



**TESTIMONY OF THE MAYOR'S OFFICE OF SUSTAINABILITY
AND THE MAYOR'S OFFICE OF RECOVERY AND RESILIENCY ON
THE FEASIBILITY OF MICROGRIDS
BEFORE THE NEW YORK CITY COUNCIL
COMMITTEES ON ENVIRONMENTAL PROTECTION AND CONSUMER AFFAIRS**

November 21, 2017

I. INTRODUCTION

Good afternoon, Chair Constantinides and Chair Espinal and members of the Council's Environmental Protection and Consumer Affairs Committees. I am Susanne DesRoches, Deputy Director, Infrastructure and Energy serving jointly in the Mayor's Office of Sustainability (MOS) and the Mayor's Office of Recovery and Resiliency (ORR). Thank you for this opportunity to address the feasibility of microgrids in New York City.

It is timely that we're discussing microgrids today. Our electric grid is one of the most critical lifeline systems in our city. It powers our buildings, our hospitals, and our transit system. When it fails, as Hurricanes Harvey, Irma and Maria, tragically showed, it can have cascading impacts to our telecommunications systems, our economy, and our access to healthcare.

Following the devastation of Hurricane Sandy, the City and State supported the evaluation and installation of new microgrids in the city that can function independently from the central electric grid, and can support critical loads in the event of a power outage. As we have seen, microgrids make sense as a custom-designed solution for a set of specific objectives from energy efficiency and cost savings to utilizing renewable energy and ensuring resiliency to the risks of climate change.

II. TYPES OF MICROGRIDS

There are various definitions of what a microgrid is. The City's working definition of a microgrid is local generation or a set of local generation sources that can be flexibly dispatched to distribute power and, in some applications, thermal energy, to more than one building and can, in the event of a grid outage, operate independent of the electric grid to continue to deliver critical power needs. There are two distinguishing features of microgrids:

1. Microgrids serve multiple buildings, rather than a single building resilient energy solution.
2. Microgrids can island, or disconnect themselves from the broader grid to continue to serve a set of local, critical loads during a grid outage.

There are two main types of microgrids. The first type has been developed for campus-style settings where a single entity owns and manages a set of buildings. This type of microgrid has been popular for decades particularly among universities and military bases. The second type of microgrid is a multi-owner or multi-user microgrid, where a microgrid serves a mix of buildings and facilities that are owned by multiple entities. This is commonly referred to as a "community microgrid." We are currently unaware of any community microgrids that have been successfully put in place in the United States. However, in the past several years, there has been a renewed interest in multi-user microgrids and several are currently in the design and feasibility stages.

III. BENEFITS OF MICROGRIDS

The value of microgrids has traditionally been centered on improving energy efficiency, reducing energy costs and increasing resiliency to provide power during an outage, as we saw during and after Hurricane Sandy. As mentioned earlier, microgrids can make sense as a custom-designed solution for a set of site-specific project

objectives, ranging from increasing energy efficiency and cost savings, utilizing renewable energy, avoiding carbon emissions, and ensuring resiliency.

The City's community energy planning analysis detailed in the *Roadmap to 80 X 50* report was the first step to understanding where microgrids can provide the most benefit to the city. As we learned, the microgrid's objectives determine which technology is used and therefore the microgrid's capabilities. For example, if the goal is to reduce energy costs, it could be cost-prohibitive to also make the microgrid resilient. Similarly, if the goal is to maximize renewable energy usage, renewables may be more expensive than what's on offer from the local utility. In short, there are benefit tradeoffs with microgrids.

Depending on the number of buildings and the energy load required, microgrids can be costly, multi-year infrastructure projects. Moreover, the Con Edison grid as a whole experiences some of the lowest outage rates in the country, complicating the economic case for a microgrid when it is tied to goals other than improving the resiliency of critical public services.

Recognizing that microgrids can be complex and expensive, which may not be feasible and/or cost-effective in all parts of the city, the de Blasio Administration is nevertheless broadly supportive of them because they can help us achieve a range of our OneNYC sustainability, resiliency and equity goals. To that end, the City is interested in helping to facilitate microgrids, particularly community microgrids that promote energy resiliency and integrate renewable energy resources and storage. However, because of the site-specific and complex nature of these projects, conducting a feasibility assessment for the entire City would be very challenging and would not necessarily lead to the development of any specific projects.

IV. MICROGRIDS IN NEW YORK CITY TODAY

There are several microgrids functioning in the city today with several more in the feasibility, design and construction stages. For example, campus-style microgrids have been built at New York University (NYU) in Manhattan, Starrett City in Brooklyn and Co-op City in the Bronx. The NYU and Co-op City microgrids garnered attention after Hurricane Sandy because of their ability to provide resilient electricity and thermal energy. There are several commercial projects in design and construction, including a 13 megawatt (MW) microgrid system for Hudson Yards.

The City is also exploring the feasibility of microgrids at several other sites. As part of ORR's Hunts Point Resilient Energy Pilot project, the City is assessing the feasibility of a microgrid for the Hunts Point Food Distribution Center. NYCHA is also in the process of developing a microgrid at the Red Hook Houses, which suffered severe damage during Sandy. The Red Hook microgrid will provide power to the Red Hook Houses during an area or city-wide outage. The Department of Environmental Protection is also developing a 15 MW system for the North River Wastewater Treatment Plant in Upper Manhattan, fueled by biogas and natural gas.

New York State is also supporting the expansion of microgrids in the city. The New York State Energy Research and Development Authority (NYSERDA), through its NY Prize grant program is funding the development of microgrids. The first phase of NY Prize awarded \$100,000 individual grants to 83 projects across New York state to conduct initial feasibility assessments and 11 of these projects were located in here the city. In the second phase in early 2017, NYSERDA awarded \$1 million dollars grants to 11 projects state-wide to conduct detailed engineering designs and develop business plans and 3 of these projects are based in city. The initial 11 city-based microgrid projects range from \$27 to \$273 million for capacities roughly between 4MW and 20 MW, enough to power up to 5000 and 25,000 apartments, respectively. There is also a project in Brooklyn at the Marcus Garvey Houses that incorporates solar plus storage and a natural gas powered fuel cell that was financed New York City Energy Efficiency Corporation (NYCEEC).

All existing microgrids in the city mentioned above are natural-gas powered, while the microgrids in design are integrating sources of renewable power such as solar and storage where feasible.

V. FEASIBILITY OF EXPANDING MICROGRIDS

There are technical, business and regulatory issues that affect the feasibility and cost of expanding microgrid projects in the city.

Technical issues

A building's infrastructure plays a key role in the feasibility of a microgrid. If the existing building is not currently wired to separate critical from non-critical loads, re-wiring the internal electric distribution system is a significant expense. Buildings also need sufficient space to house the necessary mechanicals or roof that can bear the weight of heavy equipment. If the building is in the flood plain, the mechanicals will need to be protected from flooding.

Another consideration is where the proposed microgrid is located on Con Edison's system and how the microgrid can technically be configured to island. The configuration of Con Edison's network can make it very challenging to take a section of the electric grid and isolate it from the surrounding system to create a microgrid. There may also be costly grid upgrades necessary to support the amount of on-site generation proposed.

Given the city's dense urban environment, a project may also need to install its own electric distribution wires so that the microgrid does not negatively affect the delivery of electricity to neighboring buildings not within the microgrid. The cost to install "private wires" can be very expensive, especially if installed underground. The owners and operators of this section of private wires will also need an operating and maintenance contract for the upkeep of the microgrid system.

