role of Americorps in the fight to promote climate resilience via the creation of the Civilian Climate Corps, to be incorporated with Americorps.¹³⁷ The bill, known as the Civilian Climate Corps for Jobs and Justice Act, continues the trend of the ‘green new deal’ style of governance and response to climate change that has become a hallmark of climate change mitigation.¹³⁸ Although the funding for Project Uplift was low, as it was only granted around \$8.8 million, this project served as a starting point for future projects within the NYRCR and GOSR in incorporating private actors, such as NGOs, and private households into the government's overall plan for action on mitigating the effects of climate change.¹³⁹ Furthermore, it serves as another example of

As Project Uplift was initiated in 2016 as only a pilot program under the authority of the municipal and state government of New York, the project received little funding and therefore its overall effect is somewhat minimized in comparison with far-reaching

¹³⁵ “Climate.” *AmeriCorps*, <https://americorps.gov/about/what-we-do/climate>.

¹³⁶ “Climate.” *AmeriCorps*.

¹³⁷ “Senator Markey and Rep. Ocasio-Cortez Introduce Civilian Climate Corps for Jobs and Justice to Rebuild America: U.S. Senator Ed Markey of Massachusetts.” *Home*, 20 Apr. 2021, <https://www.markey.senate.gov/news/press-releases/senator-markey-and-rep-ocasio-cortez-introduce-civilian-climate-corps-for-jobs-and-justice-to-rebuild-america>.

¹³⁸ “Senator Markey and Rep. Ocasio-Cortez Introduce Civilian Climate Corps.

¹³⁹ Project Uplift: Rockaway, New York.

projects such as Rebuild By Design. With only a budget of around eight to nine million USD being allocated to it, Project Uplift's overall impact in mitigating climate change is somewhat marginal on a macro level in climate mitigation.¹⁴⁰ Though, for the low and middle-income families who have 'fallen between the cracks' and missed out on other home renovation and public housing assistance programs, Project Uplift is certainly not viewed in the same light. In keeping with the same spirit as other modernizing climate action policies in New York City such as Rebuild by Design and OneNYC 2050, Project Uplift's main goal is to help disadvantaged and low-middle income households that are currently in what is considered to be dangerous flooding zones.¹⁴¹ Just as is seen in RBD, the municipal and state government of New York utilize a grassroots approach to connect with the people they aim to assist via the St. Bernard Project. Although, the government's role in Project Uplift is far less involved as responsibilities that would be traditionally held by the government are instead delegated to the St. Bernard Project for processing, authorizing, and implementing necessary assistance, that is, as long as applicants meet the specific requirements. While the requirements to be a 'winner' in Project Uplift are a bit elongated and involve not being able to meet specific housing regulations enumerated by New York City and New York State, in essence, the general requirements to be a potential recipient of aid are outlined on the St. Bernard Project's website as:

- Homeowner resides in a single-family home or a two-family duplex (no tenants)

¹⁴⁰ Governor's Office of Storm Recovery. *HOME ELEVATION PILOT PROGRAM (PROJECT UPLIFT)*, GOSR, 2016, pp. 1–52.

¹⁴¹ Governor's Office of Storm Recovery. *HOME ELEVATION PILOT PROGRAM (PROJECT UPLIFT)*

- Homeowner property is located in Staten Island, Gerritsen Beach, BK, or Sheepshead Bay, BK
- Homeowners is a low - to moderate income (Low <50% AMI, Moderate 80% AMI)
- Property is loathed in the 100 - year floodplain [see images #12 & 13 referred to above in the appendix]
- Property was damaged by SuperStorm Sandy, but is currently habitable
- Homeowner is ineligible for an elevation grant through the Build it Back Program, [a housing initiative under GOSR/OneNYC 250], or other programs.¹⁴²

The requirements of applicants for Project Uplift are handled and detailed via the St. Bernard Project's official website, meaning that the governments have little say nor control over the project itself and have instead delegated most of the bureaucratic and implementation work to the St. Bernard Project, or the private sector.¹⁴³ With that said, the public sector is still involved in the implementation of elevation projects for low-middle income households via Americorps. Even though the requirements to be eligible for Project Uplift are quite precise in who is able to receive aid, raising issues of accessibility, this project was not designed as an overarching infrastructure initiative meant to renovate housing for a vast number of people, but rather to serve as a safety net to help disadvantaged people who have been omitted from previous housing programs.¹⁴⁴ Though its reach is assuredly limited in just how many people can receive aid due to applicants having to meet its strict requirements, the strictness of

¹⁴² Governor's Office of Storm Recovery. *HOME ELEVATION PILOT PROGRAM (PROJECT UPLIFT)*.

¹⁴³ "Emergency Action Plans for Policy Makers: SBP USA." *SBP*. <https://sbpusa.org/who-we-help/policy-makers>.

¹⁴⁴ Governor's Office of Storm Recovery. *HOME ELEVATION PILOT PROGRAM (PROJECT UPLIFT)*

requirements to be met to receive aid can also be seen as a pro. With incredible amounts of money flowing to mitigate climate change's consequences and rising sea levels, numerous questions have been raised on just who will receive funding. As with any government-funded project, worries arise that funding and aid will only flow to those who offer the most economic benefit to New York City. By having such strict guidelines, such as only allowing homeowners and not tenants eligibility, Project Uplift ensures that what limited funding it does have flows only to those who need it most and not corporations or renters. This aspect of the climate change mitigation effort, helping those who are truly at risk and the most disadvantaged, is a hallmark of contemporary climate mitigation initiatives found throughout New York City. Helping the most disadvantaged communities and households not only serves to protect these families and households located in dangerous areas but also serves to create a sense of trust between communities that have felt disregarded by the government. In creating a positive relationship and sense of trust between the state and individual communities via the St. Bernard Project, the New York State and NYC governments gain the legitimacy that allows for even further far-reaching and innovative projects down the line due to its previous reliability. Even though Project Uplift only builds a sense of trust with an exceedingly small number of people and disadvantaged communities, initiatives like Project Uplift are but the start of a long series of climate change policies designed for communities at risk.

