Charging the Battery: Energy Efficiency in Battery Park City

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ABSTRACT

Battery Park City (BPC) is a 92-acre neighborhood in New York City's lower Manhattan, which has been developed over the past few decades by the Battery Park City Authority (BPCA), a public benefit corporation established in 1968 to develop the site. In the late 1990s, BPCA committed that all future buildings built on the remaining undeveloped parcels would need to meet "Green Guidelines," and published leading edge Environmental Guidelines. These Green Guidelines represent an ambitious effort to ensure environmentally responsible construction on a large scale in a high density urban context. By encouraging developers to strive for "green" or "sustainable design", the BPCA Green Guidelines establish BPC as a premier community with environmentally friendly places to live and work in urban environments. The first building constructed to meet the Green Guidelines, a 27 story apartment building, was completed in 2003.

The BPCA has also begun work on development and implementation of a sustainable energy master plan for the entire community with the objectives of reducing energy use and associated environmental impacts, maximizing the efficiency of the community's energy systems, and improving system reliability. This effort, with a crucial community education component, involves working with building managers and tenants in the existing commercial and residential buildings in BPC to identify and implement energy savings and clean distributed generation opportunities. This paper reviews the development and implementation of the Green Guidelines, and progress toward improving the energy efficiency of BPC's existing buildings.

Introduction

BPC is located at the southwest tip of Manhattan, and consists of 92 acres created from landfill during the 1970's. Since then BPC has emerged as a premier location for both commercial and residential development in New York City. A map of BPC is shown in Figure 1.

BPC overlooks New York harbor and the Statue of Liberty to the southwest, the Hudson River and the New York and New Jersey shorelines to the west and north and the skyline of Lower Manhattan to the east. It is adjacent to New York City's downtown financial district and is within a reasonable distance from many of the City's well-known neighborhoods, including Tribeca, Greenwich Village, Chinatown, Little Italy, SoHo and the South Street Seaport area. City Hall and a large complex of state and federal offices are several blocks to the northeast of BPC.

The World Trade Center, which was destroyed by the terrorist attack of September 11, 2001, was adjacent to BPC and was a major office, shopping and restaurant complex and a significant transportation hub. The attack had a major impact on BPC as well as other parts of lower Manhattan.

As part of the Wall Street financial district, BPC has attracted major financial institutions, including the corporate headquarters of Merrill Lynch & Company, Inc., American Express

Company, Inc., and Dow Jones & Company, Inc.. The World Financial Center comprises four office towers containing a total of approximately 8,000,000 gross square feet, and includes as its centerpiece the acclaimed Winter Garden. The World Financial Center also contains more than 200,000 square feet of retail and restaurant space, and is adjacent to the World Financial Center's outdoor Plaza and the North Cove.

In 1997 the New York Mercantile Exchange ("NYMEX") completed a 500,000 square foot building adjacent to the World Financial Center to provide its headquarters and trading facilities. The one-half acre memorial to the Great Irish Hunger of 1845-1852 was completed and dedicated in July 2002. Immediately to the north of the World Financial Center is an Embassy Suites Hotel with approximately 460 rooms and a multi-screen movie theatre.

