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A GREEN NEW DEAL FOR NEW YORK CITY HOUSING AUTHORITY (NYCHA) COMMUNITIES

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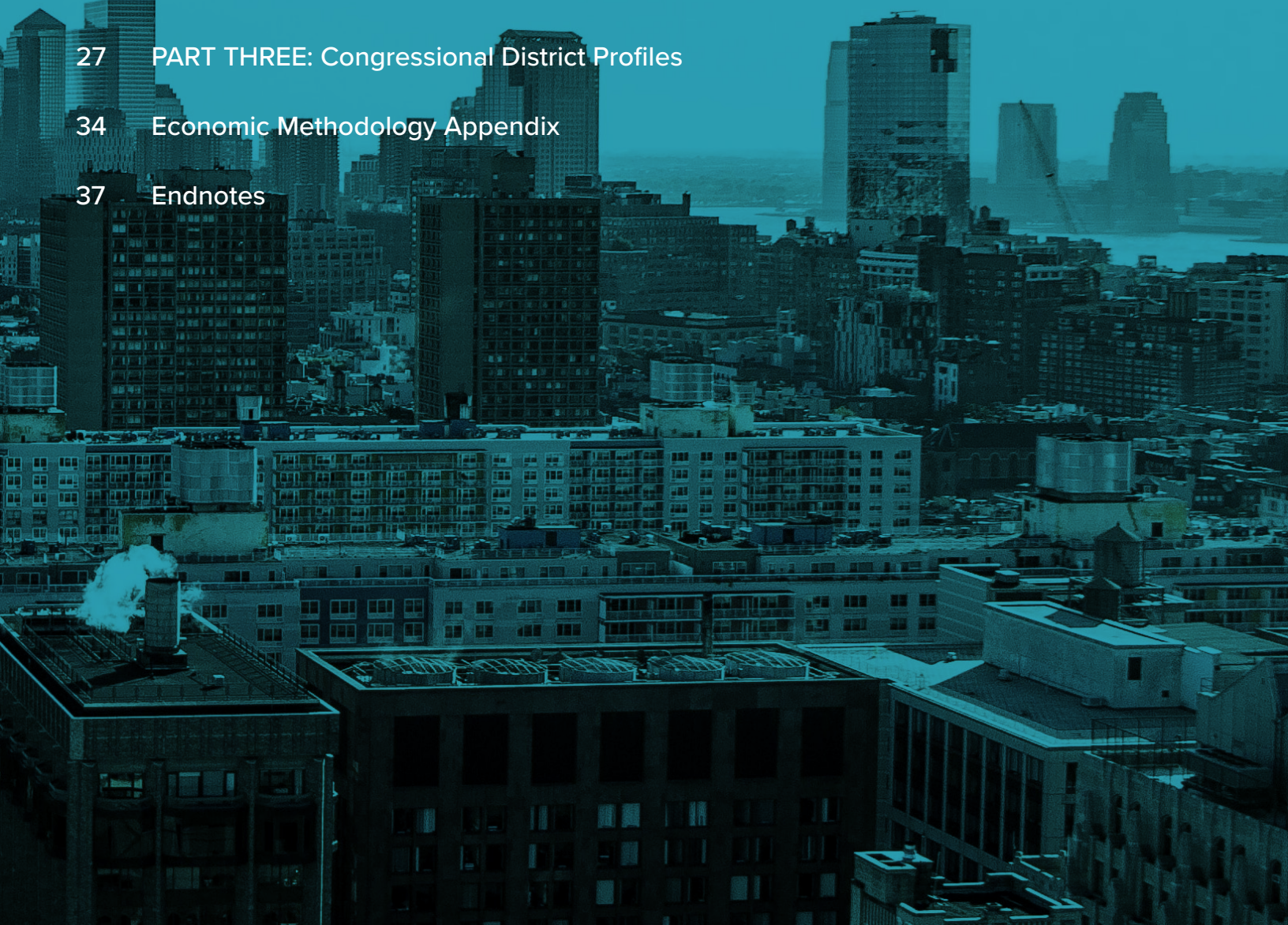

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EXECUTIVE SUMMARY

A Green New Deal for NYCHA Communities

The New York City Housing Authority (NYCHA) is in grave physical, financial and political disrepair. The agency faces a repair backlog of **$31.8 billion** according to its most recent capital plan, which was based on an extensive 2017 study commissioned by the authority. This backlog is the result of decades of disinvestment, driven by a combination of anti-government ideology and resentment towards low-income communities of color.

NYCHA, which comprises 8% of apartments in New York City and houses a population over 400,000, is the largest stock of affordable housing in the five boroughs. **With one-third of New Yorkers paying approximately 50% of their income in rent**, NYCHA's stock of permanently affordable housing is crucial to keeping the city habitable for a wide range of people. Revitalizing NYCHA will benefit residents and bring new wealth, green skills, opportunity, and greater climate safety to their communities.

But what specifically should be done? How can we make needed repairs while also transforming the city's public housing into comfortable and healthy green housing?

Enter: the Green New Deal. The **basic principles** of the Green New Deal are aggressive, short-term reductions in carbon emissions; high-quality jobs for those who need them; and sustainable investments to provide economic and environmental benefits to racialized and working-class communities.

All these principles are embodied in the Green New Deal for Public Housing Act proposed by Rep. Alexandria Ocasio-Cortez and Sen. Bernie Sanders.

This report focuses on New York, where a Green New Deal for NYCHA promises transformative change. (Our companion report, "A Green New Deal for American Public Housing Communities," addresses the public housing nationally.) New York public housing's tremendous capital backlog is a testament to the continuing injustices inflicted upon NYCHA communities by all levels of government. This backlog needs to be addressed as swiftly and thoroughly as possible.

But as we work to mitigate and adapt to climate change, we cannot simply restore NYCHA buildings to their original systems. NYCHA should be modernized, joining the wave of public housing developments receiving green upgrades of the highest quality all over North America and Europe. Pairing deep energy retrofits with desperately needed capital repairs can slash carbon emissions, improve residents' quality of life, and create thousands of high quality construction jobs for NYCHA residents and their neighbors.

Summary of benefits

A Green New Deal for NYCHA is a plan to repair NYCHA, but it is also a plan for racial, economic, and environmental justice. Fully realizing this plan through a $48 billion investment in comprehensive green retrofits and capital repairs for every large, multi-family building that NYCHA operates (including roughly 174,000 units) over ten years would yield the following impacts:

- **Abolish NYCHA's carbon pollution by** eliminating gas from all NYCHA buildings, reducing energy use, and procuring electricity from 100% renewable sources. These actions would cut NYCHA's annual carbon emissions to zero by 2030. Altogether this is a **2.3 million ton reduction of carbon per year, or the equivalent of taking 453,243 cars off the road**.[a]

- **Create up to 325,519 jobs in New York City over the course of ten years**, or an average of up to 32,552 jobs per year. This would have an estimated citywide **economic impact of up to $96 billion** in local economic activity over the course of the decade-long mobilization.

- **Increase local and regional government revenues** by adding up to **$1.84 billion** for the City and **$2.45 billion** for the State through sales and income tax revenue raised over the course of ten years.

- **Grow the high-wage 21st century green economy by creating over 11,000 good-paying, union-rate jobs in skilled construction and maintenance per year,** with major benefits for NYCHA residents and low-income communities, thanks to the Green New Deal for Public Housing Act's ambitious Section 3 hiring requirements. We expect most or all of these jobs to be union jobs; in this report, all our projections assume union-rate "prevailing wages". In New York State, the average annual compensation for construction work is currently nearly $82,000.

- **Create good, green jobs for NYCHA residents in districts across the city**. The scale of the work, combined with aggressive workforce development programs and **hiring requirements will provide approximately 787 construction jobs** per year **for NYCHA residents in NY-15, 870 in NY-13, and 802 in NY-8. Citywide,** this legislation would create as many as 4,342 jobs a year for public housing residents. Roughly a third of all jobs created will go to very low- and low-income New Yorkers across the city. This training and work experience will, in turn, open career pathways in high-income fields like construction and maintenance.

- **Reduce NYCHA's utility costs by $200 to $398 million a year** by the end of ten year retrofit period**,** amounting to nearly 10% of the annual capital expenditure.

a. Compared to NYCHA's average emissions from 2010-2017. Emission estimates based on NYCHA utility consumption from NYC's OpenData portal and guidelines set forth by the EPA and NYC in the CEQR technical manual.

- **Invest in low-income and racialized communities.** NYCHA complexes are disproportionately located in census tracts with high unemployment and high person of color populations, as shown in maps throughout this report. These new jobs would facilitate an immediate injection of capital into frontline communities, with neighborhoods with high densities of NYCHA complexes benefiting most. Moreover, by **making every NYCHA complex into a resilience center** that provides safe temperatures, backup power, and community spaces for coordinating disaster relief, a Green New Deal for NYCHA would make communities healthier and safer.

- **Reduce high rates of asthma among NYCHA residents by 18-30%,** by completely eliminating the root cause of mold as well as the mold itself, which a 2018 study found to be present in at least 30% of NYCHA apartments. A Green New Deal for NYCHA would fund aggressive programs to maintain mold-free apartments, and fully remove all lead paint and repair any resulting damage, meaning residents will see increased health benefits, saving themselves, and the city, money in healthcare costs.

- **Massively improve safety, health, and comfort in NYCHA apartments, which are currently causing unacceptable harm to residents.** Currently, compared to the New York City average, NYCHA apartments have over twice the rate of cockroach infestation, heating breakdown, broken toilets, and water leakages. It's no wonder then that NYCHA residents are twice as likely as the New York average to suffer from poor health.

- **Use public procurement to provide all NYCHA apartments,** as well as willing community and housing partners in New York and beyond, with cutting-edge, apartment-sized induction stoves and low-flow toilets. This would have benefits like improved indoor air quality (no more toxic emissions from unventilated gas ranges) and virtually eliminate toilet leaks from units. Bulk public purchases of the best new appliance models could drive down costs for everyone in the private market as well. Other public agencies or community groups could also piggy-back on these bulk purchases to secure low-cost appliances for their members.

Policy recommendations

To get there, a Green New Deal for NYCHA should include the following imperatives, all of which are consistent with the Green New Deal for Public Housing Act:

- **Repairs must be paired with deep energy retrofits** to remake NYCHA into exemplary high-quality green housing. Procurement requirements should be amended to allow for an integrated approach to repairs and retrofits, and to permit public housing authorities flexibility in obtaining contracts for high-quality, lasting work, even when this requires higher upfront costs.

- **Repairs and retrofits must be supported by aggressive workforce development programs and hiring requirements** so that Section 3 eligible workers—public housing residents and nearby low-income workers—and resident-owned businesses and cooperatives receive the maximum benefit from new jobs and investments, and can contribute to the 21st century green economy long after retrofits are completed.

- **Provide funds to build on and expand existing local plans to immediately address residents' most pressing health and safety needs,** including mold removal and heat provision, in part by training and adding additional workers to make immediate repairs that improve residents' health, safety, and comfort.
- **Retrofits must set the stage for full decarbonization**. Developments must be electrified; oil and natural gas must be phased out as next-generation HVAC systems are installed to address heat unreliability, maximize resident comfort, and facilitate a full green transition in all NYCHA buildings.
- **Outfit NYCHA residences with modern, energy efficient appliances** to immediately improve resident quality of life, realize dramatic utility savings, and reduce costs for buyers in other affordable housing complexes, and ultimately consumers across the United States, by leveraging public purchasing power to drive cost reductions and innovations in US appliance manufacturing.

Even as federal policy has systematically underfunded NYCHA, destabilized the lives of its tenants, and treated public housing as a tool for segregation rather than a permanent stock of high-quality homes guaranteed for the public's benefit, NYCHA housing has remained in extremely high demand, with vacancy rates nearly a factor of 10 lower than in market-rate rentals.[b]

Changes are needed at the federal level not only to correct chronic underfunding but also to bolster the supply of affordable, stable, and high-quality housing that public rather than private institutions can provide. Additionally, while workforce development and reinvestment begin to rectify the racial injustices perpetuated through housing and economic policies, other federal steps are required to foster the integration of public housing. Public housing has become a shelter of last resort, but through a Green New Deal, it can become an affordable, desirable, and sustainable mainstay in the American landscape.

To achieve these goals, we must make changes at the federal level, including:

- **Repeal the Faircloth Amendment**
- **Amend current public housing income requirements**
- **Amend public housing procurement requirements**
- **Fully fund public housing without requiring privatization**

b. Six percent vacancy rate in market-rate rentals versus 0.7 percent in public housing. Based on 2017 Housing Vacancy Survey.

Figure 1. **NYCHA communities suffer high unemployment**

Map of New York City broken into census tracts, showing that NYCHA complexes tend to coincide with higher levels of neighborhood unemployment. Black shapes are NYCHA developments. Dark red shading indicates high unemployment. Blue shading indicates a gradient of projected sea level rise, from 3 to 10 feet. This is also a good proxy for flood risk during storms and hurricanes.

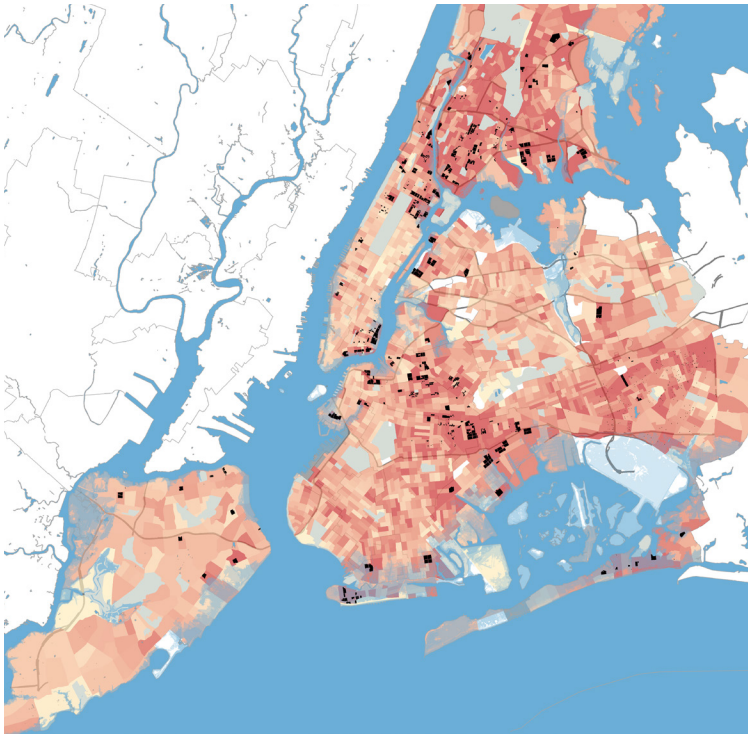
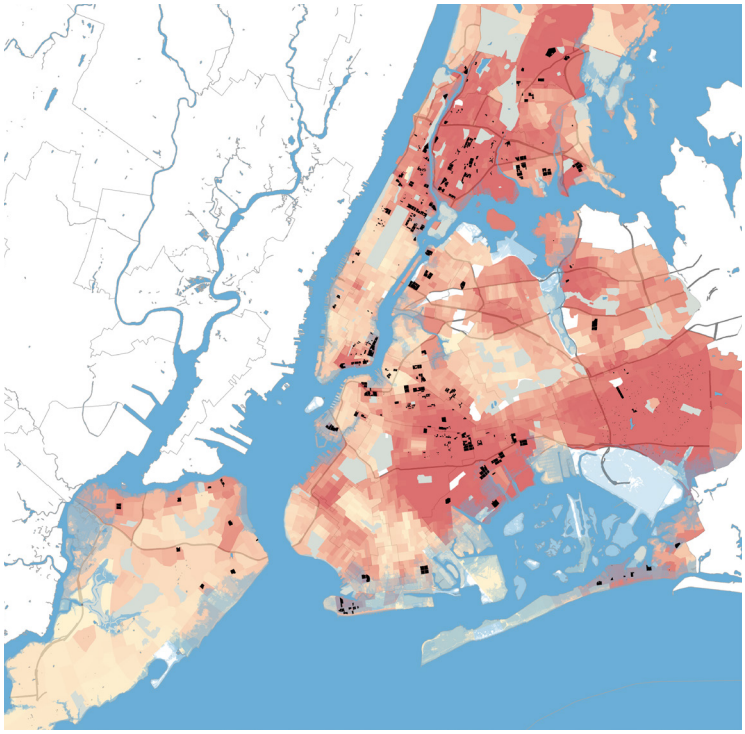


Figure 2. **NYCHA serves communities of color**

Map of New York City broken into census tracts, showing that NYCHA complexes tend to coincide with higher levels of nonwhite residents.