Despite the low funding granted to Project Uplift via the Governor's Office of Storm Recovery, Project Uplift represents a style of government outreach to combat climate change's effects in its local communities that is separate from Rebuild By

Design. Under the Rebuild by Design method of forming effective climate change policies and investing in critical green infrastructure projects, the public sector utilizes the private sector for funding, (from large foundations), and to obtain essential information from actors 'on the ground' who are experiencing the climate crisis first hand in New York City.¹⁴⁵ This process, which served as a 'test' for implementing a new form of relationships between the public and private sectors to combat climate change had resounding success with projects such as the previously explored Billion Oysters project.¹⁴⁶ Project Uplift, on the other hand, is not derived nor originates from the coalition of the public and private sectors in the form of the Department of HUD, New York State, New York City, and various private foundations/actors. Alternatively, Project Uplift, which receives funding via the Governor's Office of Storm Recovery and NYRCR initiatives still utilizes a private actor in facilitating much-needed funds and repairs to communities. Yet, the relationship between the public and private sectors is less coordinated and intimate than how the Rebuild by Design has operated under.¹⁴⁷ Primarily, the public sector's influence in Project Uplift lies in the implementation. Once a project has been approved via the St. Bernard Project, they work in coordination with the public sector by means of employing Americorps. Americorps, which was formed in 1993, though not a part of RBD, prescribes to the same rhetoric that is utilized by Rebuild by Design as they attempt to "disrupt our country's traditional disaster recovery model."¹⁴⁸ To disrupt the traditionally reactive policy, Americorps is utilized not only by NY State and NYC but also across the nation in being the architects and engineering

¹⁴⁵ Ovink and Jelte. *Too Big*

¹⁴⁶ Ovink and Jelte. *Too Big*

¹⁴⁷ "Project Uplift: Rockaway, New York: SBP USA." *SBP*,

¹⁴⁸ "Join Americorps: Get Involved: SBP USA." *SBP*, <https://sbpusa.org/get-involved/amicorps>.

side of climate change mitigation construction projects. While there still exists the coordination between disadvantaged communities and the government as the state and municipal government must still assess how effective their funds will be, the state utilizes the St. Bernard Project as a 'middle-man' in this relationship. Essentially, while the state government still assesses whether or not applicants to the project meet the requirements for Project Uplift, funds that are authorized via the city and state government are not given directly to the disadvantaged communities, but instead given to the St. Bernard Project to complete the work within New York City's legal parameters.¹⁴⁹ Although Project Uplift employs the same idea as in Rebuild By Design in creating a relationship between the public and private sector, instead of using funding from large foundations such as is seen in the Billion Oysters Project, the municipal and state government employ a private non-profit organization to act the government's middle-man between the people. Despite their still existing insulation of the disadvantaged communities from bureaucrats and the overall public sector, something which the Rebuild By Design leaders sought to eradicate, Project Uplift still gainfully uses the private sector through an NGO; increasing the necessity of the role of the private sector in responding to climate change and creating effective mitigation strategies.

The role private actors play in the development of green infrastructure is two-fold in the United States and New York State. While the shift to promoting climate change mitigation and using rhetoric to rally public support for climate change by the government is important, more preeminently, governments are using their wallets to enact change. By using the power of the purse, the federal and New York State

¹⁴⁹ "Project Uplift: Rockaway, New York.

governments funnel money to private actors/NGOs who effectively plan and disseminate money to projects that are deemed to meet requirements set by the federal, state, and local governments. This use of the public-private partnership is indicative of an overall economic trend originating in neo-liberal policies. Whereas the public sector does not aim to create projects, but instead to finance and regulate them and allow for private actors to fulfill goals set by the government. This is indicative of an overall trend in economics wherein responsibilities generally held by the government are increasingly delegated to private businesses/private land developers. This trend is marked by a transition for city governments from governance, where cities and their government are responsible for public works, to entrepreneurship, wherein private businesses work in coordination with the public sector to fulfill the same goal.¹⁵⁰ As stated by economist Dietrich: “Neoliberalization does not mean disengaging from the State, but using it in the strategy for distributing trade mechanisms in all domains.”¹⁵¹ While Dietrich was speaking about issues in Jakarta, the idea of public-private partnerships used to fulfill responsibilities previously held by the municipal/state government rings true in New York City and State. In the case of New York State and the Rebuild by Design Project mentioned, the role that private actors play is varied as the definition of a private actor is quite vague. From a macro-viewpoint, large foundations such as the Rockefeller foundation are used to take the lead in large-scale projects. This includes the Rockefeller foundation supplying funding in return for a substantial role in influencing the selection process of the Rebuild By Design program.

¹⁵⁰ Judicaëlle Dietrich, « The Neoliberalisation of Poverty Treatment Policies in Jakarta, from Inequality to Injustice » *Environnement Ville Société*, 23 Apr. 2017, <https://doi.org/https://hal.archives-ouvertes.fr/halshs-01512544/>.

¹⁵¹ Judicaëlle “The Neoliberalisation of Poverty Treatment.”

Furthermore, business leaders/stakeholders of communities are utilized by the State and the Rockefeller foundation as advisors to the overall project, yet the process for becoming an advisor rests entirely in the hands of the state as they can pick and choose who to allow and who to deny. With such control and little to no check on this power, the advisory committee composed of local business leaders/stakeholders effectively acts as a public-relations stunt as this advisory board holds little to no sway over decisions. Finally, private actors at the lowest level, as in households, have received some attention through initiatives such as Project Uplift, which moves money from the Fed/State government to disaster relief NGOs that disseminate money based on federal regulations. With the power of applications and approval handed to the St. Bernard Project, the typical bureaucratic power that would traditionally be held by the government is delegated to a private non-profit, handing it much influence over infrastructure projects essential to the continued survival of at-risk communities. Although, once an applicant is approved for the home elevation program, Project Uplift works with the Americorps, an independent government agency that has been made to specialize in climate change mitigation and resilience projects in recent years. Following this trend set by the RBD teams and seen in climate change policies at the state level such as OneNYC 2050, the public sector utilizing a private non-profit is yet another example of the overall trend of creating relationships between the public and private sector. While there is no private funding for such a small scale project, the typical bureaucratic power that would traditionally be held by the government is delegated to the St. Bernard Project, a private non-profit, handing it much influence over infrastructure projects essential to the continued survival of at-risk communities.

Although making use of a private actor as reputable as the St. Bernard Project can promote a sense of community togetherness as government bureaucrats are removed from their traditional role, issues can arise as innovative green infrastructure projects that are critical to the survival of communities and of capital in one of the world's most expensive real-estate markets is entrusted to private actors. The spectre of private actors being able to influence and control what is conventionally the role of the municipal or state government sets a worrying trend of private actors guiding infrastructure projects. The role the public sector plays in forcing these private institutions to abide by their regulations and inspections as a check to private actors influence will become ever more essential as this trend progresses due to its success in New York City and New York State.