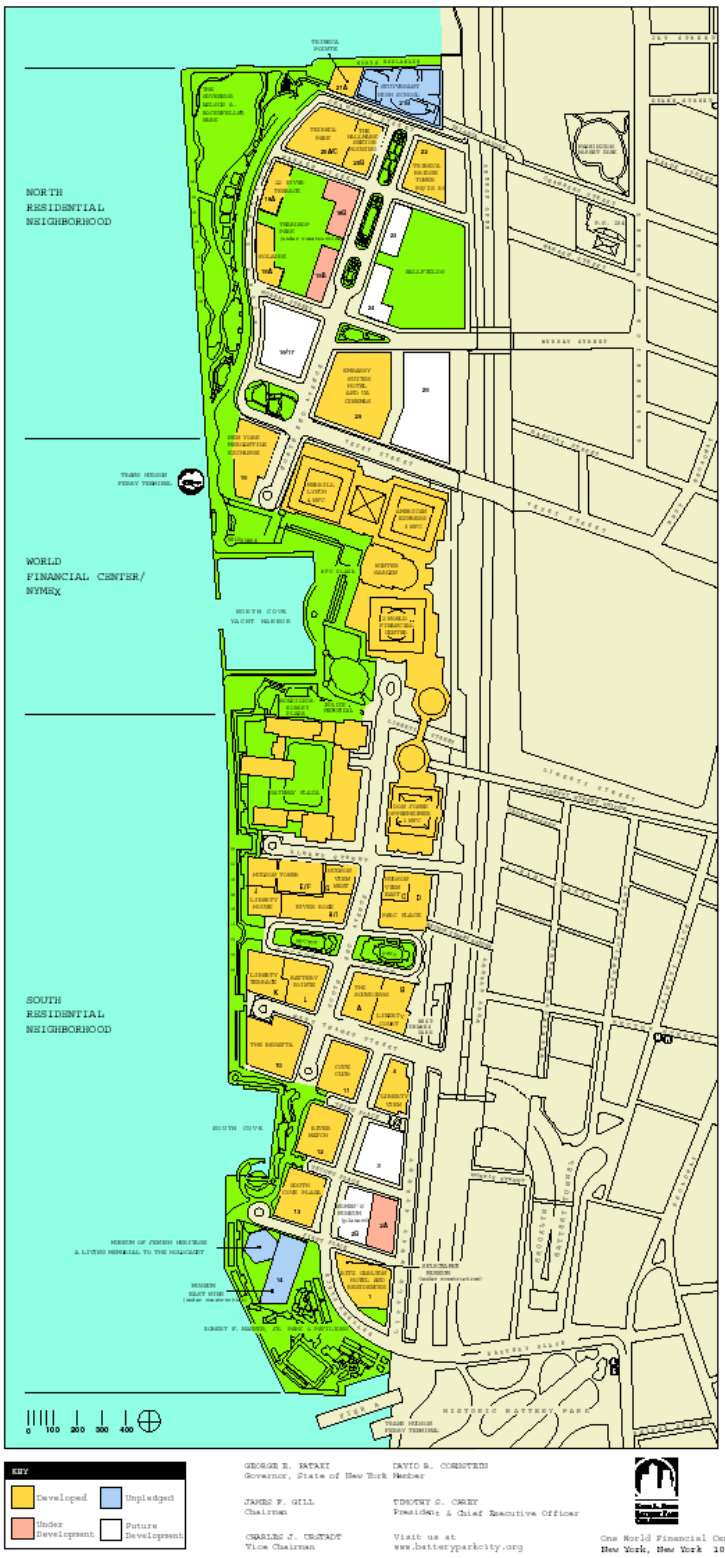
The northern part of BPC is a residential neighborhood that will ultimately contain approximately 4,000 apartments. Tribeca is across West Street from the Project's north neighborhood, providing a link to another of the city's most desirable residential neighborhoods, with access to a growing array of restaurants and retail amenities. Stuyvesant High School is at the northeast corner of BPC, as is the eight-acre Rockefeller Park and the Tribeca Bridge, a pedestrian bridge across West Street at Chambers Street. Across Chambers Street from Stuyvesant High School, the Authority has built an elementary and middle school (PS/IS 89), which began operation in the fall of 1998. Six residential projects have been completed in the north neighborhood, and two are in design. With the completion of the two projects in design, the north neighborhood will contain approximately 2,500 rental apartments, with three residential sites remaining to be developed.

The southern portion of BPC is a residential community considered to be one of New York's most architecturally distinguished and valuable neighborhoods. Approximately 5,100 residential units have been completed there, including a Ritz-Carlton luxury hotel/condominium at the southernmost end of BPC. The site immediately north of the Ritz-Carlton, with a maximum floor area of 416,200 square feet, has recently been awarded for development as a residential condominium.