PART 1:

Why the New York City Housing Authority (NYCHA) needs a Green New Deal

1.1 Core principles: A Green New Deal for NYCHA Communities

As articulated in House Resolution 109, introduced by Rep. Alexandria Ocasio-Cortez and sponsored in the Senate by Sen. Ed Markey, the Green New Deal's core priorities include aggressive cuts to greenhouse gas emissions, widespread green job creation, and addressing inequalities of race and class. The resolution explicitly calls for direct green investment in frontline communities as a way of achieving these goals in the very short-term.

This targeted investment is often critiqued as an expensive and distracting add-on to decarbonization. But in fact, green social policy is designed to slash emissions both directly by eliminating fossil fuel use and indirectly by growing the coalition for decarbonization.

The Green New Deal for Public Housing Act, proposed by Rep. Alexandria Ocasio-Cortez and Sen. Bernie Sanders in November 2019, would undertake a decade of decarbonization and capital repairs to the country's public building stock, while tackling climate change and inequality at the same time. It is a wise use of resources: the public sector already owns the buildings; they are in desperate need of maintenance already; green retrofits that slash carbon emissions, improve health and comfort, create community resiliency centers, and create jobs in neighborhoods with high unemployment, will together make huge improvements to people's everyday lives while building political support for more climate action. Indeed, we hope to see legislation soon that extends these principles to other pieces of the low-income and affordable housing system.

Following the broad contours of the Green New Deal for Public Housing Act, this report proposes a $48 billion investment in NYCHA over the next ten years, with funds drawn from general government revenues.[1] This would lower energy costs for NYCHA's public housing by hundreds of millions of dollars a year, slash annual carbon emissions by 2.3 million tons (equivalent to over 450,000 cars on the road), and create over 32,500 jobs per year in New York.

This report outlines how this act would revitalize public housing as a high quality and innovative element of New York's housing system, while massively improving residents' comfort, health and safety, creating good green jobs and slashing carbon emissions.

This investment would cover both all necessary short-term and capital repairs, *and* holistic building retrofits for all of NYCHA's buildings not currently covered by New York State's weatherization programs, totalling 174,000 units. The Act would fully fund programs to address resident health and safety including mold and lead paint removal.

Pairing green retrofits with capital repairs is the most efficient and cost-effective way to reach the twin goals of making public housing comfortable for all its residents

and upgrading building systems to the highest 21st century green standards. This investment will also develop industries and build a skilled labor force to support a strong regional economy and accelerate no-carbon green retrofits of apartment and commercial buildings across the region.

As we describe in greater detail below, in the late 1990s, NYCHA policies led to the creation of the first apartment-sized energy efficient fridge, which was manufactured in the US, and eventually slashed costs for more efficient fridges for both public housing authorities and consumers all over the country. NYCHA has led on green innovation before, and it can do so again.

In what follows, we outline some of the key needs for massive green investment in New York's public housing, and some key benefits from a Green New Deal for NYCHA. We do not assess all of the existing programs and initiatives, or go into great detail regarding the nuances of deep energy retrofits, for which techniques and best practices are continuously improving. Our goal is more modest—to scope out some of the basic climate and economic benefits of a Green New Deal for NYCHA, how this contributes to broader green investments in frontline communities, and which parts of New York will be most affected. This report is not meant to be a comprehensive plan but rather a conversation starter.

We do not lay out precisely how this work should be done, as this should be determined by a wide range of resident and stakeholder groups. However, we do point to precedents and other plans on effective public housing governance structures that could organize these retrofits.[2] Although retrofits may not be implemented by NYCHA as it is currently structured, we refer throughout this document to NYCHA as the primary agent in leading these retrofits for ease of reading.

At a time when we desperately need ways to lift up people and places who have suffered decades of disinvestment, green investments in public housing—and by extension, low-income workers who will secure new, largely unionized green jobs—is a uniquely effective way to start.

We note the essential work of community groups and NYCHA residents who are battling in the streets and halls of power every day to secure badly needed funds to repair severely neglected public housing, through campaigns like Fight for NYCHA. We agree with them that privatization is not the answer. Responding to our climate and housing emergencies provides a unique opportunity to save both the physical structures and the best ideals of public housing: a cornerstone of a broader Homes Guarantee that keeps cities affordable, innovates in efficient and green building systems, and lifts up racialized and low-income communities through the provision of beautiful, healthy, carbon-free homes.[3]

Building on the work of countless organizations and scholars, we hope to contribute to a growing conversation about saving NYCHA from decades of neglect and turning it into the equivalent of what could be one of the world's greatest green cities.

1.2 Why NYCHA needs a Green New Deal

NYCHA is in grave disrepair: physical, financial, and political. As confirmed by NYCHA's most recent capital plan[4], based on the most recent extensive study, NYCHA faces a repair backlog of $31.8 billion. The Regional Plan Association has also recently proposed an investment of nearly $50 billion in upgrades and other measures to address the crisis in NYCHA.[5] Neither report, however, takes account of climate change, the imperative of specifically green retrofits, and the need to defend and uplift New York's public housing. These reports miss the opportunity that massive federal investment provides to solve multiple problems at once, with huge benefits to workers, communities, and the broader green economy.

Racist disinvestment in NYCHA threatens the city's most affordable housing, which contains 8% of the apartments in New York City.[6] With one-third of New Yorkers paying approximately 50% of their income in rent, NYCHA's stock of permanently affordable housing is crucial to keeping the city habitable for a wide range of people.

So what should be done? How can we make the needed

repairs while also transforming the city's public housing into appealing, comfortable, and healthy green housing? NYCHA's capital plan assumes that *existing and degraded systems will be replaced with upgraded versions of the same system*. But building system technologies have improved; to restore NYCHA buildings to their original systems is untenable. We now have 21st century technology to decarbonize large multifamily buildings in cost-effective ways that would greatly improve comfort and safety. **All over North America and Europe, public housing is being modernized with deep energy retrofits that slash carbon emissions and massively improve residents' quality of life.**[7] Large, private, multi-family buildings and large commercial properties with many similar systems, are likewise improving techniques and tools everyday. NYCHA can take up the torch and help lead the next round of technological and work-force developments.

NYCHA's opportunity is to combine badly needed repairs like eliminating mold with massive green structural improvements. This could include the installation of highly efficient electric heat pumps for heating and cooling, recladding building exteriors to improve insulation and resident comfort, adding solar to rooftops, and turning NYCHA complexes into resiliency centers to help keep community members safe during extreme weather.

We estimate that for roughly $48 billion over ten years, it will be possible to conduct green upgrades of every large, multi-family building that NYCHA operates (which includes approximately 174,000 units housing at least 400,000 residents) to:

- Massively improve residents' health and comfort
- Cut NYCHA complexes' carbon footprint to zero
- Make each building resilient to storms
- Ensure each complex has community spaces to serve everyday needs and be used as shelters during extreme weather like heat waves
- **Upgrade community facilities on NYCHA land—like playgrounds—to serve NYCHA communities' residents**

A Green New Deal for NYCHA's roughly 400,000 residents could make NYCHA the equivalent of one of the world's biggest green, no-carbon cities.[8] Deep energy retrofits could do more than simply address the maintenance backlog—they could make New York's public housing the first strategic lever in the city's decarbonization efforts. In the process, residents would experience massive improvements to their health and living conditions. Unemployed and underemployed workers would be trained in 21st century green careers, technologies for no-carbon construction and maintenance would be improved for the benefit of all New Yorkers, and New York's emissions would be substantially cut.

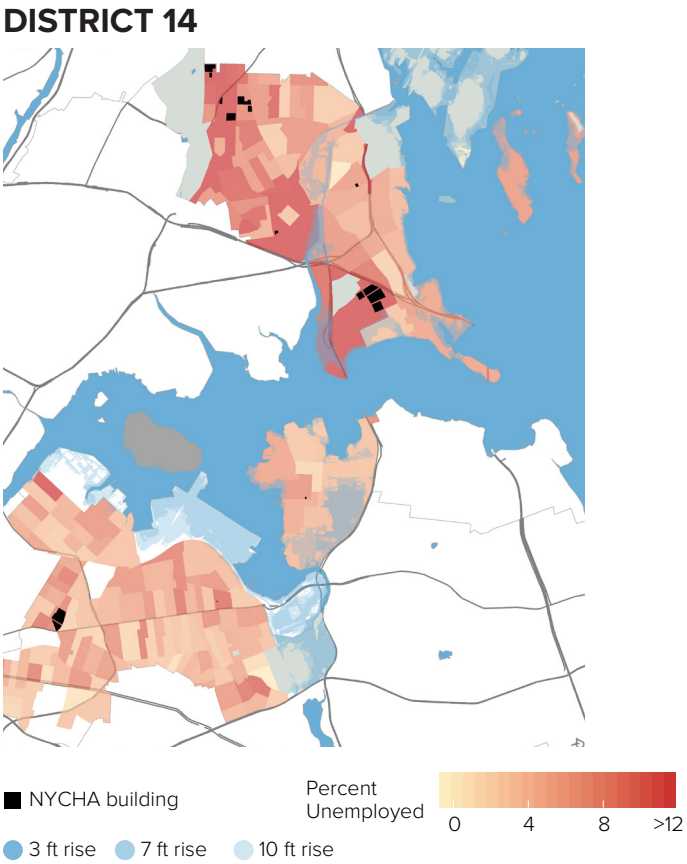
1.3 Summary of benefits

- **Abolish NYCHA's carbon pollution** by eliminating gas from all NYCHA buildings, reducing energy use, and procuring electricity from 100% renewable sources. These actions would cut NYCHA's annual carbon emissions to zero by 2030. Altogether this is a 2.3 million ton reduction of carbon per year,[9]—the equivalent of taking 453,243 cars off the road.[10]
- **Create up to 325,519 jobs in New York City over the course of ten years**, or an average of up to 32,552 jobs per year. This would have an estimated **citywide economic impact of up to $96 billion in local economic activity** over the course of the decade-long mobilization. (For methods of all our economic and jobs projections, see our Appendix.)
- **Increase local and regional government revenues** by adding up to $1.84 billion for the City and $2.45 billion for the State through sales and income tax revenue raised over the course of ten years.
- **Grow the high-wage 21st century green economy by creating over 11,000 good-paying, union-rate jobs in skilled construction and maintenance per year**, with major benefits for NYCHA residents and low-income communities, thanks to the Green

New Deal for Public Housing Act's ambitious Section 3 hiring requirements.[11] We expect most or all of these jobs to be union jobs; in this report, all our projections assume union-rate "prevailing wages". In New York State, the average annual compensation for construction work is currently nearly $82,000.

- **Create good, green jobs for NYCHA residents in districts across the city.** The scale of the work, combined with aggressive workforce development programs and **hiring requirements will provide approximately 787 construction jobs per year for NYCHA residents in NY-15, 870 in NY-13, and 802 in NY-8**. Citywide, this legislation would create as many as 4,342 jobs a year for public housing residents. Roughly one-third of all jobs created will go to very low- and low-income New Yorkers across the city. This training and work experience will, in turn, open career pathways in high-income fields like construction and maintenance.[12]
- **Reduce NYCHA's utility costs by $200 to $398 million a year** by the end of ten year retrofit period, amounting to nearly 10% of the annual capital expenditure.
- **Reducing the high rate of asthma among NYCHA residents by 18-30%.**[13] By completely eliminating the root cause of mold as well as the mold itself, which a 2018 study found to be present in at least 30% of NYCHA apartments.[14] A Green New Deal for NYCHA would fund aggressive programs to maintain mold-free apartments, and fully remove all lead paint and repair any resulting damage, meaning residents will see increased health benefits, saving themselves, and the city, money in healthcare costs.
- **Invest in low-income and racialized**

Figure 3. **NYCHA communities need more jobs**



Darker red indicates higher levels of unemployment in the census tract.

communities. NYCHA complexes are disproportionately located in census tracts with high unemployment and high person of color populations, as shown in maps throughout this report. These new jobs would facilitate an immediate injection of capital into frontline communities, with neighborhoods with high densities of NYCHA complexes benefiting most. Moreover, by making every NYCHA complex into a resilience center that provides safe temperatures, backup power, and community spaces for coordinating disaster relief, a Green New Deal for NYCHA would make communities healthier and safer.

- **Massively improve safety, health, and comfort in NYCHA apartments, which are currently causing unacceptable harm to residents.** Currently, compared to the New York City average, NYCHA apartments have over twice the rate of cockroach infestation, heating breakdown, broken toilets, and water leakages. It's no wonder then that NYCHA residents are twice as likely as the New York average to suffer poor health (see Table 2).

- **Use public procurement to provide all NYCHA apartments, as well as willing community and housing partners in New York and beyond, with cutting-edge, apartment-sized induction stoves and low-flow toilets.** This would have benefits like improved indoor air quality (no more toxic emissions from unventilated gas ranges) and virtually eliminate toilet leaks from units. Bulk public purchases of the best new appliance models could drive down costs for everyone in the private market as well. Other public agencies or community groups could also piggy-back on these bulk purchases to secure low-cost appliances for their members.

