Energy Field Report

the green design lab

P.S. -187 HUDSON CLIFFS

349 Cabrini Boulevard
New York, New York

Size: 75,252 square feet
No. of People: 840 students; 105 staff

Basics: The building was constructed in 1929 and consists of four floors, 45 classrooms, 1 computer room, offices, an auditorium, a gymnasium and cafeteria/ multipurpose room. The day begins at 5:30/6:00am for facility staff and typically ends at 6:30pm on weekdays, with staff operating the building after school 2 to 3 days a week until 10pm. The weekend operations are usually 5 hours a day. In the winter time, the boilers run four hours on Saturday and two hours on Sunday.

Key Facility Personnel

Principal:
Ms. Cynthia Chory
212-927-8218

Custodian Engineer:
Brendan Murphy
212-923-9655

Deputy Director of Facilities:
Anthony Fichera
347-672-8162

AVG. ANNUAL ENERGY CONSUMPTION (JULY 2006 - JUNE 2008)

ELECTRICITY

394,560 kWh*
$ 47,347
176 tons of CO_2

FUEL OIL

N/A

NATURAL GAS

51859 therms
$ 77,788
290 tons of CO_2

15% REDUCED ENERGY USE (PROJECTED)

335,367 kWh
$ 40,245
150 tons of CO_2

N/A

44,080 therms
$ 66,120
246 tons of CO_2

*Costs and Emissions were calculated utilizing conversion factors obtained from the PlaNYC Greenhouse Gas Emissions Calculator (v. 2008.4). Average annual energy use, costs and GHG emissions over the July 2006-June 2008 period.

MECHANICAL OVERVIEW

Heating: Building heating is provided by two dual-fuel, 150HP, fire-tube, low pressure (15psi) steam boilers installed in 2000 (typically only 1 is used). The dual fuel switchover is automatic and set to switch from gas to oil at 22˚F. During the winter, the building is supposed to run 68˚F, but is usually around 70˚F. . Classrooms and offices were originally designed to have both radiators/ convectors and uni-vents for heating and conditioned fresh air, respectively.

Cooling: The building does not have a central cooling system and has window AC units instead. Facility reported that the AC unit filters are cleaned twice a year. The MDF server room's AC unit runs all the time.

Lighting: A majority of the lighting throughout the classrooms and administrative areas are 8-foot T-12 fluorescent lighting and 4-foot T-12 lighting in renovated areas. The boiler room has 4-foot T-8 lighting. The gym lights are 150W Metal Halide fixtures.

Hot Water: A separate direct gas fired boiler unit was installed independently of the boilers for heating, supplies domestic hot water for the building. The heating plant upgrade in 2000 also included the installation of associated circulating pumps.

P.S. -187 HUDSON CLIFFS
RECOMMENDATIONS FOR IMPROVEMENT

ENERGY MANAGEMENT

- Ensure accurate utility meter readings
- Monthly energy performance report
- Periodic facility walk through audits
- Energy management plan awareness and presentations to staff
- Training for custodial Staff
- Utilize all available informational tools and systems

PREVENTATIVE MAINTENANCE

Places to focus attention:

- Boilers
- AHUs
- Heat Exchangers
- Steam Traps
- Fans
- Window AC
- Pumps
- Vacuum Pumps
- Duplex Sump Pumps
- Unit Ventilators
- DHW Heaters

FACILITIES OPERATION

- Reduce needs in large MDF room by lowering ceilings or moving servers
- Switch boilers to automatic lead-lag system for better performance
- Retrofit outdoor air dampers to operate automatically
- Plan after-school programming with energy conservation in mind
- Consider service contract for chemical feed system to improve boilers performance
- Fix the sewer pipe back-up problem to relieve staff time
- Consider retrofitting the AHUs with filters to improve coil performance and indoor air quality.
- Maintain room temperature settings at 68 degrees in winter and 76 degrees in summer