To the east of BPC's south neighborhood is the Wall Street office district (only a five-minute walk), which traditionally has been the workplace of many people living in BPC. Over the past decade, this area has been in the midst of a transformation into a 24-hour community with many more residential housing units, stores and restaurants than had previously existed. The State and City are committed to the goal of revitalizing lower Manhattan as a 24-hour neighborhood with important residential, commercial, retail and cultural components. Achievement of this goal will also provide additional amenities to people living in BPC.

Today, BPC has developed into a vibrant community featuring nearly 35 acres of permanently protected open space, residential condominium and rental buildings, commercial buildings, schools, museums, shops, art works, and gardens. BPC takes full advantage of compact building design and high-density building construction at the edge of one of the country's oldest urban cores. The development fosters a non-auto-dependant lifestyle thanks to a host of transit options, including local and regional rail, ferries and bus, as well as places of employment, and retail and entertainment facilities within walking distance of every residence. Further, with its myriad parks and esplanades along the river, the community offers an unparalleled open space amenity for an urban downtown development and a distinctive riverfront identity.

Figure 1. Map of Battery Park City



Recognition of opportunities for Green Leadership

In the late 1990s, with about 85% of the planned floor area already built out, New York Governor George Pataki and the leadership of BPCA saw the opportunity to showcase the State Government's environmental initiatives by requiring all new development in BPC to meet leading edge environmental guidelines. With several parcels about to be released for long term ground lease to developers, BPCA developed a set of leading edge Green Guidelines that any developer would need to meet.

Combined with the availability of New York State's "Green Buildings Tax Credit" which provides additional financial benefits to developers of green buildings, this "carrot and stick" approach has led to significant interest in green development in New York City.

Development and Evolution of Green Guidelines

Under Governor Pataki's leadership, BPCA published its Residential Environmental Guidelines for residential construction in January of 2000 and Commercial and Institutional Environmental Guidelines in 2002. These Green Guidelines represent perhaps the most ambitious effort to date to ensure environmentally responsible construction on a large scale in an urban context and reinforce and reassert this neighborhood's unique success in smart growth development.

By encouraging developers to strive for "green" or "sustainable design", the BPCA Green Guidelines establish BPC as a premier community that is leading the charge to design and construct environmentally friendly places to live and work in urban environments. The Governor's goal of green development resulted in BPCA Green Guidelines and set a benchmark for "green" architectural and construction standards in New York City, the region and throughout the country.

The original BPCA Residential Environmental Guidelines were written in 1999 and published in January 2000, sponsored by BPCA, the New York State Energy Research and Development Authority (NYSERDA), and the Carrier Corporation. They were written by Fox & Fowle Architects, Flack + Kurtz, Green October, the Rocky Mountain Institute, the Carrier Corporation, Barney Skanska USA, BPCA, and NYSERDA. Adding to BPC's successful development over the years, the BPCA Green Guidelines have established a process for the creation of environmentally responsible construction standards and practices for development. The buildings created by this effort will become the model for healthier, ecologically responsible, environments where occupants can enjoy the benefits of living in a "green" community.

By encompassing a range of planning and construction strategies and approaches, from encouraging the use of bicycles and shared-vehicle plans, to defining responsible landscaping practices, and improving energy efficiency including "tenant energy guides," the Green Guidelines provide options that could be applied in almost any urban or suburban context, for commercial as well as residential projects. A key goal of BPCA's Green Guidelines is to minimize the impact of first costs. Cost trade-off strategies make the implementation of the Green Guidelines economically viable for the community and help to make this approach replicable in other markets.

Based upon the initial Green Guidelines produced in January of 2000, nine development teams vied for the opportunity to develop the very first residential building in BPC to adhere to

these guidelines. Within three years, in the midst of recovery from the 9/11 attack, a preferred development team was selected, a design was approved and construction was commenced on *"The Solaire"* at 20 River Terrace, a residential building that meets the strict new standards for sustainable design.

BPC is now home to the first green high-rise residential building in the world. The first eight floors of "The Solaire" were ready for occupancy July 1, 2003, and the building is now fully occupied, with rental prices commanding a five percent price premium due to the green features, when compared to other similar buildings in the neighborhood. The Solaire received the LEED Gold Certification in April 2004. According to Russell Albanese, president of Albanese Development Corporation, the building's developer,

> "20 River Terrace will give to New York a building that not only contributes to the well-being of the environment, but also to the healthfulness of its residents. This building will introduce a new tier of choice in residences: one in which New Yorkers can select their home on the basis of issues such as air quality, energy efficiency and abundant natural light while also enjoying …access to recreation and cultural events and convenient commutes to work."