Business issues

With respect to business and models, there are few, if any effective governance and contractual models for multi-user microgrids (although this is an area that is evolving). For multi-user microgrids, there is no clear regulatory framework since microgrids have components that can be subject to a variety of pre-existing regulatory constructs. For instance, microgrids generate, distribute, and sell energy to end users; traditionally the purview of utilities and power generators. However, the traditional regulatory models that apply to utilities and generating assets may not be appropriate for microgrids given the differences in scale and magnitude and number of potential stakeholders affected.

Regulatory issues

The lack of regulatory certainty and the risk that it brings to a project is an issue the de Blasio Administration continues to discuss with the New York State Public Service Commission (PSC). The City is an vocal advocate for regulatory and utility tariff reform that supports microgrid deployment in NYC. For example, the City was effective in advocating for an exemption to the standby rate, which is an additional charge the utility imposes on owner/operators of on-site generation systems, such as combined heat and power systems, which are a common feature of microgrids. Similarly, the City advocated successfully for Con Edison to develop a multi-user offset tariff, which allows projects to use on-site generation to offset energy use at multiple buildings.

To help identify key pain points and challenges, as well as how to promote effective business models and regulatory solutions for microgrids, the City has also convened a Microgrid Collaborative featuring key stakeholders including Con Edison, NYSEERDA, the New York Power Authority, and others. In addition, the City is also working with the Smart Grid Consortium to identify policy and regulatory hurdles to deploying microgrids in New York City and New York State.

VI. CONCLUSION

In conclusion, I would like to thank the committee for this opportunity to discuss the City's approach to microgrids. It is clear microgrids can serve multiple purposes as we seek to increase the sustainability and resiliency of our city. I would be happy to answer any questions you may have.



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Brooklyn, NY 11232 NYC-EJA.org

On the ground — and at the table.

New York City Environmental Justice Alliance testimony to the New York City Council Committee on Consumer Affairs and Committee on Environmental Protection in relation to the Feasibility of Microgrids.

November 21, 2017

Good morning Chairperson Espinal, Chairperson Costa, and Members of the City Council. My name is Annel Hernandez and I am here to testify in support of evaluating the feasibility of microgrids across the five boroughs, on behalf of the New York City Environmental Justice Alliance (NYC-EJA). Founded in 1991, NYC-EJA is a non-profit citywide membership network linking grassroots organizations from low-income neighborhoods and communities of color in their struggle for environmental justice. NYC-EJA empowers its member organizations to advocate for improved environmental conditions and against inequitable environmental burdens. Through our efforts, member organizations coalesce around specific common issues that threaten the ability of low-income and communities of color to thrive, and coordinate campaigns designed to affect City and State policies — including renewable energy, resilient energy, energy storage technologies, microgrids, and community-owned projects directly benefiting these communities.

Because a number of the NYC-EJA member organizations come from communities overburdened by greenhouse emissions and co-pollutants from power plants and dirty industries clustered in their neighborhoods, our organization is a key advocate of emission reduction and renewable energy targets. Our NYC Climate Justice Agenda is a multi-year research and advocacy campaign to address the need for a comprehensive community-based approach to community resiliency. In 2017, we released a report which analyzed Mayor de Blasio's OneNYC plan and made several recommendations to strengthen the City's policies in environmental justice communities. We highlighted that in addition to its promising economic potential, microgrids and solar-plus-storage technologies can have extensive environmental and health benefits, particularly for vulnerable communities who have been historically exposed to noxious pollutants generated from traditional fossil fuel energy infrastructure. Resilient energy can provide power during emergencies, blackout periods, and peak demand, especially to vital facilities such as emergency shelters, hospitals, public housing, schools, and in particular the Hunts Point Food Distribution Center. This technology has the potential to displace inefficient and dirty peaking plants, thus significantly reducing air pollution in environmental justice communities. The City should study, prioritize, and streamline the deployment of microgrids and resilient energy systems in the coming years. The City should also study progress made to date and strategies to reduce barriers for microgrid development including technical, policy, and regulatory barriers. We recommend that any microgrid cost-benefit analyses include economic, social, environmental, and resiliency benefits. In pursuit of a Just Transition, New York City should be leading the nation in the procurement of renewable energy and energy storage technologies that meet ambitious emission reduction and resiliency targets.

NYC-EJA commends the New York City Council for holding a hearing on the feasibility of microgrids, and creating an opportunity for public comment on this important strategy to increase community resiliency. We urge the City Council hold a hearing early next year on Int. 1567. A just energy policy is central to NYC-EJA's work, and we look forward to a continued collaboration with the City to mitigate the threats of climate change.

Discussion on Microgrids
November 21, 2017
City Hall, New York City

Good afternoon. My name is Kari Dietrich. I am a member and volunteer with 350Brooklyn, which is a local chapter of the international organization 350.org. 350Brooklyn is dedicated to fighting the global threat of climate change on the local level.

When we talk about fighting climate change, we are talking about ways to reduce greenhouse gas emissions as well as ways to build a more resilient New York City in the face of a warming world, in which increasingly intense storms are likely. Microgrids helps us accomplish both of these objectives.

Like many residents of New York City, I lost power during Hurricane Sandy. At the time, I lived in the Brooklyn neighborhood of Red Hook, which was in the flood zone. Nothing of mine was lost due to flooding, but in Sandy's aftermath, my neighborhood went some three and a half weeks without power before it was restored. My regular daily life ~ I was a graduate student at the time ~ was entirely disrupted. I slept on friends' couches sometimes, at other times in my cold, dark apartment. I lived out of a bag and grabbed showers where I could. After my schoolwork, my daily priority became about finding where I could recharge devices, so that I could stay connected to loved ones and the outside world. It was an extended period of disruption and displacement for myself and many others, that can be completely avoided in the future. One clear way to achieve this is by investing in microgrids.

A microgrid is designed to be agile and autonomous, operating fully while allowing for temporary disconnection to the broader power infrastructure, and being friendly to alternative sources of power. This flexibility not only enables the city to be resilient in the case of another natural disaster, but it also encourages the use of clean and currently available sources of energy, like solar, geothermal and wind.

According to environmentalist and entrepreneur Paul Hawken in his book "Drawdown", grid flexibility is one of the best ways we have to reverse global warming. Rather than being dependant on coal-fired or gas-fired plants hundreds of miles away, with microgrids, homes and communities can rely on solar panels on their roof and batteries in their basement, while still being connected to the rest of the grid. Incorporating microgrids is key to ensuring that the desired flexibility is attained without risking consistency and sustainability.

While New York engages in setting up microgrids, it is essential that we incentivize people and companies to seek out renewable energy. One of the best ways to ensure this is to allow homeowners and building owners to sell back their excess energy from rooftop solar panels to the grid. That way they can get paid for the energy they generate, and nothing is lost or wasted.

In short, microgrids can help us both prepare for and prevent the threat of climate change. Renewable sources are by their very nature distributed and resilient. Thus, renewable energy must become a main staple of microgrids with solar, geothermal, and wind being major components.

By New York investing intelligently in microgrids, it is one major step closer to being an advanced city making life better for its citizens.

Thank you.

Testimony
before
New York City Council
Committee on Consumer Affairs and Committee on Environmental Protection
T2017-6898 Oversight - The Feasibility of Microgrids
Scott Kessler

LO3 Energy Inc. / Brooklyn Microgrid Corp.

Summary of Points

- Community microgrids provide communities with energy resiliency, local economic and environmental benefits, and the opportunity to shape their own energy infrastructure
- Brooklyn Microgrid represents the first peer-to-peer community microgrid, aimed at accelerating local, clean energy resources and enabling community members to get the energy that is right for them
- State, local, and utility policies and rules can help streamline the development of community microgrids across New York City and more broadly.

