FORDHAM UNIVERSITY
THE JESUIT UNIVERSITY OF NEW YORK

Climate Action Plan:
2014 Annual Executive Update

Office of the Vice President for Facilities Management and Sustainability
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NYC MAYOR'S CO_2 CHALLENGE

PlaNYC

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Annual Executive Update

Progress Towards 30% by 2017 Goal

Fordham University joined the New York City Carbon Challenge in 2007 and committed to reduce its greenhouse gas emissions[1] by 30% from 2005 levels by 2017. This means we will reduce our carbon emissions per square foot to 15.07 pounds of CO_2e/ft^2 from 21.53 pounds of CO_2e/ft^2. Committing to a goal that is tracked in units normalized by square feet will ensure progress towards the 2017 goal is not hindered by the growth of the University's campus. More details about the Carbon Emissions Inventory methodology that is used for Carbon Challenge reporting can be found in Appendix A.

Fordham began tracking our annual carbon emissions by measuring a baseline level of emissions in 2005, which determined the starting point for our 30% emissions reduction goal. In the baseline year of 2005:

- Our total carbon emissions were 31,055 Metric Tons of CO_2e
- Our total area was 3,180,320 ft^2
- Our carbon intensity was .0097 Metric Tons of CO_2e /ft^2 or 21.53 pounds of CO_2e/ft^2

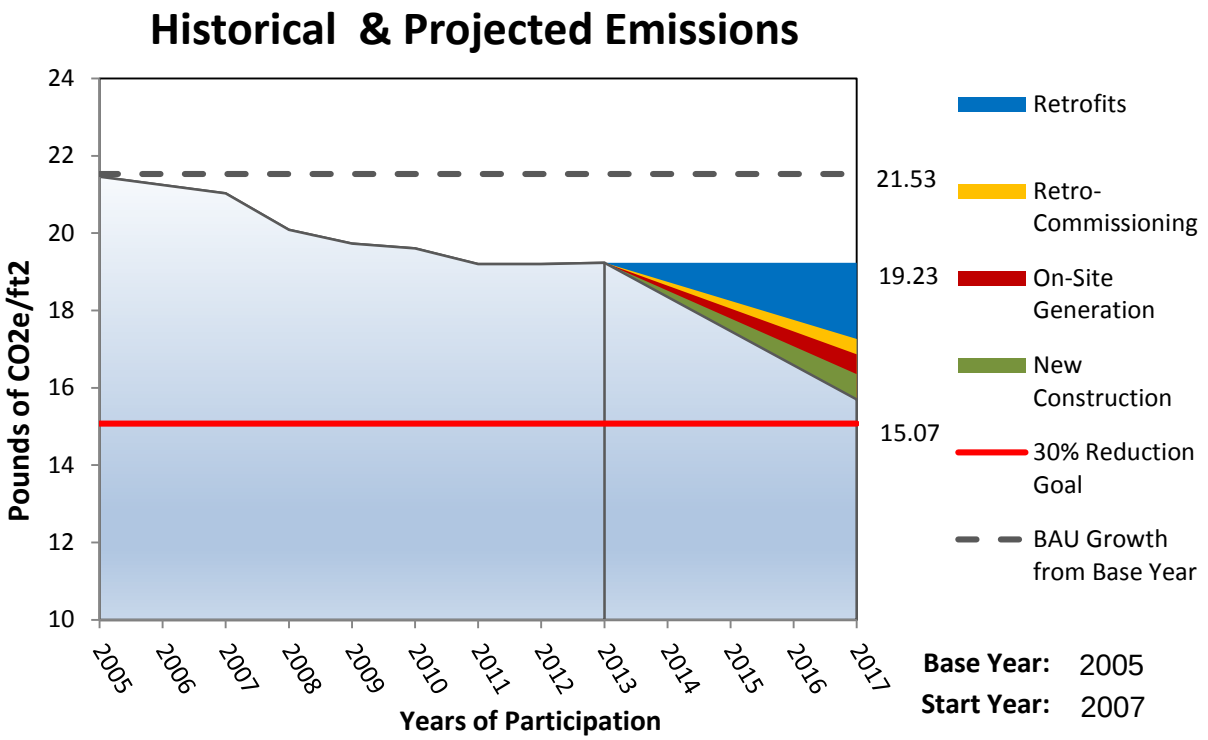
In calendar year 2013, emissions per square foot were 10.7% less than our 2005 baseline:

- Our total carbon emissions were 31,971 Metric Tons of CO_2e
- Our total area was 3,665,031 ft^2
- Our carbon intensity was .0087 Metric Tons of CO_2e /ft^2 , or 19.23 pounds of CO_2e/ft^2

Roadmap to Achieve 30% Emissions Reduction by 2017 Goal

Fordham is planning to implement a number of energy conservation measures to achieve its goal by 2017. These measures are outlined in a table that can be found in Appendix B. The following chart depicts both current and projected future progress towards meeting the 30% by 2017 emissions reduction goal based on implementation of these energy conservation measures.

[1] Note: For purposes of the Mayor's Carbon Challenge, greenhouse gas emissions are measured in terms of carbon dioxide equivalent (CO_2e) per square foot. Please see the explanation of standard units further in this report for more information.



If all of the projects identified in Appendix B were implemented, Fordham's emissions would still be greater than its 2017 goal by 1.4 pounds of CO_2e/ft^2 assuming that the heating and cooling loads for 2017 are similar to those of 2013.

A series of weather related events had a significant impact on Fordham's greenhouse gas emissions in 2013. This came about in part due to a drop in temperature that resulted in a 17% increase in heating degree days compared to 2012. A related impact was a shortage of natural gas which required that Fordham use 24,000 more gallons of fuel oil. A similar weather pattern in 2017 could impact the achievement of Fordham's goal. The City is currently engaging in discussions to determine if and how weather normalization can be incorporated into the Carbon Challenge reporting methodology. We encourage them to keep this in mind when reviewing our performance.

In addition to energy conservation measures and retro-commissioning activities that were identified in its Local Law 87 studies, the University is also considering the following in order to achieve the 2017 goal:

- Building retrofits such as lighting,
- On-site generation (solar photovoltaic array and/or co-generation)
- Introduction of new, energy efficient building stock

- Replacement of end-of-life equipment with energy efficient products

Conclusion

In the six years since Fordham University accepted the Mayor's Carbon Challenge, we have already achieved significant progress toward realizing our 30% emissions reduction goal, realizing a 10.7% reduction in emissions from the 2005 baseline to date. Fordham will continue to evaluate its current list of potential projects and to identify new projects in order to achieve the goal by 2017. Fordham's decisions regarding which projects to implement will be based on our capital budget and the payback of the project investments.

In keeping with the Jesuit traditions of the pursuit of wisdom and learning, education of the whole person, and respect for the environment, the University recognizes the value of minimizing its environmental impact and endeavors to pursue best practices throughout all aspects of its activities. Fordham University is committed to sustainability as a central consideration in not only its physical plant operations but also its student development and education, faculty and staff involvement, and curriculum.

Appendix A

Carbon Emissions Inventory Methodology

Fordham tracks its carbon emissions according to the methodology of the Mayor's Carbon Challenge. Under this methodology, all energy use in buildings is categorized by fuel type and aggregated together for all facilities for every year of the Challenge, beginning in the baseline year and ending in the end year. The annual energy consumption for each fuel type is entered into a Carbon Emissions Inventory calculator tool, provided by the NYC Mayor's Office of Long-Term Planning and Sustainability, which multiplies energy consumption by a "carbon coefficient" to find the associated level of carbon dioxide equivalent (CO_2e).

All carbon coefficients for the Mayor's Carbon Challenge were developed by the NYC Mayor's Office of Long-Term Planning and Sustainability and are in compliance with the 2009 Local Government Operations Protocol (LGOP). The Mayor's Carbon Challenge uses New York City's carbon coefficients for electricity and steam, which are based on power plant data. All emissions coefficients for natural gas, propane, and heating fuel oils No. 2, 4, and 6 were developed by the U.S. EPA.