CAPITAL IMPROVEMENTS

- Replace all motors with energy efficient equivalents
- Upgrade HVAC pneumatic controls to DDC/BMS
- Install occupancy sensors on classroom lighting
- Reduce corridor lighting by fixture management (i.e. control 50% of corridor lighting with occupancy sensors)
- Upgrade all lighting in the building to T-8s
- Upgrade to LED exit signs
- After upgrading HW circulating pump motors to NEMA premium efficiency (with VFDs if possible by design) also install night setback controls (thermostat, wiring, a dialer and notification protocol) to maintain boiler operation at night to prevent space temperatures from reaching below 55deg F

Information adapted from reports prepared by AECOM/KEMA for the NYC Department of Education in October 2009

Photo © US Department of Energy

Energy Field Report

the green design lab

GEORGE WASHINGTON HIGH SCHOOL CAMPUS

549 Audubon Avenue
New York, New York

Size: 400,516 square feet
No. of People: 2,750 students; 255 staff

Basics: The building was constructed in 1925, with 100 classrooms, computer rooms, an indoor swimming pool, a gymnasium, a cafeteria, an auditorium and several offices. On the building property, there are several temporary classroom units (TCUs), a field house and an athletic field. The main building has six floors not including the basement, penthouse and the Cupola Tower. Program scheduling and community activities require staff to operate the building beyond typical school hours.

Key Facility Personnel

Campus Manager:
Erin B. Larkin
212-927-1841 x125

Custodian Engineer:
212-927-1482

Deputy Director of Facilities:
Anthony Fichera
347-672-8162

AVG. ANNUAL ENERGY CONSUMPTION (JULY 2006 - JUNE 2008)

ELECTRICITY

1,964,000 kWh*
$ 235,680
876 tons of CO_2

FUEL OIL

231,200 gallons
$ 693,600
2,893 tons of CO_2

NATURAL GAS

4,150 therms
$ 6,224
23 tons of CO_2

15% REDUCED ENERGY USE (PROJECTED)

1,669,400 kWh
$ 200,328
744 tons of CO_2

196,520 GALLONS
$ 589,560
2,051 TONS OF CO_2

3,527 therms
$ 5,291
20 tons of CO_2

*Costs and Emissions were calculated utilizing conversion factors obtained from the PlaNYC Greenhouse Gas Emissions Calculator (v. 2008.4). Average annual energy use, costs and GHG emissions over the July 2006-June 2008 period.

MECHANICAL OVERVIEW

Heating: Building heating is provided by two No. 6 oil fired (retrofitted from coal-fired), 450HP, Heine steam boilers. Generated steam is supplied to radiators and uni-vents throughout the building as well as heating coils with in air handling units. During the winter, the boilers operate 24/7 in order to compensate for the building's heat loss. Landmark status prevents upgrades such as insulation or high efficiency windows.

Cooling: The building does not have a central cooling system but has window AC units. A split system type air conditioning unit was recently installed to serve the cafeteria but is currently not in use due outstanding issues with the School Construction Authority (SCA).

Lighting: A majority of the lighting throughout the classrooms, and administrative areas are T-8 fluorescent. However the field house still has T-12 light fixtures. Most of the exit signs in the building are compact fluorescent.

Hot Water: Domestic hot water for the building is supplied by a hot water storage tank heated by the main boilers. One boiler runs for a few hours each day during the summer until it builds a sufficient amount of pressure to supply steam to heat exchangers which provide domestic hot water and pool heating for the rest of the day.

GEORGE WASHINGTON HIGH SCHOOL CAMPUS
RECOMMENDATIONS FOR IMPROVEMENT

ENERGY MANAGEMENT

- Ensure accurate utility meter readings
- Monthly energy performance report
- Periodic facility walk through audits
- Energy management plan awareness and presentations to staff
- Training for custodial Staff
- Utilize all available informational tools and systems

PREVENTATIVE MAINTENANCE

Places to focus attention:

- Heating and Ventilation Units
- Heat Exchangers
- Fans
- AHUs/Packaged Systems
- Pumps
- Vacuum Pumps
- Unit Ventilators
- Boilers
- Steam Traps/Radiators

