

# NYC Schools Comprehensive Plan: *Greener, Healthier Schools for the 21<sup>st</sup> Century*

February 18, 2011  
Discussion Document



# Plan to build on commitment for a greener, greater NYC that runs efficiently and innovatively



## PlaNYC Sustainability Goals

- Improved air quality
- Clean, reliable energy
- Climate action
- ...and more

## NYC Simplicity & Other 3<sup>rd</sup> Term Goals

- Innovative
- Efficient
- Better, Cheaper, Faster

# Plan: upgrade NYC schools to be greener and healthier with 21<sup>st</sup> century technology

- Find and implement all cost-effective energy efficiency opportunities **in over 770 of the City's oldest schools\***
- Fix or replace out-dated equipment and install new technologies
  - Lighting
  - Boiler upgrades
  - Insulation
  - Other HVAC improvements
  - Occupancy sensors
  - Smart meters & sub-meters
  - Other control systems
- Complete implementation in the next 10 years



\* In compliance with Greener, Greater Buildings legislation

## Progress to make schools greener and healthier to date

- **Since the mid-1990s, the City has completed energy efficiency retrofits in 239 school facilities.** In each instance ballasts were replaced with those that do not contain PCBs. This effort has led to 27,788 metric tons reductions in greenhouse gas emissions (CO<sub>2</sub>e ) and millions of dollars in energy cost savings.
- In addition, the **City currently has energy efficiency projects underway at 90 schools.**
  - 33 in design and/or construction
  - 57 energy audits in progress; these will become comprehensive retrofits
- To support the City's retrofit and energy conservation program, the NYC Department of Education (DOE) has started to roll out an **Energy Efficiency Operations & Maintenance (O&M) Program** citywide.
  - Objective of O&M Program: enhance energy efficiency of City municipal buildings, including schools, through no and low cost changes including, repairing, maintaining, and operating equipment more effectively, increasing training and awareness, and providing management oversight, accountability and transparency.
  - Over 300 custodial engineers have been trained, with the goal to have all trained by 2013.
  - 72 school buildings participate in Peak Load Management to protect NYC's electric grid on the hottest summer days.
  - DOE's Sustainability office is introducing energy conservation curriculums to students, offering professional development on energy conservation for teachers, and spearheading various energy efficiency pilot programs.
- **Benchmarked all schools using US EPA's Portfolio Manager.**
  - NYC Department of Education is the first school district in the country to achieve this!
  - EPA Portfolio Manager is a tool that measures the total electricity, natural gas, steam, and fuel oil consumed in a building and adjusts for other factors – location, building type, year of construction, number of workers, gross square footage – to give buildings an energy efficiency rating. It gives the City a detailed profile of building energy use, make comparisons among buildings, and help identify which are operating inefficiently.

