

Housing Authority of the City of Newark - Energy Conservation Program

General

The Newark Housing Authority (the “Authority”) is the largest public housing authority in New Jersey, charged with providing low-income residents in Newark with decent, safe and affordable housing. The Authority owns and operates over 8,000 rental units located in 38 neighborhoods, consisting of six high-rise buildings, seven elderly low-rise or garden complexes, thirteen family town house complexes, and two family low-rise or garden complexes. Its mission is to invest in families by building and maintaining affordable housing to encourage economic independence and healthy communities.

Currently, the Authority has embarked on a comprehensive energy management and energy improvement project¹ through a guaranteed energy performance contract (“EPC”) that promises to revolutionize both the way it provides and consumes energy at all of the Authority’s housing complexes. The project anticipates significant energy and cost savings generated through the energy conservation measures that, after debt servicing, will accrue long after the hardware has been installed. Additionally, investing in new technology today will help ease the considerable capital improvements needs years from now. Furthermore, these improvements provide the Authority with yet another way to reduce its carbon footprint and ensure a healthy and sustainable community for our residents and greater community now and in the future. The Authority intends to borrow funds at a desirable interest rate to finance all project costs, including design, acquisition, installation cost and soft costs under this project.

Energy Conservation Program

The U.S. Department of Housing & Urban Development (HUD) permits public housing authorities to employ financing techniques that use cost savings from reduced energy consumption to repay the cost of installing energy conservation work. As such, the project itself requires no upfront capital expense to the Authority. The loan borrowed by the Authority will be repaid exclusively from operational cost savings generated after the installation of the energy conservation equipment. An added feature of the project is that performance of the equipment and the potential consumption savings are being guaranteed by the contractor, Constellation Energy. Constellation Energy guarantees that the Authority will achieve the consumption savings it projects for the 15 year contract term. This guarantee is backed by the parent company of Constellation Energy.

Environmental Impact

Because of the reduction in electric and fossil fuel consumption associated with this project, the Authority calculates a substantial reduction in the amount of pollutants emitted to the atmosphere. As a result, the Authority will minimize emissions of harmful nitrogen oxides (NO_x), sulfur oxides (SO_x), and carbon dioxides (CO₂). By implementing this project, the Authority will minimize the creation of pollutants, the impact of which is approximately equal to turning off 31,154 100-watt light bulbs for a year, eliminating the average daily use of water for 2,800 persons, and removing 2,800 cars off the road each year. Other environmental outcomes of this project are comparable to planting 76,212 trees each year and removing 2,800 cars off the road each year. The total carbon footprint reduction will be equal to 16,596 tons of carbon dioxides per year.

¹ Additional information relating to the Authority's Energy Conservation Program, including a full copy of the Authority's Energy Conservation Program Plan, is available at the offices of the Authority located at 500 Broad Street, Newark, NJ. The additional information, includes, but is not limited to: 1) an assessment of risks involved in the implementation of the Program; 2) schedules showing calculations of all costs of implementation of the energy conservation measures, and their projected energy savings; 3) a description of Program maintenance requirements; 4) a description of the energy services guarantee associated with the Program; 5) a description of design compliance issues requiring the professional services of architects and engineers, and the identity thereof; and 5) eligibility for, and costs/revenues associated with the PJM Independent System Operator for certain service activities.

Energy Project Snapshot

Energy Conservation Measures (ECM)

Lighting (hallways, apartments, common space):

Lighting improvements have been recommended for all sites listed in this energy conservation program. The proposed upgrade takes into account four major components of a lighting system – use, quality, maintenance, and energy savings. The primary design strategy includes upgrading existing lighting components to a high-efficiency system in an effort to improve both energy and material savings. Existing fluorescent fixtures, which cannot be upgraded by re-lamp/re-ballast or retrofit, will be either replaced with new luminaries or re-lamped and/or re-ballasted based on their current condition. Existing incandescent and compact fluorescent exit signs will be replaced with new polycarbonate LED exit signs containing battery back-up. Existing incandescent and compact fluorescent illuminating fixtures will be replaced with high performance compact fluorescent equivalents.

Water (toilets, showerheads, aerators):

Water and sewer savings for this measure are derived from reduced flow of fixtures, resulting from a combination of fixture replacements and replacement of regulating devices within specific fixture types. The residential water consumers consist of water closets (toilets), shower heads, bathroom and kitchen sink faucet aerators.