For purposes of the Challenge, however, the carbon coefficients for electricity and steam are fixed at their 2005 baseline year levels because the coefficients for these fuel types can vary significantly between years. Improvements in New York City's electricity supply, for example, provide an advantage to Challenge participants who depend primarily on electricity, regardless of whether they make any energy conservation investments. Fixing the carbon coefficients at 2005 levels therefore serves to standardize the competition across all Challenge participants. Please see the complete list of the carbon coefficients below.

Fordham has also chosen to measure the carbon emissions from our solid waste stream in our future inventories. Mayor's Carbon Challenge participants will complete a waste characterization study to determine the baseline volume and composition of their municipal solid waste and conduct annual waste studies to track changes to this baseline. Note that both the methodology and the carbon coefficients for waste are still under development and will be incorporated into our Carbon Emissions Inventory next year.

Mayor's Carbon Challenge Emissions Coefficients

Emissions Coefficients for Buildings

	Electricity (kwh)	Natural Gas (therms)	#2 Fuel Oil (gallons)	#4 Fuel Oil (gallons)	#6 Fuel Oil (gallons)	Propane (gallons)	Steam (Mlbs)
MTCO2e per unit energy	0.000422704	0.0053156	0.010264026	0.011016722	0.01132755	0.012413804	0.089414631
MMBtu per unit energy	0.0095346	0.1	0.138	0.146	0.15	0.091	1.33015

Emissions Coefficients for Fleets

	Diesel (liters)	Gasoline (liters)	100% Biodiesel (liters)	100% Ethanol (liters)	Compressed Natural Gas (GJ)
MTCO2e per unit energy	0.0026972	0.0023196	0.0024971	0.0015190	0.0502883

Emissions Coefficients for Waste

	Paper Products (tons)	Food Waste (tons)	Plant Debris (tons)	Wood/Textiles (tons)	Other (tons)
MTCO2e per unit energy	TBD	TBD	TBD	TBD	TBD

Building Subtotals/Rose Hill Campus

Total Buildings	38
Total Area (Gross ft^2)	2,842,340

Note: BBL Refers to the NYC tax Block and Lot

Building Subtotals/Lincoln Center Campus

Total Buildings	3
Total Area (Gross ft^2)	833,506

Appendix B

Energy Conservation Measure	Project Name	Project Description	Annual MT CO2e Reduction	Annual lbs. CO2e/sq.ft. Reduction	% of Baseline lbs. CO2e/sq. ft.
On-site Generation	Rose Hill PV	Install 250 kW of Solar Panels to provide electricity and thermal energy to the gym.	85	0.05	0.2%
Retrofits	Level II Energy Audits	ASHRE Level II Audits of all buildings greater than 50,000 sq ft conducted by EME.	1,075	0.57	2.7%
New Construction	Lincoln Center Law School and Dormitory	415,000 sq ft new construction project that will be designed to LEED Silver standards.	1,216	0.65	3.0%
Retrofits	Windows Rose Hill	Replace old single pane windows with high efficiency windows.	1,281	0.68	3.2%
On-Site Generation	Cogen at Rose Hill	Install 800 kW Reciprocating engines at the Central Plant to provide electricity and steam throughout the campus.	892	0.48	2.2%
Retrofits	Chiller Replacement	Replace 550 Ton Steam Absorption Chiller at Macaulay Hall with efficient unit and possible small cogeneration.	41	0.02	0.1%
Retrofits	CHW Replacement	Replace chilled water system at Walsh Library.	910	0.49	2.3%
Retro-Commissioning	RCx	Retrocommissioning studies of all buildings greater than 50,000 sq ft conducted by EME. Lincoln Center Only	721	0.39	1.8%
Retrofits	Old Law School Renovation	Renovate old Law School building following completion of new Lincoln Center Law School building.	141	0.08	0.3%
Total			6,361	3.40	15.8%