A photo of the Solaire is shown below in Figure 2, with a summary of its "green features" in Figure 3 (more detailed information about the Solaire's features can be found in summary for the US Department of Energy's Summary Brochure on the Solaire (DOE 2004)).

Figure 2. The Solaire in Battery Park City

Revisions to Update Green Guidelines

The Solaire was the first building to meet the BPCA Green Guidelines, but more will soon follow. BPCA recently approved the development of a 450,000-square-foot, 282-unit luxury condominium building on Site 2A. The developer has begun construction in the Spring of

2004, and construction will also soon begin on sites 18B and 19B for approximately 500 additional units.

Figure 3. "Green Features" of the Solaire

Energy

- Energy conserving building design is 35% more energy-efficient than code requires, resulting in a 67% lower electricity demand during peak hours.
- Lower electric bills for residents.
- Photovoltaic panels convert sunlight to electricity.
- Computerized building management system and environmentally responsible operating and maintenance practices.

Air Quality

- Advanced central air-filtration system.
- In-building 24-hour air quality monitoring system.
- Vapor and air barrier minimizes random air-infiltration.
- 24/7 exhaust in every bath and kitchen.
- Building materials and paints with low or no off-gassing.
- 24-hour carbon monoxide monitoring in parking garage.

Water Quality

- Central water-filtration system for entire building.
- Refrigerators that provide doubly filtered drinking water and ice.

Additional Features

- 33% more sheetrock between apartments provides extra soundproofing and fire barriers.
- Resident-use, pesticide-free rooftop garden provides natural insulation for building.
- Rainwater storage and reserve for roof garden irrigation.
- In-building wastewater treatment system re-supplies toilet water and make-up water for central air conditioning.
- Natural gas-fed central heating and cooling system, free of ozone depleting refrigerants.
- In-building bicycle storage area.

Updating the Green Guidelines to respond to the public's awareness of environmental conservation and increased demand for higher quality and healthier environments, as well as new technological developments, are also a key aspect of BPCA's Guidelines project. The current version of the Green Guidelines, published in December 2003 (BPCA 2003) as part of an RFP for Site 16/17, incorporates what was learned from *The Solaire*, and is a response to the evolving technology, philosophy, and feasibility of green development.

Existing Buildings in BPC

While the Green Guidelines are making a dramatic impact on the environmental performance of new buildings built in BPC, BPCA management recognized that the existing building infrastructure built prior to the Solaire has many opportunities for green improvement. In 2002, BPCA initiated a sustainable energy master planning process, to develop a sustainable energy master plan for the entire community with the ambitious objectives of reducing energy use and associated environmental impacts, maximizing the efficiency of the community's energy systems, and improving system reliability. The sustainable energy master plan, with a crucial community education component, is intended to be applied not only to future construction but also to existing buildings.

The first phase of this project included a preliminary assessment of the existing energy infrastructure at BPC; the legal, regulatory, political and financial settings; and the development

of preliminary sustainable energy goals and objectives. The goals and objectives explored during the preliminary assessment, along with their estimated feasibility, are presented in Table 1, with a summary of progress/status over the past year.