Conclusion:

The incessant sea-level rise that the world is experiencing every day has brought climate change to the forefront of political discourse for every nation. For countries that are situated along the coast, rising sea-levels force their hand to confront the reality that major urban centers that are central to global economies are under a dire threat. Even though countries have made promises to meet certain criteria to stave off rising sea levels and other human-caused disasters enumerated in the Paris Peace Accord, as of 2021, only one country, Gambia, is currently meeting the expectations they agreed to.¹⁵² With countries floundering to meet expectations they signed off on to avert the worst consequences climate change has to offer, already, some consequences are becoming unavoidable. In terms of sea-level rise, cities around the world have been contending with this existential crisis for decades as human-induced climate change consequences have not suddenly appeared but have been in the making for decades. In contending with this issue, some countries and cities have been able to fare better than others. Take, for example, Indonesia, despite knowing that one of the major global centers of trade in the world, Jakarta, was sinking at an exponential rate, much of the municipal and national government's response has been to largely ignore the problem as the highest elite are too virtually protected from the worst of climate change. The problem of climbing sea levels reached a critical point in Jakarta that forced the government to finalize plans to relocate the most critical government institutions and businesses to another city located on a separate island (Java → Borneo). While this will save the

¹⁵² Jackson, Daniel. "Report Shows Nearly All Countries off Track to Meet Paris Agreement Climate Goals." *CourthouseNews.com*, 15 Sept. 2021, .

governments and major businesses the problem of the sea rising at a mean rate of 3.6 mm annually does not disappear.¹⁵³ Of course, those left behind in the city transition, the most desolate and disadvantaged communities, are forced to fend for themselves and adapt to a reality they had little to no hand in creating. Although the measures taken in by the Indonesian government are towards the extreme end, it is the result of traditional government response to climate change that has valued profits at the cost of their city. As the public sector across the world has turned to neoliberal policies that focus on producing ever-increasing profit margins while the quality of life measures necessary for disadvantaged communities are left wanting, cities that end up 'lost' such as Jakarta could become the norm across the world.

In contrast to the failures of Jakarta and Indonesia, for the Netherlands, they have been contending and 'winning' the battle for land reclamation against the sea for centuries to cement their place in the world. Whereas the municipal government in Jakarta and Indonesia seemingly turned its back on its people by decentralizing government duties, such as infrastructure or utilities, and offering them to the private sector for profit, the Netherlands has been relying on a government response almost entirely opposed to the response that the Jakarta government has had. Rather than decentralizing authority to private interests, the national, provincial, and municipal governments in the Netherlands have significant control and often coordinate with private citizens and local businesses to ensure transparency and inclusivity between the public and private sectors. This style of governance seeks to create bonds between communities and the officials who govern them by incorporating their concerns into any

¹⁵³ "FAQ 5.1 Is Sea Level Rising?." *FAQ 5.1 - AR4 WGI Chapter 5: Observations: Oceanic Climate Change and Sea Level*, https://archive.ipcc.ch/publications_and_data/ar4/wg1/en/faq-5-1.html#:~:text=Global%20sea%20level%20is%20projected,about%204%20mm%20yr%E2%80%931.

major project undertaken by the government. In the context of climate change, the Netherlands has resorted to creating large scale infrastructure projects that are not designed for profit nor to simply serve as barriers/protection from the sea, rather, the critical infrastructures designed in coordination with the private sector reflect a progressive method of disaster management that entails building within nature.¹⁵⁴ Furthermore, by building within nature, infrastructure projects no longer degrade the local ecology but enhance and support local environments and native animal populations. Thus, supporting the local communities and private citizens that live in or around communities surrounding green infrastructure. The push for progressive policies utilized in the Netherlands is in direct contention with what traditional disaster management policies have been instituted in the world. Whereas traditional reactionary policies are only able to respond *after* devastating catastrophes, progressive policies take the practical approach and seek to limit if not outright stop natural disasters before they ever occur. The success and benefits that the Netherlands has experienced in having an increased focus from the public sector in combating climate change by building with nature to the benefit of the private citizens have begun to take root in international communities around the world as they seek to replicate the Netherlands' success in the face of increasingly worsening natural disasters.

Although the United States has long been considered a leader of the free world and a bastion of democracy and free-thinking, the United States has been gravely lacking in coming to an accord on the simplest of matters, including even accepting the reality of climate change, let alone having an effective response to catastrophes such as

¹⁵⁴ "Building with Nature." *Building with Nature | Dutch Water Sector*, <https://www.dutchwatersector.com/news/building-with-nature>.

rising sea levels across the world.¹⁵⁵ With the polarization that comes with one of the major parties in the United States actively denying the existence of climate change and its consequences, forming an effective climate change mitigation policy has been exceedingly difficult. Yet for coastal cities such as New York City, no amount of propaganda or marketing can convince their citizens who experience its reality to ignore the unmistakable consequences outside their windows and in their communities. Following coastal storms that battered the New York City coastline such as Hurricane Irene (2011), Tropical Storm Lee (2011), and then culminating with the arrival of Superstorm Sandy (2012), the public and private sectors could no longer afford to treat climate change with indifference and were forced into proactive measures. Despite New York City already identifying climate change and the myriad of consequences that come with it as an issue as early as 2007 with the creation of PlaNYC 2030, which was marketed as a truly comprehensive climate change initiative that ensured equity for NYC communities, the plan fell short of taking transformative measures that would mitigate problems including sea-level rise. PlaNYC 2030 instead took small-time measures and carried out projects such as cleaning water tunnels that had not been cleaned in nearly a century.¹⁵⁶ While surely a positive, the lack of serious ambition and marketing of issues being resolved that citizens would assume is already happening, as it is the responsibility of the government, doomed PlaNYC 2030 just eight years into its lifespan designed for twenty-three years. In its place, in learning from the failures of PlaNYC 2030, the New York City municipal government created a new initiative, One

¹⁵⁵ James. Rainey, "The Trump Administration Scrubs Climate Change Info from Websites. These Two Have Survived." *NBCNews.com*, NBCUniversal News Group, 18 July 2018, <https://www.nbcnews.com/news/us-news/two-government-websites-climate-change-survive-trump-era-n891806>.

