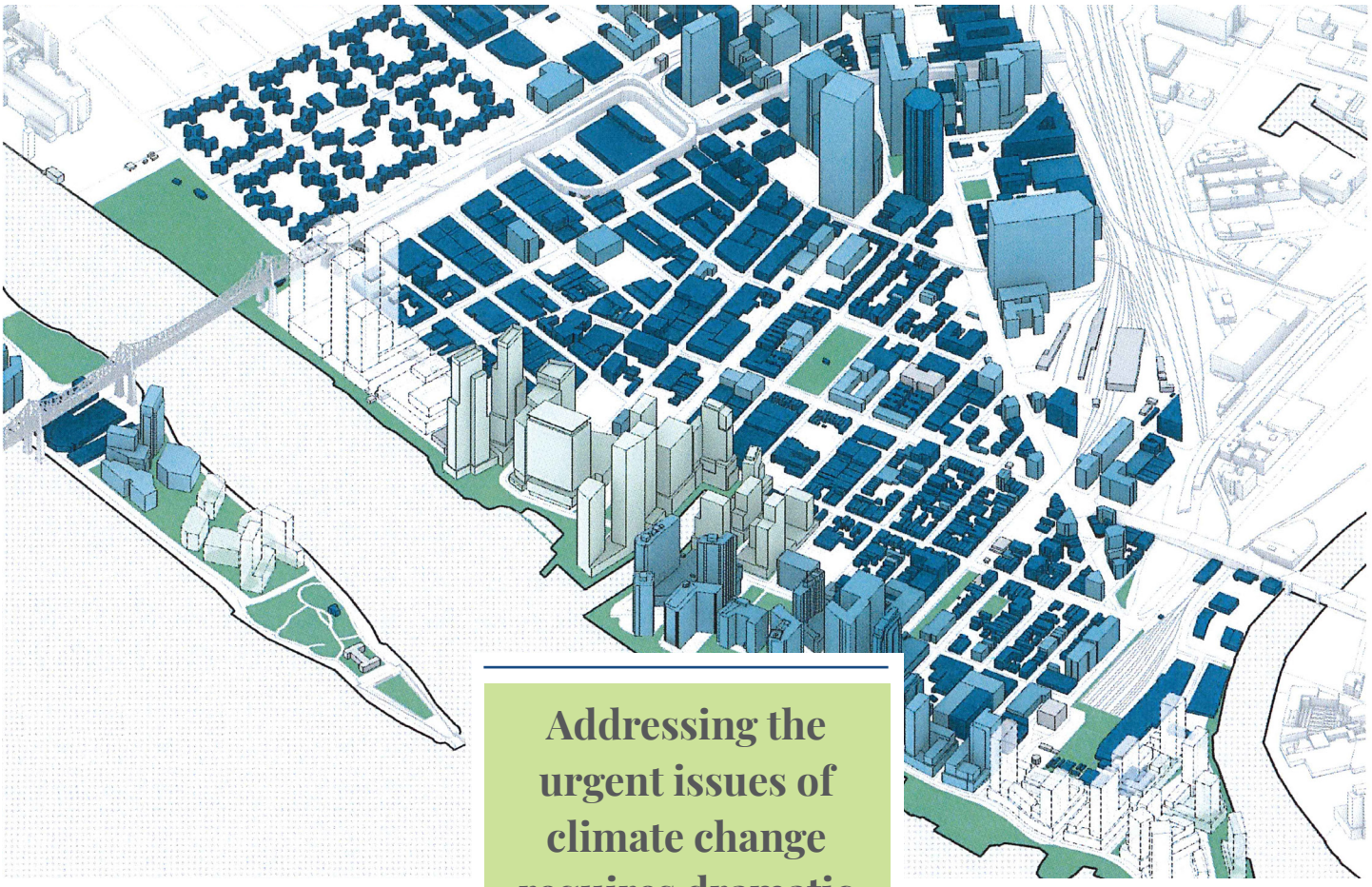
Engineering green district energy in Long Island City



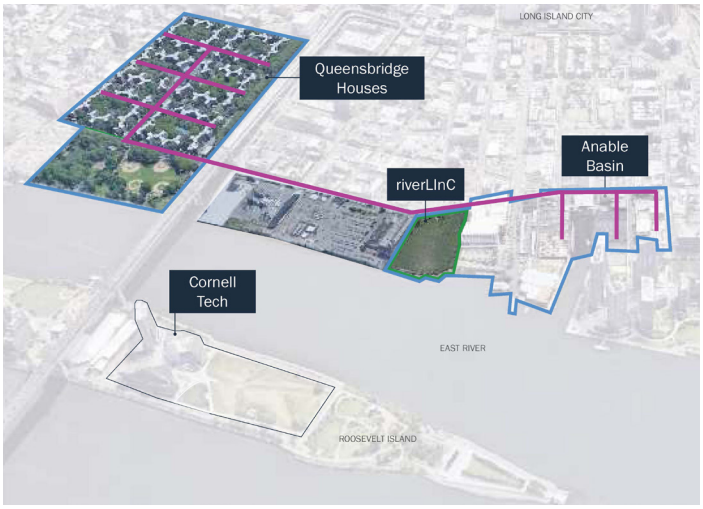
Addressing the urgent issues of climate change requires dramatic re-thinking of how energy is generated and consumed.

Home to roughly 7,000 people living in 3,142 apartment units, the 1939 Queensbridge Houses development is supported by infrastructure that is long past outdated. Providing a major upgrade with a green district energy system will improve residents' lives, create jobs, establish a resilient modern infrastructure benefiting Long Island City, and introduce a model to replicate throughout the five boroughs.