Testimony

Chairman Espinal, Chairman Constantinides, Members of the Committee on Consumer Affairs and Members of the Committee on Environmental Protection, thank you for the opportunity to provide testimony for this Hearing on The Feasibility of Microgrids. My name is Scott Kessler and I serve as the Director of Business Development for LO3 Energy, an energy technology company that enables a more open and flexible marketplace to allow consumers, producers, and utilities to deploy and manage energy assets in an increasingly open and competitive electricity market using distributed ledger software.

LO3 Energy is a young company with deep roots in energy, finance, and technology. We

are passionate about the future of an increasingly flexible, responsive, and reliable utility grid. We are developing ways to give people and utilities opportunities to shape that future. The community energy microgrids that we are building enable utilities and neighborhoods to share in the responsibilities and benefits of reliable distributed energy resources.

You may be familiar with the concept of the “internet of things,” the idea that our devices, machines, thermostats, automobiles and appliances are able to use built-in sensors and computing power to communicate information, coordinate with each other, and manage our environment and our energy use intelligently and independently, by following the rules that their owners program into them. Our technology platform activates this internet of things within the local power grid, enabling PV panels, batteries, and Nest thermostats to generate market signals that will govern and balance neighborhood loads, generation, and storage assets, and allowing them to coordinate with the broader interconnected transmission grid. Our platform enables this functionality by implementing a market in which neighbors, independent power producers, energy services companies, and utilities can choose to buy and sell energy and energy services on a peer-to-peer basis in real time. For example, a neighborhood resident may run his washing machine when electricity in the local peer-to-peer market is least expensive, perhaps when energy output from his neighbor’s solar panels reaches its peak in the early afternoon; or a department store may dial back its air conditioning when that local electricity is most expensive, for example when a local utility transformer is being over-taxed in the late afternoon on a hot summer day.

Currently, LO3 Energy is developing such a marketplace within the Park Slope, Gowanus, and Boerum Hill communities of Brooklyn, through a benefit corporation called Brooklyn Microgrid. The goal of this project is to enable the multi-participant marketplace for

consumer choice that is envisioned by the energy regulators in New York, and likewise to improve the local community's energy security during extreme weather events and other emergencies. Said more simply, neighbors can buy and sell energy, usually produced from a rooftop solar PV system, with one another. The Brooklyn Microgrid can be thought of as a virtual microgrid – many distributed but digitally connected energy resources that are able to provide the same benefits to the Con Edison network as a physical microgrid, namely generation, storage, demand curtailment, and ancillary services – and is in the design phases to add physical resiliency.

This community-based microgrid in Brooklyn—which can be replicated in hundreds more communities around the U.S. and globally—will create a decentralized, peer-to-peer energy network that also coordinates with the broader power grid. By sending appropriate price signals for energy and energy services, these locally optimized networks engage all market participants to deploy distributed energy resources and infrastructure upgrades in the most efficient manner. These local energy resources also provide resiliency for emergencies; reduce customer costs; optimize utility infrastructure investments; and enable renewable electricity, energy efficiency, and energy storage deployments within that community. Meanwhile, the new market drives community investment and jobs, boosting the local economy.

This is a new opportunity for communities who, until now, have been dependent on the grid's central planners and unable to directly participate in, control, or contribute to the reliability or source of the electricity on the grid. Projects like Brooklyn Microgrid, and distributed energy marketplaces enabled by the internet of things more broadly, will enable consumers and communities to truly determine their energy future—their source of energy, when they want to use that energy, and the price they pay for that energy. Community microgrids represent a novel

approach to the idea of non-wires alternatives, exemplified by the Brooklyn Queens Demand Management project in Brooklyn. But rather than one organization doing procurements on behalf of local citizens, community microgrids also offer the opportunity for communities to express a preference for certain types of energy, through their selection of where they get their electricity from. Local residents can be further empowered through the opportunity to own a portion of the community microgrid, either through investment in the organization directly or through a micro-investment in a community solar project or other energy asset.

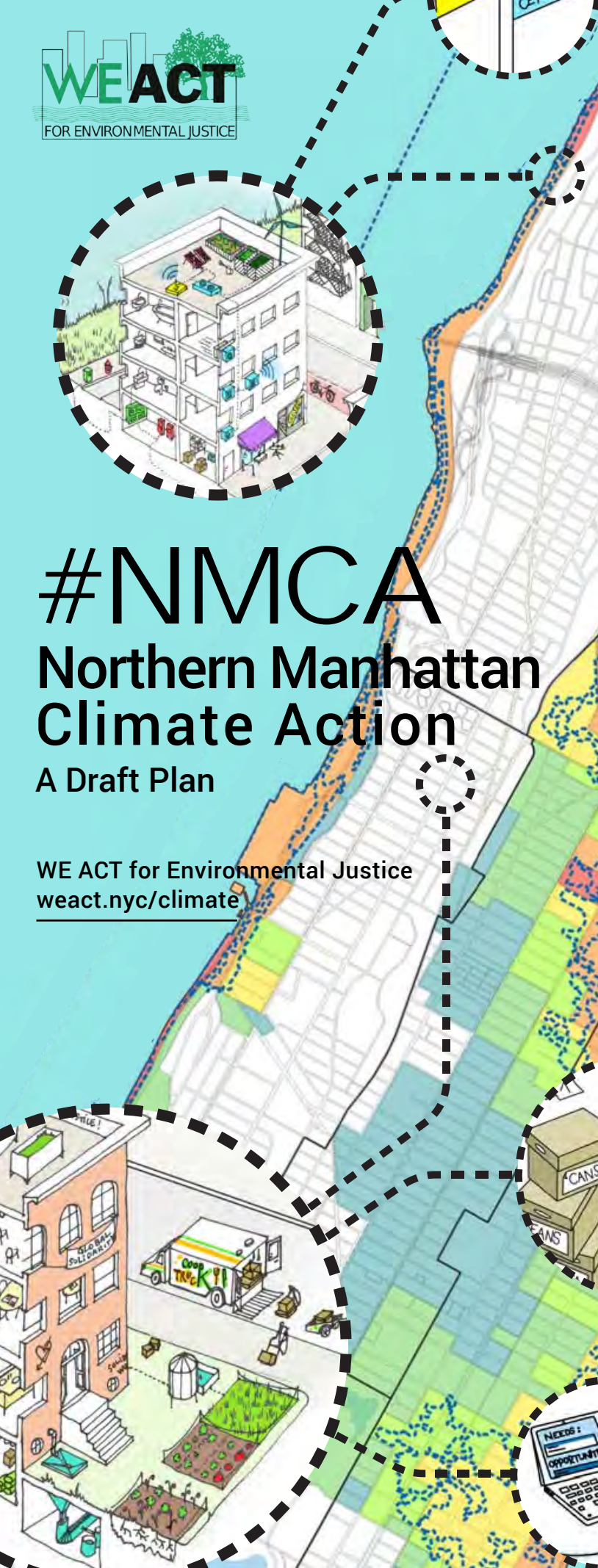
The role of public policy is key to enabling community energy marketplaces and community microgrids. Local policymakers can streamline the creation of these organizations through structures such as community choice aggregation, which facilitates the participation of an entire community as one. Additionally, local policymakers can work with energy regulators such as the NY Department of Public Service and Public Service Commission to ease requirements for community energy marketplaces. Specifically, for one neighbor to transact energy supply with another, an energy retailer, or ESCO, must take title to that energy in the interim. This requirement should be revised to enable direct transactions without unnecessary intermediaries, if that information can be provided to Con Edison and the New York Independent System Operator.