Table 1. **New Onsite Construction Jobs per Year from Repairs & Retrofits**[15]

CONGRESSIONAL DISTRICT	NYCHA RESIDENTS	NEW ONSITE CONSTRUCTION JOBS PER YEAR	NEW NYCHA CONSTRUCTION JOBS PER YEAR
5	9,999	297	111
6	5,978	177	66
7	62,872	1,865	699
8	72,114	2,139	802
9	22,811	677	254
10	11,266	334	125
11	14,065	417	156
12	21,351	633	237
13	78,184	2,319	870
14	11,304	335	126
15	70,735	2,098	787
16	9,695	288	108

Notes: Total On-site construction jobs: 11,579 per year
For NYCHA residents: 4,342 per year

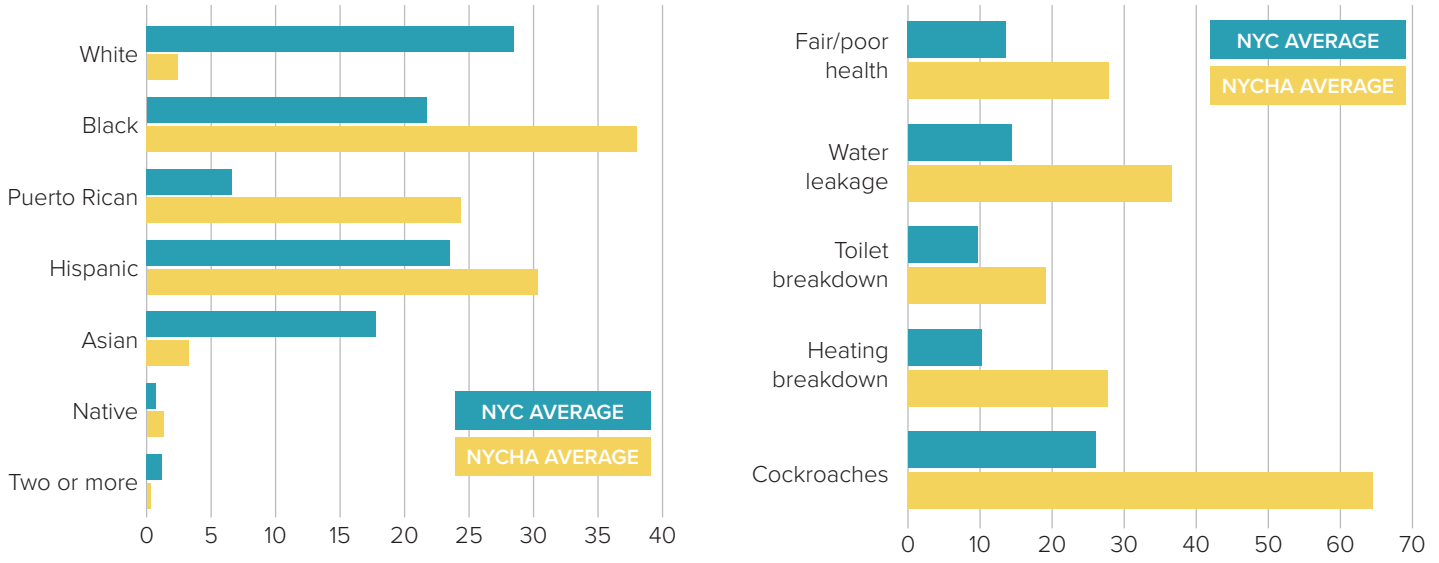
1.4 Background: NYCHA's neglect

NYCHA needs help. It needs a more effective solution than the already failing public-private partnerships pursued by a desperate Mayor De Blasio and a litany of other city, state, and federal politicians. **NYCHA needs a real federal reinvestment**, not the superficial blame-shifting of the new HUD monitor.[17]

First and foremost, **NYCHA residents need massive investments to meet their real, basic needs**. The good news is that those investments would *also* save nearly half a million units of affordable housing from falling physically beyond repair or into privatization; create hundreds of thousands of jobs (including thousands for NYCHA residents), including thousands of jobs in construction and manufacturing; add billions of dollars to the local economy; bring resiliency centers to neighborhoods across New York City; and lower the prices of cutting-edge electric appliances for all Americans through bulk purchase orders of new models.

Recently, 83% of NYCHA apartment units inspected by New York State[18] experienced at least one severe condition (mold, lead paint, water damage, inoperable appliances, etc). Lead and mold exposure are only the most visceral of the rampant indignities suffered by NYCHA residents. One life-shortening result of these deteriorating conditions is residents' disproportionate rates of asthma.[19] Residents also suffer perpetual discomfort from home temperature. Most NYCHA units are notoriously overheated in the winter, without the ability to control apartment temperature unit by unit, and yet they also experience frequent boiler failures leaving them without heat, hot water, or both. On the hottest summer days, units are insufferably hot, unless residents pay an extra fee to be allowed to run a window AC unit. This lower quality of life is a direct result of the buildings' inadequate and inefficient systems. NYCHA itself reports that "average energy use at NYCHA developments is 40% higher than at median multi-family buildings across New York City.[20] A major decade-long investment in deep energy retrofits and capital repairs would, in addition to all its environmental and social benefits, unlock huge, lasting savings in

Figure 4. **NYCHA is subject to racist disinvestment that exposes public housing residents to unacceptable housing conditions**



Racial disparities in resident background (left) and unsafe conditions of NYCHA apartments compared to New York average (right).[16]

operational costs, making up for decades of neglect, and putting NYCHA on firmer footing for the decades ahead.

Meanwhile, proposals to address public housing's crisis, namely the Rental Assistance Demonstration, merely move funding from other housing programs to public housing on condition of privatization.[21] In our view, the issue is not lack of funds, but a federal unwillingness to adequately fund public housing, and to provide this funding through rational, far-sighted policy.

RE-INVESTING IN PUBLIC HOUSING COMMUNITIES

The aggressive workforce development measures in the Green New Deal for Public Housing Act's would **reverse the history of discriminatory disinvestment and provide structured pathways to union employment in skilled maintenance and construction for thousands of NYCHA residents.** We also believe that substantial increases in affordable—or better, free—community childcare services would also have massive benefits for working parents, mothers especially, in facilitating economic access, as is seen in cities and regions throughout the North Atlantic. The Green New Deal for Public Housing Act's procurement rules would also favor NYCHA resident-owned businesses, including worker cooperatives, and provide sustained and inclusive economic development throughout the region.

Table 2. **Characteristics of residents and their apartments, comparing NYCHA to New York City averages (proportion of residents)[22]**

	NYC average	Bronx NYCHA	Brooklyn NYCHA	Manhattan NYCHA	Queens NYCHA	Overall NYCHA
Race/Ethnicity						
White, non-Hispanic	29%	1%	3%	1%	5%	2%
Black, non-Hispanic	22%	32%	51%	30%	25%	38%
Puerto Rican	7%	27%	20%	31%	19%	24%
Other Hispanic	24%	36%	22%	31%	46%	30%
Asian	18%	0%	3%	7%	4%	3%
Native	1%	4%	0%	0%	0%	1%
Job & Labor-force Status						
Unemployment Rate	2%	9%	6%	6%	2%	7%
Working Age Labor Force Participation Rate	79%	41%	41%	38%	42%	59%

Table 2. **Characteristics of residents and their apartments, comparing NYCHA to New York City averages (proportion of residents) (Cont'd)**

	NYC average	Bronx NYCHA	Brooklyn NYCHA	Manhattan NYCHA	Queens NYCHA	Overall NYCHA
Health Status						
Fair/poor health	14%	31%	22%	30%	37%	28%
Apartment Condition						
Water leakage	14%	44%	36%	36%	17%	3%7
Toilet breakdown	10%	20%	17%	22%	21%	19%
Heating breakdown	10%	23%	30%	29%	33%	28%
Cockroaches	26%	71%	58%	69%	60%	65%

Systematic disparities in living conditions, health, and employment status between NYCHA and overall New York residents. Note: in this dataset the sample size of NYCHA residents in the Staten Island was too small to include reliable statistics.

PART 2:
Why NYCHA needs a Green New Deal

In this section we scope out in broad strokes a few of the core components the Green New Deal for Public Housing Act's implications for NYCHA. This is a basic outline of steps that can be taken but will ultimately be tailored on the basis of community leadership, ongoing legislation, and the specific contexts of each building and community. Legislation (and reports like these) would in fact be weaker by including excessively prescriptive detail.

2.1 Accelerate deep energy retrofits for all units to slash carbon emissions, and ensure fossil-free public housing

New York City has passed legislation (the Climate Mobilization Act) requiring most big buildings to reduce their emissions by 40% by 2030 and 80% by 2050. NYCHA does not face the same penalties as most building owners if it does not meet these goals, but this does not mean public housing cannot or should not become a leader in decarbonization efforts. Instead, NYCHA can take advantage of integrated project management techniques to synchronize repairs and retrofits, become a leader in lowering residential emissions, and begin to foster a necessary new green infrastructure to benefit the whole region.

NYCHA houses over 400,000 New Yorkers in 173,762 units of public housing developments.[23] It also manages approximately 5,000 units in scattered site developments that can be retrofitted through state programs, although we do not address those units here.[24]

The most efficient and effective way to reduce energy use and improve home comfort and safety is through "deep energy retrofits," which are comprehensive upgrades to windows, the building's outer cladding, and its core energy systems. These retrofits do not eliminate all problems in aging public housing developments, but they do reduce multiple drivers of multiple drivers of mold and pest infestation (i.e., air leaks between units). The best practice for deep energy retrofits is to (a) sequence repairs to minimize resident displacement (often limited to one day, and usually less than one week), and (b) conduct capital repairs at the same time to minimize disruption.

NYCHA units consistently fail to provide comfortable housing for residents. Units are systematically overheated in the winter, while only 50% of NYCHA units have air conditioning, whereby residents pay a fee for the right to install and run window AC units. Deep energy retrofits would thus dramatically improve *both* energy efficiency *and* resident comfort. Today, NYCHA uses 40%-50% more energy per square foot[25] than the median New York City multi-family building, while delivering unhealthy home environments and inadequate comfort and safety.

What's more, when paired with appliance replacement, **deep energy retrofits are the best opportunity to** eliminate gas **from buildings, an essential strategy for slashing carbon emissions and ending fracking.** Gas removal in the home would improve indoor air quality and increase health and safety. Gas ranges, especially

when used without adequate ventilation, expose residents to toxic fumes, like carbon monoxide, that contribute to respiratory illnesses. Current NYCHA guidelines for appliances in apartments require gas ranges with a non-ventilating hood (p. 22).[26,27] And eliminating gas use will spare NYCHA from increasingly expensive and unreliable gas supplies, as protests against pipelines continue, gas financing continues to weaken, and climate advocates successfully increase fossil fuel costs. NYCHA will save money by leading, rather than following, the inevitable abandonment of gas in buildings.

While this plan requires federal funding and federal legislation, the most important next step is to simply begin, and both the city and the state have adequate resources to conduct at least some deep energy retrofits along the lines discussed in this report.

RETROFITS SUMMARY

The broad outline of some key pieces for deep energy retrofits to NYCHA buildings are listed below as a starting place. The specific solutions that are implemented will vary by development, based on architecture, existing systems, and location, but this should be seen as a starting place for planning retrofits. All this would be *in addition* to normal system repairs, such as repairing elevators plumbing and roofs (and adding solar where feasible), refurbishing electrical wiring, and cleaning and improving ventilation systems. *The steps outlined below are key elements for (1) improving building insulation, (2) increasing the comfort and efficiency of indoor appliances, and (3) providing comfortable, electrically generated cooling and heating that can be controlled by individual units.*

We also urge the use of **integrated project management** so that repairs and retrofits are planned and implemented together to minimize the cost of each.[28] Other public agencies conducting large-scale residential retrofits have found this approach invaluable in efficiently implementing deep retrofits. Because so many of NYCHA's building systems are at the end of their lifespan, an integrated effort to retrofit and repair developments could yield enormous savings.[29]

A common theme is the *full electrification* of building systems, so that all energy can come from zero-carbon sources like wind and solar. This investment in electrification is especially timely given the moratorium on new gas hookups in downstate NY.[30] The professed shortage has been associated with some of the heat outages faced by NYCHA residents.[31] Electrification will therefore build both **resiliency** and long-term **heat reliability** while setting the stage for full decarbonization.[32]

These holistic retrofits must also be an opportunity to make all public housing units as compliant as physically possible to modern accessibility standards, to fully meet the needs of residents with disabilities.

A summary of proposed retrofits is shown on the following page.

Temporary accommodations:

Around the world, techniques have been developed to minimize displacement of residents during upgrades, sometimes to as little a couple days. However we don't expect this to be possible in every NYCHA building. **We suggest exploring options like building new resident NYCHA social housing towers with the idea of using those towers in their first 10 years effectively as hotels, where residents can stay for days or weeks while their units are being rehabilitated.** In most cases, it is possible to conduct deep energy retrofits that would require residents to vacate their apartment for up to a week maximum. Throughout this process it is essential that these new structures stay within in the NYCHA system to foster continued trust and residential support while the upgrade process happens, with minimal risk of eviction.

Overcladding	This is an essential component in retrofitting NYCHA buildings to meet zero- carbon energy efficiency standards. Overcladding involves patching up the existing exterior structure of buildings, then adding new, fire-resistant, non-toxic, mineral insulation in addition to a new weather-resistant outer shell to the exterior of an existing structure. The "tower in the park" architecture of most NYCHA buildings means adding insulation by overcladding is sensible and cost-effective. *Overcladding must be part of an integrated plan so that new building system components, such as wiring for electrical heat pumps, can be run between the new outer wall and the pre-existing wall.*
Heat Pumps	Electrified heat pumps pull heat from their surroundings and transfer it in or out of the building. They provide an opportunity to integrate building-wide heat, air conditioning, and dehumidification in a unified electrical system with no on-site emissions or pollution. In NYCHA, such heat pumps make major improvements to resident health and comfort, compared to the inconsistent heat and toxic on-site power generation currently faced by NYCHA residents. In the summer, these heat pumps can significantly reduce the humidity in apartments. *Dehumidification from air pump systems will also help eliminate one of the root causes of mold (ambient humidity).* And because heat pumps can be electrified, they are a necessary component to decarbonization. Heat pump technology is also increasingly available to heating hot water. It may be combined with electrical resistance heating where technologically necessary. Depending on the specific location of housing complexes, heat pumps can be installed in the ground (ground-source heat pumps) or on the side or roof of a building (air-source heat pumps). Ground-source heat pumps are just as resilient to flooding as air-source heat pumps that are elevated beyond any possible flood level. There will also be cases where heat pumps are used to heat water both for radiators and general use; air conditioning would then be supplied by super-efficient window units. Given the growing number of extreme heat days caused by climate change, it is imperative to ensure cool, safe apartments to all NYCHA residents during warm months. These systems are also compatible with each apartment having its own thermostat to regulate indoor temperature.
Energy Recovery Ventilators (ERVs)	ERVs recycle heat as part of the increased ventilation of apartments, and should be built into building systems as a part of an integrated plan, improving both energy efficiency and indoor air quality.
Appliances	Appliance replacements are a straightforward and essential step to improving quality of life and creating healthier, sustainable apartments. For instance, *toilet breakdowns are reported at nearly twice the rate in NYCHA buildings than in NYC overall*[33] and other cities implementing retrofits have found that replacing leaky, inefficient toilets to be an immediate source of water and cost savings.[34] Also essential for eliminating fossil fuels: gas stoves should be replaced with electric induction ranges and ovens. These are now the modern standard worldwide, and are preferred by many of the world's best chefs. Any new refrigerators, laundry machines, dishwashers, or other building appliances should likewise be replaced with the most modern and efficient models.