¹⁵⁶ 2008 N.Y.C. Local Law No. 17, N.Y.C. Admin. Code §§ 2008 - 17.

NYC 2050, which in 2015, took the place of PlaNYC 2030 as the transformative climate change policy that New York City desperately needed. Within this promise of a decisive policy designed for climate change came the pledge from the New York City municipal government to offer fair and equitable distribution of aid designed to combat climate change, reflecting the idea of a 'green new deal' reminiscent of FDR's New Deal.¹⁵⁷ In doing this, OneNYC 2050 sought to replicate the same values found in the Netherlands' climate action policies such as turning from gray infrastructure initiatives that include sea barriers and dykes to green infrastructure that is predicated upon using nature to protect communities. As the devastating effects of climate change already offer a reason to combat climate change, with the ascendancy of the Trump Administration to the office of the executive in the United States, climate change response became a critical policy that New York City had to pursue.

The municipal and state governments of New York City and New York State were not alone in designing critical climate change initiatives that sought to transform the relationship the private communities had with the public sector and nature as a whole. Prior to the ascendancy of the Trump Administration, (2017 - 2021), the Obama administration, through then Dept. of Housing and Development Secretary, Shaun Donovan, had been exploring various international plans by which the United States could draw from and implement within its own context. To this end, Donovan, after being appointed chair for Obama's Hurricane Sandy Rebuilding Task Force, made a last-second detour on a European trip to the Netherlands in 2013 to meet with special

¹⁵⁷ "Senator Markey and Rep. Ocasio-Cortez Introduce Civilian Climate Corps"<https://www.markey.senate.gov/news/press-releases/senator-markey-and-rep-ocasio-cortez-introduce-civilian-climate-corps-for-jobs-and-justice-to-rebuild-america>.

water management officials, including Henk Ovink.¹⁵⁸ From this unscheduled meeting arose the idea of implementing Dutch initiatives in the United States, specifically in New York as it was reeling from SuperStorm Sandy. While they understood a direct copy and paste of Dutch initiatives would not be possible, as the Dutch model had too much central government control than could be allowed under the federal system in the United States.¹⁵⁹ The objective of transforming the United States culture and relationship with nature through building coalitions between the public and private sectors via natural infrastructure gained immense momentum. The brainchild of these meetings and mutual understanding came in the form of the Rebuild by Design initiative, or RBD. This federally designed plan was less of a traditional infrastructure project wherein the federal government would direct funds for cities and states to decide what to do with. Instead, the Rebuild By Design initiative, kicked off in 2013, was designed as a competition that utilized the Dutch mode of thinking of incorporating the private sector with the planning of the public sector.¹⁶⁰ In incorporating the private sector, the RBD team sought to utilize private foundations and integrate community leaders in at-risk/affected communities into researching and designing green infrastructure projects that would not be reactionary but proactive in mitigating the effects of climate change before the consequences could be felt. This sentiment of looking toward community leaders and using the private sector as a coalition between the varying levels of government in New York was echoed in the OneNYC 2050 due to its success. While there are numerous reasons that can be attributed to the success of RBD, a significant portion should be attributed to the coalitions of private and public sectors

¹⁵⁸ Ovink, and Jelte. *Too Big*

¹⁵⁹ Ovink, and Jelte. *Too Big*

¹⁶⁰ Ovink, and Jelte. *Too Big*

utilizing experts from a myriad of backgrounds. Instead of allowing bureaucrats that are far removed from the citizens, they plan to help decide where funding is most needed, the RBD sought to transform how New Yorkers view their relationship with nature and climate change by making genuine attempts to include victims of Sandy and disaster relief. This sentiment is typified by the quote: “The perspective of the man who has lost his daughter is just as relevant as that of the scientist who knows what caused the disaster, the designer who knows what the solution looks like, the officials who create the policy and the politician who makes the decision.”¹⁶¹

By changing the initial process by which climate change policies are enacted, from reactionary policies to becoming more progressive, communities that would be affected by the policies suddenly had a voice. The transformation was not only in including the private sector, but also in having all levels of the public sector, federal, state, and municipal coordinate to decide on a few natural infrastructure projects. To be able to handle the new coordination and regulations set forth by the federal government for New York State, the Governor’s Office of Storm Recovery was set up in 2013. As the federal government sought to exercise greater control over how states and cities use funding appropriated to them, a new office was needed to coordinate with the federal government and dispense aid to New Yorkers. This is in stark contrast to prior federal government involvement. Whereas previously federal government officials wouldn’t even be a part of the planning and implementation process funded by the Dept. of HUD. Under RBD, experts in inequality, sociology, community leaders, and urban planners are all organized together and present a series of plans for RBD leaders to then judge and decide which plans will be applied. The air of competition allowed for ten main projects

¹⁶¹ Ovink, and Jelte. *Too Big*. “Be Radically Inclusive” Pg 142.

to rise to the top out of an initially proposed 148, seven of which were based in New York State/New York City, and the other three split between NJ and CT. of the ten projects selected, one of the most prominent from the RBD competition is the Billion Oysters project or 'Living Breakwaters.' This project is most prominently a physical infrastructure that protects much of the New York City coastline from things such as erosion, rising sea levels, and storm surges by placing rubble out in the New York 'rubble' as a sort of buffer. The breakwaters also double as an 'anchor' for oyster bed populations that nearly went extinct from New York harbor, to grow and repopulate. Just as the breakwaters are versatile and serve dual purposes, so too do the oysters. While having the oysters repopulated constitutes a conservation project, the oysters serve a secondary, but perhaps more important role for the entire city of New York by helping filter the many pollutants that have been present on the coastline due to the city's growth. This project epitomizes the modernization of climate policy initiatives as instead of utilizing 'gray' infrastructure that only served the purpose of short-term preventative measures, green infrastructure is being funded and completed with the combined efforts of the public and private sectors in New York.