Like testimony LO3 Energy recently provided to the Federal Energy Regulatory Commission and the US House of Representatives Energy Subcommittee, policymakers at the state and federal level can help lift roadblocks to the participation of individuals and local governments in energy transactions in community marketplaces and encourage cooperation, communication, and interaction between these new community energy marketplaces and the wholesale markets. State and Federal policy can clarify that behind-the-meter consumer energy

assets should access energy markets on equal footing with in-front-of-the-meter energy assets, and that distributed energy resources like batteries, thermal storage, active demand management, microgrids, and other hybrid energy resources can transact energy services in the same manner as traditional generation.

In summary, we think that community microgrids will be critical to enabling consumers to participate in and benefit from community-based energy resources, both under normal operations and in emergencies. We see this as a win for the consumer, a win for the utility, and a win for the grid. We are grateful that these Committees are discussing these important issues and we look forward to serving as a resource as you continue these conversations.

Thank you again for the opportunity to deliver this testimony. We look forward to addressing any questions the Members of either Committee have about LO3 Energy and the Brooklyn Microgrid.



1) #NMCA OVERVIEW

Over the past several years, climate change has begun to exact a disproportionate toll on the poor and working class people of New York City. For the economically precarious, climate change can drive them further into poverty and ultimately lead to their displacement. During Hurricane Sandy, we saw that marginalized communities lost their homes, jobs, and more, at a higher rate than others. And yet, to this day, the political and economic dynamics that precipitated Sandy's fallout have hardly changed.

In order to protect NYC's most vulnerable people from climate change, the NMCA promotes environmental policies that also address the root issues of inequality. Conflicts in terms of class, race, gender, ethnicity, and age, need to be mitigated and overcome, not simply the impacts of rising sea levels.

The NMCA addresses these issues by working to increase democratic activity within and outside of the government. For its vision to be implemented, we must engage with the legislative process, while building our own systems of economic exchange and urban development that are not dependent on a faltering public sector.

The ideas within the NMCA are the result of a six month-long planning process led by WE ACT for Environmental Justice, and done in partnership with a multitude of stakeholders (listed on the back cover). The core ideas in this plan were generated during seven workshops held between January and June of 2015, in which hundreds of New Yorkers participated.

The plan's study area includes the neighborhoods of Inwood, Washington Heights, West Harlem, Central Harlem, and East Harlem (Figure 1). Over 600,000 people, mostly African American and Latino, reside in these neighborhoods. Over 20% of the area's residents live in poverty, a rate substantially greater than the rest of Manhattan's 14% average.

Inequality across the city is that 20% of all household earners control over 54% of the City's wealth. Since 1990, the top 1% of earners have seen their median income grow from \$452,415 to \$716,625, while the bottom 10% of earners saw their income increase modestly, from \$8,468 to \$9,455. These statistics demonstrate that some people are dramatically better prepared to absorb the shocks of climate change, largely because NYC's disparity in wealth also translates into an advantage in political power and access to resources.

As we invest billions of dollars in preparing for climate change, those investments should be leveraged to address other social crisis, such as chronic unemployment, poor diet, mass incarceration, and quality of education, among others. Otherwise, we will have prevented climate change from erasing NYC, but the slow erosion of gentrification will swallow much of what's left.

In terms of the physical impact that climate change will have on Northern Manhattan, it is predicted that by 2100 we could see temperatures climb by up to 8°F, sea levels rise by up to six feet, precipitation increase by 13%, and what are now once-in-100 year floods occur once every eight years. These are "worst-case scenarios," but even the best-case scenarios pose a grave threat to Northern Manhattan's people and infrastructure, including utilities and transportation routes critical to the City as a whole.

To download this plan and for more information visit: <http://weact.org/climate>

2) CLIMATE CHANGE & SOCIAL EQUALITY

The NMCA uses the frameworks of environmental justice, resilience, and social cohesion to guide its recommendations.

Resilience, as defined by the New York City Panel on Climate Change, is "the ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a potentially hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures."

However, environmental justice work strives to improve upon existing socio-economic conditions, not simply restore and maintain them. Therefore, as is argued in "From Resilience to Resourcefulness: A Critique of Resilience Policy and Activism," definitions of resilience must be expanded to avoid "privileging" established social structures, which are often shaped by unequal power relations and injustice" and "[closing] off wide questions of progressive social change which require transformation of established systems." In other words, we must ask if the economy should "conform to meet the needs, values, and vision of a democratic society, or evolve to advance the capitalist system," regardless of its impact on our social fabric.



Discussion at an April 4, 2015 climate change workshop organized by WE ACT. The workshops was one of seven that used "serious games" to plan climate actions.

As Melissa Checker points out in her article "Wiped Out by the "Greenwave": Environmental Gentrification and the Paradoxical Politics of Urban Sustainability", our over-dependence on systems of private investment leads to "environmental gentrification [that] builds on the ... successes of the urban environmental justice movement and appropriates them to serve high-end redevelopment that displaces low income residents." As such, "the efforts of environmental justice activists to improve their neighborhoods...now help those neighborhoods attract an influx of affluent residents."

This plan supports the growing movement in NYC to recognize the crucial connection between climate change and social equality. By working together, we hope we can implement comprehensive reform that empowers the struggling masses to remake the city in their own vision, and not be victims to the hyper privatization and environmental degradation that threatens us all.

3) CONCEPT ONE: ENERGY DEMOCRACY

According to the U.S. Energy Information Administration, New Yorkers pay the nation's second-highest energy prices. This manifests as a disproportionate cost burden for low-income New Yorkers, which threatens not only their ability to retain access to energy services, but also limits access to housing, healthy food, healthcare, and other costly necessities. Therefore, this plan calls for all green energy projects to provide direct economic and environmental benefits to low-income residents. This may be achieved through local hiring agreements, investments in neighborhood companies/organizations, and creation of systems for tenants to lead change within their own communities.

One type of energy improvement that aligns with this goal is known as Distributed Energy Resources (DER), specifically in the form of microgrids. Microgrids are small geographic areas that produce their own energy using renewable resources (wind, solar, geothermal, etc.) and are therefore not dependent on the main grid. Such systems can confer direct economic benefits on low-income residents by creating manufacturing, construction, and maintenance jobs while also providing savings. However, regulations must be passed to ensure that cost savings are passed down to tenants, not absorbed by property owners or middlemen. Green energy cooperatives can help maximize the economic benefit for tenants in this manner. Cooperatives allow homeowners, property managers, and other local stakeholders to pool their resources to construct and manage their own microgrids, affording them maximum control over generation, consumption, and costs.



The Mother Clara Hale Bus Depot, complete after 10 years, is NY's first LEED certified bus depot. Bus depots in Harlem house the buses many N.Yers use, especially when subway service is suspended, but result in pollution and respiratory problems for local residents.

In our workshops, people consistently expressed a desire for a more robust and democratic system of tenant associations. Such associations are an essential ingredient in the creation of larger systems of common property/resource ownership and management, such as cooperatively-owned microgrids. The fact that members of tenant associations already share a roof over their heads makes the prospect of "shared solar" that much more attractive.

As a member of the Energy Efficiency for All Coalition, WE ACT has already begun work to connect community members with renewable energy sources and efficiency improvements and to explore options for microgrids under the New York State Public Service Commission's Reforming the Energy Vision (REV) process. With the support of other partners such as Solar One and the City University of New York, Northern Manhattan could see microgrid pilot projects and large-scale investments in energy infrastructure in the near future.

But ultimately, as Trade Unions for Energy Democracy recently stated, "the transition to an equitable, sustainable energy system can only occur if there is decisive shift in power towards workers, communities and the public." In making such a transition, we must confront what Energy Democracy Initiative recognizes as a fundamental "clash between the priorities of political elites and corporations on one hand, and the needs of the masses of people for a truly socially and environmentally sustainable society on the other."