FACILITIES OPERATION

- Solve permit issues associated with cafeteria split system unit
- Educate building occupants to reduce lighting in classrooms Maintain room temperature settings at 68° in winter and 76° in summer
- Take steps to reduce unnecessary plug-in loads throughout the entire building
- Take steps to consistently de-energize computers, smart boards, projectors and other consumers when not in use
- Take steps to consistently keep windows closed in spaces that are being cooled or heated.
- Retrofit air handling units with air filters
- Utilize heavy curtains for the windows to minimize heat loss in the winter

CAPITAL IMPROVEMENTS

- Install pool heater to be used in summer time
- Upgrade field house lighting
- Install LED exit signs throughout the entire building
- Install and utilize retractable Pool Covers to minimize energy waste Upgrade pool chemical treatment station. Investigate potential chlorine alternative
- Install occupancy sensors for lighting control throughout the entire building Install stand alone domestic hot water heater to be used in the summer time
- Replace existing boilers
- Replace pump/fan motors with NEMA premium efficiency motors Install BMS/EMS system
- Replace the single pane windows with more energy efficient windows.

Information adapted from reports prepared by AECOM/KEMA for the NYC Department of Education in October 2009

Photo © US Department of Energy

Energy Field Report

the green design lab

FIORELLO H. LAGUARDIA HIGH SCHOOL

100 Amsterdam Avenue
New York, New York

Size: 459,433 square feet
No. of People: 2,600 students; 225 staff

Basics: Fiorello LaGuardia High School, constructed in 1984, has 10 floors with 110 classrooms and 11 dance/music studios. There is one theater, one concert hall, a gymnasium and two large lobbies used for exhibitions of student art work. Full scale facilities for musical instrument repair, stage production equipment areas and several rehearsal rooms and office spaces. The building operates from 5am to 12am, and on most weekends and throughout the entire summer.

Key Facility Personnel

Principal:
Kim Bruno
212-496-0700

Custodian Engineer:
George Sesack
212-877-4370

Deputy Director of Facilities:
Joe Lazarus
347-386-4477

AVG. ANNUAL ENERGY CONSUMPTION (JULY 2006 - JUNE 2008)

ELECTRICITY

5,893,200 kWh*
$ 707,184
2,628 tons of CO_2

STEAM

26,363 Mlbs
$ 579,975
1,988 tons of CO_2

NATURAL GAS

1,650 therms
$ 2,474
9 tons of CO_2

15% REDUCED ENERGY USE (PROJECTED)

5,009,220 kWh
$ 601,106
2,234 tons of CO_2

22,408 Mlbs
$ 492,979
1,690 tons of CO_2

1,402 therms
$ 2,103
8 tons of CO_2

*Costs and Emissions were calculated utilizing conversion factors obtained from the PlaNYC Greenhouse Gas Emissions Calculator (v. 2008.4). Average annual energy use, costs and GHG emissions over the July 2006-June 2008 period.

MECHANICAL OVERVIEW

Heating: Building heating is achieved utilizing ConEd steam. The 225 psi utility supply is reduced to 12-14 psi in order to serve eight heat exchangers and several preheat/heating coils in each of the air handling units. There are a total of eight heat exchangers supplying heat to the following system:

- Reheat loop (2)
- Lobby air curtains (2)
- Perimeter heating loop (2)
- Domestic hot water heating (2)

Cooling: In order to satisfy building cooling needs there are three water-cooled centrifugal chillers, one of which is currently out of service due to a suspected transformer problem. There are three 100 HP pumps that supply chilled water to cooling coils in 16 air handling units and a secondary loop that serves several unit ventilators.

Lighting: Most lighting throughout the classrooms, practice spaces, studios and administrative areas are T8 fluorescent. Lighitng is left on in the lobbies, theaters and other spaces regardless of ambient sunlight.

Other: The building contains sixteen escalators and two elevators. The escalators run constantly when the building is unoccupied. The facility staff makes an effort to de-energize these devices when possible, but report that it tends to be difficult because of the handicap requirement.