YELLOWSTONE STOVES FOR ALL: HOW NYCHA's PURCHASING POWER CAN HELP ALL AMERICANS, AGAIN, WITH A PUBLIC OPTION FOR APPLIANCES

Mass public purchase of new energy-efficient appliances for NYCHA would involve purchasing approximately 175,000 units' worth of new stoves, three-quarters of that number for super-efficient, nearly leak-proof low-flow toilets (three-quarters because NYCHA is already conducting replacements), and roughly half that number in new fridges (NYCHA is already in a turnover process.)

But NYCHA can do more than simply buy new appliances: it can remake the market to the benefit of all Americans by using its procurement power to demand better product for lower cost.

L+ B1

The Metro Section

TUESDAY, JUNE 20, 1995

The New York Times

METRO DIGEST

HISTORY OF ILLS AT IMMIGRATION JAILS
James F. Slattery started small, managing a hotel on the edge of Kennedy Airport. He kept the Riviera hotel filled through a contract with the Government to absorb the overflow from immigration jails, which convinced him that the future of the lodging industry lay not with tourists but with inmates. In six years, Mr. Slattery and his partners built the fifth largest prison business in the country. [Page A1.]

The Union County Prosecutor's office and the Elizabeth Police Department have called for the closing of the Esmor detention center. [B4.]

NEW YORK CITY

BIAS DEBATE DIVIDES A SCHOOL
The teachers and students of Norman Thomas High School in Manhattan are spending the end of the school year divided, wrestling with the troubling is-

Public Housing Efficiency Plan, Step 1: Get New Refrigerators

By MATTHEW L. WALD

The New York Power Authority has persuaded housing officials to throw away most of the 180,000 refrigerators in New York City's public housing units over the next nine years — even if they are working fine. The authority will recruit manufacturers to build more efficient ones, and will provide them free to the New York City Housing Authority.

This, power officials say, is the way to make money in the energy business these days.

The key to the deal, to be signed today, is energy efficiency. Refrigerators use more electricity than anything else in an apartment, and the models now in use by the Housing Authority, some of which are 20 years old, are the kitchen equivalent of gas guzzlers. The Housing Authority believes that new models will save money on electric bills, while the Power Authority hopes that innovations like the free-fridge deal will help it keep customers and carve out a niche for itself amid growing competition.

Appliance manufacturers have made tremendous strides in refrigerator efficiency in the last few years, but so far only in the larger, more expensive models used in big suburban kitchens.

The reason is that homeowners buy refrigerators and also pay the electric bills, so they may consider efficiency when shopping. In apartments, tenants usually pay electric bills, so landlords tend to shop for the cheapest models. "The landlords have no motivation to buy the efficient one," said an energy expert who has pushed the new plan, Ashok Guptah of the Natural Resources Defense Council.

But in New York public housing, the Housing Authority buys the refrigerators and also pays the electric bills. The Power

180,000 refrigerators won't be standing in the way of progress.

Authority, which took over serving the Housing Authority from Consolidated Edison in 1976, supplies the electricity. It believes that it can induce manufacturers to serve a huge, ready-made market — public housing — by adapting new technologies to make an apartment-sized, 14-cubic-foot refrigerator. The Power Authority hopes to line up several other housing authorities that it supplies — and maybe some others out of state — to sweeten the incentive for appliance makers.

"We think that between New York and a few other big cities, we have a market for 50,000 refrigerators a year, which is enough to get manufacturers excited about building them," said S. David Freeman, president and chief executive of the Power Authority.

Once the machines have been developed, Power Authority officials say, they may be adopted by landlords of other subsidized housing, like Mitchell-Lama developments or buildings for the elderly. And they may be sold at retail for co-op owners.

Mr. Guptah said that the new refrigerators could be developed using existing technology. His group helped organize a consortium of 24 utilities two years ago that paid a $30 million prize to the develop-

Continued on Page B4

New York Times coverage of an early phase of the NYCHA fridge program.[35]

In fact, it is little known that NYCHA did this before, in the late 1990s.[36] At that time, there did not exist an apartment-sized, 14.4 cubic foot, energy efficient refrigerator. NYCHA partnered with the New York Power Authority (NYPA; a state-run public utility), the Citizens Conservation Corporation, and some other groups to run a contest for such a fridge. The manufacturer Maytag won the bid, with an efficient model that cost less than its more wasteful competitors. (The new model would go on to become the first Energy Star fridge sized for apartment living.) The new fridges were manufactured in Newton, Iowa. NYPA purchased tens of thousands of these fridges; NYCHA received them for free, as NYPA put up the initial capital, and then paid themselves back through the lower energy use that followed form the fridges' installation. Once they were paid back, NYCHA benefited from ongoing savings. NYCHA and NYPA also allowed other public housing authorities in the region to piggyback on bulk orders and take advantage of the lower sticker price from large orders. The technological developments that went into the new fridges lowered costs for more efficient fridges for the entire US appliance market, as well as lowering utility bills. All the fridges that NYCHA replaced were recycled.[37]

Today, NYCHA could run a similar contest for modern induction stoves like those manufactured in the United States by Frigidaire. Currently, induction stoves are considered the best cooking method available by many of the world's best chefs, because of how quickly they heat up, and how responsive they are to controls. Because they work through magnetic force, they do not burn human skin, and only heat up when in contact with pots and pans. For this contest, NYCHA would specify a slightly smaller slide-in model than is typically on the market, and demand lower costs. As with the energy efficient fridges, they could allow public housing authorities around the region—and ideally, country—to piggy-back on bulk orders for additional savings. In turn, all Americans would have access to these new appliances, at lower prices thanks to bulk purchase and production. More than one company could win the contest, to diversity manufacturing opportunities.

In this report, we suggest going even further than the earlier fridge model. What if these government-procured stoves were branded to reflect the effort to preserve American natural splendors? Let's say they were called the Yellowstone Stoves. What if people who did not live in public housing could buy in to government orders? Public housing authorities could be mandated to offer community groups or other institutions in their region's the opportunity to also piggy-back on bulk purchases. The same logic could hold for bulk purchases by other public entities (the army, government buildings, veterans' hospitals, etc). This would ultimately allow almost any individual to benefit from the lower cost. They might have to wait for delivery, and accept a single model. But it would be one more way that the economic might of the federal government—namely, the public purse—could benefit everyone.

This program would also be an immediate boost to the domestic appliance manufacturing industry and directly create jobs in American manufacturing and supplier industries. Based on modest assumptions, new appliances for NYCHA units would create 1,693 new job-years nationally over the course of ten years.[38] As with jobs in retrofits, we anticipate that these jobs wouldn't simply disappear afterwards but become a strong foundation for the growing industries of a new, green economy.

CREATE JOBS AND DEVELOP THE 21ST CENTURY GREEN ECONOMY

An investment in NYCHA is an opportunity to begin to address historical wrongs and give NYCHA residents their due. This proposal would create high-skilled, high-paid, career-track, union jobs with workers learning techniques that can be applied across the region, especially in retrofitting the vast number of large, multi-family buildings in New York City and the broader region. In doing so, it not only begins the process of decarbonization and promises immense quality-of-life benefits, but also acts as a jobs and industrial program.

Economic models described in the appendix of this report show a total economic impact of up to **$96 billion and 325,519 job-years over the course of a decade in NYC** as a result of this plan. But headline numbers frequently miss the most important economic development impacts. Thousands of new jobs going to newcomers to the city or the already-employed have different impacts than new jobs that will benefit un- and underemployed populations, such as the new jobs that will be created by Public Housing Green New Deal. Not only does this mean that the proposed program will have more positive social effects, it also means greater economic benefits.[39]

A Green New Deal for NYCHA will mean thousands of on-site construction jobs that will be subject to City and Federal hiring requirements and that will benefit from aggressive workforce development programs implemented along with retrofits. The Public Housing Green Dew Deal Act would reform HUD's Section 3 regulations to increase the training and hiring of public housing residents and other low-income workers to work on green retrofits for public housing. **Over the course of ten years, we estimate that roughly 75% of new jobs in construction and maintenance would go to Section 3 eligible workers.**

For simplicity, we assume that half (37.5% of total new construction and maintenance jobs) would come from NYCHA residents working on their complexes, and another half would be low-income workers throughout the city. In the district profiles further down this report, we estimate the number of NYCHA resident jobs created per congressional district (see Table 2 on the next page).

The legislation seeks to ensure that these workers enter apprenticeship programs that lead to permanent positions in trade unions throughout the state and region (in this part of the US, we expect the vast majority of these positions to be unionized). In this report, all our projections assume prevailing, union-rate wages. More specifically, the legislation provides additional funds and economic awards to local agencies that innovate and produce successfully synchronized local programs, utilizing grants to ensure that hiring and contracting opportunities go to public housing residents. The legislation also requires data reporting accountability while increasing job opportunities to public housing residents through stronger hiring and contracting requirements.

The Green New Deal for Public Housing Act would also ensure Section 3-owned businesses are prioritized by including worker cooperatives, and providing various elements of the green retrofit work. Modeling the impacts of this important policy is beyond the scope of this report.

Through new jobs and workforce development, this plan will nurture human capital and provide economic access for people currently facing a high rate of unemployment. Other cities have successfully partnered with non-profits to help public housing residents find jobs renovating developments.[40]

It will also function as an industrial development program to nurture green industries, develop expertise, and lower costs for building retrofits—residential and commercial—all over the region, and even the country, for years. [41]

In the following table, we estimate the total numbers of new jobs created in New York City by a $48 billion, ten-year Green New Deal for NYCHA, broken into job categories alongside current average wages. Estimates were generated using regional models developed by the Bureau of Economic Analysis (BEA).

Table 3. **New Direct & Indirect Jobs, Citywide - Breakdown by Sector**

INDUSTRY	ESTIMATED NEW JOBS PER YEAR	AVERAGE WAGES ($)
Construction and maintenance	11,942	81,866
Professional scientific and technical services	2,842	135,337
Administrative and waste management services	2,346	63,372
Real estate and rental and leasing	2,294	83,320
Health care and social assistance	2,022	50,970
Retail trade	1,778	44,103
Management of companies and enterprises	1,703	194,405
Durable goods manufacturing	1,429	62,082
Food services and drinking places	1,310	36,354
Finance and insurance	1,243	299,863
Other services	974	51,517
Educational services	445	73,628
Wholesale trade	429	94,990
Arts entertainment and recreation	375	74,354
Transportation and warehousing	360	58,337
Accommodation	344	36,354
Information	305	150,909
Nondurable goods manufacturing	137	62,082
Utilities	38	127,672

2.2 accelerate key policies of existing sustainability agenda & integrate retrofits with existing capital need

In 2016, NYCHA released an extensive report, "NextGeneration NYCHA Sustainability Agenda." outlining their 2025 goals:

- Eliminate the root causes of mold by modernizing ventilation systems and fixing leaks in roofs, façades, and pipes;
- Eliminate overheating and unplanned gas and hot water outages;
- Begin the path of meeting the City's goal of reducing greenhouse gases 80% by 2050;
- Address climate adaptation and resiliency in all capital planning; and
- Incorporate sustainability into the day-to-day management of all properties.

These green priorities are appropriate and coincide with the solutions of this report. The operational details of improved immediate repairs are beyond the scope of this report. However, with the proposed $48 million budget, there would be sufficient funding to ensure programs accelerating immediate repairs like mold, lead, and pest abatement, and improved emergency boilers, could be covered.

Funding for capital repairs from the Green New Deal for Public Housing Act could prioritize (a) expanding and accelerating NYCHA's existing mold abatement programs, such as Mold Busters and Mold 2.0, and creating new programs if needed; and (b) working with resident and stakeholder councils to agree on a plan ensuring heat and hot water as needed, by eliminating boiler breakdowns without purchasing new, expensive, long-term gas boilers that would operate beyond 2030. For these and other short-term problems, new funding from the Green New Deal for Public Housing Act can be used to rapidly train a far larger workforce of maintenance and construction workers to rapidly meet all short-term repair needs while deeper structural fixes are made over time.

Our major departure from NYCHA's current plans is accelerating the timeline for deep energy retrofits by starting the first projects immediately in 2020. We've seen the growth of large-building retrofits in New York City and energy efficiency overhauls in major public housing complexes from Toronto, to Boston, and Paris[42]. These cities have realized **energy savings from 20 to 60 percent or more and even larger carbon emission reductions.** We can do this now by building on the considerable experience of whole-building, deep energy retrofits that increase home comfort and resiliency.

Repairs can often be combined with aggressive energy efficiency programs to minimize the cost of each. While NYCHA has been utilizing Energy Performance Contracts (EPCs), and individual NYCHA buildings have achieved savings of 25 percent through partial retrofits,[43] so far NYCHA as a whole has not realized significant and consistent savings from its energy efficiency measures.[44]

In contrast, based on current spending, a Green New Deal for NYCHA would save 35-70% of current energy costs, realizing **$200 to $398 million a year in energy savings.**

By adopting an integrated approach to project management that both addresses NYCHA's immense current capital needs and acts as a positive investment in new, green public housing, a Green New Deal for NYCHA can quickly and cost-effectively address multiple needs at the same time, including the elimination of fossil fuels from NYCHA buildings.

2.3 Turn NYCHA complexes into neighborhood resiliency centers

Energy efficiency, building retrofication and in-unit upgrades promulgate the opportunity for NYCHA facilities to become community resiliency centers. Vastly improved energy efficiency, complete electrification, and rooftop solar installation could be supplemented by:

- Creating common spaces on ground floors to serve as community cooling centers during heatwaves, heating centers during extreme cold snaps, disaster relief coordination during extreme weather events, and sites for resiliency and disaster relief training during times of calm weather.[45]
- Establishing relief areas in buildings vulnerable to flooding above the flood zone line.
- Installing substantial, rechargeable batteries linked to rooftop solar for back-up power during emergencies to last for 2-4 days, while maintaining sufficient gas or diesel backup emergency generation until battery capacity is sufficient.
- Prioritizing "wet" flood proofing for the first story of vulnerable buildings (and second where appropriate), which is more reliable than "dry" proofing. With "wet" flood proofing, water can enter and leave the building while causing minimal damage. It is more predictable and cost-effective than "dry" floodproofing, which can only be "tested" in a flood event with potentially dire results.