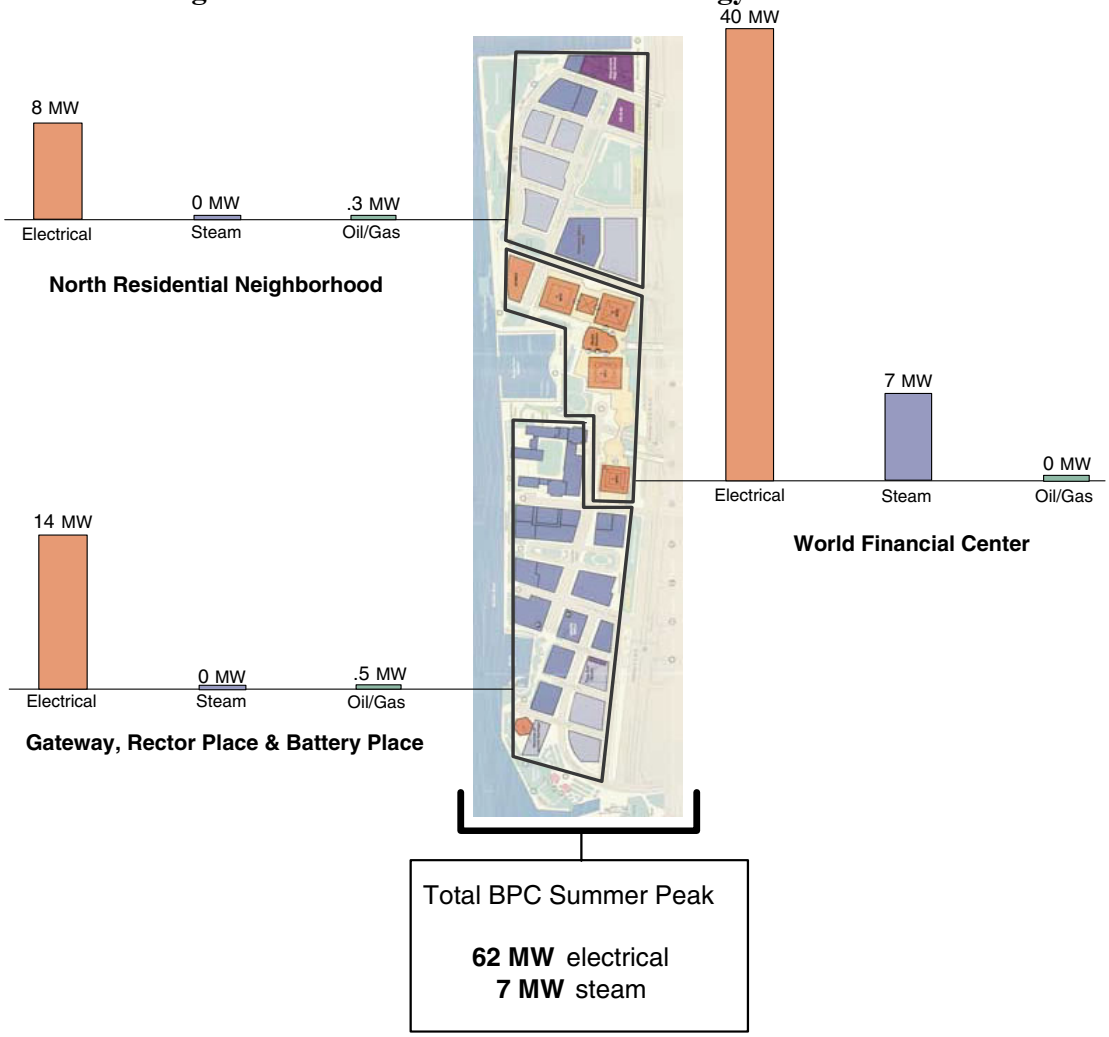
Table 1. Sustainable Energy Master Plan Preliminary Goals, Feasibility, and Status

	Goal	Estimated Feasibility	Status
DEMAND	20%-40% Reduction in Existing Buildings and Apply Green Building Green Guidelines to New Construction	High, though requires cooperation from tenants	Work underway with some building managers, including NYMEX and several residential buildings Ongoing
OFF-SITE SUPPLY	100% BPCA Purchase of Alternative/Green Energy and 10% – 20% Of Tenants Purchase Alternative/Green Energy	BPCA will purchase energy through the NY Power Authority, which has a growing green energy portfolio. There will also be an education effort to encourage tenants to purchase green energy	On Hold; may be revisited
INDEPENDENT ON-SITE SUPPLY	Develop Distributed Generation Systems Throughout BPC (Solar, Micro / Mini Turbine, Fuel Cells, Wind)	High for small to medium Distributed Generation Demo Projects	Investigating potential sites
DEMONSTRATION FACILITY / BETA SITE	Develop 100 KW to 500 KW "Plug & Play" Demonstration and Education Facility to Test Clean Energy Technologies	High, strong potential to follow up on success with Green New Buildings	As noted above, seeking best education/demo sites
ENVIRONMENTAL	20%-50% Reduction in Global CO_2 Emissions	Medium	Will result from other activities above

