

# [University Name] Climate Action Plan

Please remove this photo and replace with an image of your own institution.



Produced by [Name of Lead Author, Department]  
[Submission Date, Year]



Produced with assistance from the Mayor's Office of  
Long-Term Planning and Sustainability

**[Primary Contact Name]**  
**[Primary Contact Email]**  
**[Primary Contact Phone]**

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## Instructions:

To fill out this Climate Action Plan (CAP) template, please follow the instructions, designated in blue text, at the beginning of each section. Please be sure to delete the instructions before submitting your final Plan. Black text can remain in the CAP, bolded text needs to be replaced with your university-specific information, and gray text is example language that should be replaced with your own information. Please note: City Hall University is not a real university. All information is intended to serve as sample text only.

To replace bolded text, you can use Word's "Find and Replace" function (Ctrl F) to update to update the following throughout the document:

- [University Name] – Replace with your university's name
- [Base Year] – Replace with your base year
- [Start Year] – Replace with your start year
- [End Year] – Replace with your end year
- [Most Recent Year] – Replace with the year of your most recent inventory

# Executive Summary

### [University Name]’s Commitment to the Mayor’s Carbon Challenge

The NYC Mayor’s Carbon Challenge is a voluntary program for prominent universities, hospitals, and commercial offices in New York City to reduce their building-based greenhouse gas (GHG) emissions by 30% or more in ten years. City Hall University accepted the NYC Mayor’s Carbon Challenge to Universities in 2007, committing to reduce emissions from its New York City buildings by 30% from 2006 levels by 2019. This Climate Action Plan lays out City Hall University’s strategy to meet this goal.

### Current Reductions in Emissions

Since accepting the Mayor’s Carbon Challenge, City Hall University has reduced both its carbon emissions intensity per square foot by 23.8% and its energy consumption by 19.6% from its 2006 base year levels. The reduction came from a combination of electricity reductions, fuel switching from No. 6 oil to No. 2 oil and natural gas, and a residence hall energy reduction competition. Overall, City Hall University’s Main Campus in Manhattan contributes the greatest absolute energy use and carbon emissions, but the Flushing Campus has the greater energy and carbon intensity.

### Reductions in Carbon and Energy Use Intensity

	Carbon Intensity (lbs CO2e / Sq Ft)	Energy Use Intensity (kBtu / Sq Ft)
2006 (Base)	21.72	168
2012 (Current)	16.55	134.68
Reduction	-23.82%	-19.62%

Please fill out [Table 1](#) in your Climate Action Plan Tool Kit and insert it here.

### Current and Completed Projects

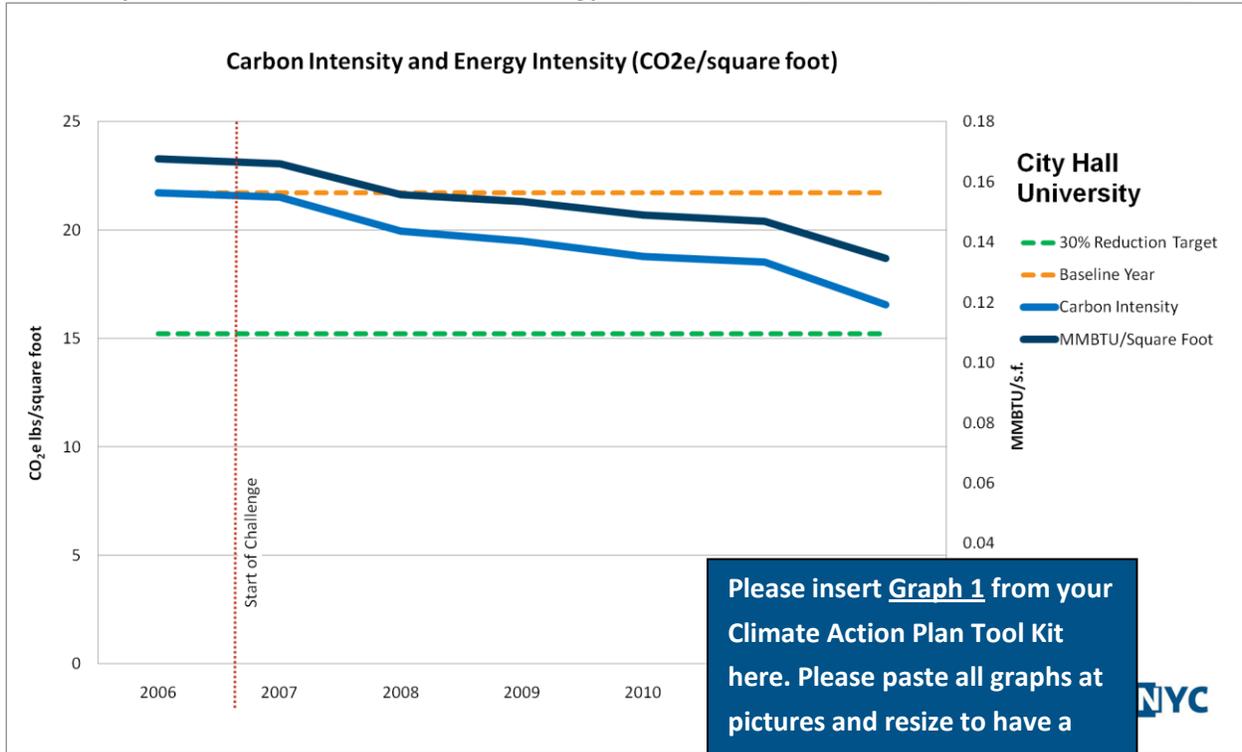
City Hall University has completed several projects to reduce carbon emissions, increase building efficiency, and decrease operational costs. These include lighting replacements on City Hall University’s Main Campus, heating oil conversions to eliminate the burning of No. 6 oil, and an energy-reduction competition in the Manhattan Municipal Building Residence Hall. As a result, in 2012 the University system saved an estimated 99,319 MMBtus, 7,206 metric tons of carbon dioxide equivalent, and a total of \$560,000 in reduced energy costs.

### Planned Projects and Next Steps

Building on its progress thus far in the Challenge, City Hall University has developed a road map to meet the Mayor’s Carbon Challenge goal. The University has identified projects and strategies across the areas of lighting, operations and maintenance training, behavioral changes, retro-commissioning, and LEED Silver standards for new buildings. Projects have already been identified that are projected to reduce GHG emissions by roughly 782 metric tons of carbon dioxide equivalent and will save the university \$111,000 in energy costs based on current electricity prices.