All of these measures would help turn NYCHA complexes into sustainability assets for all of New York City.

A Green New Deal for NYCHA must include a rigorous assessment of the long-term viability of the most vulnerable NYCHA complexes. We would urge much less extensive *energy system* retrofits in those buildings, and a more narrow focus on resident comfort, health and safety. In the medium term, we would move all flood-vulnerable residents into *new*, modern NYCHA buildings elsewhere in the city, making every effort to construct new housing as close to the same neighborhoods as physically possible.

The creation of robust, flood-proof, storm proof resiliency centers will be especially important in flood-vulnerable neighborhoods. At present, 1,622 NYCHA residents live on land that would be flooded with 3 feet of sea-level rise (a certainty by the end of the century, and likely sooner), another 26,155 live on land that would be flooded by 7 feet of seal level rise (moderately likely by end of century), and another 73,486 on land that would be flooded by 10 feet of sea-level rise. In terms of NYCHA apartments, 712 units are in buildings whose land would be flooded with 3 feet of sea level rise, 11,553 units at 7 feet, and another 32,994 at 10 feet. Note that long before land is permanently flooded, it is vulnerable to floods; for example, as sea levels rise over 3 feet, flooding events will increasingly impact land in the 10 foot zone.

In the short and medium term, wet-proofing first and eventually second floors will make NYCHA complexes near the water resilient. Longer-term, it will be necessary to build new public housing even just to replace the units we already have (and we should be building even more).

2.4 Build more housing

Numerous national presidential candidates have proposed to repeal the Faircloth amendment and build new social housing through the National Housing Trust Fund and/or other means. In New York City, new social housing construction provides an integration opportunity for the "tower in the park" NYCHA developments and their communities. This could be done by building narrow cross streets through the enclosed areas of NYCHA complexes, building new housing in the form of mixed-use infill (2-6 stories high), and providing space for social services, commerce, and new housing units. The new housing should all be ADA-compliant to offer new apartments to people with disabilities currently living in NYCHA buildings that lack the infrastructure for fully comfortable, convenient and healthy lives.

This new housing should be constructed in places outside the 10 foot sea level rise vulnerability zone And all new housing must satisfy the highest standards of accessibility for residents with disabilities. The

construction of new towers will also be essential. More recent public housing that was built in Vienna since the 1970s includes some massive complexes with extraordinary quality of life; the plant covered Alt-Erlaa complex, for instance, provides "3,172 mostly family-friendly apartments (65% of homes with at least 3 bedrooms),"[46] includes an indoor and outdoor swimming pool, hosts evening classes like ceramics, has its own TV channel, and has been described by Britain's Channel 4 News as perhaps the greatest social housing development in the world.[47]

Our proposal is not made to imply that NYCHA public housing towers are fatally flawed; with maintenance they will create a comfortable and safe atmosphere.[48] Rather, it is to integrate is to incorporate new techniques of urban planning and mixed-income social housing with existing tower developments.

2.5 Governance

In this section, we are suggesting steps that could be taken by different levels of government to advance the aims of this report. This section is meant to be a conversation starter rather than an exhaustive plan.

We acknowledge existing reforms proposed by the City and the Regional Plan Association to improve governance at NYCHA.[49]

Additionally, we assert that current public housing residents must be given a meaningful say in the Authority's new governance and throughout the process of implementing repairs and retrofits, noting that there have been examples of public housing redevelopment that were characterized by meaningful tenant empowerment and resulted in durable, high-quality repairs and institutional success, as in renovation of Boston's Commonwealth Development.[50]

In short, we **recommend a new governance structure, that is better integrated with New York City's existing resources, and which makes room for meaningful input and control from NYCHA residents and tenant associations.**

In terms of operations, we recommend that this new Task Force seek consolidated bids that cover several buildings at once, using integrated project management techniques described above. Those firms would in turn be responsible for contracting on-site workers and smaller businesses subject to federal requirements for extremely high participation of Section 3-eligible workers (i.e. NYCHA residents and low-income residents of New York City) and high participation of resident-owned businesses. The Toronto Atmospheric Fund provides a precedent for effectively implementing public housing retrofits with this model.[51] Additionally, federal restrictions on public housing procurement that subordinate resident needs or limit PHA flexibility in assuring high-quality of repairs and construction must be reformed.[52]

NYCHA has already done substantial work in developing expertise and programs around green retrofits, much of it in partnership with New York State. We expect any new governance structure to take advantage of this important early work.

We have already noted above that New York City and State can take important steps to facilitate the project of the Green New Deal for Public Housing Act by funding the first comprehensive, deep energy retrofits of some NYCHA complexes to begin developing skills and expertise even before there is major federal investment. Below we focus on some additional notes for federal and community-level governance.

FEDERAL LEVEL

Changes are needed at the federal level to both correct chronic underfunding and encourage high-quality, public housing while ensuring affordability and stability that market-produced housing cannot. While workforce development and reinvestment begin to rectify some historical wrongs of U.S. housing and economic policy, other federal steps are required to shift the American model of public housing from a low-cost option of last resort to a high-quality option that (a) diversifies housing options, and helps develop the latest skills and techniques of 21st century green building construction and maintenance, and (b) sustains diverse communities as their members live complex and well-supported lives.

Some key steps necessary for improving public housing policy at the federal level:

- **Repeal the Faircloth Amendment.** Allow public housing agencies to begin building new public housing, both to accommodate existing need, and replace units lost to poor repair and extreme weather at a 2:1 ratio.
- **Amend the current public housing income requirements.** As in prior eras of public housing, more relaxed rules on tenant income should be paired with increased development of new low-rent units, allowing upward mobility while ensuring available public housing for new, lower-income tenants.[53]
- **Fully fund public housing without requiring privatization.** This report urges all levels of government to freeze and strongly consider reversing all measures to privatize NYCHA, including the Rental Assistance Demonstration project (RAD), which shifts the subsidy stream from Section 9 to Section 8, in the process reducing residents' rights. Instead, improve NYCHA governance through institutional reform, as well as greater resident and stakeholder control. In our view, RAD unlocks funding while while exposing tenants to eviction risk and fundamentally eroding the best aspects of public housing. While many have seen RAD as the only possible way to inject funds into public housing, this is only due to artificial constraints imposed by federal policy.[54] The Green New Deal for Public Housing Act represents a fundamental change, which would make public housing a high quality piece of a broader system, with ongoing investments to leverage as a public asset to anchor wealth in communities, combat inequalities of race and class, and develop the 21st century green economy. RAD's tradeoffs are far worse for tenants than a Green New Deal for Public Housing.
- **Explore options like community land trusts run by residents as a governance model** that diversifies social housing governance, rather than public-private partnerships with corporate landlords.

COMMUNITY GOVERNANCE

There is clearly a need for a more democratic governance around public housing. We're fully supportive of increased democratic engagement during this process.

Increasing the strength and powers of federally recognized public housing resident councils will provide uniquely straightforward mechanisms for residents to govern their own housing.

Empowering local efforts to unite multiple different groups in shared oversight, like the Stakeholder Council proposed in New York by groups like Community Voices Heard, would allow for a variety of racial and economic justice groups, labor unions, and other community groups, all intimately involved in the lives of public housing residents, to have shared input in public housing decision-making.

Labor unions are democratic structures controlled by their workers. Unions representing workers involved in upgrades to NYCHA buildings have a distinctive role to play in helping shape all economic decisions regarding the upgrading and maintenance of public housing.

Finally, the empowerment of NYCHA residents in the upgrade work itself, through Section 3 hiring requirements and small business procurement requirements, will provide yet another avenue for residents to help shape the Green New Deal for NYCHA, as workers and small-business owners will be intimately involved in each step of the upgrade process.

It can be helpful to break up a big problem into small pieces. Below, we do so on the basis of congressional districts, by summarizing data about NYCHA communities in tables and maps for each congressional district in New York that has NYCHA buildings. The University of Pennsylvania's Socio-Spatial Climate Collaborative, or $(SC)^2$, uses small-area estimation

PART 3:
CONGRESSIONAL DISTRICT PROFILES

techniques to analyze the prevalent demographic and economic factors in neighborhoods (technically, census tract) across the country.[55] While we do not have this data on NYCHA residents specifically, we can estimate the prevalence of these neighborhood indicators based on NYCHA building locales and can compare them to the New York City average. The data is summarized in the maps and tables below, which show levels of unemployment, segregation, and poverty across census tracts. In the district summary tables, we also illustrate disparities in policing (via New York's data on stop and frisk), and we show how many NYCHA residents are exposed to different levels of prospective sea level rise—aka, how many residents live on land that would be flooded at 3, 7, and 10 feet sea level rise. This also functions as a proxy for immediate flood risk: buildings in the 3 foot level zone are extremely vulnerable to flooding at any time.

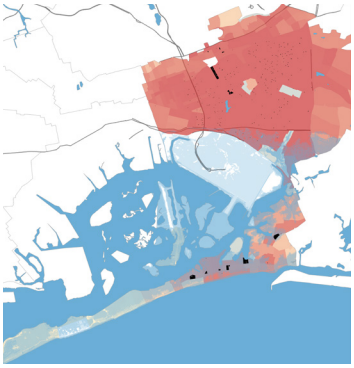
Today, NYCHA communities are ground-zero of the eco-apartheid in New York City.[56] A Green New Deal for NYCHA would bring desperately needed investments into those communities, with benefits like improved infrastructure, increased local employment and skill development, local business growth, and generally increased economic activity, broadly benefitting NYCHA communities and improving the lives of both public housing residents and their neighbors.

The following profiles highlight social, economic, and racial disparities between NYCHA communities and the New York City average, as well as some key district-level benefits.

DISTRICT 5

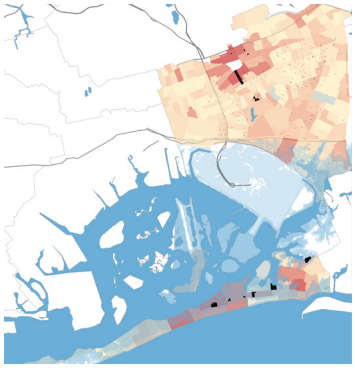
NYCHA building · 3 ft rise · 7 ft rise · 10 ft rise

Non-white



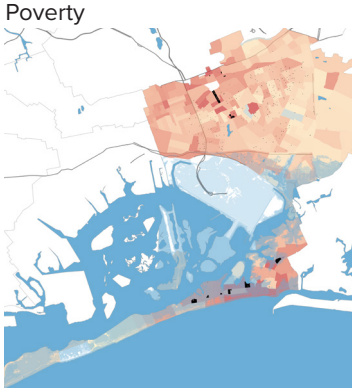
Percent Non-white: 0 · 30 · 60 · 90

Police



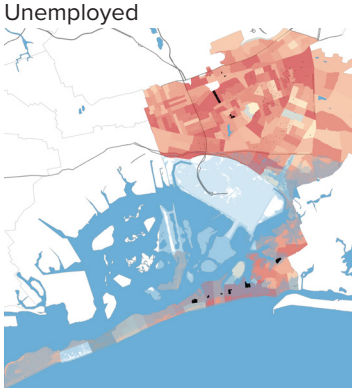
Annual Stops: 0 · 5 · 10 · >15

Poverty



Percent Poverty: 0 · 10 · 20 · >30

Unemployed



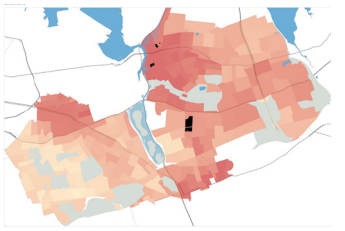
Percent Unemployed: 0 · 4 · 8 · >12

INDICATOR	AVERAGE NYC CENSUS TRACT	Average NYCHA community census tract in NY-5
Neighborhood proportion under federal poverty line	20%	31%
Neighborhood annual police stop & frisk, total number per year	6	13
Neighborhood percent white	32%	6%
Estimated new, on-site resident jobs a year		111
NYCHA residents		9,999
Residents exposed to 3 foot sea level rise		1,622
Additional residents exposed to 7 foot sea level rise		3,363
Additional residents exposed to 10 foot sea level rise		0

DISTRICT 6

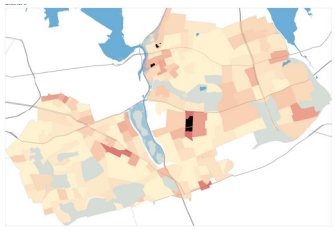
NYCHA building · 3 ft rise · 7 ft rise · 10 ft rise

Non-white



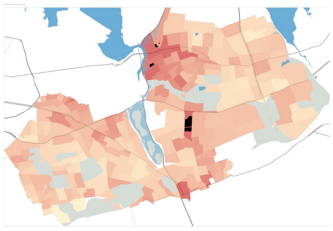
Percent Non-white: 0 · 30 · 60 · 90

Police



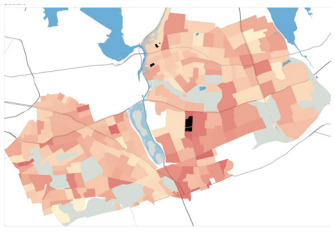
Annual Stops: 0 · 5 · 10 · >15

Poverty



Percent Poverty: 0 · 10 · 20 · >30

Unemployed



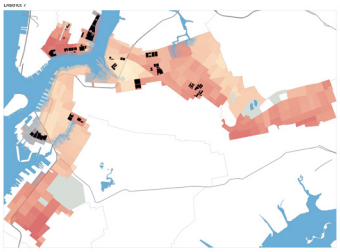
Percent Unemployed: 0 · 4 · 8 · >12

INDICATOR	AVERAGE NYC CENSUS TRACT	Average NYCHA community census tract in NY-6
Neighborhood proportion under federal poverty line	20%	46%
Neighborhood annual police stop & frisk, total number per year	6	16
Neighborhood percent white	32%	13%
Estimated new, on-site resident jobs a year		66
NYCHA residents		5,978
Residents exposed to 3 foot sea level rise		0
Additional residents exposed to 7 foot sea level rise		0
Additional residents exposed to 10 foot sea level rise		0

DISTRICT 7

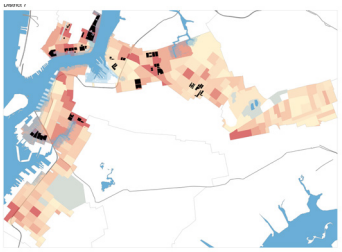
■ NYCHA building ● 3 ft rise ● 7 ft rise ● 10 ft rise