# Work is currently underway at schools that contain PCB-era ballasts

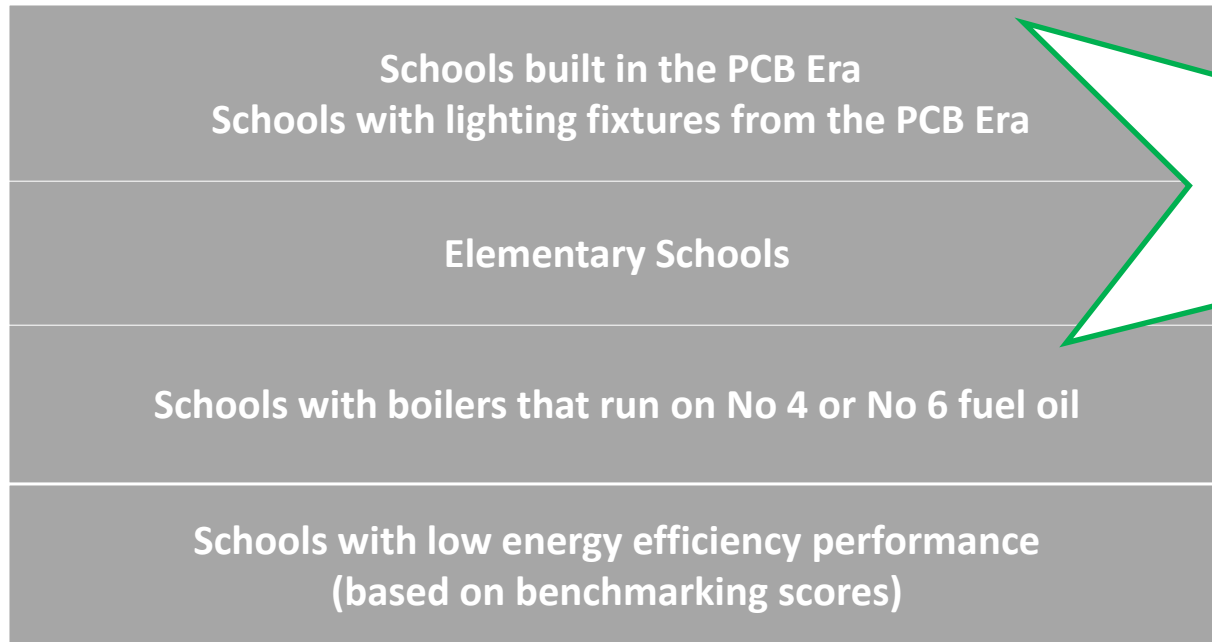


*NYC has identified 772 schools that potentially contain lighting ballasts with PCBs and plans lighting replacement projects at them all. This year, the City will begin replacements at 114 schools and lay the foundation for a streamlined process to complete the remaining 658.*

- Out of the City's 90 active energy efficiency school projects, 69 are at schools that contain PCB-era ballasts and involve replacing the ballasts
  - 26 in design and/or construction
  - 43 energy audits in progress
  - In total, these projects will cost \$90.7 million and result in \$10.6 million in energy savings (and remove nearly 75,000 ballasts)
- Additionally, the City is undertaking 45\* lighting-only projects at schools that were determined to require immediate attention. The lighting in these schools will be replaced by the end of 2011.
- These energy efficiency projects will continue through existing contracts; however, to ramp up these efforts and to implement the NYC Schools Comprehensive Plan, the City is pursuing additional contracting capacity. In 2011, the City will:
  - Release initial Request for Proposals (RFP) **for Energy Savings Performance Contracting (ESPC)** at twenty schools by Summer 2011
  - Incorporate lessons learned from the first round of projects to create standard RFP and contract templates to be used to ramp up the use of ESPC significantly
  - Release 2<sup>nd</sup> round RFP for an additional 20 schools in Fall 2011
  - Projects with the ESPC contracts will launch at these first 40 schools in 2012 (*see chart on next page*)

*\* 45 is an approximate maximum number and may fluctuate between 35 and 45 schools. To be consistent, the remainder of the presentation uses the number 45 even though it remains a moving target.*

# Strategy: prioritize schools with greatest opportunity and need for environmental improvement



Schools will be grouped by geography to maximize efficiency

Timeline	2011*	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
# school projects launched	114 (69+45)	40	60	80	100	100	100	100	78	Complete Projects Under Construction		772
City investment (millions)	\$135.7	\$43.1	\$64.6	\$86.1	\$107.6	\$107.6	\$107.6	\$107.6	\$84.0			\$843.9

\* 2011 projects include those currently underway (launched pre-2011), and those launching this year. Costs are higher in 2011 because projects include some of the largest schools with higher retrofit costs and include accelerated lighting projects to address leaks.

## What goes into a lighting project?

- Step 1:** Identify inefficient lighting fixtures (lamp + ballast), including T12 fluorescent lamps with magnetic ballasts (some of which may contain PCBs).
- Step 2:** Remove the entire lighting fixture and install a new efficient PCB-free lighting fixture and occupancy sensor, including T5 or T8 fluorescent lamps with (non-PCB) electronic ballasts and metal halide fixtures.
- Step 3:** Properly dispose of or recycle old fixture components in a safe and speedy manner in compliance with all state and federal regulations.

# The City will keep the public informed about our progress

*The City understands that demonstrating progress on the Plan will improve its success and overall implementation.*

- Through the Pilot Study and other PCB related projects, the City has continually demonstrated an openness about the presence of PCBs in school buildings both to EPA and to the public.
- The City will continue this openness in implementation of the Plan by creating a website that the public can visit to learn about upcoming and completed projects and track the City's progress as a whole.
- As it stages the work that is required in each building the City will work with school communities to ensure that they are informed about the work and its progress.
- City officials will continue to attend meetings at schools and Community Education Councils and answer questions about the City's overall approach to this issue.