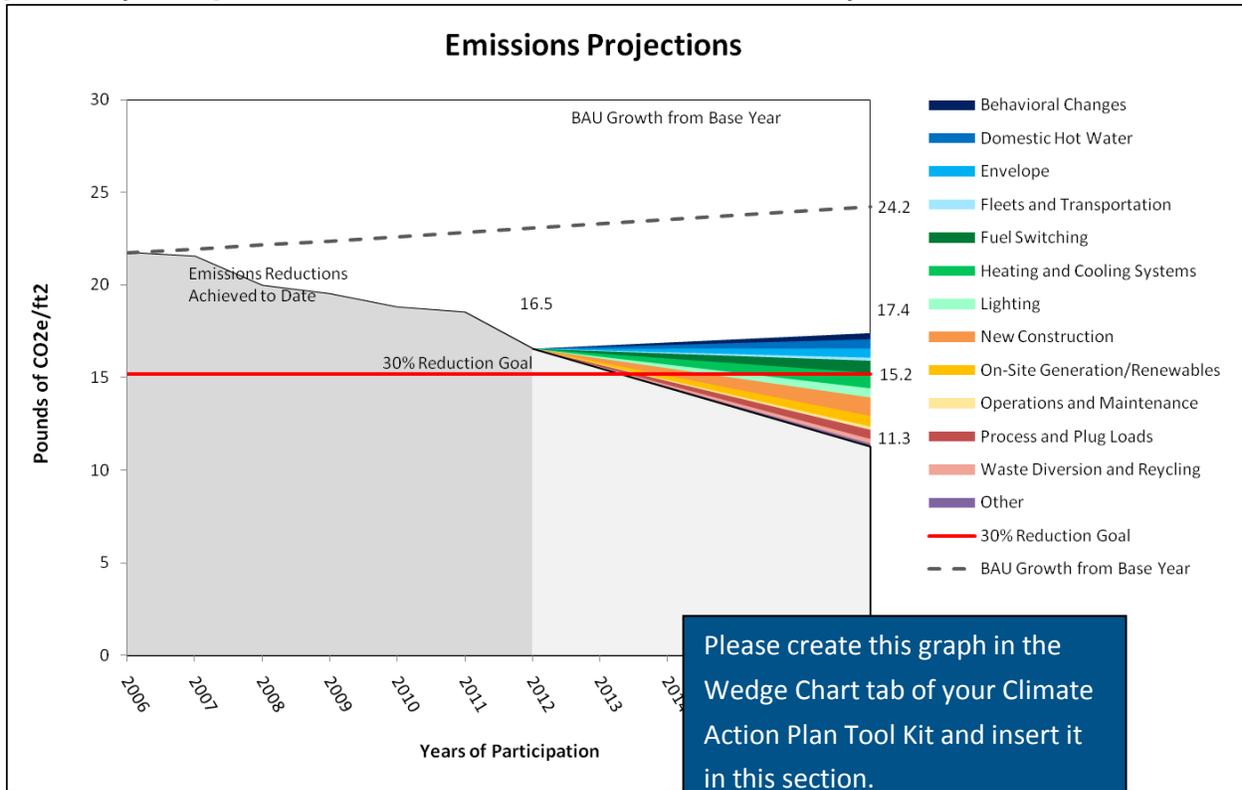
Over the next five years, City Hall University will continue to evaluate projects and monitor progress toward the Mayor’s Carbon Challenge goal. By committing to this goal, the University is demonstrating its dedication to environmental sustainability and helping New York City reduce its emissions 30% by 2030.

**[University Name]'s Carbon Emissions and Energy Use Reduction, [Base Year] - [Most Recent Year]**



Please insert [Graph 1](#) from your Climate Action Plan Tool Kit here. Please paste all graphs at pictures and resize to have a width of 6.5 inches.

**[University Name]'s Plan to Reach a 30% Reduction in Carbon Intensity**



Please create this graph in the Wedge Chart tab of your Climate Action Plan Tool Kit and insert it in this section.

# About the Challenge

In this section, please provide an introduction that summarizes:

- **The need for action**
- **Background on PlaNYC, the Greener, Greater Buildings Plan and the Mayor's Carbon Challenge**
- **Your institution's commitment to the Mayor's Carbon Challenge**
- **Scope of the Climate Action Plan**
- **An explanation of standard units**

Please take what is useful from the following text.

## Background

Tackling global climate change is one of the most significant challenges we face today. Projected impacts of climate change include rising sea levels and storm surges, increased heat and heat waves, and more frequent droughts and floods, all of which pose serious threats to public health, safety, and continued economic development. Given the overwhelming proof that anthropogenic or “man-made” greenhouse gas emissions are the cause of global climate change, bold action is needed to reduce our energy consumption and mitigate these emissions.

## PlaNYC

Although climate change is a global problem, its effects are often felt locally. Recognizing the need for action, in 2007 New York City released PlaNYC, a comprehensive sustainability plan that set out the ambitious goal to reduce the city's greenhouse gas emissions by 30% from 2005 levels by 2030.

## Green Buildings and Energy Efficiency

Because roughly three-quarters of New York City's emissions come from the energy used in buildings, almost double the proportion within the U.S. as a whole, the City has focused on reducing energy use from its buildings to meet the PlaNYC goal. A key component of this effort is a package of legislation called the Greener, Greater Buildings Plan (GGBP), which updates the city's energy codes and requires owners of large buildings to measure their energy performance annually, conduct energy audits and undergo retro-commissioning of building systems every ten years, upgrade to more energy efficient lighting, and provide all large commercial tenants with energy sub-meters by 2025. Together, these laws are projected to reduce citywide GHG emissions by roughly 5%.<sup>1</sup>

## The NYC Mayor's Carbon Challenge

The New York City Mayor's Carbon Challenge builds on these initiatives by engaging leaders in the private and institutional sectors to achieve accelerated GHG reductions in their buildings. Following City government's pledge to cut its own emissions by 30% in just ten years (30x17), New York City Mayor Michael R. Bloomberg issued a “challenge” to leaders in the private and institutional sectors to match this goal. Since then, 17 of New York City's leading universities, the 11 largest hospital systems, and 10 global companies with office space in the city have accepted the challenge to reduce their GHG emissions per person or per square

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<sup>1</sup> Information from the NYC Mayor's Office of Long-Term Planning and Sustainability.

foot by at least 30 percent in ten years. Together, these participants make up more than 140 million square feet of space and contribute roughly 4 percent of New York City's total emissions—meaning that their efforts are expected to reduce citywide emissions by more than 1 percent by the end of the Challenge.<sup>2</sup>

### **[University Name]'s Commitment to the Mayor's Carbon Challenge**

[University Name] accepted the Mayor's Carbon Challenge in [Start Year] and committed to reduce its greenhouse gas emissions<sup>3</sup> by 30% from [Base Year] levels by [End Year]. This Climate Action Plan lays out [University Name]'s strategy to meet this goal and the progress it has made through [Most Recent Year]. [University Name]'s participation in the NYC Mayor's Carbon Challenge will help cut citywide GHG emissions and allow the University to continue its commitment to reducing its energy use and increasing environmental sustainability.

### **What Is a Climate Action Plan?**

The Climate Action Plan is [University Name]'s roadmap for achieving a 30% reduction in greenhouse gas emissions by [End Year]. This Plan puts forward a framework to develop and implement strategies to meet this goal and allows the university to track its progress as it moves forward with the Mayor's Carbon Challenge.

### **Scope**

This Plan includes:

- Background information about [University Name] and its facilities;
- A description of [University Name]'s additional commitments to environmental sustainability;
- Energy use benchmarking information for all [University Name]'s New York City-based properties over 50,000 square feet, as required by Local Law 84 of 2009;
- An inventory of annual greenhouse gas emissions from [University Name]'s New York City properties using the NYC Mayor's Carbon Challenge reporting methodology;
- A description of completed projects and strategies the university has undertaken to reduce its energy use and emissions;
- Highlights of [University Name]'s innovative projects;
- An explanation of the strategy moving forward that will enable [University Name] to meet its 30% emissions reduction goal by [End Year].

**Feel free to add a description of anything else you have included in the Plan.**

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<sup>2</sup> Information from the Mayor's Office of Long-Term Planning and Sustainability. Based on 2005 levels.

<sup>3</sup> Note: For purposes of the Mayor's Carbon Challenge, greenhouse gas emissions are measured in terms of carbon dioxide equivalent (CO<sub>2</sub>e) per square foot. Please see the explanation of standard units on the next page for more information.

### Standard Units

The Mayor’s Carbon Challenge and the U.S. Environmental Protection Agency’s Portfolio Manager Tool, which is used to complete

benchmarking, require energy reporting to be completed in standard units. Below is a list and explanation of these standard units, which will be used throughout this Climate Action Plan.

### Standard Units for the Mayor’s Carbon Challenge

Measure	Units	Abbreviation	Description
<b>Greenhouse Gas Emissions</b>	Carbon dioxide equivalent	CO <sub>2</sub> e	The level of carbon dioxide (CO <sub>2</sub> ) that would have the same climate impact as a given concentration and type of greenhouse gas.
<b>Energy Use</b>	Million British thermal units	MMBtu	A standardized measure of total energy use to compare energy use across different fuel types. For purposes of the Challenge, energy use is measured in terms of <i>source energy</i> , or energy use that takes into account weather fluctuations or transmission, delivery, and production losses of an energy source.
<b>Floor Area</b>	Gross square feet	Sq. Ft.	Includes the total number of square feet measured between the <i>exterior</i> surfaces of the enclosing fixed walls. This includes spaces such as vent shafts, stairs, basements, etc.
<b>Carbon or Emissions Intensity</b>	Pounds of carbon dioxide equivalent per square foot	Lbs. CO <sub>2</sub> e/Sq. Ft.	A measure of the intensity of carbon emitted per person or square foot, which standardizes emissions levels for companies of different sizes.
<b>Energy Use Intensity</b>	One thousand British thermal units per square foot	kBtu/Sq. Ft.	A measure of the intensity of energy used per square foot, which standardizes energy use for companies of different sizes.