Non-white



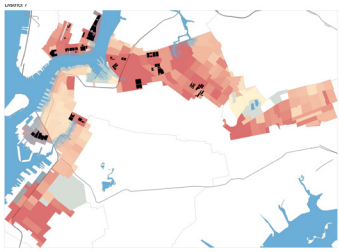
Percent Non-white 0 30 60 90

Police



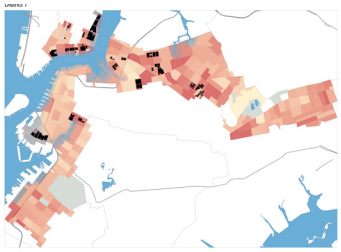
Annual Stops 0 5 10 >15

Poverty



Percent Poverty 0 10 20 >30

Unemployed



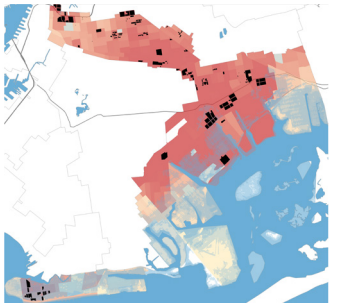
Percent Unemployed 0 4 8 >12

INDICATOR	AVERAGE NYC CENSUS TRACT	Average NYCHA community census tract in NY-7
Neighborhood proportion under federal poverty line	20%	41%
Neighborhood annual police stop & frisk, total number per year	6	14
Neighborhood percent white	32%	5%
Estimated new, on-site resident jobs a year		699
NYCHA residents		62,872
Residents exposed to 3 foot sea level rise		0
Additional residents exposed to 7 foot sea level rise		11,572
Additional residents exposed to 10 foot sea level rise		10,838

DISTRICT 8

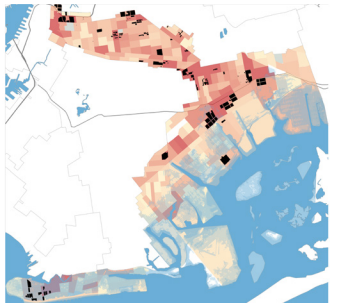
■ NYCHA building ● 3 ft rise ● 7 ft rise ● 10 ft rise

Non-white



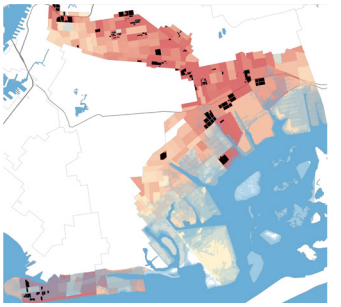
Percent Non-white 0 30 60 90

Police



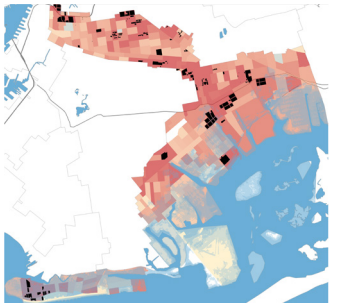
Annual Stops 0 5 10 >15

Poverty



Percent Poverty 0 10 20 >30

Unemployed



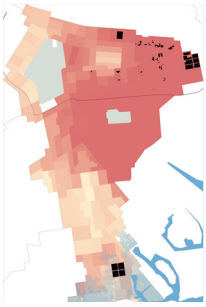
Percent Unemployed 0 4 8 >12

INDICATOR	AVERAGE NYC CENSUS TRACT	Average NYCHA community census tract in NY-8
Neighborhood proportion under federal poverty line	20%	45%
Neighborhood annual police stop & frisk, total number per year	6	13
Neighborhood percent white	32%	4%
Estimated new, on-site resident jobs a year		802
NYCHA residents		72,114
Residents exposed to 3 foot sea level rise		0
Additional residents exposed to 7 foot sea level rise		2,410
Additional residents exposed to 10 foot sea level rise		13,818

DISTRICT 9

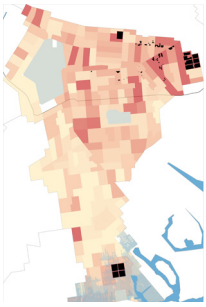
■ NYCHA building ● 3 ft rise ● 7 ft rise ● 10 ft rise

Non-white



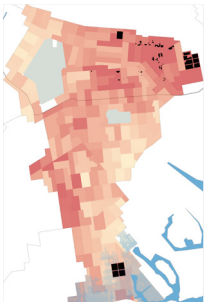
Percent Non-white 0 30 60 90

Police



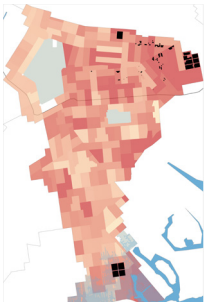
Annual Stops 0 5 10 >15

Poverty



Percent Poverty 0 10 20 >30

Unemployed



Percent Unemployed 0 4 8 >12

INDICATOR	AVERAGE NYC CENSUS TRACT	Average NYCHA community census tract in NY-9
Neighborhood proportion under federal poverty line	20%	50%
Neighborhood annual police stop & frisk, total number per year	6	16
Neighborhood percent white	32%	2%
Estimated new, on-site resident jobs a year		254
NYCHA residents		22,811
Residents exposed to 3 foot sea level rise		0
Additional residents exposed to 7 foot sea level rise		0
Additional residents exposed to 10 foot sea level rise		4,710

DISTRICT 10

■ NYCHA building ● 3 ft rise ● 7 ft rise ● 10 ft rise

Non-white

Percent Non-white 0 30 60 90

Police

Annual Stops 0 5 10 >15

Poverty

Percent Poverty 0 10 20 >30

Unemployed

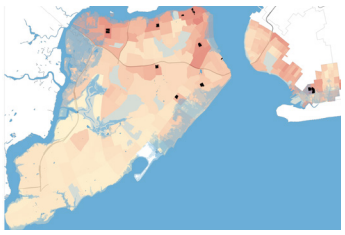
Percent Unemployed 0 4 8 >12

INDICATOR	AVERAGE NYC CENSUS TRACT	Average NYCHA community census tract in NY-10
Neighborhood proportion under federal poverty line	20%	29%
Neighborhood annual police stop & frisk, total number per year	6	8
Neighborhood percent white	32%	21%
Estimated new, on-site resident jobs a year		125
NYCHA residents		11,266
Residents exposed to 3 foot sea level rise		0
Additional residents exposed to 7 foot sea level rise		0
Additional residents exposed to 10 foot sea level rise		3,521

DISTRICT 11

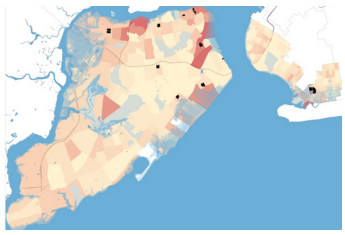
■ NYCHA building ● 3 ft rise ● 7 ft rise ● 10 ft rise

Non-white



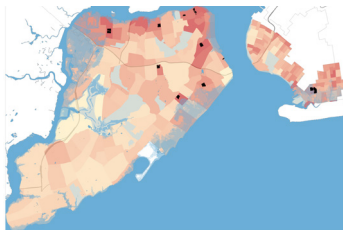
Percent Non-white 0 30 60 90

Police



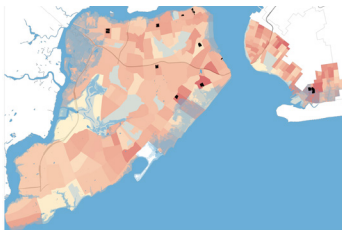
Annual Stops 0 5 10 >15

Poverty



Percent Poverty 0 10 20 >30

Unemployed



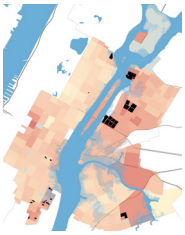
Percent Unemployed 0 4 8 >12

INDICATOR	AVERAGE NYC CENSUS TRACT	Average NYCHA community census tract in NY-11
Neighborhood proportion under federal poverty line	20%	47%
Neighborhood annual police stop & frisk, total number per year	6	10
Neighborhood percent white	32%	13%
NYCHA residents		14,065
Estimated new, on-site resident jobs a year		156
Residents exposed to 3 foot sea level rise		0
Additional residents exposed to 7 foot sea level rise		0
Additional residents exposed to 10 foot sea level rise		4,112

DISTRICT 12

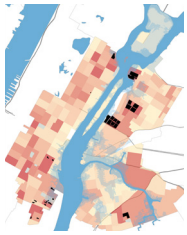
■ NYCHA building ● 3 ft rise ● 7 ft rise ● 10 ft rise

Non-white



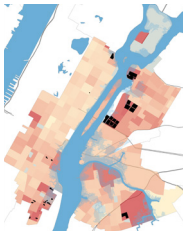
Percent Non-white 0 30 60 90

Police



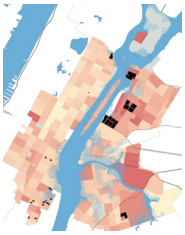
Annual Stops 0 5 10 >15

Poverty



Percent Poverty 0 10 20 >30

Unemployed



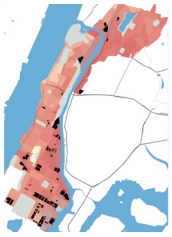
Percent Unemployed 0 4 8 >12

INDICATOR	AVERAGE NYC CENSUS TRACT	Average NYCHA community census tract in NY-12
Neighborhood proportion under federal poverty line	20%	41%
Neighborhood annual police stop & frisk, total number per year	6	18
Neighborhood percent white	32%	7%
NYCHA residents		21,351
Estimated new, on-site resident jobs a year		237
Residents exposed to 3 foot sea level rise		0
Additional residents exposed to 7 foot sea level rise		3,540
Additional residents exposed to 10 foot sea level rise		11,124

DISTRICT 13

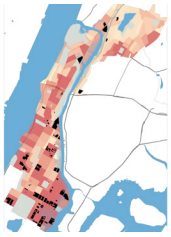
NYCHA building · 3 ft rise · 7 ft rise · 10 ft rise

Non-white



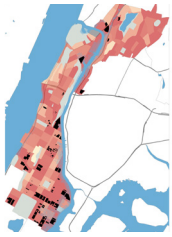
Percent Non-white 0 30 60 90

Police



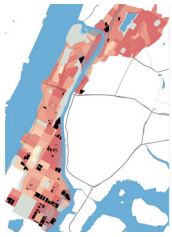
Annual Stops 0 5 10 >15

Poverty



Percent Poverty 0 10 20 >30

Unemployed



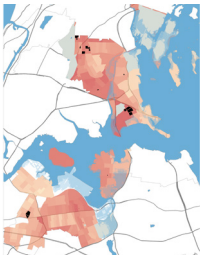
Percent Unemployed 0 4 8 >12

INDICATOR	AVERAGE NYC CENSUS TRACT	Average NYCHA community census tract in NY-13
Neighborhood proportion under federal poverty line	20%	43%
Neighborhood annual police stop & frisk, total number per year	6	23
Neighborhood percent white	32%	4%
Estimated new, on-site resident jobs a year		870
NYCHA residents		78,184
Residents exposed to 3 foot sea level rise		0
Additional residents exposed to 7 foot sea level rise		5,270
Additional residents exposed to 10 foot sea level rise		21,353

DISTRICT 14

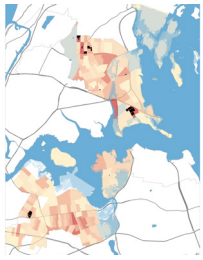
NYCHA building · 3 ft rise · 7 ft rise · 10 ft rise

Non-white



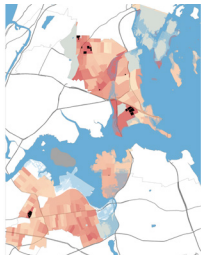
Percent Non-white 0 30 60 90

Police



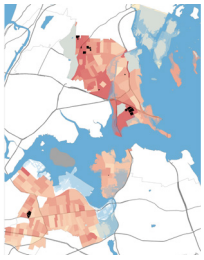
Annual Stops 0 5 10 >15

Poverty



Percent Poverty 0 10 20 >30

Unemployed



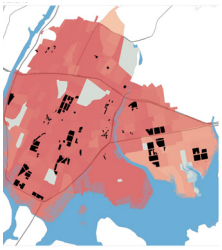
Percent Unemployed 0 4 8 >12

INDICATOR	AVERAGE NYC CENSUS TRACT	Average NYCHA community census tract in NY-14
Neighborhood proportion under federal poverty line	20%	45%
Neighborhood annual police stop & frisk, total number per year	6	18
Neighborhood percent white	32%	4%
Estimated new, on-site resident jobs a year		126
NYCHA residents		11,304
Residents exposed to 3 foot sea level rise		0
Additional residents exposed to 7 foot sea level rise		0
Additional residents exposed to 10 foot sea level rise		0

DISTRICT 15

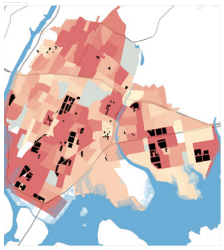
NYCHA building | 3 ft rise | 7 ft rise | 10 ft rise

Non-white



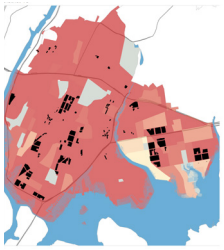
Percent Non-white 0 30 60 90

Police



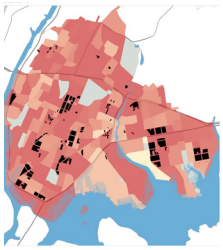
Annual Stops 0 5 10 >15

Poverty



Percent Poverty 0 10 20 >30

Unemployed



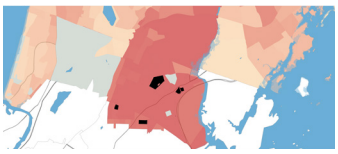
Percent Unemployed 0 4 8 >12

INDICATOR	AVERAGE NYC CENSUS TRACT	Average NYCHA community census tract in NY-15
Neighborhood proportion under federal poverty line	20%	47%
Neighborhood annual police stop & frisk, total number per year	6	19
Neighborhood percent white	32%	2%
Estimated new, on-site resident jobs a year		787
NYCHA residents		70,735
Residents exposed to 3 foot sea level rise		0
Additional residents exposed to 7 foot sea level rise		0
Additional residents exposed to 10 foot sea level rise		4,010

DISTRICT 16

NYCHA building | 3 ft rise | 7 ft rise | 10 ft rise

Non-white

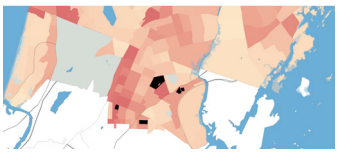


Percent Non-white 0 30 60 90

Police

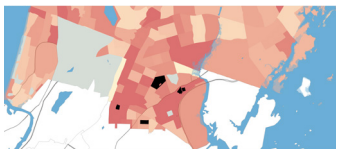
Annual Stops 0 5 10 >15

Poverty



Percent Poverty 0 10 20 >30

Unemployed



Percent Unemployed 0 4 8 >12

INDICATOR	AVERAGE NYC CENSUS TRACT	Average NYCHA community census tract in NY-16
Neighborhood proportion under federal poverty line	20%	44%
Neighborhood annual police stop & frisk, total number per year	6	11
Neighborhood percent white	32%	1%
Estimated new, on-site resident jobs a year		108
NYCHA residents		9,695
Residents exposed to 3 foot sea level rise		0
Additional residents exposed to 7 foot sea level rise		0
Additional residents exposed to 10 foot sea level rise		0

ECONOMIC METHODOLOGY APPENDIX

Regional Model and Jobs Estimates

Economic impact estimates for the five borough area were calculating using the Regional Input-Output Modeling System (RIMS II) developed by the Bureau of Economic Analysis. RIMS II can help provide estimates for the regional economic impact, including changes in total jobs, wages, and area domestic product, based on a shock in demand for this industry or set of industries, or based on estimates for total new wages and jobs in a given set of sectors. As an initial outlay of spending creates the direct jobs, it also spurs industries that supply materials and other industries that benefit from increased wages and spending. Regional estimates through RIMS II reflect these indirect effects and industrial linkages.