FIORELLO H. LAGUARDIA HIGH SCHOOL
RECOMMENDATIONS FOR IMPROVEMENT

ENERGY MANAGEMENT

- Ensure accurate utility meter readings
- Monthly energy performance report
- Periodic facility walk through audits
- Energy management plan awareness and presentations to staff
- Training for custodial Staff
- Utilize all available informational tools and systems

PREVENTATIVE MAINTENANCE

Places to focus attention:

- Chillers
- AHUs
- Heat Exchangers
- Steam Traps
- Fans
- Split Systems
- Cooling Towers
- Pumps
- Unit Ventilators/Unit Heaters
- Emergency Generator

FACILITIES OPERATION

- Correct problem with unconditioned air infiltration from the loading dock
- Educate building occupants to reduce lighting in classrooms when ambient lighting is sufficient
- Maintain room temperature settings at 68° in winter and 76° in summer
- Utilize glycol as per original design in order to allow pumps to shut off during unoccupied winter hours
- Turn off lights in the auditorium, gymnasium, classrooms and offices
- Take steps to consistently reduce unnecessary plug-in loads through out the entire building
- Take steps to consistently turn off window air conditioners, computers, smart boards, projectors and other consumers when not in use
- Take steps to consistently keep windows closed when spaces are being conditioned or heated

CAPITAL IMPROVEMENTS

- Escalator Occupancy Sensors
- Replace motors with energy efficient equivalents
- Upgrade overhead incandescent lighting in both the theater and concert hall to energy efficient equivalents
- Retrofit lighting on aisles and seats with energy efficient LED lights
- Install occupancy/manual controls in both theater and concert hall
- Upgrade HVAC pneumatic controls to DDC/BMS
- Install occupancy sensors on classroom lighting
- Install photo/Timer controls and upgrade lighting in lobby and corridors
- Upgrade building exterior lighting to energy efficient equivalent and install photo/Time controls on building exterior lights and
- Install isolation/independent control valves on uni-vents, ensure connection to room thermostats Install VFDs on chilled/condenser water pumps
- Install VFDs on cooling tower fans

Photo © US Department of Energy

Information adapted from reports prepared by AECOM/KEMA for the NYC Department of Education in October 2009

Energy Field Report

the green design lab

CHOIR ACADEMY OF HARLEM

2005 Madison Avenue
New York, New York

Size: 204,000 square feet
No. of People: 670 students; 134 staff

Basics: The building was constructed in 1965, with 3 floors consisting of 67 classrooms, a computer room, multiple offices, an auditorium, a gymnasium and cafeteria/multipurpose room. The building is operated weekdays during school hours from 8:00am to 4:00pm. However, special events require weekend operation, even during the summer. There is a night-time cleaning shift that begins shortly after the end of the school day and concludes around midnight.

Key Facility Personnel

Principal:
Dr. A. Ellen Parris
212-289-6227 (x182)

Custodian Engineer:
Patrick O'Sullivan
212-8312298

Deputy Director of Facilities:
Frank Coppola
347-386-4471

AVG. ANNUAL ENERGY CONSUMPTION (JULY 2006 - JUNE 2008)

ELECTRICITY	FUEL OIL	NATURAL GAS
		
1,111,200 kWh*	77,000 gallons	N/A
$ 133,344	$ 231,000	
496 tons of CO_2	804 tons of CO_2	

15% REDUCED ENERGY USE (PROJECTED)

944,520 kWh	**65,450 GALLONS**	**N/A**
$ 113,342	**$ 196,350**	
421 tons of CO_2	**683 tons of CO_2**	

*Costs and Emissions were calculated utilizing conversion factors obtained from the PlaNYC Greenhouse Gas Emissions Calculator (v. 2008.4). Average annual energy use, costs and GHG emissions over the July 2006-June 2008 period.