### Standard Units for EPA’s Portfolio Manager

Measure	Units	Abbreviation	Description
<b>Site Energy Use Intensity (Site EUI)</b>	One thousand British thermal units per gross square foot	kBtu/Sq. Ft.	A measure of the on-site energy use per square foot in a building (does not take into account weather fluctuations or source energy losses).
<b>Weather-Normalized Source Energy Use Intensity (Source EUI)</b>	One thousand British thermal units per gross square foot	kBtu/Sq. Ft.	A measure of energy use per square foot that takes into account weather fluctuations and all transmission, delivery, and production losses of the energy source.

# About [University Name]

Please provide a narrative description of your institution's facilities that includes, at a minimum:

- A brief description of your university
- A brief description of each of your university's campuses and a general description of the activities that each one supports
- A map of each campus that makes up your university
- Tables 2 and 3 from your Climate Action Plan Tool Kit.
- A description of any planned or recently completed expansions of your institution and the projected impact on your institution's energy use and carbon emissions

The following is sample text—please remove and insert your own text in its place.

## Background

City Hall University was founded in 1811 and is now one of New York City's leading universities specializing in public policy research. Across two campuses, City Hall University has 2,051 full-time equivalent students and 504 full-time faculty and support staff.

## Campuses and Buildings

City Hall University is made up of a Main Campus in Manhattan and a satellite campus in Queens (see map below). City Hall University's Main Campus is located in the Civic Center neighborhood of lower Manhattan. It includes office space, classroom space, a data center and one large residential dormitory. The University's satellite campus is located in Flushing, Queens,

and consists of additional office and classroom space and a new data center.

Across its two campuses, City Hall Hospital owns and operates four buildings with a gross area of 1,709,000 square feet. It also leases 500,000 square feet of space at 253 Broadway on its Main Campus for a system-wide total of five buildings and a gross area of 2,209,000 square feet. Following the methodology of the Mayor's Carbon Challenge, only 50 percent of the leased property's square footage is counted in City Hall Hospital's carbon emissions inventory to account for the base building system energy use, but the full square footage of all properties are listed in the table below.

The Main Campus contains four of the five buildings and constitutes the majority of the university system. It is used by 404 full-time employees. City Hall University's Flushing Campus consists of one building dedicated primarily to additional classroom space and staffed by 100 full-time faculty and support staff.

City Hall University is in the process of expanding a number of its facilities. Since 2005, City Hall University added an energy-intensive data center to its Flushing Campus and is now in the preliminary stages of expanding into one additional 500,000 square foot building located in the TriBeCa neighborhood of Manhattan. The University is expected to break ground on the new building in 2014.

**If you plan to include emissions from fleets and waste into the Challenge, please provide information about these sources.**

**The following is sample text—please remove and insert your own text in its place.**

City Hall University also owns and operates a fleet of 70 vehicles. These include 7 diesel-powered vans, 10 diesel-powered buses, 10 gasoline-powered sedans, and 35 hybrid sedans.

Across its two campuses, City Hall University disposes of 100,000 pounds of waste annually,

of which approximately 25,000 pounds is diverted for recycling and composting. The university plans to conduct a physical waste audit in 2013 to gain a better understanding of the composition of its waste stream and implement a waste-reduction strategy.

**Please include a map of your institution and Data Tables 2 and 3 from your Climate Action Plan Tool Kit. If you have multiple campuses, please provide separate maps and data tables for each campus. A labeled campus map is preferable, but if one is not available, you may also create a map using an online mapping tool such as Google Maps.**

## Campus Map

### City Hall University – Main Campus

Please remove this map and replace with a map of your own campus.



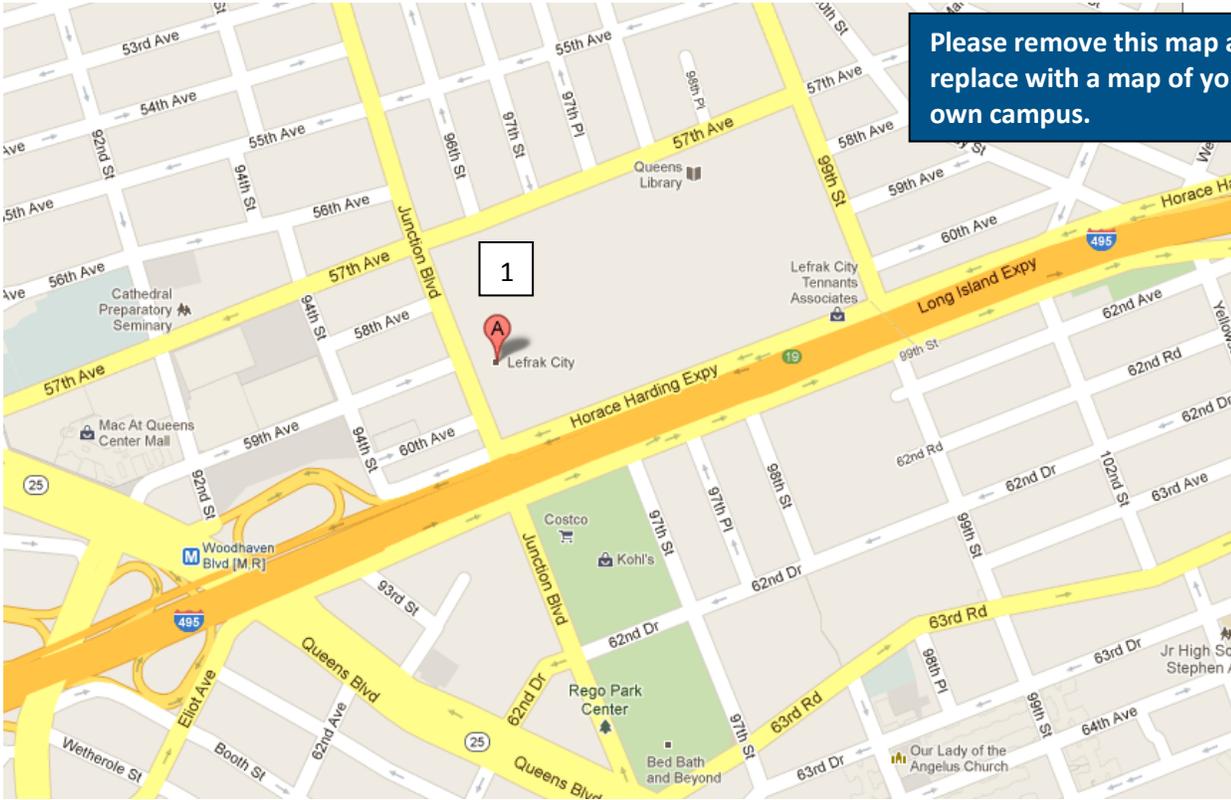
### Building Area Breakdown for City Hall University – Main Campus

Bldg #	Property Name	Address	Owned vs. Leased	Floor Area (Gross SF)	Property Type (Primary Function)
1	City Hall Building	260 Broadway	Owned	24,000	Residence Hall/Dormitory
2	Manhattan Municipal Building	1 Centre Street	Owned	1,000,000	Residence Hall/Dormitory
3	250 Broadway Building	250 Broadway	Owned	585,000	Classrooms
4	253 Broadway Building	253 Broadway	Leased	500,000	Classrooms

<b>Total Buildings</b>	4
<b>Total Area</b>	2,109,000

Please fill out [Tables 2 and 3](#) in your Climate Action Plan Tool Kit and insert them in this section. **Note:** Total square footage in this list may not be equal to the square footage in the Inventory. Square footage for some leased properties may be discounted by 50% to account for the base building system energy use.