4) CONCEPT TWO: EMERGENCY PREPAREDNESS

As Hurricane Sandy brutally showed, New York City's residents, government, and physical infrastructure are extremely unprepared to withstand a severe natural disaster. After Sandy, areas such as the Hockwages experienced "total blackouts" with "no communications to speak of." Residents had to resort to bullhorns to relay messages, print fliers at home to share information, and physically "congregated at local hubs like churches...and schools" to communicate.

In order for NYC to be prepared for the next Sandy, neighborhood-specific preparedness plans must be devised, climate-proof communication systems must be developed, and necessary physical resources, such as flood protection infrastructures and space for storage of food and medicine must be built out. In addition, much of the suffering in Sandy's aftermath resulted from misappropriation of resources, not from a lack of public/private capacity. Therefore, in any future disaster, opportunities for more community input in resource distribution must be created to ensure that resources (and institutions) are appropriated for the public good.

The emergency response plan included here focuses on creating a locally-managed communication system that operates in analog and digital formats and that can effectively direct vulnerable populations to necessary resources during a climate crisis. This communication system will include wayfinding tools (signage), social media plans, physical message boards, means for crowdsourcing, and tools to direct people to cooling centers, energy supplies, medicine, food, and water. In the long-term, this communication system can be used to foster

robust democratic participation in emergency response decisions.

Building flood protection infrastructures such as coastal barriers, mainland rain gardens, bioswales, and more can ensure that our private and public spaces are protected. Involving residents in the creation of green spaces can also, in and of itself, aid in recovery from crises, as giving people the chance to express their instinctive "affinity for nature" through the "creation of restorative environments may [bolster] resilience." NYC already provides some financial support for the construction of open space and green infrastructure: the Department of Environmental Protection has committed over \$208 million to its Green Infrastructure Program, while the Department of Parks and Recreation's City Parks Initiative, which carries out park improvements in underserved neighborhoods, is worth \$130 million.

The Department of Health and Mental Hygiene is currently exploring the possibility of developing neighborhood health hubs. In addition, it possesses valuable information regarding who is most in need of assistance during heatwaves and other emergencies. Further advocacy can be done to encourage DOHMH and the NY state government to expand the Low Income Home Energy Assistance Program to include air conditioning and other necessities.

Community Emergency Response Teams (CERT) are also integral to planning and recovering from a disaster. Other programs that support this objective include the NYC Citizen Corps and the Office of Emergency Management's (OEM's) Ready NY Campaign and NYC Readiness Challenge.



After Hurricane Sandy, many residents without the means to relocate were cut off from their jobs, families, healthcare services, and more. Several years later, those areas are still recovering, while other areas have yet to be prepared.

5) CONCEPT THREE: SOCIAL HUBS

In the immediate future, development of more physical spaces for activities related to movement-building is key. Providing spaces for local activists to organize meetings, produce materials, and incubate projects is a crucial and perpetually-needed resource. It also serves the basic function of bringing diverse groups together and building community cohesion, while also accommodating the need for community gardens, libraries, green energy infrastructure, artists' workshops, and more.

In the short-term, temporary and/or mobile hubs for social cohesion should be established to serve these functions, with a long-term goal of establishing a permanent, central resilience hub on the site of the 135th Street Marine Waste Transfer Station, pictured below.

Many cite Eric Klinenberg's research, which explains that during the 1995 Chicago heatwave, while most low-income and minority communities suffered severely, "3 of the 10... neighborhoods with the lowest rates of heat-related deaths were low-income, African American communities." These three communities proved resilient because they had "high levels of community interaction and organization [and] decreased isolation among residents." A network of hubs, programmed

by the rich composition of people that live locally, could help facilitate similar interactions in Northern Manhattan. In fact, several such "hubs" are already having an impact, such as Word Up Bookstore: Libreria Comunitaria, The Brotherhood Sister Sol, and more.

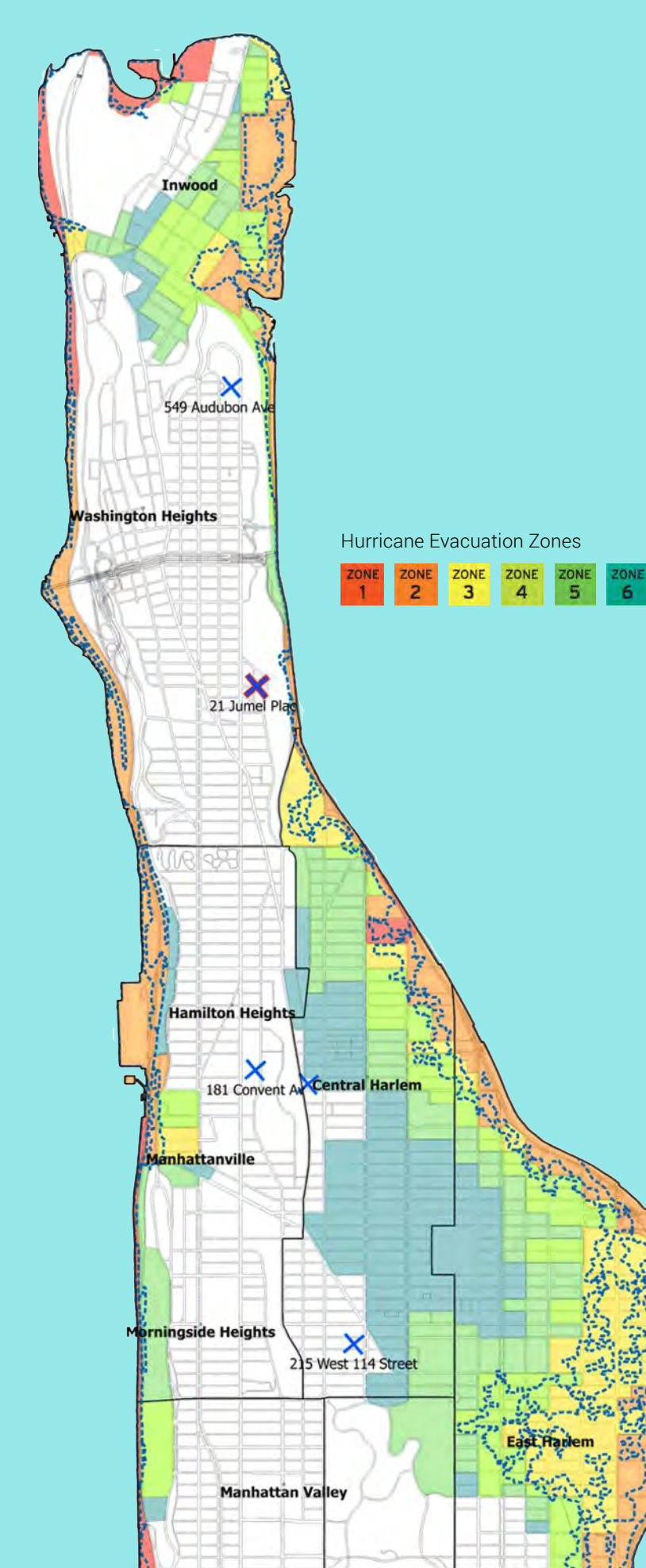
Large cities that have recently experienced changes in political power that favor the working class, such as Madrid and Barcelona, have credited "social centers" for playing an important organizational role. While subsisting on small membership fees or income from bars or cafés, many such spaces served as crucial gathering spaces for community activists. This resulted in the development of political strategies and actions that have now led to concrete electoral success.