For the regional estimates cited in this paper, RIMS was used two different ways in order to provide a range of plausible values. One method straightforwardly applied RIMS final-demand multipliers to the industries that would be directly affected by new public spending under this plan; the other applied the bill-of-goods method to disaggregate new spending further and added assumptions about the proportions of intermediate construction materials that would be imported versus supplied locally.

RIMS & Bill-of-Goods

This bill-of-goods method requires additional initial estimations and assumptions but is less subject to aggregation error; it is generally seen as the most preferred method for estimating the impact of construction spending.[57] Both models return estimates within a plausible range of one another; in general, estimates from the bill-of-goods methods are reported in the body of this paper.

For both methods, the model was parameterized with the initial capital outlay for repairing and retrofitting NYCHA, based on estimates for total costs for all repairs, as described in the NYCHA's 2019 Five-Year Capital Plan and AECOM's 2017 Physical Needs Assessment.[58] The breakdown of spending across NYCHA's capital needs in these sources was used to estimate the sectoral breakdown of spending for the RIMS II model, allowing us to weigh total spending by different RIMS multipliers to more accurately estimate regional effects. Because the needs for retrofitting NYCHA and realizing a Green New Deal for residents are different from the Authority's current plan to meet capital needs without retrofitting, we adjusted the current breakdown of needs to reflect greater share of spending into engineering and energy transmission sectors and scaled the total spending amount up to reflect our proposal.

For the first method, which straightforwardly applied multipliers to input industries, the exact breakdown of spending assumed in our model is shown below.

PERCENT	INDUSTRY
70	Residential structures
12	Architectural, engineering, and related services
9	Maintenance and repair
5	Management of companies and enterprises
4	Employment services

For the bill-of-goods method, the cost of intermediate goods for the construction work was broken out from wages and overhead. Spending on intermediate materials was weighed by an assumed import ratio to get domestic spending on manufacturing and supplier industries.[59] Then the demand shocks to industries supplying intermediate goods were multiplied by RIMS II final demand multipliers to get new jobs and total economic impact from the spending in these sectors.

PERCENT	INDUSTRY
8	Maintenance and repair*
31	Residential structures*
11	Architectural, engineering, and related services
13	Management of companies and enterprises
2	Employment services
2	Insurance carriers and related activities
>1	Truck transportation
3	Wholesale trade
9	Nonmetallic mineral product manufacturing
9	Machinery manufacturing
5	Electrical equipment and appliance manufacturing
8.5%	Fabricated metal product manufacturing

For the bill of goods model, construction jobs and wages must be accounted for separately.[60] Total wages were estimated based on assumptions informed by AECOM's physical needs assessment. Then construction and maintenance jobs were calculated based on prevailing wage tables for types of workers in these sectors.[61] Finally, indirect jobs created by construction worker spending were calculated using the RIMS II Households multiplier. New construction jobs and indirect jobs from worker spending were added into the impact estimates for spending in other sectors to yield total new jobs and impact.

New Jobs by Industry

To estimate employment growth by industry, RIMS tables employment multiplier industry cross tables were used to estimate the feedback effect of all the sectors that would directly see a final demand change on other sectors throughout the regional economy. Then these effects were summed, with direct construction jobs added back in.

This breakdown of new jobs by RIMS Sector is shown below, with each industry paired with its current average wage in NYC, as per the quarterly census of employment and wages (QCEW):

Considerations Outside RIMS

The RIMS model is used because it an accepted standard to estimate regional economic impacts of demand shocks of this sort. However, contemporary economic research finds that, while regional economic multipliers often tend to be overstated, this is less the case when a region has more available labor.[62] Therefore due to the specifics of our proposal—- that it is targeted in areas with currently high levels of labor-market slack and should be paired with aggressive workforce development programs—- the actual job and economic impact number realized due to this spending program will be relatively higher than the estimates, compared to many other economic impact studies. This is due to the fact that many regional economic models do not account for the fact that that new jobs created in an already-tight labor market will have a diminished impact— in these cases, hires would consist largely of new in-migrants to the area or the already-employed.[63] However, with more labor market slack and an aggressive workforce development pipeline, as will be the case for this plan, more new hires will go to currently un- or underemployed local residents, and benefits will be higher.

INDUSTRY	ESTIMATED NEW JOBS OVER PERIOD	AVERAGE WAGES
Construction	119,417	81,866
Professional scientific and technical services	28,415	135,337
Administrative and waste management services	23,460	63,372
Real estate and rental and leasing	22,936	83,320
Health care and social assistance	20,219	50,970
Retail trade	17,776	44,103
Management of companies and enterprises	17,033	194,405
Durable goods manufacturing	14,292	62,082
Food services and drinking places	13,099	36,354
Finance and insurance	12,428	299,863
Other services	9,738	51,517
Educational services	4,451	73,628
Wholesale trade	4,291	94,990
Arts entertainment and recreation	3,745	74,354
Transportation and warehousing	3,602	58,337
Accommodation	3,438	36,354
Information	3,053	150,909
Nondurable goods manufacturing	1,365	62,082
Utilities	383	127,672
Mining	4	92,292

On-site Jobs Estimates

Direct new on-site construction jobs were estimated based on information on the NYC prevailing wage schedule and information in AECOM's 2017 Physical Needs Assessment and other assumptions, as described above. To estimate on-site jobs on the neighborhood level, the direct jobs number was weighed by the percent of NYCHA in the selected district. The percent of NYCHA in each district was determined from data from the NYCHA Development Data Book.[64]

To estimate the number of these jobs going to NYCHA residents, we took the average annual hiring requirement in the bill being proposed throughout the next ten years, which is 75%.[65] Then, to reflect the fact that other low-income hires (not just NYCHA residents) can work towards the requirement in the bill, this percentage was adjusted downward to 37.5% to estimate NYCHA hires.

The table of estimates of jobs by district is shown below:

DISTRICT	NYCHA. RESIDENTS	NEW.ONSITE. CONSTRUCTION EMPLOYMENT (JOB-YEARS)	NEW.NYCHA. CONSTRUCTION EMPLOYMENT (JOB-YEARS)
5	9,999	2,966	1,112
6	5,978	1,773	665
7	62,872	18,648	6,993
8	72,114	21,389	8,021
9	22,811	6,766	2,537
10	11,266	3,342	1,253
11	14,065	4,172	1,564
12	21,351	6,333	2,375
13	78,184	23,190	8,696
14	11,304	3,353	1,257
15	70,735	20,980	7,868
16	9,695	2,876	1,078

Fiscal Impact Estimates

We've included estimates for NYCHA's utility savings as well as City and State tax revenue from increased income and sales tax collections. The tax revenues estimates are based on the output of our RIMS model, supplemented with outside estimates for the average propensity to consume across income quintiles, the distribution of part-time jobs across sectors, QCEW wage data for NYC, and information about local tax rates. Although we estimate only utility savings and new income and sales tax revenue, other fiscal effects, including increased property and business tax revenue should also be anticipated, although they are not modeled here.

To estimate additional local income and sales tax, the breakdown of new jobs by industry from our RIMS model was paired with QCEW wage data. This breakdown is shown above. Because RIMS includes part-time jobs in its estimates of total jobs, jobs were weighed by sector based on BEA estimates of ratios of total jobs to full-time equivalent jobs (FTE) across industries.[66] This allowed us to estimate total new FTE and total new wages by sector. Then each sector was assigned an income quintile based on QCEW wage data, and paired with an average propensity to consume based on its income quintile. Estimates for average propensity to consume by income quintile were taken from work from the Washington Center for Equitable Growth.[67]

Based on new FTE, average wages, and propensity to consume estimates, we were able to estimate both total new earnings and consumption. These values were then weighed by adjusted[68] local personal income and sales tax rates to yield new tax revenues through these streams.

Based on the regional impacts estimated from the bill-of-goods RIMS model, we estimate the plan will generate $1.84 billion for the City and $2.45 billion for the State in new sales and income tax revenue over the period.

National Estimates

Because not all spending resulting from our plan happens locally, or because indirect economic effects eventually leak out of the five-borough region, national economic impacts will necessarily be larger than regional effects. This is doubly so for these estimates because some construction materials are assumed to be imported from outside the five-borough area in our regional model.

We estimate roughly 749,630 and 909,120 new jobs nationally from this project through this period. The lower bound of this estimate was obtained using the same cost breakdown by industry to obtain our regional estimates,[69] and applying a set of national (rather than regional) multipliers. National multipliers were obtained through estimates from the Employment Policy Institute based on BEA and BLS data.[70]

The upper end of the bound was obtained applying our total cost estimate of $48 billion to the jobs multiplier implied by previous economic impact studies of large-scale renovations and repairs of residential structures. Specifically, we use an estimate released by the Department of Housing and Urban Development (HUD) for new jobs resulting from renovations and rehabilitations associated with RAD conversions of public housing.[71]

Final Note

All estimates were obtained through replicable models created in R using BEA's RIMS tables and public data sources. Full R scripts can be made available upon request.

ENDNOTES

1. This figure is of course a rough estimate. We generated it by multiplying the current capital needs shortfall of $32 billion by 1.5, since these massive green retrofits would involve both full capital repairs and new systems work. We also include projects like the creation of resiliency centers, which go beyond the work envisioned by capital needs studies. We also note the 2016 estimate from a NYCHA report that deep energy retrofits including capital repairs would cost roughly $230,000 per unit. Over 174,000 units, this yields close to a $48 billion cost. We prefer to estimate cost at the higher end and revise downward as techniques and technologies improve, rather than set raise expectations with an unrealistically low cost and face backlash afterward. See: New York City Housing Authority. 2018. "Capital Plan Calendar Years 2019-2023." https://www1.nyc.gov/assets/nycha/downloads/pdf/capital-plan-narrative-2019.pdf and New York City Housing Authority. 2015. "NextGeneration NYCHA Sustainability Agenda." https://www1.nyc.gov/assets/nycha/downloads/pdf/NGN-Sustainability.pdf

2. See section 2.6 on governance below for this discussion.

3. See www.homesguarantee.com.

4. New York City Housing Authority. 2018. "Capital Plan Calendar Years 2019-2023". https://www1.nyc.gov/assets/nycha/downloads/pdf/capital-plan-narrative-2019.pdf

5. http://www.rpa.org/article/warning-of-%E2%80%9Cdemolition-by-neglect%E2%80%9D-regional-plan-association-issues-recommendations-for

6. NYU Furman Center. 2014. "Profile of Rent-Stabilized Units and Tenants in New York City". https://furmancenter.org/files/FurmanCenter_FactBrief_RentStabilization_June2014.pdf

7. Castle Square. 2016. "Did You Know? Castle Square's Deep Energy Retrofit." June 2. http://www.cstoboston.org/single-post/2016/06/02/Did-You-Know-Castle-Squares-Deep-Energy-Retrofit

   Kimmelman, Michael. 2012. "At Edge of Paris, a Housing Project Becomes a Beacon." *New York Times.* March 27. https://www.nytimes.com/2012/03/28/arts/design/renovated-tour-bois-le-pretre-brightens-paris-skyline.html

   Slessor, Catherine. 2019. "Grand Parc, Bordeaux review - a rush of light, air and views." *The Observer,* May 12. https://www.theguardian.com/artanddesign/2019/may/12/grand-parc-bordeaux-lacaton-vassal-mies-van-der-rohe-award.

   TAF (The Atmospheric Fund). "TowerWise." https://taf.ca/programs/towerwise/ . Accessed November 2019.

   Walsh, Martin J. 2014. "Chapter 7: Green Sustainable Housing". *Housing A Changing City: Boston 2030.* https://www.boston.gov/sites/default/files/boston2030_chapter_7_green_and_sustainable_housing.pdf

8. NYCHA's population is more than the estimated population of luxury faux green cities like Nigeria's Eko Atlantic and is two thirds as large as Denmark's genuinely green Copenhagen.

9. Compared to NYCHA's average emissions from 2010-2017. Emission estimates based on NYCHA utility consumption from NYC's OpenData portal and guidelines set forth by the EPA and NYC in the CEQR technical manual.

10. Based on typical passenger-vehicle emissions estimates from the EPA. EPA (United States Environmental Protection Agency). 2018. "Greenhouse Gas emissions for a Typical Passenger Vehicle". https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100U8YT.pdf

11. A significant amount of all on-site work would be reserved for NYCHA residents and other low-income New Yorkers. As envisioned in the Green New Deal for Public Housing Act, starting in 2022, 90% of work would be done by Section 3 eligible workers, namely NYCHA residents and very low- low-income residents of the metro area where a particular project is undertaken. (The bill proposes that work requirements are phased in from the current level, such that overall, 75% of the work between 2020-2029 would be done by Section 3 eligible workers.) For simplicity's sake, we assume that half of the required Section 3 work is done by public housing residents in the immediate area, and the other half by Section 3 workers located anywhere in the city.

12. Average wages for construction in New York City in 2018 was $81,866 in 2018. NY law sets minimum wage standards for construction and building services for many types of projects that scale up from $45/hr. Average wage data is from the Quarterly Census of Employment and Wages (QCEW) from NYS. Prevailing and minimum wage rates and requirements for the City and State are listed by the City Comptroller.

    New York City Comptroller Scott M. Stringer. "NYC Wage Standards." Accessed November 2019. https://comptroller.nyc.gov/services/for-the-public/nyc-wage-standards/wage-schedules/.

    Based on standard calculation of the population attributable fraction given a mold prevalence of 44% (New York State Department of Health. 2018. "Assessment of New York City Housing Authority (NYCHA) Properties. https://www.governor.ny.gov/sites/governor.ny.gov/files/atoms/files/FINAL_Assessment_of_NYCHA_Report.pdf), relative risk of 1.5-2.0 (Quansah, Reginald, Maritta S. Jaakkola, Timo T. Hugg, Sirpa A M. Heikkinen, Jouni J. K. Jaakkola. 2012. "Residential Dampness and Molds and the Risk of Developing Asthma: A Systematic Review and Meta Analysis." *PLoS One,* 7(11). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3492391/), and a theoretical reduction to 0% exposure.