### City Hall University – Flushing Campus



### Building Area Breakdown for City Hall University – Flushing Campus

Bldg #	Property Name	Address	Owned vs. Leased	Floor Area (Gross SF)	Property Type (Primary Function)
1	Flushing Building	59-17 Junction Blvd.	Owned	100,000	Mixed Use Property

### Flushing Campus Subtotals

Total Buildings	1
Total Area	100,000

Please fill out **Tables 2 and 3** in your Climate Action Plan Tool Kit and insert them in this section. **Note:** Total square footage in this list may not be equal to the square footage in the Inventory. Square footage for some leased properties may be discounted by 50% to account for the base building system energy use.

# Additional Commitments

Please include a description of any additional commitments to environmental sustainability that your institution has made.

The following is sample text—please remove and insert your own text in its place.

## **[University Name]’s Additional Commitments to Sustainability**

In addition to its commitment to the NYC Mayor’s Carbon Challenge, City Hall University has made other internal and external commitments to reduce its global environmental footprint and increase the sustainability of its operations.

## **Commitments to Sustainability**

City Hall University’s other sustainability goals include commitments to offer sustainably grown food in cafeterias and to review the environmental impact of its supply purchases. Additionally, City Hall University has implemented a recycling awareness campaign and aims to achieve a 100% waste diversion rate by 2030. By reducing the university’s operating costs along with its environmental footprint, these initiatives are good for both the university and the planet.

# Benchmarking Information

For your institution's buildings subject to New York City Local Law 84, please provide information from the benchmarking you completed in Portfolio Manager, as required by New York City Local Law 84.

At a minimum, please include:

- Background information on benchmarking under LL84
- The total number of buildings your institution was required to benchmark in the year of your last inventory
- Table 4 from your Climate Action Plan Tool Kit with all benchmarking results from the most recent year
- **OPTIONAL:** The total number of buildings your university benchmarked in its base year and data Table 4 from your Climate Action Plan Tool Kit with benchmarking results from the most recent year

Please take what is useful from the following text.

## Background

New York City's Local Law 84 of 2009 is the first in a package of four local laws collectively called the Greener, Greater Buildings Plan (GGBP). Local Law 84 requires owners of all buildings over 50,000 square feet in gross floor area and in lots with more than 100,000 square feet of built floor area to report their buildings' annual energy use through a process called benchmarking. Benchmarking measures a building's total energy use by fuel type and adjusts for other factors, which allows owners to compare building energy performance to other similar

buildings and help determine whether systems are operating efficiently.

**[University Name]** benchmarked its properties for **[Most Recent Year]** using an online tool developed by the U.S. Environmental Protection Agency called Portfolio Manager. Using **[University Name]'s** energy use information, Portfolio Manager produces a measure of energy use intensity (EUI), or energy use per square foot per year, and an ENERGY STAR score for each benchmarked building.

A building's EUI can be expressed in several ways. Portfolio Manager generates site EUI and the weather-normalized source EUI for each benchmarked building. The site EUI provides the on-site energy use per unit of gross building area, while the weather-normalized source EUI incorporates weather fluctuations and losses from production, transmission, and delivery of the energy source into the final number.

The ENERGY STAR score is a number on a scale of 1-100 assigned to each eligible building that compares the efficiency of energy use across similar facilities. For example, an ENERGY STAR score of 75 indicates that a building performs better than 75% of all comparable buildings nation-wide. The score is based on the Commercial Building Energy Consumption Survey (CBECS), which is conducted every four years by the U.S. Department of Energy's Energy Information Administration. ENERGY STAR scores are only available for certain building types and at least 50% of the gross floor area must be one of these eligible building

type to receive a score, so the lack of an ENERGY STAR score for a building does not indicate poor energy performance in a building.

**[University Name]’s Benchmarking Information**

[University Name] has submitted benchmarking information for its owned buildings to comply with NYC Local Law 84 since 2011. In [Most Recent Year], [University Name] was required to benchmark [Number of Benchmarked Buildings] buildings. Below is a table that includes the benchmarking results for these buildings in [Most Recent Year].

**OPTIONAL:** Benchmarked energy use for these [Number of Benchmarked Buildings] buildings for the base year of [Base Year] is also included below for purposes of comparison.

The following is sample text—please remove and insert your own text in its place.

*Site EUI:* City Hall University’s average site EUI for benchmarked buildings in 2012 was 131.25 kBtu/ft<sup>2</sup>, with a high of 175 and a low of 75 kBtu/ft<sup>2</sup>.

*Source EUI:* The average weather-normalized source EUI for 2012 was 143.75 kBtu/ft<sup>2</sup>, with a high of 200 and a low of 100 kBtu/ft<sup>2</sup>.

*Water Use:* City Hall University’s average water use in 2012 was 14.25 gallons/ft<sup>2</sup>, with a high of 17 and a low of 12 gallons/ft<sup>2</sup>.

*ENERGY STAR Scores:* In 2012, City Hall University’s ENERGY STAR scores from benchmarked buildings ranged from a low of 37 in the 250 Broadway Building to a high of 74 in the Manhattan Municipal Building.

**[University Name] Benchmarking Results – [Base Year]**

Building Name	Address	BIN	BBL	Site EUI (kBtu/ft <sup>2</sup> )	Source EUI (kBtu/ft <sup>2</sup> )	ENERGY STAR Score	Reported Gross SF	Notes:
City Hall Building	260 Broadway	1001473	1-00135-7501	150	125	61	30,000	
Manhattan Municipal Building	1 Centre Street	1001394	1-00121-0001	100	75	74	1,000,000	
250 Broadway Building	250 Broadway	1001408	1-00124-0024	200	175	37	600,000	
253 Broadway Building	253 Broadway	1082757	1-00134-7501					
Flushing Building	59-17 Junction Boulevard	4047310	4-01918-0001					

Please fill out Table 4 in your Climate Action Plan Tool Kit and insert it here. Note that it is optional to report benchmarking information for your university’s base year.

**[University Name] Benchmarking Results – [Most Recent Year]**

Building Name	Address	BIN	BBL	Site EUI (kBtu/ft <sup>2</sup> )	Source EUI (kBtu/ft <sup>2</sup> )	ENERGY STAR Score	Reported Gross SF	Notes:
City Hall Building	260 Broadway	1001473	1-00135-7501	140	115	60	30,000	
Manhattan Municipal Building	1 Centre Street	1001394	1-00121-0001	102	76	74	1,000,000	
250 Broadway Building	250 Broadway	1001408	1-00124-0024	180	165	39	600,000	
253 Broadway Building	253 Broadway	1082757	1-00134-7501	175	150	48	500,000	
Flushing Building	59-17 Junction Boulevard	4047310	4-01918-0001	130	105	70	1,500,000	

# Carbon Emissions Inventory

In this section, please include information from your Carbon Emissions Inventory, including:

- Background information on the emissions sources, GHG accounting methodology, and carbon coefficients used for the Mayor's Carbon Challenge
- Your university's reported energy use, emissions, and square footage for the base year
- Your university's reported energy use, carbon emissions, and square footage for the most recent year
- The reduction in carbon intensity achieved in the most recent year
- Any major changes in fuel sources since the base year
- Tables 5 and 6 from your Climate Action Plan Tool Kit
- Graphs 1-5 from your Climate Action Plan Tool Kit
- **OPTIONAL:** A description of your emissions by campus and Graphs 6 and 7 from your Climate Action Plan Tool Kit

Please take what is useful from the following text.

## Background

All Mayor's Carbon Challenge participants complete a portfolio-wide carbon emissions inventory to calculate their energy use and associated carbon emissions for New York City-based properties for each year of the Challenge, beginning with a selected base year and ending with the last year of the Challenge. The GHG emissions calculated in the participant's base year is the year from which Mayor's Carbon

Challenge reduction goal is measured. [University Name] accepted the Mayor's Carbon Challenge in [Start Year] and pledged to reduce its carbon emissions in [Base Year] by 30% by [End Year].