Residents of Washington Heights, have recently been demanding a gathering space as part of a multi-million dollar Port Authority bus terminal renovation. When they were offered only a meager 250 square feet of space, Councilman Ydanis Rodriguez responded, "our community is left out entirely. Port Authority: we do not want another slumlord in our community, so we demand that you do your part." Whether or not the Port Authority ultimately heeds the demands of this community, establishment of such spaces is essential.



The abandoned 135th Street Marine Waste Transfer Station presents an opportunity to develop a community space on the waterfront, which can be used to monitor the impacts of climate change, build social cohesion through community events, and provide space for public meetings, research labs, galleries, and other workspaces.

Figure 1 - Northern Manhattan



6) CONCEPT FOUR: PUBLIC PARTICIPATION

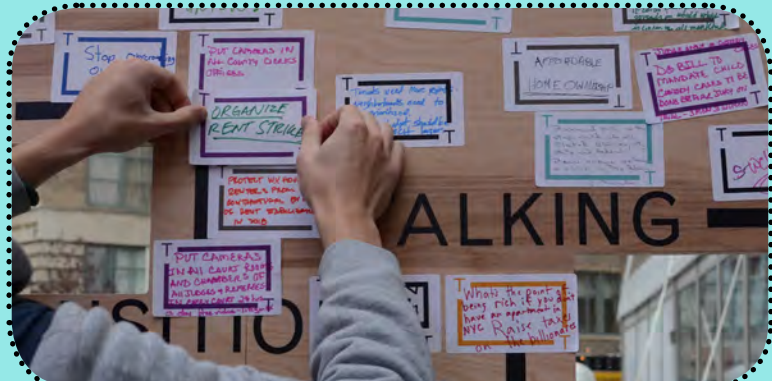
Changing the political dynamics in NYC so that low-income residents are not excluded from policy-making is crucial to the effective implementation of this plan. Without a change in the current distribution of political power, only limited, cosmetic gestures will be made to protect low-income groups from climate change; little will be done to change the fundamental, underlying problem of poverty.

Organizing deeper participation in existing systems of governance and also creating new, more responsive systems when necessary can help shift the balance of power towards the underclass. This initiative should include, but not be limited to, the following activities: increasing political education and mobilization through protests and direct actions; developing partnerships with governmental and non-governmental allies; writing educational curricula; organizing involvement in participatory budgeting; and building participation in the electoral process.

Participatory budgeting (PB), and, in the future, participatory legislation, have been proven to bolster civic participation. A 2011 study of PB that compared five Brazilian municipalities with PB to five without it found that the effect of participatory budgeting "was to increase the flow of information about municipal governance, create a space for citizens to voice their demands and to scrutinize what were once highly insulated and

discretionary decisionmaking processes," allowing citizens not only to allocate monies, but also to "bargain from a position of greater strength with municipal authorities" in general. In NYC, PB should be expanded to the 9th City Council district - the only district in Northern Manhattan that does not currently offer PB.

Around the world, we are seeing a resurgence in the belief that democratic activities can put an end to the disastrous results of fiscal austerity and the broader ideologies of neoliberalism. Whether at the 2014 People's Climate March or a Black Lives Matter demonstration, people are demanding greater control over the policies and institutions that have, up until now, controlled their livelihoods without their input and created an oppressive society in the process. In July of 2015, the Greek people, heeding the Prime Minister's calls for them "to decide - with sovereignty and dignity" to not accept the "extortionate" policies that could prevent them from "ever standing on [their] own two feet, socially and financially," used democracy to reject the weight of the global financial system and its unquenchable thirst for public monies. And in Spain, recent municipal elections have shown that including diverse ideas in political platforms can create broad partnerships that cut through historic divisions, uniting the people and moving them towards a more just future.



The De Blasio administration has made several gestures towards increasing public participation in policy-making, but much more can be done to connect the will of the people to NYC's economic and environmental policy outcomes.

7) NEXT STEPS

In order to implement the NMCA, we must (1) Increase democratic participation in the development of City policy and (2) Build grassroots infrastructure that allows communities to control their own responses to climate change.

In order to achieve these goals, we must continue to work with a wide network of New Yorkers to build the critical mass necessary for profound, systemic change. Thus far, it has been an honor to build connections with a wide variety of actors from the local and international climate justice communities, many of which are represented in the attached diagrams in the back page. The countless presentations, conversations, and correspondences that went into this project have not only created this plan, but have also facilitated relationships among community members that help us to better understand what our responsibilities are as New Yorkers. Strengthening these relationships is imperative if we are to carry out wide-scale action that will change City policy and build systems of participation and mutual aid at the local level.

Some of the specific policy actions the NMCA proposes are listed below.

The primary policy target of the NMCA is OneNYC, the City's chief policy framework

on environmental and other issues, which is due to be revised in 2019. A few of the many environmental objectives listed in OneNYC are to "invest in emergency shelter sites to accommodate 120,000 New Yorkers with disabilities; fund "physical assets for emergency response" as well as community-centered education projects, and create green jobs and local hiring plans to benefit those most in need of economic opportunities.

In terms of the City Council, the NMCA targets the chairs of the Environmental Protection, Land Use, Transportation, Waterfronts, Parks and Recreation, Sanitation and Solid Waste Management, and Economic Development Committees, among others. These committee chairs will be called upon to take action for climate justice and will be pressured by constituent actions. The Black, Latino, and Asian caucus and the Progressive caucus, are natural allies in this campaign. In terms of electoral politics, a voter engagement strategy must be developed for the 2017 elections that identifies key races, registers voters, seeks commitments on climate justice from candidates, and generally increases public participation in the electoral process.

Community Boards 9, 10, 11, and 12 will prove critical in advancing our policy recommendations. In the past, WE ACT has partnered



The North River Sewage Treatment Plant is an example of the undue environmental burden facing Northern Manhattan. Originally planned for 72nd Street, it was built instead at 135th to allow room for Robert Moses's Riverside Park on the Upper West Side.

7) NEXT STEPS CONT'D

with Community Board 9 to participate in the Department of City Planning's 197-a program, which supports community-based urban planning. We will continue to build these partnerships around the proposals of the NMCA.

In addition to OneNYC, the One City, Built to Last plan is of great importance. It lays out the City's plan to reduce its carbon emissions by 80% by 2050 and centers on improving the energy efficiency of NYC's building stock. A recent report by the Alliance for a Greater New York (ALIGN), stated that efforts associated with One City, Built to Last may require over \$5 billion in investments every year and could create 82,000 new jobs annually from now to 2050. In the plan, the City also pledges to support community-shared solar projects and to train and hire community members for new green jobs. The plan's Retrofit Accelerator Program could spur further construction and energy improvements in Northern Manhattan, and is connected to DEP's Clean Heat program, which WE ACT has been involved in implementing.

Besides energy efficiency investments in buildings, we need large investments to improve stormwater management infrastructure, alter the design of our streets and mass transit systems, and protect our coastal

areas, among other things. The Department of Environmental Protection leads a Green Infrastructure Program that invests millions in mitigating increased floods and rising temperatures already being observed. Such infrastructure is badly needed in areas of Northern Manhattan that currently have a dearth of green space and that are in a floodplain, such as East Harlem. The Department of City Planning is already conducting a Resilient Neighborhoods study that is engaging East Harlem in planning flood protection measures.

Another key component of the NMCA planning process was our ongoing academic partnerships, including those with the NASA Goddard Institute for Space Studies and the Mailman School of Public Health at Columbia University, our research partnerships with the Pratt Institute's sustainability and urban planning programs, partnerships with City College students and faculty, and work with auxiliary programs such as the Urban Climate Change Research Network, among others.