# PCB Removal a priority, as part of a strategy to make schools healthier



- The City believes that outdated PCB ballasts should be removed from schools in a responsible and programmatic manner.
- Note that PCB air levels in tested schools are in general low, and even where found to be above EPA's guidance level, remain well below the levels of lifetime exposure found to be associated with health concerns.
- Published medical opinion and environmental testing confirm that the levels of PCBs identified in New York City public schools do not present an immediate health risk to students and staff.
- Therefore, to promote the cleanest and healthiest school environment, the City believes that efforts to phase PCB ballasts out of schools should be undertaken in connection with comprehensive energy retrofits. Lighting retrofits, which reduce energy consumption and energy costs, can be used to financially leverage measures that will also lead to substantial reductions in greenhouse gases responsible for global warming and in fine particulate matter, scientifically linked to respiratory illness and mortality.

## Result: Improved Schools

### Greener

- More energy efficient
- Reduced emissions of global warming gases
- Reduced emissions of air pollutants
- Removal of lighting with PCBs

### Healthier

- Improved comfort and air quality from upgrades to heating and ventilation systems
- Enhanced lighting levels for students and teachers

### 21<sup>st</sup> Century

- Installation of smart metering and monitoring technologies
- Improved ability to control energy use, climate, and comfort
- Installation of sensors that turn off lights in empty rooms

Achieved through

*budget-friendly*

approach that will

result in annual

*cost savings*

to the City

# Comprehensive Plan = Greener + Healthier

**NYC Schools Comprehensive Plan will reduce greenhouse gas emissions (GHG) by more than 200,000 metric tons CO<sub>2</sub>e**

- This represents 13% of City government's goal to achieve a 30% reduction by 2017
- Equivalent to removing 40,000 cars from the road
- Equivalent to the energy use of 16,600 single family homes

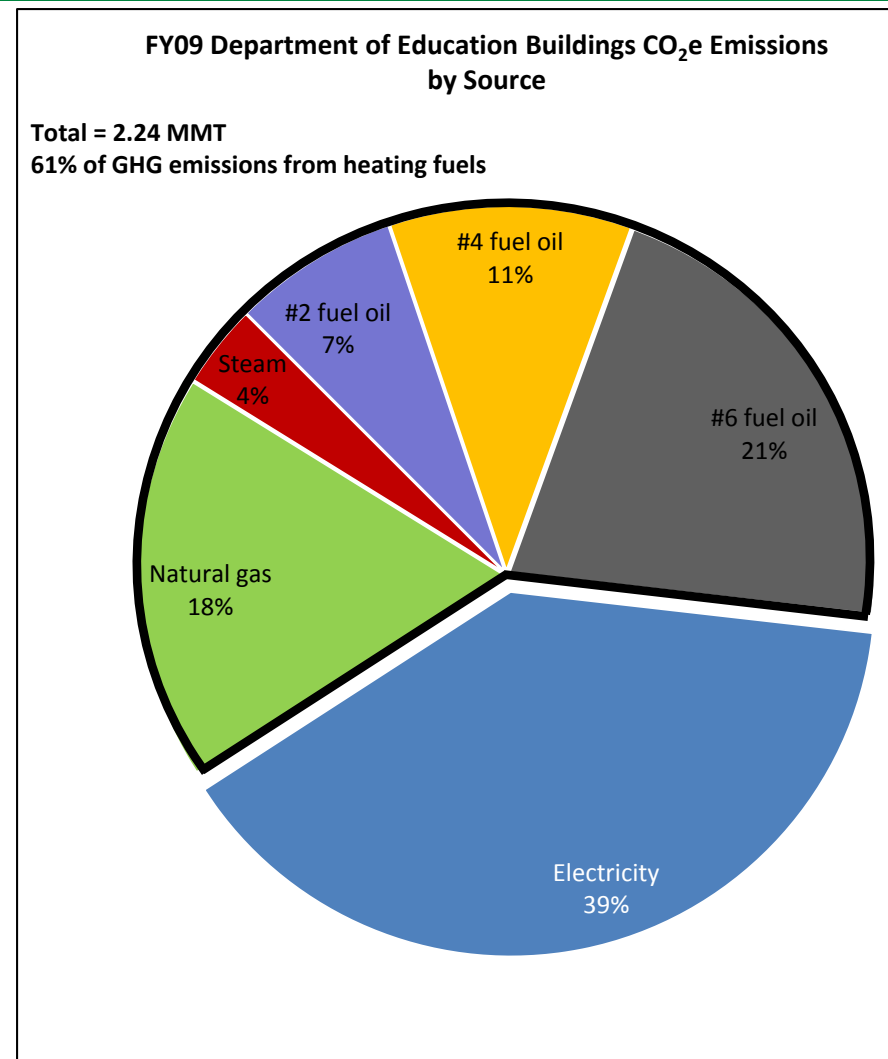
**The improved efficiency of heating systems and the replacement of No. 4 and No. 6 fuel oil furnaces will improve air quality by reducing emissions of the following air pollutants:**