## Emissions Sources

The Mayor's Carbon Challenge covers all building-based emissions from the energy use over which participants have direct operational control. These include emissions that are attributable to on-site energy use on participants' properties as well as emissions that result from offsite generation of the energy sources. It is important to note, however, that emissions reported for the Mayor's Carbon Challenge do not include the full profile of each participant's emissions. For one, the Mayor's Carbon Challenge only includes emissions from properties that are located in New York City, and some participants operate properties outside the city limits that are not counted in the Challenge. In addition, emissions include only what the World Resources Institute (WRI) labels "Scope 1" and "Scope 2" emissions.

According to the WRI's Greenhouse Gas Protocol, an institution's full profile of emissions consists of: Scope 1 emissions, which include emissions that are physically produced on an institution's property (for example, fossil fuels used in boilers); Scope 2 emissions, which are indirect emissions from the offsite generation of energy sources that are used on-site (for example, electricity or district steam); and Scope 3 emissions, which are emissions that are not produced on-site or from offsite

generation but are nonetheless attributable to the institution's activities (for example, from air travel or solid waste disposal). The Mayor's Carbon Challenge includes Scope 1 and Scope 2 emissions but does not necessarily include Scope 3 emissions because they are not always produced within city boundaries and lack general agreement on proper accounting methodologies.

The Mayor's Carbon Challenge requires that **[University Name]** measure emissions from all buildings and properties that it owns and operates and from rental properties greater than 10,000 square feet where **[University Name]** pays the entire utility bill. In rental properties greater than 10,000 square feet where **[University Name]** does not pay the entire bill, the gross square footage of the property is discounted by 50%. Rental properties of less than 10,000 square feet are optional under the Challenge. **[University Name]** **[has/has not]** decided to count these properties.

The majority of carbon emissions from universities come from the energy used in their buildings. For this reason, the participants in the Mayor's Carbon Challenge are focused primarily on reducing carbon emissions from these sources. Reducing and reporting carbon emissions from vehicle fleets and solid waste are optional under the Challenge. **[University Name]** **[has / has not]** chosen to include carbon emissions from its vehicle fleet beginning in its **[year fleets incorporated]** inventory. The university **[has / has also / has also not / has not]** chosen to include carbon emissions from its waste stream beginning in its **[year fleets incorporated]** inventory.

### GHG Accounting Methodology

As a Mayor's Carbon Challenge participant, **[University Name]** agrees to track its carbon emissions according to the methodology of the Mayor's Carbon Challenge. Under this methodology, participants report their non-weather normalized source energy use for all covered properties by fuel type and aggregate it annually for every year of the Challenge, beginning in the base year and ending in the end year. Participants enter this energy use 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<sub>2</sub>e).

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 2012 United States Community Protocol for Accounting and Reporting Greenhouse Gas Emissions (USCP). The Mayor's Carbon Challenge uses New York City-specific carbon coefficients for electricity and steam, which are calculated by the Mayor's Office of Long-Term Planning and Sustainability based on power plant data. All coefficients for natural gas and heating fuel oils No. 2, 4, and 6 were developed by the U.S. EPA.

For purposes of the Challenge, the carbon coefficients for electricity and steam are fixed at 2005 base year levels because the coefficients for these fuel types can vary significantly between years. Improvements in New York City's electricity supply, for example, would provide an advantage to Challenge participants who depend primarily on electricity, regardless of their energy efficiency investments. Fixing the carbon coefficients at 2005 levels therefore

standardizes the competition across all the Challenge participants. Please see below for the complete list of the Mayor’s Carbon Challenge carbon coefficients.

**Optional: If you are including emissions from fleets and/or waste, please keep this methodology here. If you are not including these emissions, you may remove the methodologies below.**

The Mayor’s Carbon Challenge gives hospitals the option to include carbon emissions associated with vehicle fleets and solid waste, but it is not required. Under the methodology of the Challenge, fleets are vehicles owned and operated by an institution. This includes maintenance vehicles, ambulances, buses, shuttles, and security vehicles, but does not include personal commuting or employer-owned vehicles that are leased to individuals. The minimum reporting requirement for fleets are the total annual gallons of fuel consumed, aggregated by fuel type (gasoline, diesel, biodiesel). The electricity used to fuel hybrid, plug-ins, and electric vehicles are assumed be reported in an institution’s electricity bill, which would be reported in the ‘Energy’ section of the Carbon Emissions Inventory. All carbon coefficients for fleets were calculated according to New York City’s methodology for greenhouse gas inventories, which are based on EPA and/or ICLEI protocols.

For institutions like **[University Name]** that elect to include emissions from solid waste, the Mayor’s Carbon Challenge requires a minimum reporting of annual mixed/unsorted MSW

(general municipal solid waste sent to a landfill), recycled waste (sent to a recycling facility), and composted waste (if there is an institutional composting program). Waste inventories are recorded in short tons. Institutions have the option to complete a physical waste audit to determine waste characterization percentages, which would break down the mixed/unsorted MSW category into mixed recyclables, mixed organics, and sorted MSW. Breaking down the waste stream provides more accurate emission levels.

The emission factors for mixed/unsorted MSW, mixed recycling, and mixed organics were derived from the EPA WARM model, Exhibit 6 and material definitions list. They were modified according to the methodology New York City accounts for greenhouse gas emissions. Transportation to landfills is not included in the equation, as it is counted separately for the city and would have a minor effect on the coefficients. For simplicity of accounting, all waste is assumed to be taken to a landfill. According to New York City data, 95% of commercial waste is landfilled, and only 5% is incinerated. The Mayor’s Carbon Challenge assigns a carbon coefficient of zero for recycling and composting, although it recognizes that the EPA WARM model provides a negative coefficient for these diversions because of attributed carbon sequestration. This methodology was meant for influencing waste management practices, not greenhouse gas accounting. A zero coefficient acknowledges that recycling and composting reduces emissions, but there is no current research to accurately quantify it.

## Mayor's Carbon Challenge Emissions Coefficients

### Emissions Coefficients for Buildings

	Electricity (kWh)*	Natural Gas (therms)*	#2 Fuel Oil (gal)	#4 Fuel Oil (gal)	#6 Fuel Oil (gal)	Diesel For Back-up Generation (gal)	Steam (Mlbs)
MT CO <sub>2</sub> e per unit energy	0.000422704	0.005315600	0.010264026	0.011016722	0.011327550	0.010264026	0.086629611
MMBtu per unit energy	0.009546	0.1	0.138	0.146	0.15	0.138	1.33015

\*Fixed at 2005 Levels

### Emissions Coefficients for Fleets

	Gasoline (gal)	Diesel (gal)	Biodiesel B20 (gal)	Biodiesel B5 (gal)
MT CO <sub>2</sub> e per unit energy	0.008477	0.01021	0.008672	0.008526

### Emissions Coefficients for Waste

	Mixed MSW - Sorted & Unsorted (tons)	Mixed Organics (tons)	Mixed Recyclables (tons)	Composted Waste (tons)	Recycled Waste (tons)
MT CO <sub>2</sub> e per unit weight	0.819	0.282128	0.416475	0	0

### [University Name]’s Goal

To measure progress toward the Mayor’s Carbon Challenge goal, participants perform a baseline carbon emissions inventory to measure emissions levels in their base year. Based on this inventory, [University Name] will reduce its [Base Year] carbon intensity of [Carbon Intensity in Base Year] pounds per foot by 30% to [Carbon Intensity for Challenge Goal] by [End Year].

### [University Name]’s Carbon Emissions Inventory

[University Name] completed its most recent carbon emissions inventory for the Mayor’s

Carbon Challenge for [Most Recent Year]. Based on this inventory, [University Name] has reduced its carbon intensity by [Reduction in Carbon Intensity] and reduced its energy use intensity by [Reduction in Energy Use Intensity]. See below for a summary of [University Name]’s progress.

### Changes in Energy Sources

In addition to reducing energy use, switching to cleaner energy sources can also significantly lower carbon emissions.

Please describe any major changes in your university’s energy sources here.