By further pursuing these partnerships and policy goals, we can leverage public investments while, in a parallel process, building local capacity to end the scourges of poverty and discrimination.



Many areas in Northern Manhattan, particularly in East Harlem, do not have enough open space or tree cover to mitigate the urban heat island effect. This problem is exacerbated by pollution from local infrastructure, such as bus depots.

8) PROJECT TEAM

August 2015
www.weact.org/climate

West Harlem Environmental Action, Inc. (WE ACT for Environmental Justice) is a Northern Manhattan community-based organization whose mission is to build healthy communities by ensuring that people of color and/or low income participate meaningfully in the creation of environmental policies and practices.

WE ACT staff members that contributed to this project include: Peggy Shepard, Cecil Corbin-Mark, Aurash Khawarзад, Louis Bailey, Charles Callaway, James Burke, Matt Deen, Amber Myers, Ogongnaya Dotson-Newman, Evelyn Joseph, Carlos Jusino, David Chang, Hector Gerardo, Jalonne White-Newsome, and Stanley Fritz. Additional support was provided by WE ACT interns including Naima Drecker-Waxman, Meera Vaidya, Theo Judd Hilton, Peiyu Phua, Sophia Jose, Griffin Levine, Omar Hammad, and Betina Araujo.

Written and assembled by: Aurash Khawarзад
Hand-drawings and cover by: Mateo Fernandez-Muro
Co-edited by: Victoria Hoffmeister

Serious Games were designed by Michael McDonald of OVIAIR Global Resilience Systems, an organization engaged in international emergency preparedness and resilience efforts.

Scientific research support was provided by Cynthia Rosensweig of the NASA Goddard Institute for Space Studies and Patrick Kinney of the Columbia Mailman School of Public Health.

Participants who supported this project by means of meeting facilitation and research include: Lisa Hamilton, Elizabeth Guerra, Cecilia Pineda, Tony Santiago, Jewel Jones, Maria Garcia, Rita Miller, Perry Sheffield, Mason Cavell, Oronde Tennant, Sarah Fischer, Carlton Davis, Alicia Barksdale, Diana Blackwell, Tina Johnson, Sarah Martin, Arnold Boatner, Euline Williams, Josette Bailey, Deirdre Aherne, Diane Hymans, Evelyn Knapp, Naomi Moreira, Raya Salter, Rory Christian, Jeanelle Roman, Jacqueline Hurt, Helen Jones, Jonathan Marable, Maria Lynch, Rodney Cromartie, Ramon Ramsey, Juan Rosa, Lazelle Williams, Glen Holloman, Kelly Moltzen, Daniel Carrion, Victoria Lee, Grace Tuttle, Johann Vollenhoven, Karmel Al Labadi, Danielle Peters, Manishka de Mel, Erika Lindsey, Ilyia Azarovf, Ibrahim Abdul-Matin, and many more.

New York City public agencies that supported this process by providing policy information include: NYC Department of Health and Mental Hygiene, Office of Emergency Management, Department of City Planning, Mayor's Office of Sustainability, Mayor's Office of Recovery and Resiliency, and Department of Environmental Protection, among others.

Additional organizations that supported this project include: Environmental Defense Fund, Environmental Health Services Center, USA Family Health Services, Microecologies, Inc., Natural Resources Defense Council, Morgan Stanley Children's Hospital, Manhattan Neighborhood Network, Asociacion de Mujeres Progresistas, Inc., Mount Sinai Children's Environmental Health Center, West Harlem Group Assistance, Brotherhood Sister Sol Community League of the Heights, Corbin Hill Food Project, Hamilton Heights Community Preservation Organization, Office of Councilman Mark Levine, Office of Councilman Ydanis Rodriguez, Word Up Bookstore, Harlem Community Development Corporation, Parsons The New School for Design, Pratt Institute, American Institute of Architects, NY Chapter, Manhattan Community Boards 9, 10, 11, and 12.

Project supported by the Kresge Foundation

#NMCA RESILIENCE CONCEPTS

The following concepts were generated by project participants as measures that can protect our environment while reducing socio-economic inequality. Logos indicate potential partnerships, not formal agreements. Writing and layout by: Aurash Khawarzad (@khawarzad), Hand-drawings by: Mateo Fernandez-Muro (@Matufis) More info at: <http://weact.nyc/climate>

Coastal Protection

Coastal areas, particularly those in the floodplain shown in Figure 1, are in need of green infrastructure that provides ecosystem and flood protections. NYC is currently implementing a coastal protection project worth \$3.7 billion and has released its first-ever comprehensive coastal protection plan, A Stronger, More Resilient New York. The plan seeks to deepen public participation in waterfront restoration and protection by expanding the

Waterfront Management Advisory Board and includes pledges to undertake feasibility studies for construction and restoration of flood-prone areas. DEP has also spent over \$40 million to-date on wetlands restoration and other coastal protections. What remains to be seen is the extent to which developments will encompass community-based plans or be leveraged to gentrify waterfront areas.

Networked technology controls energy usage and monitors environmental conditions.

Community Land Trusts (CLT)

Organizing property ownership through a CLT is one way to preserve affordable housing by removing properties from the speculative market. CLTs also allow participants to collectively use space for local agriculture, energy production, recreation, and even social services such as childcare. Such shared governance structures can help rebuild the commons in terms of how we use space/resources.

Affordable Cooperative Housing

The City plans to create and/or preserve 200,000 units of affordable housing between 2015 and 2025. This will be done by maximizing use of City-owned land, mandating inclusionary zoning, and providing tax incentives to developers, among other things. However, many are skeptical that these efforts will provide the necessary amount of housing at truly affordable prices (particularly for vulnerable populations such as the homeless, criminalized populations, the elderly, etc.). Therefore, new cooperative homeownership mechanisms such as community land trusts must be explored.

Social Hubs

Community meeting spaces are crucial to support ongoing planning efforts, as they are necessary for local organizations to host educational programs, hold meetings, produce materials, use for storage, etc. Having a local hub open for community use can support centralized planning and production activities while remaining grounded in local needs and capacities.

Multipurpose Infrastructure

New design guidelines should be implemented so that waterfronts promote industrial activities while remaining accessible to the public. This can be done through constructing green spaces that both mitigate flood damage and support water-based transportation should be constructed. These spaces are also important for cooling the urban heat island and supporting physical activity, local agriculture, and more.

Local Markets

Manufacturers, farmers, and other "makers" within the hub can sell their goods at local markets, which support non-conventional commerce, including bartering networks and alternative currencies.

Ferry Service

The West Harlem Piers (pictured below) is a good location to add ferry services for daily commuters and to create alternate evacuation routes. OneNYC calls for several new ferry routes.

Food from the Hudson Valley

Farms in the Hudson Valley can make use of improved waterfront infrastructures to ship food into NYC, which can strengthen NY state's economy while providing healthier food options for local food deserts. OneNYC plans to invest \$100 million in marine terminals for freight movements.



Cooperatively Owned Microgrids

Both the City and state government have called for an expansion of distributed generation (DG) technology, including wind, solar, and geothermal. This plan supports the implementation of DG in the form of microgrids that are deployed in vulnerable areas and/or are managed by local stakeholders. The City is currently undertaking a microgrid feasibility study and removing policy roadblocks to microgrid construction by working with ConEd and the Public

Service Corps to revise "ConEd's standby tariffs to lessen economic impediments to DG". Microgrids provide multiple benefits, including reliable power when the main grid experiences a blackout, reductions in energy costs, more control for residents over their own energy consumption, and employment opportunities.