Even though the physical construction of the Living Breakwaters infrastructure in New York harbor is a resounding success in protecting communities in New York City, the physical construction does little in terms of changing how everyday New Yorkers view their relationship with climate change and nature as a whole. As a chief goal of the RBD initiative brought from the Netherlands, changing the perspective the average citizen has on nature is not an easy task. With that said, the Billion Oysters Project is seemingly all-encompassing in achieving the goals of Rebuild By Design by

incorporating an education initiative within their project. Specifically, the Billion Oysters Project, in coordination with the New York City Public Schooling system, has created education initiatives and their own harbor schools to teach not only kids in schools but also adults who seek to become volunteers for the Billion Oysters Project.¹⁶² The schools and potential volunteers act as a form of advocacy that can permeate through generations. As such, fully assessing the impact of education takes years if not decades. Yet, in the meantime, students who attend the Harbor School sponsored via the Billion Oysters project are not only prepared for careers relating to maritime biology but also directly prepared to work for the Billion Oysters Project, ensuring that future generations will be aware of climate change and have an easy path in taking direct action to the benefit of their communities.¹⁶³ As the Billion Oysters Project is a relatively new initiative, it is impossible to judge how effective education is but it is vital in transforming the hearts and minds of New Yorkers over time to have a climate change-conscious population.

With the seemingly unmitigated success that is the Rebuild By Design Project of course comes other projects with similar aims to protect at-risk communities via a coalition between the public and private sector. The same ideals as the RBD initiative, such as promoting relationships between the private and public sectors and building for at-risk communities are but a few that gain major transactions. While the Billion Oyster Project utilized private foundations and community leaders to form a coalition with the public sector, at the State level, through the GOSR, a private non-profit, the St. Bernard Project is employed to benefit communities in NYC. The project that the St. Bernard

¹⁶² "Urban Assembly New York Harbor School." *Billion Oyster Project*.

¹⁶³ "Urban Assembly New York Harbor School." *Billion Oyster Project*.

Project is used for, Project Uplift, is designed to raise the elevation of low - middle incomes houses that are stuck within a dangerous flood plain.¹⁶⁴ While there had been previous housing projects at the state and municipal level, Project Uplift is designed to be a safety net that catches any homeowner that has ‘fallen through the cracks’ and missed out on other similar projects. To this end, the state government, through the GOSR, has employed the St. Bernard Project to take on the bureaucratic role that the government would typically be responsible for. This entails handling and processing all applicants’ requests for Project Uplift, handing a private nonprofit much power and influence.¹⁶⁵ Of course, as the St. Bernard is a celebrated non-profit that gained notoriety for helping in the disaster recovery process following Katrina in 2006 it has legitimacy and trust throughout the United States.¹⁶⁶ Even still, Project Uplift is just a pilot program and only received around \$9 million in funding, this trend of delegating authority to private actors raises issues of private interest groups being able to subvert the goal of governments and taking this power traditionally held by the government, who can be held accountable through elections/government regulations. By allowing private interests a greater say in infrastructure projects such as the Billion Oysters Project and Project Uplift, this leaves the potential of the corruption of the original and noble purpose of the RBD and modernizing climate change policies, to help and raise disadvantaged communities from the worst of climate change. If the initiatives like the Billion Oysters Project are treated as an economic project, then green infrastructure projects can end up being commodified and employed to protect/enhance economic

¹⁶⁴ “Project Uplift: Rockaway, New York: SBP USA.”

¹⁶⁵ “Project Uplift: Rockaway, New York: SBP USA.”

¹⁶⁶ “Thompson, Richard.. “St. Bernard Parish Rebuilds Itself from Utter Devastation after Hurricane Katrina.” *The Advocate*, 23 Aug. 2015, https://www.theadvocate.com/baton_rouge/news/article_8b548335-05ab-51c0-aa88-4ba5400a1c58.html.

interests over raising the quality of life for communities across NYC. In combating this, using ideals promoted by the RBD project that is derived from the Netherlands can be crucial to ensuring transparency and limiting the corruption of projects with such high economic potential. Specifically, ensuring that relationships are built between the public sector and private communities is essential to ensuring that projects designed for communities remain in the hands of the people. Of course, the economic potential that projects like the Billion Oysters Project offers is undoubted, shaping who is to be the greatest beneficiary of critical green infrastructure is critical to the continued success of natural infrastructure projects such as the Billion Oysters project and Project Uplift.

Images:

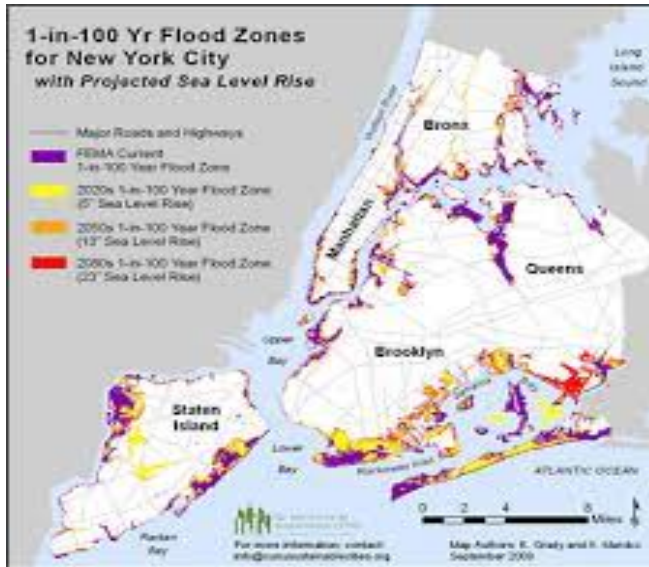


Image #1 (above): Refers to potential sea-level rise among areas of NYC.



above) Image #2 of a Sand Motor in the Netherlands.



(above) Image #3: the site of the new capital city proposed by the government in Jakarta.

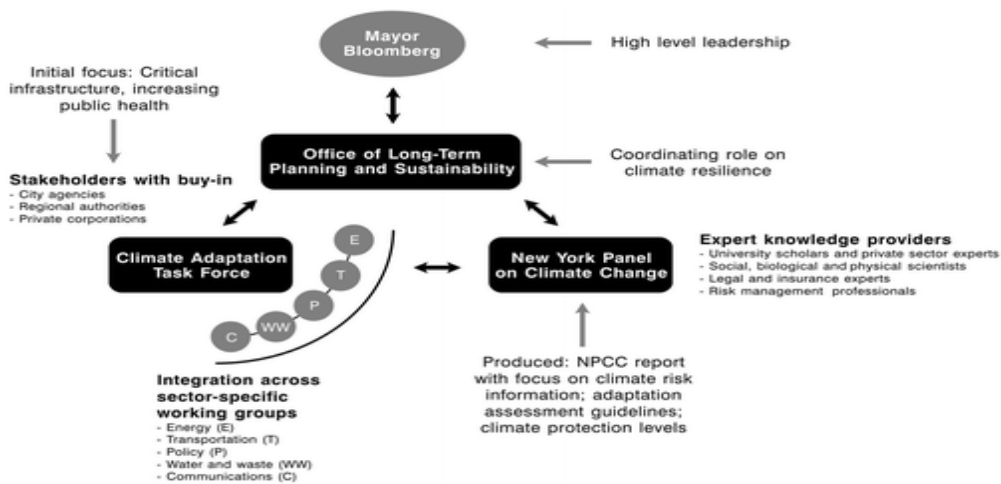


Image #4: (above) the structure of NPCC and essentially, who reports to whom.