Windows:

The Authority intends to replace existing windows at several senior high-rise buildings with new, energy efficient, cost effective windows. The windows being replaced are single paned, metal frame windows. The new windows will decrease air infiltration and heat loss problems and provide additional energy savings to the housing authority.

Boiler Decentralization:

Energy losses associated with the existing central plant at Stephen Crane Village are high due to multiple leaks in the steam piping distribution system, a nonoperational condensate recovery system, and heat losses throughout the extensive underground distribution piping system to remote buildings. Decentralization is the most cost effective solution to address energy losses in the existing centralized system.

Boiler Controls (Outside Air Reset, Stack Economizer):

This measure eliminates much of the waste associated with overheating buildings in winter months, effectively wasting valuable energy. With the addition of zone control valves, outdoor air temperature sensors and indoor rate thermostats, the steam delivered to heating units are reduced to prevent unnecessary consumption. System pressure may be controlled to balance input to terminal heating equipment with outdoor air temperature. This will alleviate the problem of overheating and reduce the losses associated with distribution piping.

Boiler stack economizers recover waste heat that would otherwise be exhausted to the atmosphere and essentially lost from the heating boiler. Condensing economizers take the sensible heat from the exhaust and latent heat from the water vapor contained in the exhaust and transfer it to water that can be used for domestic purposes such as showering and kitchen use. Both measures will reduce energy consumption and indirectly lower emissions.

Cogeneration:

Cogeneration is a widely accepted method of producing power and heat on a decentralized basis. It involves the efficient simultaneous production of electricity and hot water using natural gas to reduce energy costs. This technology is also known as combined heat and power or CHP. These systems are typically installed to provide thermal supply with electricity as an ancillary output providing economic benefit to overall electricity purchase. It typically has the benefits of: lower energy costs, excellent payback, high efficiency and reduced carbon emissions.

Energy Service Company (ESCO)

Constellation Energy / CLT

Project Cost **Total Guaranteed Savings (15 Years)**
 \$49,560,203 \$78,548,607

NJ Rebate Incentive - \$2,112,764.20 potential to the Authority for energy conservation work to occur at seven (7) hi-rise senior buildings including Stephen Crane (North Ward), Otto Kretchmer (South Ward), Seth Boyden (South Ward) and James Baxter Terrace (Central Ward).

Payback Years – 8.8 (average number of years for equipment to generate operational savings to cover project cost)

Contract Term – 15 years plus two (2) year construction

Residential Sites – Family, Hi-Rise and Townhomes (34 different communities) affecting 6,443 units

Useful Equipment Life Cycle – up to 25 years

Projected Consumption Savings (1st year): Water= 102,698,000 gallons, Electricity= 7,512,716 kWh, Therms= 1,259,253

| ECM | Consumption Decrease/ (Increase) | | | Guaranteed Cost Savings Year 1 | | | |
|-----------------------------|-------------------------------------|------------------|--------------------------|-----------------------------------|--------------------|--------------------|--------------------|
| | Water & Sewer M Gallons | Electric kWh | Natural Gas Therms | Water & Sewer | Electric | Natural Gas | Total |
| High Efficiency Lighting | ----- | 5,916,310 | ----- | \$ - | \$1,084,805 | \$ - | \$1,084,805 |
| Low Flow/Flush Equipment | 101,792 | ---- | 491,457 | \$537,421 | \$ - | \$740,112 | \$1,277,533 |
| Window Replacement | ---- | ---- | 60,111 | \$ - | \$ - | \$97,272 | \$97,272 |
| Outside Air Reset | 906 | ----- | 488,390 | \$4,812 | \$ - | \$773,558 | \$778,369 |
| Boiler Stack Economizer | ----- | ----- | 112,226 | \$ - | \$ - | \$177,095 | \$177,095 |
| Boiler Decentralization | ----- | ----- | 138,860 | \$ - | \$ - | \$212,223 | \$212,223 |
| Cogeneration | ----- | 1,596,406 | (31,802) | \$ - | \$273,127 | \$(49,938) | \$223,189 |
| Totals | 102,698 | 7,512,716 | 1,259,253 | \$542,233 | \$1,357,932 | \$1,950,322 | \$3,850,486 |