### [University Name]’s Carbon Emissions Reduction, [Base Year] – [Most Recent Year]

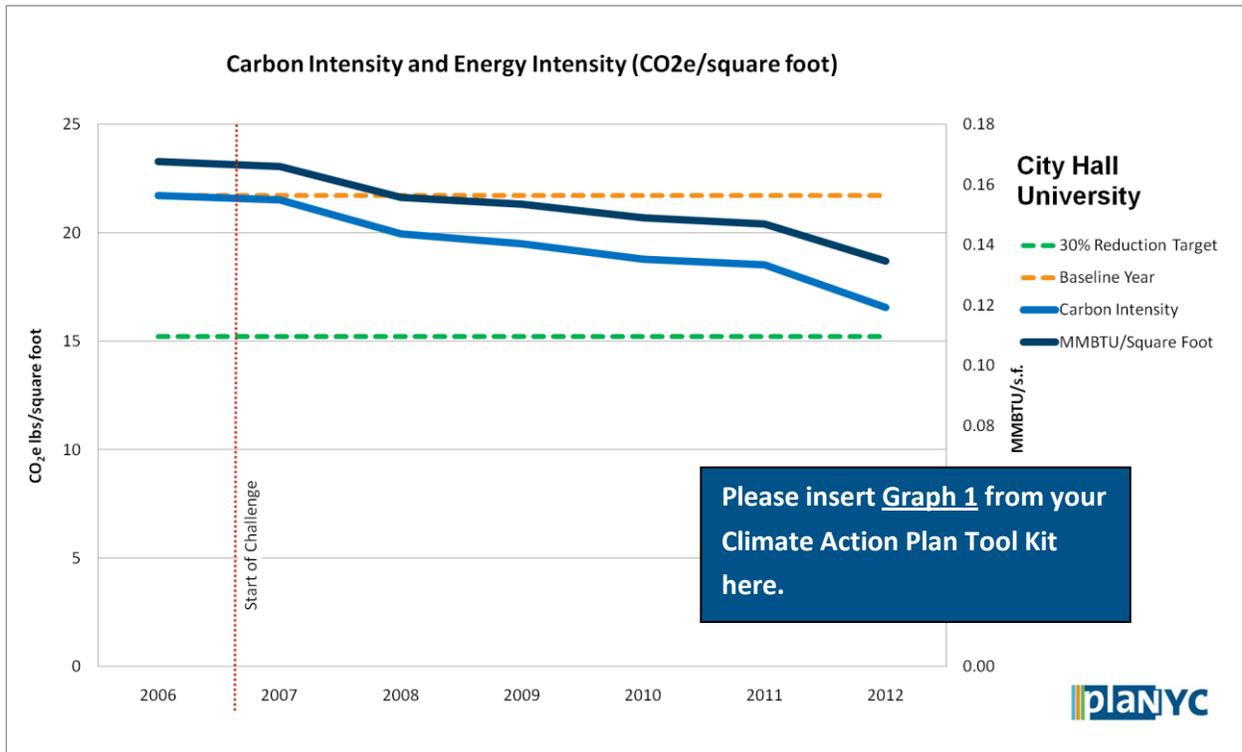
	Base Year (2006)	Current Year (2012)	Percentage Change
Total Emissions (MT CO <sub>2</sub> e)	49,253	41,275	-16.20%
Gross Floor Area (Sq Ft)	5,000,000	5,500,000	10.00%
Emissions Intensity (lbs CO <sub>2</sub> e / Sq Ft)	21.72	16.55	-23.82%

Please fill out [Tables 5 and 6](#) in your Climate Action Plan Tool Kit and insert it here.

### [University Name]’s Energy Use Reductions, [Base Year] – [Most Recent Year]

	Base Year (2006)	Current Year (2012)	Percentage Change
Total Energy Use (MMBtu)	837,805	740,733	-11.59%
Gross Floor Area (Sq Ft)	5,000,000	5,500,000	10.00%
Energy Use Intensity (MMBtu / Sq Ft)	167.56	134.68	-19.62%

**[University Name]’s Carbon and Energy Use Intensity Reduction, [Base Year] – [Most Recent Year]**



**Factors Affecting [Most Recent Year] Inventory**  
 If applicable, please explain which fuel sources contributed most to your emissions and/or energy use reductions.

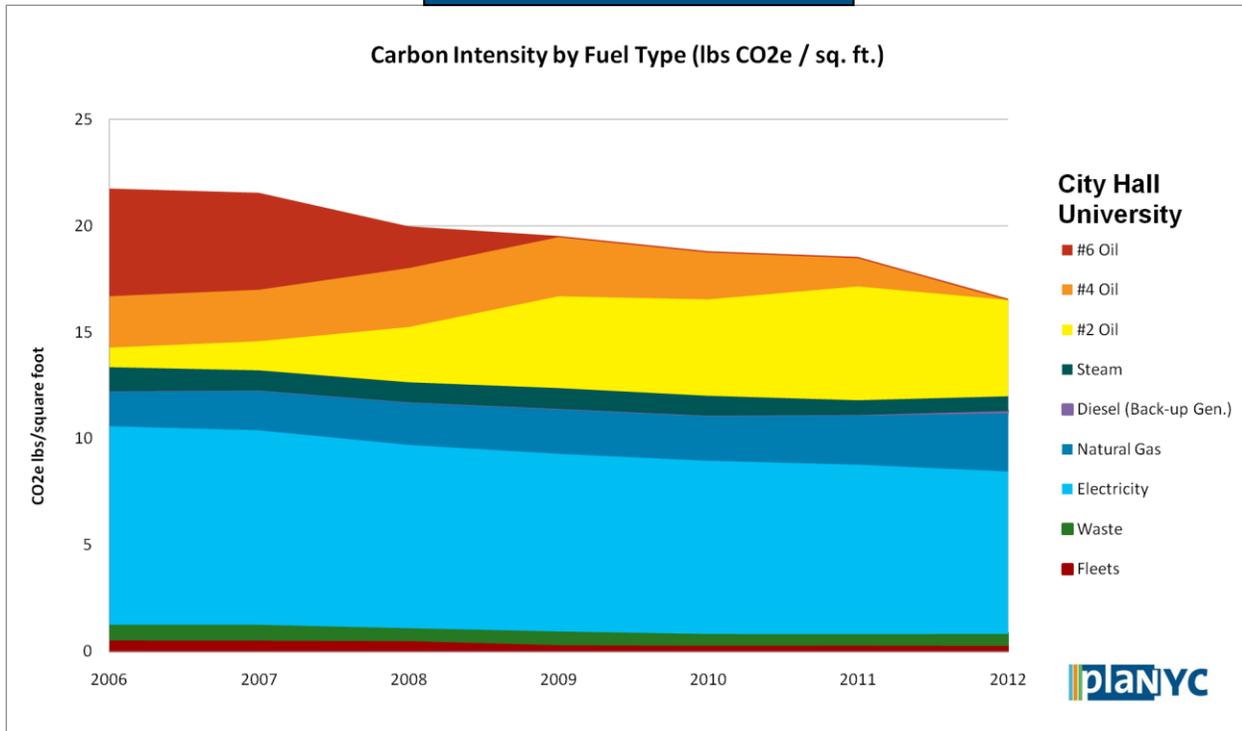
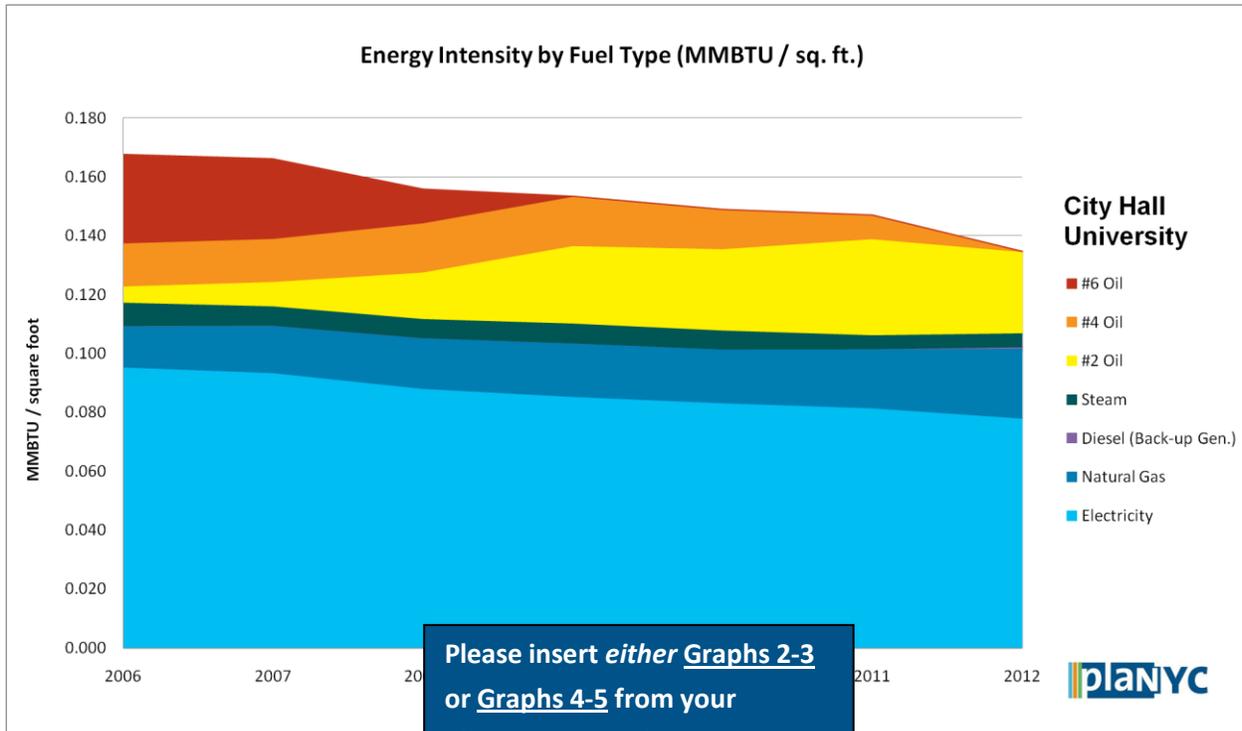
If weather or other exogenous variables affected your current emissions, please also describe these factors here.