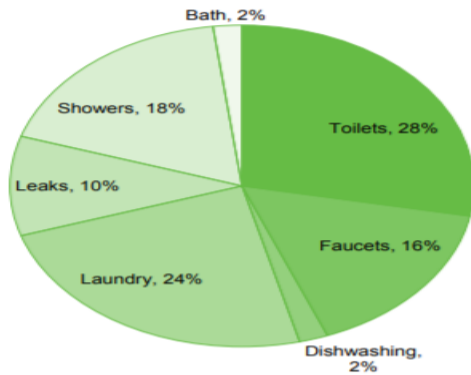


Image #5: (Above): usage by the percentage of water in a typical single-family home in NYC.



Image #6 (above): This image outlines the cyclic nature of disaster management in relation to before and after a disaster strikes.



Above, Image #7: This image depicts the two aspects of infrastructure between traditional man-made objects, such as piping, and how 'green infrastructure' is blended into communities.¹⁶⁷

¹⁶⁷ Matsler, A. Marissa. "Making 'Green' Fit in a 'Grey' Accounting System: The Institutional Knowledge System Challenges of Valuing Urban Nature as Infrastructural Assets."

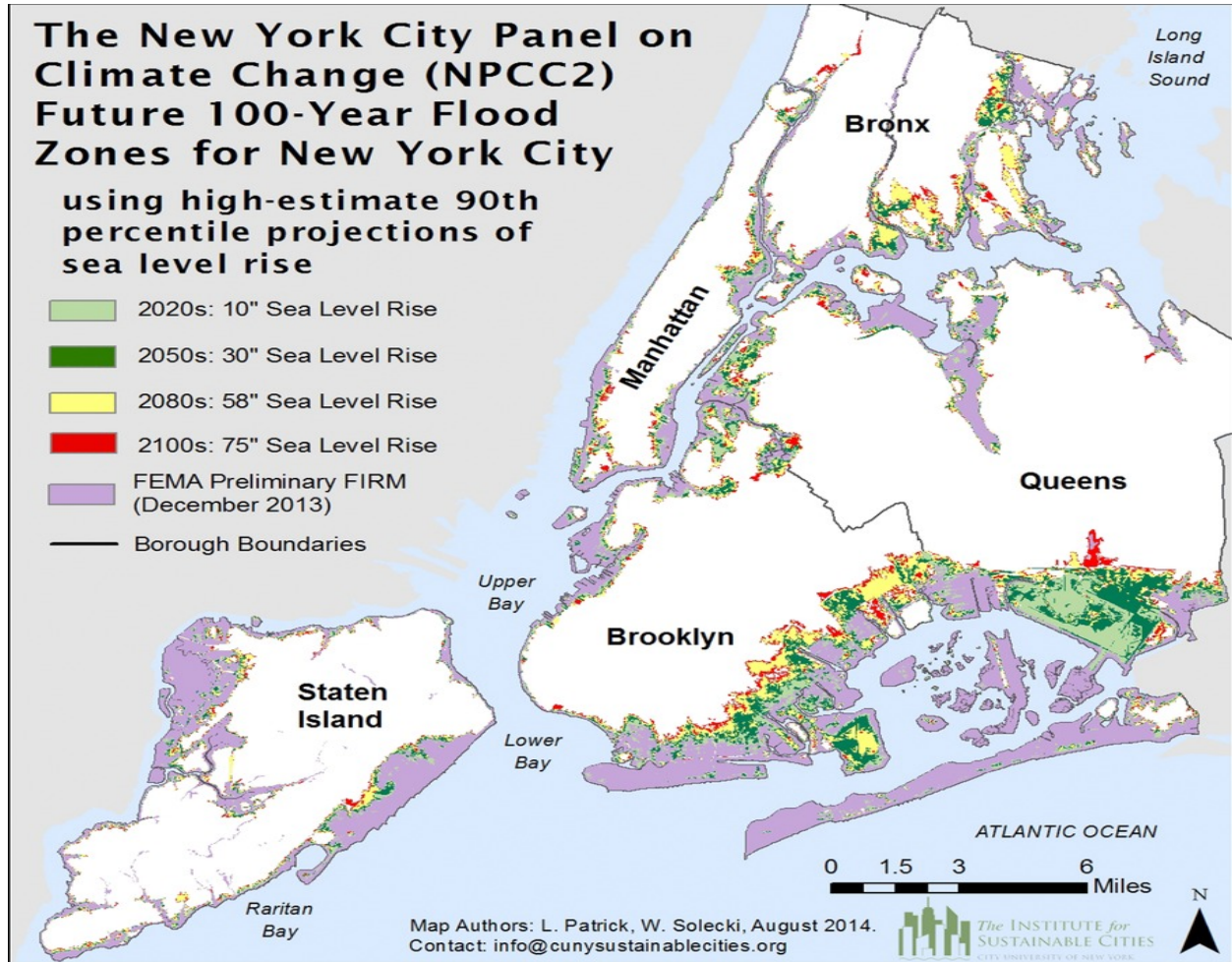


Image #8, Above: This image refers to projected worst case scenarios concerning sea-level rise in New York City tracked through nearly a century of predictions.