- Fine Particulate Matter (PM<sub>2.5</sub>), also known as soot:  
7 tons; ~annual emissions from 21,000 cars
- Nitrogen Oxide (NO<sub>x</sub>):  
72 tons; ~annual emissions from 8,000 cars

**#4/#6 fuel burning boiler replacements in up to 287 schools result in immediate health benefits.**

**Additionally, the NYC Schools Comprehensive Plan will:**

- Put NYC schools on track to comply with the City's new heating oil regulations
- Remove and properly dispose of nearly 500,000 PCB ballasts



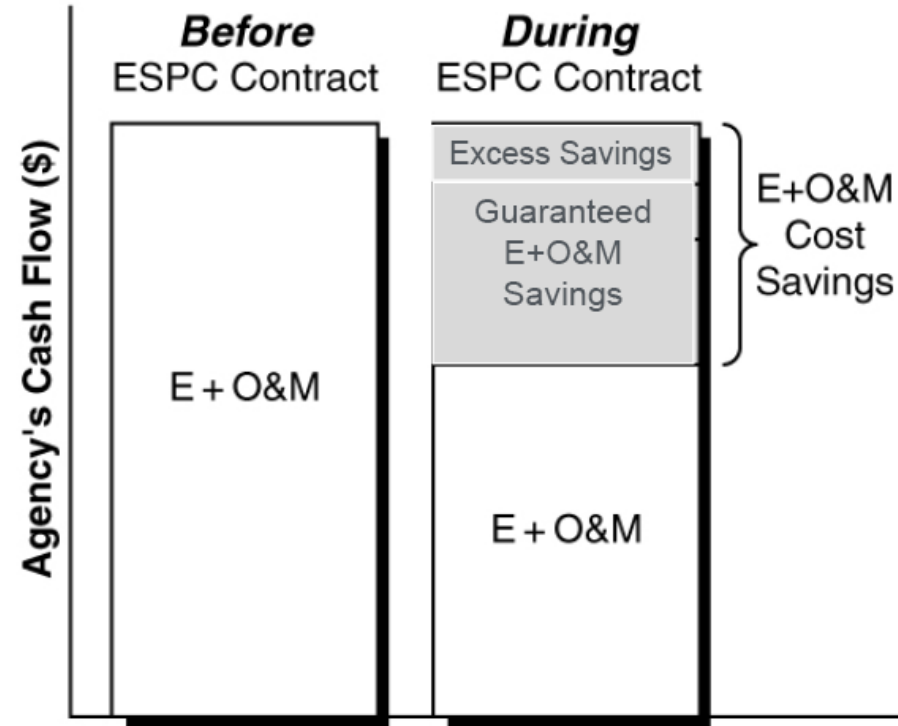
## ...and includes installation of 21<sup>st</sup> Century Technology

To ensure energy efficient operations over the life of the energy performance contract and into the future, we will install 21<sup>st</sup> Century technologies:

- Occupancy sensors as part of the lighting system upgrade
  - Sensors turn off lights when classrooms are unoccupied
  - Sensors contain dual-technology sound and motion detectors to ensure lights are switched off only when the space is unoccupied
- Install metering and monitoring technologies
  - Real-time data allows facility operator to make informed decisions about energy operations
  - Meters will be used to verify energy cost savings
- Equipment controls and Building Management System (BMS), where appropriate
  - Install or optimize a building's BMS for optimal control and operability
  - Transition to direct digital controls, where cost-effective
  - Ensure existing controls are programmed correctly and are functioning as designed

# The Comprehensive Plan uses a fiscally Responsible approach, leading to City savings

- Since 2008, City has transitioned from lighting-only projects to comprehensive projects to achieve deeper emissions reductions in a fiscally responsible way.
  - Reduces wasted costs associated with various project teams returning to buildings for incremental improvements
  - Allows for deeper energy savings, saving the City more money on energy bills
  - Has greater environmental benefits
- The NYC Schools Comprehensive Plan continues to follow this trend while expanding the City's capacity to address more facilities more quickly through additional contracting mechanisms
- With increased capital investment in schools, the City gains operational savings through energy savings and reduced emergency operational costs
- **Energy savings performance contracting (ESPC) is a mechanism that allows the City to ensure that it achieves and maintains energy savings.**



Source: USDOE Federal Energy Management Program (FEMP) ESPC Training Program

# Energy Performance Contracting: How does it work?