MECHANICAL OVERVIEW

Heating: Building heating is provided by two, No. 2 fuel oil fired (8,739 MBH) steam boilers, which were installed in 1965. Steam is supplied to a heat exchanger that provides hot water to the building's air handling unit coils, uni-vents and fan-coil units for space heating. Domestic hot water for the building is supplied by a hot water tank heated by the steam year round.

Cooling: Two (234-ton) water-cooled steam absorption chillers are utilized for central cooling of the entire building. The fact that the building has no windows results in significant heat gain prompting them to activate the chillers when outside temperatures are far below that threshold.

Lighting: In several areas, the lighting was observed to be energized without occupants being present. All of the lighting in these spaces is frequently left on regardless of occupancy. Most of the exit signs in the building are compact fluorescent.

Other: all HVAC equipment is shut down every night. Due to the lack of central control system capabilities, air handling units are shut down nightly utilizing the fire-alarm system which doesn't align with the best practices to control HVAC equipment

CHOIR ACADEMY OF HARLEM
RECOMMENDATIONS FOR IMPROVEMENT

ENERGY MANAGEMENT

- Ensure accurate utility meter readings
- Monthly energy performance report
- Periodic facility walk through audits
- Energy management plan awareness and presentations to staff
- Training for custodial Staff
- Utilize all available informational tools and systems
- ConEd Steam Properties

PREVENTATIVE MAINTENANCE

Places to focus attention:

- Boilers
- AHUs
- Heat Exchangers
- Steam Traps/Radiators
- Fans
- Pumps
- Vacuum Pumps
- Duplex Sump Pumps
- Unit Ventilators
- Split Systems
- Absorption Chillers
- Cooling Towers
- Emergency Generator
- Heating and Ventilating Units

FACILITIES OPERATION

- Fans for auditorium, music room, band room, boys/girls dressing room are turned-on all the time; isolate music room and band room ventilation from this large auditorium fan
- Return air in the classrooms are in the closets behind door and some are blocked. Work with staff to keep registers unobstructed
- Install vend-miser devices on the vending machines
- Relocate chiller condensate pneumatic control panel
- Maintain room temperature settings at 68° in winter and 76° in summer
- Turn off lights in unoccupied spaces, especially the auditorium, gymnasium, classrooms and offices
- Turn off and unplug window air conditioners, computers, smart boards, projectors and other consumers when not in use

CAPITAL IMPROVEMENTS

- Replace all motors with energy efficient equivalents
- Upgrade HVAC pneumatic controls
- Install occupancy sensors on classroom lighting, auditorium and cafeteria
- Reduce corridor lighting with occupancy sensors
- Optimize the ventilation system to isolate and separately control large public assembly areas
- Upgrade to LED exit signs
- Consider replacing the deteriorating absorption chillers with electric chillers
- Replace deteriorated flexible duct connections throughout the building to reduce air leaks in the system
- Actuator links on some of the fan units are broken
- Ensure that belts on the fan motors are aligned
- Chiller condensate tank valve leak to be fixed
- Repair roof leaks

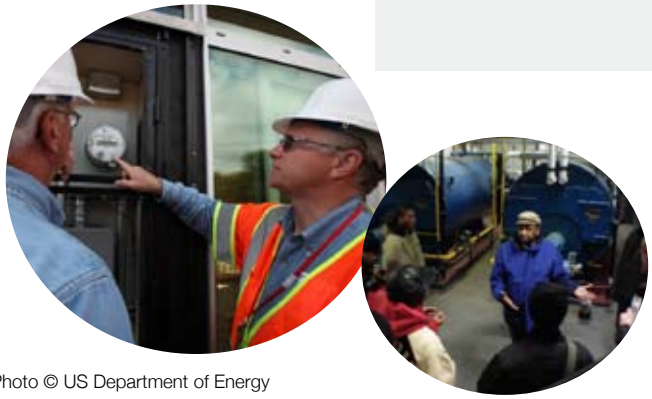

Photo © US Department of Energy

Information adapted from reports prepared by AECOM/KEMA for the NYC Department of Education in October 2009