A part of the Sustainable Energy Master Planning project includes development of baseline energy consumption information for BPC, and effort over the past year has gone into assembling a detailed database of current consumption, and projecting potential reductions through energy efficiency improvements and distributed generation opportunities. A summary of the estimated summer energy loads in BPC is presented as Figure 4.

A challenge in working with the existing buildings is that BPCA has no regulatory authority or other means to mandate greater efficiency in the buildings built prior to development of the Green Guidelines. As such, the BPCA energy team has been working closely with a number of the building owner and managers in BPC, and aggressively attempting to get their attention to improve the efficiency of the buildings, both for energy cost savings and other "greening" aspects included in the new building Green Guidelines. The unfortunate reality is that energy costs are a relatively small cost for the very expensive real estate in Lower Manhattan, and getting the attention of senior management for saving a relatively small amount of money is a significant challenge.

Figure 4. Estimated Summer Peak Energy Loads in BPC



The team has had some success working with the NYMEX facility, where "top to top" convincing, with the President of BPCA dealing directly with the Board Chairman of NYMEX, has resulted in strong interest in NYMEX becoming LEED EB (Existing Building) Certified. A number of actions by the facility management staff are needed to make this a reality, and it is not yet certain whether enough improvements can be made to achieve the LEED certification.

Similarly, several of the existing residential buildings where a single managing agent controls multiple buildings, and has the potential to improve hundreds of residential units if convinced of the merits, are considering energy efficiency and distributed generation projects. More information about the success of this will be known in the coming years.

Conclusions

Following the BPC example, which has unanimous political support locally, regionally and at the State level, other communities are looking to invoke similar environmental guidelines for envisioned future urban redevelopment projects. A 90-block section of midtown Manhattan, known as Midtown West, is undergoing a zoning environmental impact statement that includes a

provision to develop sustainable guidelines written directly into the zoning special district regulations. Recently, the Lower Manhattan Development Corporation (LMDC), the state entity established to coordinate re-development following the World Trade Center attack which is responsible for all of the new buildings going in to replace the buildings destroyed, issued a set of draft environmental guidelines, similar in some ways to the BPCA Green Guidelines, but in some ways more broad due to the wide scope of LMDC's planning responsibility.

A recent news story on Green Buildings in New York's Gotham Gazette (2003), a daily newspaper published by the Citizens Union Foundation, talked about the important role of government in stimulating green building markets. According to the article:

> "Cities such as Austin, Texas, and San Francisco have long featured environmentally sound construction, but the movement did really begin in New York City until recently, when the state and city governments began getting involved.
>
> In 2000, Governor George Pataki unveiled a green building tax credit, the first one of its kind in the country, that has allowed some developers of environmentally friendly buildings to write off as much as $6 million on their tax bill.
>
> The impetus for the Solaire came from the BPCA, a semi-autonomous state entity, which in 2000 adopted some of the most stringent green building requirements in the country. When these requirements are applied to the next generation of buildings to go up in Battery Park City, they will make that area of lower Manhattan one of the most environmentally-conscious urban neighborhoods in the world."

Embraced by developers, the BPCA Green Guidelines project is an example of a public authority legislating the development of private space, representing a unique meeting of government and economics and leading the way for other public private partnerships to build green and to achieve the environmental goals of smart growth.

The larger potential for energy efficiency and further greening remains with the large stock of buildings constructed in BPC prior to the development of the Green Guidelines. With the voluntary nature of work to encourage building owners and managers to retrofit existing buildings, it is less clear how successful BPCA efforts will be. An important lesson from the BPCA initiatives is to begin any mandatory guideline (or even minimum code) activity as soon as possible, to have the largest effect possible.

References

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