13. Based on standard calculation of the population attributablefraction given a mold prevalence of 44% (New York StateDepartment of Health. 2018. "Assessment of New YorkCity Housing Authority (NYCHA) Properties. https://www.governor.ny.gov/sites/governor.ny.gov/files/atoms/files/FINAL_Assessment_of_NYCHA_Report.pdf), relative risk of1.5-2.0 (Quansah, Reginald, Maritta S. Jaakkola, Timo T. Hugg,Sirpa A M. Heikkinen, Jouni J. K. Jaakkola. 2012. "ResidentialDampness and Molds and the Risk of Developing Asthma: ASystematic Review and Meta Analysis." PLoS One, 7(11). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3492391/), and atheoretical reduction to 0% exposure.

14. https://www.governor.ny.gov/sites/governor.ny.gov/files/atoms/files/FINAL_Assessment_of_NYCHA_Report.pdf

15. Estimates obtained through methodology described in the appendix of this report.

16. United States Census Bureau. 2018. "2017 New York CIty Housing and Vacancy Survey Microdata" data. https://www.census.gov/data/datasets/2017/demo/nychvs/microdata.html

17. Goldenberg, Sally. 2019. "City quietly pauses plans for private development at Brooklyn NYCHA site." Politico. May 6. https://www.politico.com/states/new-york/city-hall/story/2019/05/05/city-quietly-pauses-plans-for-private-development-at-brooklyn-nycha-site-1007308. Goldenberg, Dan. 2018. "The long-term health consequences of living at NYCHA." Politico. April 4. https://www.politico.com/states/new-york/albany/story/2018/04/06/the-long-term-health-consequences-of-living-at-nycha-352931

18. York State Department of Health. 2018. "Assessment of New York City Housing Authority (NYCHA) Properties. https://www.governor.ny.gov/sites/governor.ny.gov/files/atoms/files/FINAL_Assessment_of_NYCHA_Report.pdf

19. Goldenberg, Dan. 2018. "The long-term health consequences of living at NYCHA." Politico. April 4. https://www.politico.com/states/new-york/albany/story/2018/04/06/the-long-term-health-consequences-of-living-at-nycha-352931

20. New York City Housing Authority. 2016. "City Seeks Partners & Solutions To Increase Energy Efficiency And Reduce Utility Costs." October 18. https://www1.nyc.gov/site/nycha/about/press/pr-2016/city-seeks-partners-solutions-to-increase-energy-efficiency-and-reduce-utility-costs-20161018.page

21. RAD is discussed more along with other components of federal policy below.

22. In order to break out NYCHA residents, 2017 HVS data was used. United States Census Bureau. 2018. "2017 New York CIty Housing and Vacancy Survey Microdata" data. https://www.census.gov/data/datasets/2017/demo/nychvs/microdata.html

23. Better Buildings U.S. Department of Energy. "New York City Housing Authority (NYCHA)." Accessed November 2019. https://betterbuildingssolutioncenter.energy.gov/partners/new-york-city-housing-authority-nycha

24. ibid.

25. ibid

26. California Air Resources Board. "Indoor Air Pollution from Cooking." Accessed November 2019. https://ww2.arb.ca.gov/resources/documents/indoor-air-pollution-cooking

27. New York City Housing Authority. 2017. "Design Guidelines: Rehabilitation of NYCHA Residential Buildings." https://www1.nyc.gov/assets/nycha/downloads/pdf/nycha-design-guidelines.pdf

28. This approach is described in documents from The Atmospheric Fund, a Toronto city agency that has successfully implemented a program of public-housing energy efficiency retrofits: "TAF promotes an integrative, whole-system approach to achieve profitable and innovative deep retrofits. This approach is a highly collaborative and involves an iterative design process in which design teams employ whole-systems thinking to create multiple benefits from single expenditures, often resulting in substantial energy savings." Sample RFP provided by Toronto Atmospheric Fund (TAF) in private correspondence.

29. Example from sample RFP provided by TAF: "envelope components (such as windows, roof and walls) that require significant maintenance or that are approaching the end of their service lives are excellent RCM candidates that could also be used to reduce the needed capacity (and cost) of HVAC equipment."

30. Muoio, Danielle and Marie J. French. 2019. "Gas moratorium puts city officials in a bind." Politico. August 23. https://www.politico.com/states/new-york/albany/story/2019/08/23/gas-moratorium-puts-city-officials-in-a-bind-1152020

31. Muoio, Danielle and Marie J. French. 2016. "NYCHA tenants step into pipeline fight". Politico. April 4. https://www.politico.com/states/new-york/newsletters/politico-new-york-energy/2018/04/04/nycha-tenants-step-into-pipeline-fight-050359.

    Although pipeline proponents have asserted new natural gas is necessary to provide heat for NYCHA, it is unclear whether that is true or just being claimed to divide NYCHA residents and environmental advocates. See: Wood, Robert. 2018. "Pipeline proponetns playing HOushing Authority tenants for fools." *Crain's New York Business.* April 19. https://www.crainsnewyork.com/article/20180419/OPINION/180419854/letter-to-the-editor-williams-co-pipeline-proponents-playing-new-york-city-housing-authority-tenants-for-fools

32. Until battery storage options are sufficiently robust, we recommend maintaining gas or diesel emergency generators on site. NYCHA can offset these emissions through on-site and proximate solar farms.

33. United States Census Bureau. 2018. "2017 New York CIty Housing and Vacancy Survey Microdata" data. https://www.census.gov/data/datasets/2017/demo/nychvs/microdata.html

34. Authors' interviews with officials at Toronto, Canada's The Atmospheric Fund, which organizes energy retrofits of public housing in Toronto. See TAF (The Atmospheric Fund). https://taf.ca . Accessed November 2019

35. Wald, Matthew L. 1995. "Public Housing Efficiency Plan, Step 1: Get New Refrigerators." The New York Times. June 20.

36. Dougherty, Rob. 1996 "Refrigerators promise $5 Million Savings in NYC." Energy User News, vol. 21 num. 11.

    Morgan, Steven and Steven Vaccaro.1995 "New Refrigerators At No Cost: Let Water Savings Pay For Them!" Aim Apartment Industry Magazine, July.

37. Interview and correspondence with Steve Morgan, an official who helped managed this program at the then-named Citizens Conservation Corporation.

38. Based on national employment multipliers from the Economic Policy Institute and estimated spending of $143 million for new refrigerators, stoves, and toilets for NYCHA units. Due to utility savings associated with new, energy-efficient models the Authority is likely to see savings from this investment over time.

    Bivens, Josh. 2019. "Updated employment multipliers for the U.S. economy." *Economic Policy Institute*. https://www.epi.org/publication/updated-employment-multipliers-for-the-u-s-economy/

39. Current research in economic development often stresses how economic multipliers will be higher if a greater proportion of jobs are going to those currently un- or underemployed, although this dynamic is not yet captured in most economic development models. See "Who Benefits From Economic Development Incentives? How Incentive Effects on Local Incomes and the Income Distribution Vary with Different Assumptions about Incentive Policy and the Local Economy," Timothy J. Bartik, W.E. Upjohn Institute. https://research.upjohn.org/up_technicalreports/34/ Also see the appendix on economic estimates for more on this.

40. For example, see The Atmospheric Fund's partnership with social enterprise Building Up in Toronto: TAF (The Atmospheric Fund). "TowerWise." https://taf.ca/programs/towerwise/ . Accessed November 2019.

41. This benefit of public sustainability efforts is already recognized by the City. See for example: Low Carbon Production. 2016. "Passive House Accelerates" http://lowcarbonproductions.net/naphn16-flipbook/docs/NAPHN16_Passive-House-Accelerates_Ebook.pdf Economic development studies, including some commissioned by HUD in past years have also reliably and repeatedly noted out-sized regional economic benefits of energy efficiency programs, noting in particular how fossil fuel dependency can drain regional economies by making them dependent on imports. Replacing the steady regional drain of fossil fuel dependency with local jobs in energy efficiency can bolster regions' economies in substantial, far-reaching ways. See for examples: HUD (U.S. Department of Housing and Urban Development). 1898. "The Hidden Link: Energy and Economic Development." https://www.hud.gov/sites/documents/DOC_4326.PDF , or for a more recent study: Oppenheim, Jerrold. HUD (U.S. Department of Housing and Urban Development). 2000. "Energy Desk Book for HUD Programs." https://www.huduser.gov/publications/pdf/energybook.pdf"Energy Efficiency and Economic Development in the North Country, New York". Democracy and Regulation. https://www.stlawu.edu/sites/default/files/resource/Economic%20Impact%20of%20Energy%20Efficiency%20Investment%20in%20the%20NC%202%20083115%20FNL%20clean.pdf

42. Deep Energy Retrofit Castle Square. Accessed November 2019. http://www.castledeepenergy.com

    Kimmelman, Michael. 2012. "At Edge of Paris, a Housing Project Becomes a Beacon." *New York Times.* March 27. https://www.nytimes.com/2012/03/28/arts/design/renovated-tour-bois-le-pretre-brightens-paris-skyline.html

    Toronto Community Housing. "TowerWise Retrofit Report". Accessed November 2019. https://www.torontohousing.ca/Pages/TowerWise-Retrofit-Project.aspx

43. Better Buildings U.S. Department of Energy. "NYCHA Deploys First Renewable Energy Solution for 25% Savings." Accessed November 2019. https://betterbuildingssolutioncenter.energy.gov/beat-blog/nycha-deploys-first-renewable-energy-solution-25-savings

44. New York Housing Authority. 2019. "Adopted Budget for FY 2019 And The Four-Year Financial Plan FY 2020-2023." https://www1.nyc.gov/assets/nycha/downloads/pdf/nycha-2019-budget-book.pdf

45. On the importance of adding social infrastructure to public amenities to increase resilience to climate disruption and extreme weather, while improving everyday life on a regular basis, see: Klinenberg, Eric. 2019. Palaces for the People. https://www.penguinrandomhouse.com/books/557044/palaces-for-the-people-by-eric-klinenberg/

46. Faust, Coronare Modestus. 2012. "Alt-Erlaa: Architecture That Serves A Social Purpose — Social housing That Looks & Feels Like Luxury Housing." August 26. https://spfaust.wordpress.com/2012/08/26/alt-erlaa-architecture-that-serves-a-social-purpose-social-housing-that-looks-feels-like-luxury-housing/

47. Channel 4. 2019. "Does Vienna Have the World's Best Council Housing? Swimming Pools, Private TV Channels & More." https://www.youtube.com/watch?v=d6DBKoWbtjE

48. Current research has often emphasized how the tower architecture has often been a scapegoat rather than a real source of problems for public housing in the U.S., and that towers can be indeed provide safe and effective housing. See Public Housing Myths by Nicholas Daen Bloom, Fritz Umbach and Lawrence J. Vale.

49. See for example the New York City Housing Authority. 2015. "NextGeneration NYCHA Sustainability Agenda." https://www1.nyc.gov/assets/nycha/downloads/pdf/NGN-Sustainability.pdf , Strategy #4, "Reduce central office costs" and Regional Plan Association. 2019. "Time to Act: Restoring the promise of NYC's Public Housing." http://www.rpa.org/publication/time-to-act-restoring-promise-of-nycs-public-housing

50. The renovation of Boston's Commonwealth Development in the 1980s can be seen as an effective precedent and a model for the sort of tenant governance we propose. The Commonwealth Tenants Association was given a range of rights in the development process, including the right to fire the private management company working on their building. Bloom, Nicholas Dagen, Fritz Umbrach and Lawrence J. Vale. 2015. Public Housing Myths: Perception Reality, and Social Policy 2015. pg 149-150. https://www.cornellpress.cornell.edu/book/9780801478741/public-housing-myths/

51. See TAF (The Atmospheric Fund). https://taf.ca. Accessed November 2019.

52. In particular, procurement rules that mandate that the lowest-cost bid is accepted must be reformed so this requirement does not sabotage quality of repairs and lead to higher costs in the long term.

53. Through the earlier history of public housing in the U.S., many residents of public housing were themselves skilled maintenance workers in their buildings. However, as income limits were imposed, workers in the skilled trades were pushed out of their homes and out of the public housing system. This dislocation was not only an enormous injustice, it also destroyed an important source of funding for public housing was associated with increasing racial and economic segregation in developments. While income limits set aside the most units for the most need, they also limit economic access for tenants under threat of dislocation. They guarantee that poverty is concentrated in public housing developments and erode the finances of PHAs. In order for residents to actually benefit from the jobs and workforce development programs, this rule must be changed. It will also promote more dynamic and stable future for public housing centered around community. See The Color of Law, Richard Rothstein 2017; and "The Last And Most Difficult Barrier": Segregation And Federal Housing Policy In The Eisenhower Administration, 1953-1960, Hirsch 2005.

54. Rental Assistance Demonstration (RAD) is a federal program to provide funding for public housing repairs on condition of privatization. While the federal government has systematically underfunded public housing and blocked Public Housing Authorities (PHAs) from accessing various funding streams, RAD allows units to be transferred from public to private ownership "so that developers and housing authorities can tap into a broader range of subsidies and financing tools to rehabilitate and manage the units." This is to say, the funds to fix public housing are already being spent—but they are currently attached to a requirement to privatize the units.

    While the federal government imposed income thresholds on NYCHA's tenants and decreased subsidies below their current need, it has also prohibited public housing authorities from using Low-Income Housing Tax Credits (LIHTCs) and restricted its ability to issue bonds. Effectively, it has starved PHAs of funds and prohibited them from finding money elsewhere. More recently, it has introduced RAD, so that public housing can access some of the money it has been cut off from—- but only if its privatized.

    However, there is no sensible reason for this condition, and even with the protections put on units converted through RAD, privatization has been plagued by corruption and illegality that has displaced tenants and disrupted lives. Private landlords frequently and aggressively pursue legal evictions of former public housing residents, which carries an extremely high risk of pushing families into homelessness and stressing the city's institutions for homeless services. Conversion to private ownership goes against public housing's obligation to protect tenants. The federal government must realize its obligation to fund public housing, and scrap its current model of defunding to force privatization.

For further reference, see:

Cohen, Rachel M. 2017. "The Hopes and Fears around Ben Carson's Favorite Public Housing Program." *City Lab.* April 27.https://www.citylab.com/equity/2017/04/the-hopes-and-fears-around-ben-carsons-favorite-public-housing-program/523926/

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65. The hiring requirement in the bill, which states that work for NYCHA retrofits must be done by Section 3 residents (ie, NYCHA residents and other low-income city residents) scales from 30 to 90 percent as time passes. We assume that this applies only to maintenance and construction work.

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68. To reflect deductions and exemptions.

69. The first method described was used, not the bill of goods method. This is largely because the household spending jobs multiplier, which was used in the bill-of-goods method to estimate indirect jobs results from construction worker spending, did not have an available national equivalent.

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**copy-edit errors fixed, 11/15/19*