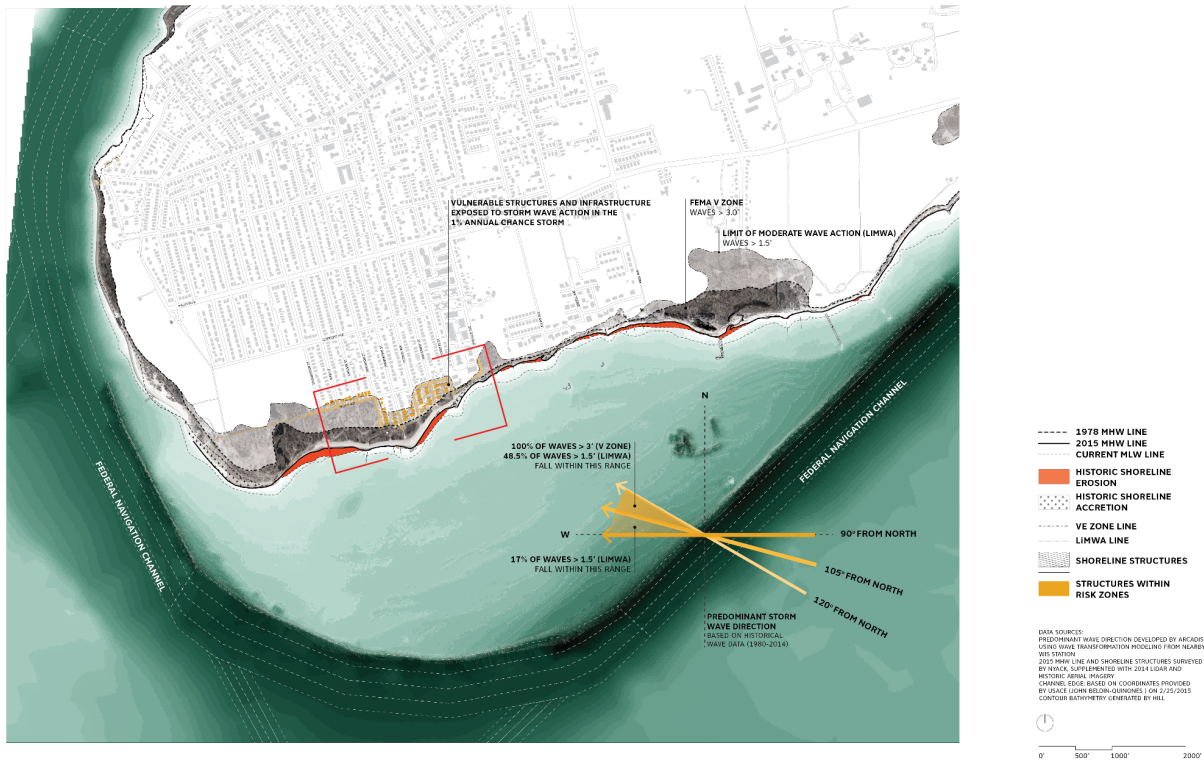


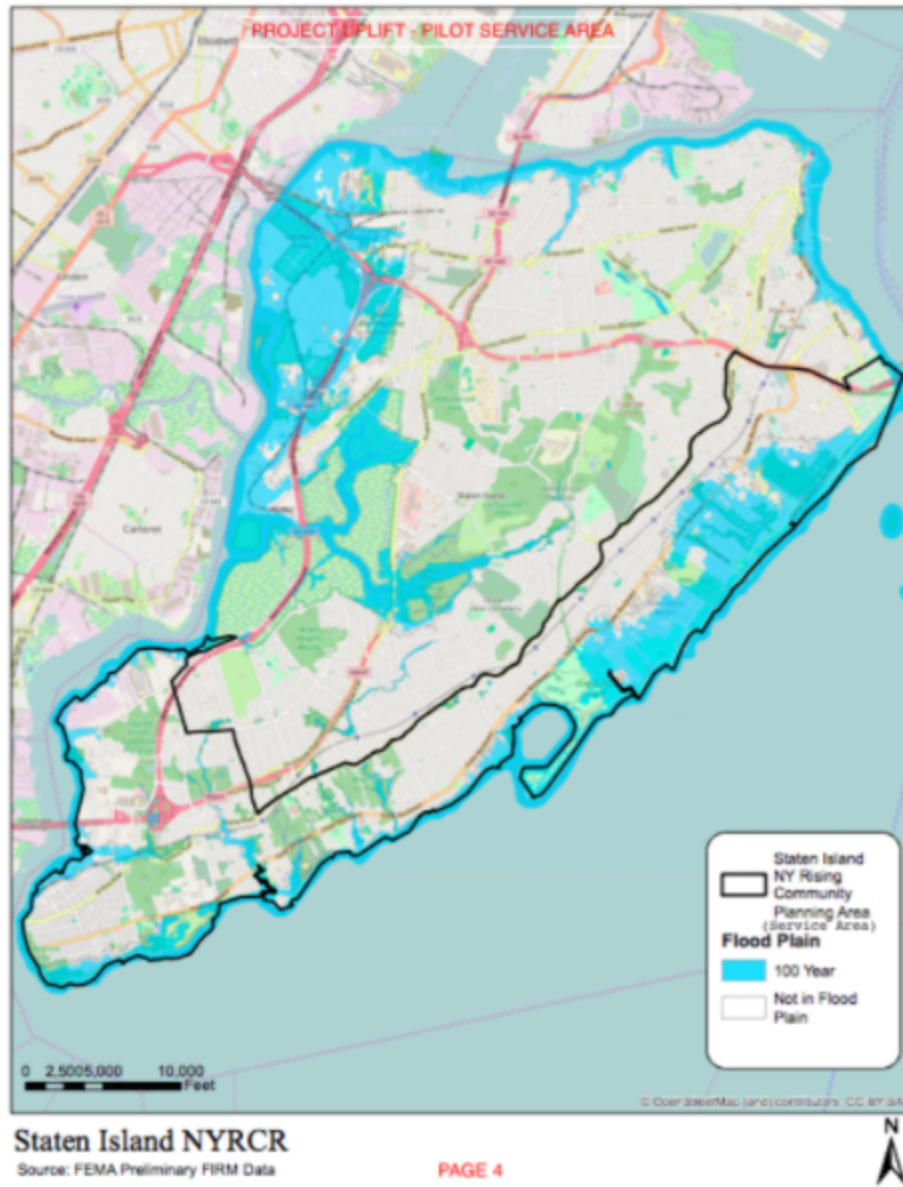
Image #9 (above): Refers to areas deemed most at risk due to climate change and location of breakwaters.