Green district energy is already an established means of providing exceptional energy efficiency and drastically reducing carbon emissions around the world and increasingly across the US. The central strategies and technologies involved are already functioning in support of the Cornell Tech campus on Roosevelt Island, and are a core component of the planning and design to date for the mixed-used RiverLInC development at Anable Basin. The RiverLInC system is engineered to integrate with Queensbridge Houses, providing highly efficient, highly reliable, extremely low carbon heating and cooling.

Connecting distribution infrastructure from the waterfront RiverLInC district to Queensbridge will be required. However, the concept will reuse the existing mechanical spaces of Queensbridge houses but replace existing mechanical equipment with reliable, controllable components that will increase tenant comfort, provide enhance controllability, and address significant deferred maintenance that has rendered the current system unreliable. The current steam boiler system will be removed and replaced with electric heat pumps to create heating and cooling for each residential unit. Equipment will be modular in nature, facilitating efficient construction processes to minimize building disruption. Redundant equipment components will ensure system reliability. Phasing will ensure steady, visible progress during implementation and allow residents to remain within the community during construction.

This concept sharply reduces energy use and carbon emissions while addressing deferred maintenance, enabling a zero carbon future while exceeding NYCHA Sustainability Goals.



.A district green energy system for New York

Buildings account for 67% of New York City's greenhouse gas emissions, and 75% of building-specific usage is related to heating and cooling.

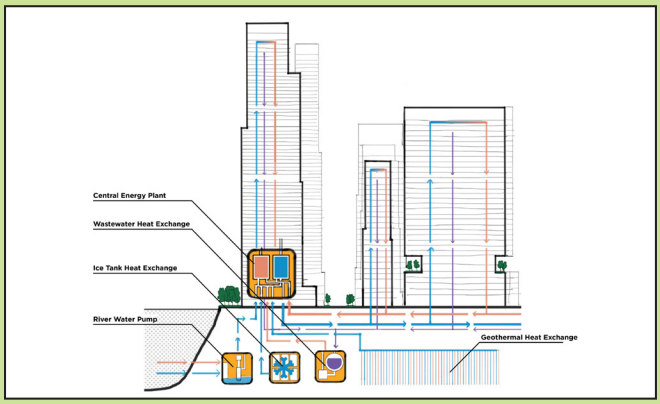
For decades, business-as-usual has enabled inefficient designs with poorly insulated facades and emissions-heavy building systems for heating and cooling. This is a paradigm that can no longer be sustained.

New York has taken steps to start tackling this problem. In 2019, Local Law 97 was adopted, mandating a 40% reduction in emissions by 2030. The OneNYC plan targets an 80% reduction in emissions by 2050.

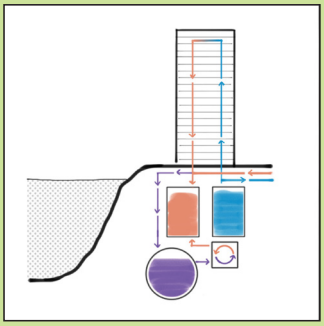
Partnership between public and private sectors is required to effectuate this transition at scale. The public sector must work on greening the sources of power in the electric grid, while partnering with the private sector on implementing large-scale alternative energy solutions.

As an example, The Anable District will feature energy efficient modern architectural design to reduce the heating and cooling loads on systems needed to make people comfortable, while also striving to deliver heating and cooling without the use of fossil fuels. To do this, the plan embraces the potential of a climate-forward "thermal grid" that leverages clean energy sources to heat and cool buildings.

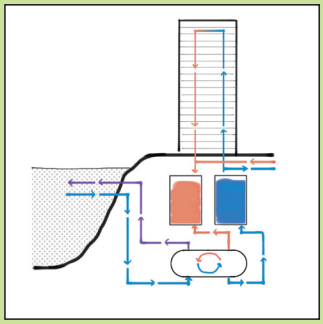
A central heat-pump facility can be constructed in one building within the district (or integrated among multiple buildings). Buildings can draw from hot and chilled water loops at the site level, circulated from a central plant that exchanges energy from clean energy sources: geothermal wells, river-source cooling, air source heat pumps, wastewater energy recovery, and thermal storage.



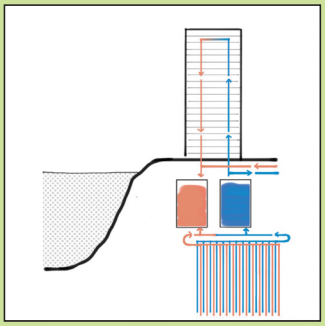
RiverLInC heat exchange systems.



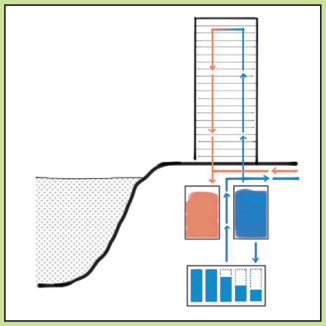
River heat exchange extracts cooler water during hotter months and warmer water during colder months with no impact on the East River ecosystem.



Geothermal heat exchange taps warmer earth temperatures during winter and cooler temperatures in summer.



Extracting heat from wastewater offsets heating demand.



A highly efficient energy storage system is provided onsite.

Images courtesy of: SHoP Architects

Addressing the urgent issues of climate change requires dramatic re-thinking of how energy is generated, recaptured, distributed, and consumed. As part of a comprehensive energy platform, this is a feasible initiative for deployment, implementation, and operation throughout the City and region.

MEP GEOTHERMAL ENGINEERING

37A 9th Street | Brooklyn, NY 11215

Contact Info:

Jeff Urlaub, PE
Principal
715.828.8592
jurlaub@mepgeoeng.com

Mike Walters, PE, LEED AP
Principal
608.225.8608
mwalters@mepgeoeng.com