If your institution was directly affected by Hurricane Sandy, include a paragraph

describing the impact. Please describe any emergency back-up generation that was required and how this affected your current fuel-use and emissions profiles.

Please feel free to add more information about the impact of your reduction. EPA’s GHG Equivalencies Calculator may be useful:  
<http://www.epa.gov/cleanenergy/energy-resources/calculator.html>

[University Name]'s Carbon and Energy Use Intensity by Fuel Types, [Base Year] – [Most Recent Year]



**Carbon Emissions by Campus**

**OPTIONAL:** If you have energy use data broken down by campus, please:

- Describe the contribution of each campus to your carbon emissions in the base year and most recent year
- Include the campus graphs in your Climate Action Plan Tool Kit

The following is sample text—please remove and insert your own text in its place.

Breaking down City Hall University’s carbon emissions and carbon intensity by campus offers insight into opportunities for further reductions in emissions from each campus.

Because City Hall University’s 2,109,000 square foot Main Campus is significantly larger than its Flushing Campus, the absolute emissions from this campus unsurprisingly make up the greatest share of the university’s overall emissions profile in 2012. Approximately one-third of City Hall University’s emissions come

from its property in the Manhattan Municipal Building, meaning that energy efficiency investments in this property will have a significant impact overall. City Hall University’s buildings at 250 Broadway and 253 Broadway make up the next largest contributions to the university’s total emissions, respectively, while the City Hall Building accounts for the smallest portion. By comparison, the Flushing Campus only accounts for 2,317 MT CO<sub>2</sub>e, which is roughly 5 percent of the Main Campus’s total emissions.

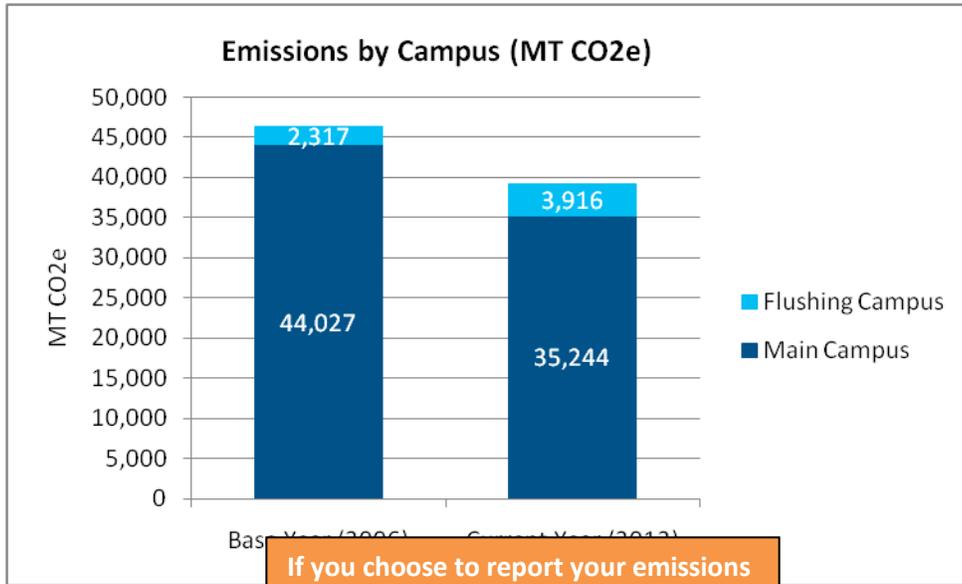
Separating City Hall University’s carbon *intensity* by campus shows that the Flushing Campus contributes the largest proportion of carbon emissions per square foot. This is likely due in part to City Hall University’s recent installation of new, energy-intensive data center on this campus. Thus, making energy efficiency investments at the Flushing property will also be an important opportunity for reducing City Hall University’s carbon intensity.

**[University Name]’s Carbon Emissions by Property, [Base Year] – [Most Recent Year]**

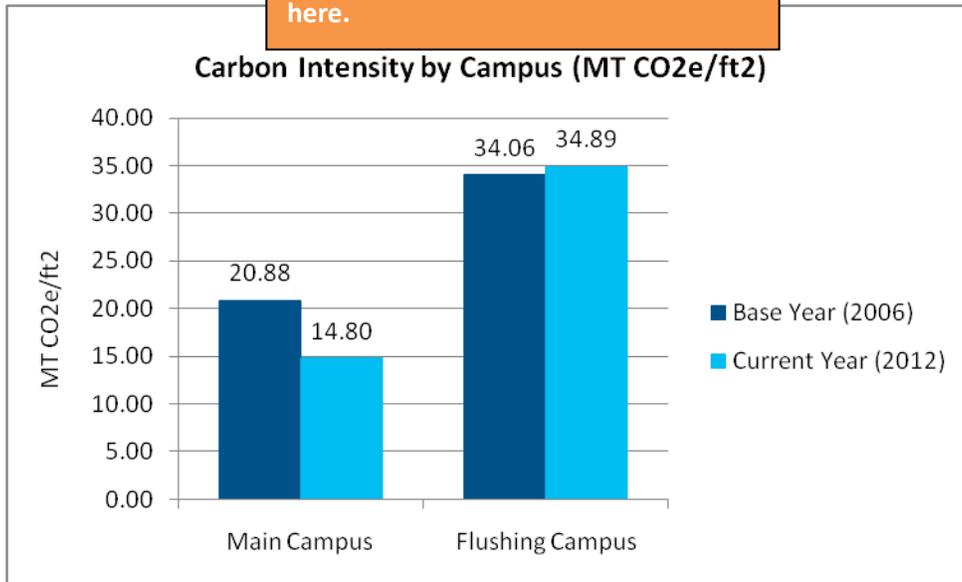
Campus	Base Year (2006)		Current Year (2012)	
	Carbon Emissions (MT CO <sub>2</sub> e)	Carbon Intensity (MT CO <sub>2</sub> e/sq.ft.)	Carbon Emissions (MT CO <sub>2</sub> e)	Carbon Intensity (MT CO <sub>2</sub> e/sq.ft.)
Main Campus	44,027	20.88	35,244	14.80
Flushing Campus	2,317	34.06	3,916	34.89

If you choose to report your emissions by property, please insert [Table 7](#) from your Climate Action Plan Tool Kit here.