Table 22. Strategy: Ensure adequate resources to enhance the ability of Community-Based Organizations (CBOs) to prepare for and respond to local emergencies.				
Project Name	Short Description	Estimated Cost	Project Category	Regional (Y/N)
Community Based Organizations (CBO) & Vulnerable Population Emergency Action & Education Plan	Develop a plan to enable CBOs to coordinate their efforts to address emergency preparedness education, evacuation, and long-term resiliency needs of vulnerable populations during and after severe weather events and emergency situations.	\$475,000	Proposed	Y
Greater Bay Shore Resiliency Generator Project	Permanent placement of fixed generators at crucial community facilities including: BSFD Headquarters, Brightwaters Village Hall, YMCA, Bay Shore High School, Town of Islip's 2 nd Avenue Highway Yard, and Maple and Ocean Avenue Docks	\$1,425,000	Proposed	Y

Image #10 (above): This image refers to funding approved for education plans along with CBOs, which act to help communities in emergency situations.

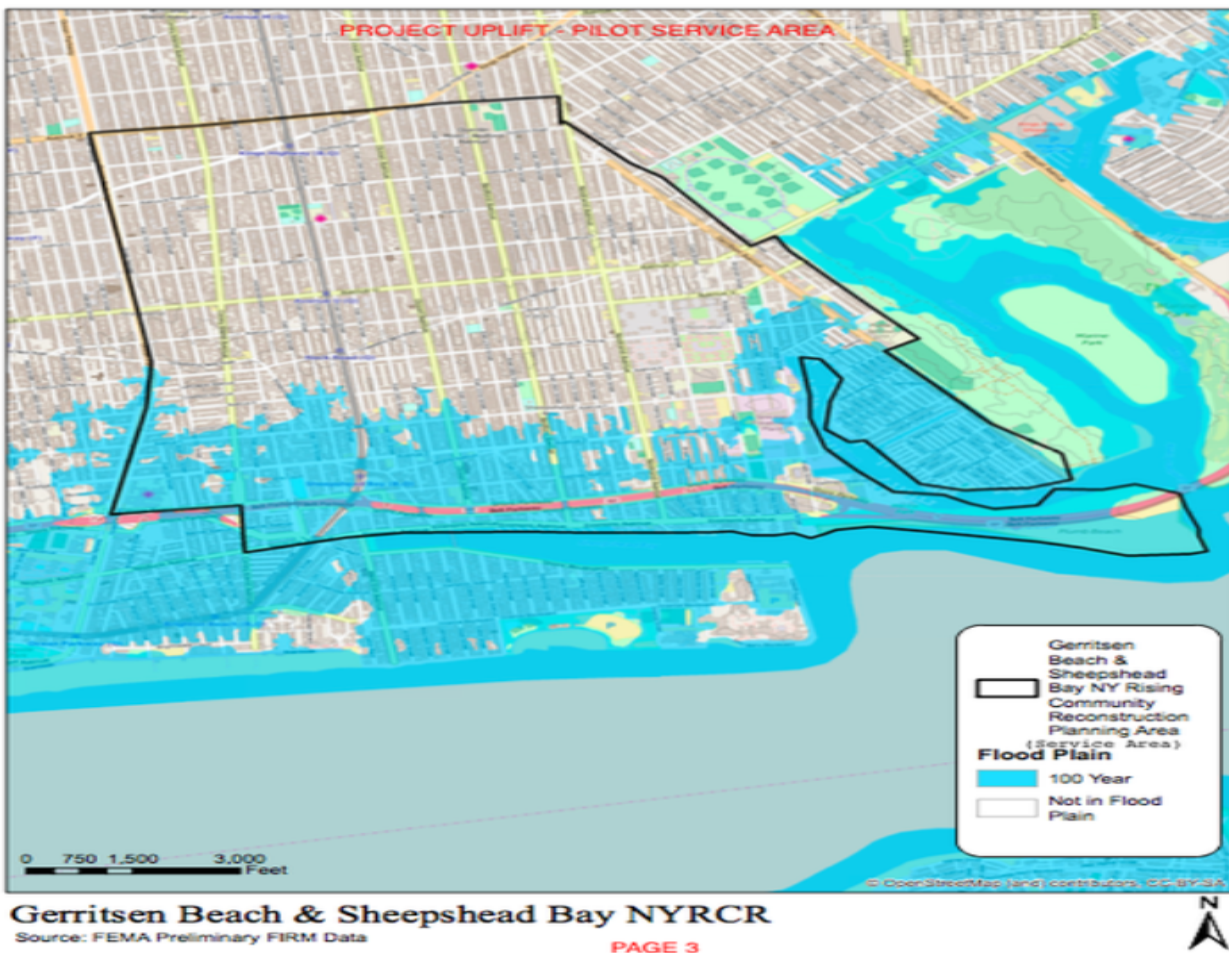
Table 21. Strategy: Ensure public safety and the ability of first responders to promptly and effectively react to severe storm events and other emergencies.				
Project Name	Short Description	Estimated Cost	Project Category	Regional (Y/N)
Fire and Rescue Communications	Upgrade communications equipment to eliminate technical deficiencies and incompatibility of equipment among first response agencies (such as Suffolk County OEM).	\$640,000	Proposed	Y
Fire and Rescue Equipment	Purchase of high-water Search and Rescue equipment.	\$168,000	Proposed	Y
Enhanced GIS Emergency Management System	Project to enhance a Town-wide GIS system to improve storm response and recovery.	\$50,000	Proposed	Y
Greater Bay Shore Resiliency Generator Project	Place permanent fixed generators at crucial community facilities including: BSFD Headquarters, Brightwaters Village Hall, YMCA, Bay Shore High School, Town of Islip's 2 nd Avenue Highway Yard, and Maple and Ocean Avenue Docks.	\$1,425,000	Proposed	Y

Image #11 (above): Refers to funds used by the GOSR to the benefit of local communities (specifically Suffolk County).



Above, Image #12: The image above is displaying the affected area that Project Uplift solely focuses on. Homes/buildings along/within this boundary are considered some of the most affected areas in need of aid.¹⁶⁸

¹⁶⁸ "Rockaway, New York: Where We Help: SBP USA." SBP, <https://sbpusa.org/where-we-help/rockaway-ny>.



Above, Image #13: The image above is displaying the affected area that Project Uplift solely focuses on. In this case, Gerritsen Beach & Sheephead Bay.¹⁶⁹

¹⁶⁹ "Rockaway, New York: Where We Help: SBP USA." SBP, <https://sbpusa.org/where-we-help/rockaway-ny>.

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