Community Bank

Financial services should be provided by local institutions connected with the community. Locally-run finance can shift the focus of banks away from their short-term profit, towards long-term investment in infrastructure, development of small businesses, and other much-needed investments in shared resources that will benefit the community.

Places of Worship

Churches, mosques, synagogues, and other religious institutions provide flexible spaces for community planning and emergency services, while conveying important climate-related messages through religious practices. Many churches, urged on by Pope Francis, are joining the struggle for climate justice.

Urban Agriculture

Local agriculture is an integral component of climate resiliency, as it helps build communities' self-reliance while reducing the massive petro-chemical footprint of existing industrialized food systems. The City plans to increase its number of community gardens by partnering with schools, helping gardeners sell their produce at farm stands, and supporting urban farms through

(cont'd from Urban Agriculture)

the multiagency Building Healthy Communities Initiative. NYCHA's Gardening and Greening program is also working to expand accessibility to community gardens. Our partners, such as the Corbin Hill Food Project, are deeply engaged with these issues and are mapping out an effective model for a sustainable food system in Northern Manhattan.

Participatory Budgeting

In April 2015, over 51,000 NYC residents voted on how to allocate \$52 million to various locally-developed capital projects across 24 NYC Council Districts. Participatory budgeting is a clear example of how residents can be made to engage directly with governance systems to tailor policy to their needs. Given the level of site specificity essential to effectively address climate change issues, PB should be expanded to encompass more of the City's budget, green projects, and longer-term investments.

Resilient Housing

True victory in the climate struggle is not simply based on the preservation of physical conditions, but also on the achievement of lasting security for communities that are now under threat of displacement. Therefore, affordable housing should be a priority for climate advocates, just as it is for the Mayor's office and many NYers. Supporting NYCHA by reinvesting in its infrastructure is a necessary first step, but we must also ensure that further price hikes do not happen and that NYCHA property leased to private developers does not cause further gentrification. Simultaneously, alternative models for transitional housing, such as the Sugarhill development by Broadway Housing Communities should be explored.

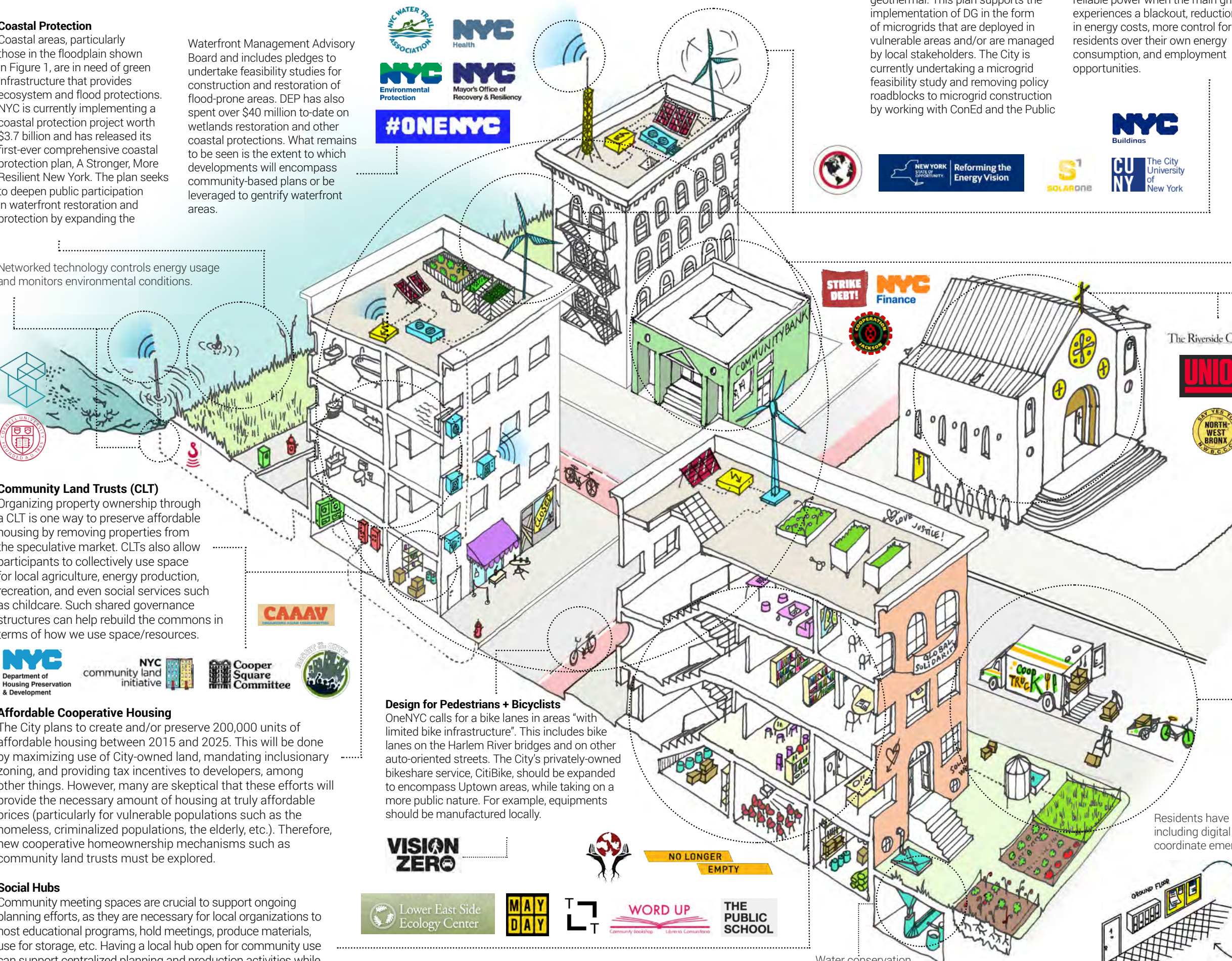
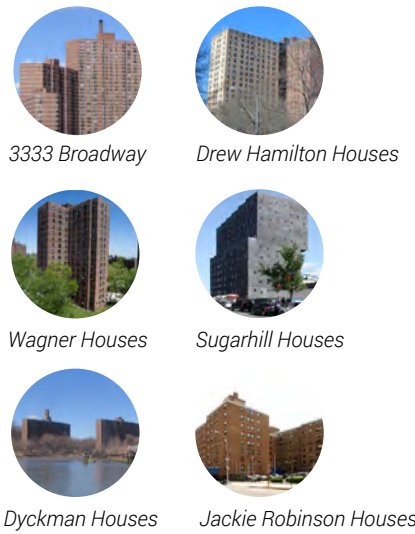
It is particularly important to ensure that homes are cool enough for the elderly. Between 2000 and 2011, 85% of those who died from heat in NYC died in their own homes.

"NYCHA has an important role to play in reducing this city's carbon footprint and I look forward to [making] our public housing more efficient and resilient"

-Council Member Ritchie Torres

Healthcare

Healthcare services should not only be expanded to provide aid to more people; they must also be made resilient enough to continue to function during the next superstorm, heatwave or other crisis. Post-Sandy healthcare resilience efforts include installing infrastructure to protect against flooding, building distributed generation systems (and microgrids), and connecting precarious demographic groups with health services. Healthcare providers should establish connections with local emergency response systems so that people who need special health services during a crisis can be reached and treated quickly.



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I represent: BURNS Engineering

Address: 1261 Broadway New York NY

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I represent: 350 Brooklyn

Address: Brooklyn, NY

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Name: Scott Kessler

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I represent: Brooklyn Microgrid

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Address: 1854 AMSTERDAM AVE NYC 10031

I represent: WE ACT FOR ENVIRONMENTAL JUSTICE

Address: SAME AS ABOVE

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Name: Annel Hernandez

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