**City Hall University's Carbon Emissions and Carbon Intensity by Property, [Base Year] – [Most Recent Year]**



If you choose to report your emissions by property, please insert [Graphs 6-7](#) from your Climate Action Plan Tool Kit here.



# Completed Projects

In this section, please include information about the projects and strategies you've completed that have contributed to your emissions reduction so far. Please include:

- A description of the projects and strategies your university has completed to date and their estimated energy reductions, carbon reductions, financial savings, and payback times
- **OPTIONAL:** Any operational improvements and/or additional benefits from your projects and strategies
- A description of any exogenous variables that may have reduced your energy use
- Any adjustments you have made to your emissions projections
- A description of your measurement and verification process for estimates of energy savings
- Table 8 from your Climate Action Plan Tool Kit

You are encouraged to include photos of your selected projects interspersed within the text.

Please take what is useful from the following text.

## Overview

Participants in the Mayor's Carbon Challenge may achieve reductions in carbon emissions through both energy efficiency projects and conversions to cleaner energy sources. Energy efficiency projects include the installation of equipment or implementation of processes that are more efficient than currently required by relevant standards and achieve a permanent

reduction in energy consumption. Fuel conversions include the replacement of one energy source for a building system with another source, which can result in emissions reductions even while using the same level of energy.

Please state whether your university has completed fuel conversions.

## Methodology of Estimating Energy and Carbon Reductions

Please describe how your university measures and verifies energy savings. Please take what is useful from the following text.

To quantify the energy and carbon reductions of completed projects and strategies, [University Name] uses a measurement and verification process that adheres to the [Your University's M&V Protocol]. Measurement and verification includes data collection, measurements, monitoring, and analysis to determine the energy and demand savings from completed energy efficiency and fuel conversion projects. Using a tool provided by the Mayor's Office, [University Name] applied carbon coefficients to the energy savings to find the resulting carbon emissions reduction of each project. It is important to note, however, that even with a robust measurement and verification process, there is always some degree of uncertainty in the energy reduction estimates that may be the result of end use or demand changes, exogenous factors such as the weather, and inherent uncertainties with modeled data.

**The following is sample text—please remove and insert your own text in its place.**

### **Completed Projects and Estimated Impacts**

In the past six years, City Hall University has implemented several projects have enabled the University to achieve a 23.8 percent reduction in its carbon per square foot since its 2006 base year.

### **Completed Projects and Estimated Impacts**

*Heating Oil Conversion:* In 2008, City Hall University began replacing boilers and burners to eliminate the use of all No. 4 and No. 6 heating oil on its Main Campus. The University completed this conversion in December 2011, installing cleaner-burning natural gas boilers that use No. 2 oil as a backup fuel. This project is estimated to have reduced City Hall University’s carbon emissions per square foot by roughly 21% compared to baseline levels.

*Lighting Upgrades:* In addition to eliminating heavy heating oil on its Main Campus, City Hall University began investing in lighting upgrades for both the Main Campus and the Flushing Campus in 2009. So far, 50% of existing lights in City Hall University have been replaced with energy efficient LED lights. This change has resulted in savings of more than 15% in annual energy use for lighting, translating to a 3% reduction in City Hall University’s baseline carbon intensity.

*Residence Hall Competition:* In 2009, City Hall University also installed energy sub-meters on each floor of its Manhattan Municipal Building Residence Hall, which allowed the residence hall to launch a floor-by-floor competition to reduce resident energy use. Each floor competed to save energy by turning off lights, shutting down computers at night, and sharing

laundry machines. The first year of the competition realized an 8% energy savings in the residence hall, translating to a 2% overall reduction in our baseline energy intensity and associated carbon emissions.

### **Financial Impacts**

Not only have these strategies reduced City Hall University’s carbon emissions, they have also translated to significant financial savings. Based on an analysis by City Hall University’s Department of Finance, the completed fuel conversion will provide the University an annual savings of about \$500,000, primarily due to lower rates for natural gas, with a payback time of 3 years. In addition, City Hall University’s lighting upgrades are expected to save \$45,000 annually, with a payback time of 2 years, and the residence hall competition will save an estimated \$15,000 annually, with a payback time of two years. In total, City Hall University expects to save \$560,000 per year as a result of these three energy conservation strategies.

### **Exogenous Impacts**

Exogenous factors can significantly impact building-level energy use and therefore affect City Hall University’s progress in the Mayor’s Carbon Challenge. In 2012, Hurricane Sandy caused a two-week power outage in the City Hall Building, 250 Broadway, 253 Broadway, and the Manhattan Municipal Building, reducing annual electricity consumption in these properties. City Hall University brought in diesel generators to power these buildings for one week of the power outage, which partly, but not completely, offset the decrease in energy use and emissions.

### **Measurement and Verification**

Based on the projects that City Hall University has completed, the university has updated its

strategy and adjusted its original projections for energy savings and emissions reductions.

The institution originally predicted that its fuel conversion would reduce total emissions by 18% and save \$450,000 annually, but this was revised upwards to a 21% reduction in emissions and \$500,000 in cost savings because of greater than anticipated boiler efficiencies and the falling price of natural gas. City Hall University will continue its originally planned projects, but these additional reductions give City Hall University a greater cushion to realize its 30% reduction goal.

The emissions, energy use, and cost reductions realized from lighting upgrades are generally

consistent with City Hall University’s original projections. This means that completing the upgrades should realize a total of 6% emissions reductions and \$45,000 in cost savings.

City Hall University’s residence hall energy use competition exceeded initial projections. To continue this strategy will cost virtually nothing beyond the initial investment in energy sub-meters and should continue to realize at least 2-3% in energy savings and associated emissions reductions for each additional year of the Challenge. Given the positive results of this project, City Hall University has decided to launch additional competitions and initiatives aimed at changing behavior as a cost-effective way to achieve additional reductions.

**[University Name]’s Completed Projects and Strategies**

Completed Project Information			Energy Savings	Cost Savings			GHG Reductions
Energy Conservation Measure (ECM) Category	Measure Name	Project Description	Est. Electricity and Fuel Savings (MMBTU/yr)	Dollars Saved Annually (\$/yr)	Installation Cost (\$)	Simple Payback (Years)	Est. Emissions Reduction (MT CO2e/yr)
Fuel_Switching	#6 oil or #4 oil to #2 oil	Replaced all burners and boilers using No. 4 and No. 6 heating oil to more efficient natural gas boilers, with No. 2 heating oil as a backup fuel	85,000	\$500,000	\$1,500,000	3.0	6,572
Lighting	Upgrade to LED	Replaced 50% of university's lights with energy efficient LED lights	13,364	\$45,000	\$90,000	2.0	592
Submetering	Install Submeteri	Installed energy sub-meters on each floor of the Manhattan Municipal Building		\$15,000	\$30,000	2.0	423

Please fill out Tables 8-9 in your **Climate Action Plan Tool Kit** and insert it in this section.

**Total Savings from [University Name]’s Projects and Strategies**

Total Energy Savings (MMBTU/yr)	Total Dollars Saved Annually (\$/yr)	Total Cost of ECMs (\$)	Simple Payback (Years)	Est. Carbon Reduction (MT CO2e/yr)	Reduction in Carbon Intensity (lbs CO2e/Sq Ft)
107,910	\$560,000	\$1,620,000	2.9	7,586	3.04

# Highlights

**In this section, please highlight at least one project of particular interest. The following is sample text—please remove and insert your own text in its place.**

## **Flushing Building Competition**

In 2010, City Hall University launched the “How Low Can You Go?” energy use competition in its Manhattan Municipal Building Residence Hall. Using the energy sub-meters installed on each floor of the residence hall in 2009, the floors competed against each other for the lowest energy use per month. At the end of the month, prizes were awarded to the floor with the lowest energy use, and a grand prize was awarded at the end of the year for the floor that had to lowest total energy use for the whole year.

The energy savings and emissions reductions resulting from the competition were significant. Energy use decreased every month of the Challenge as students learned new savings techniques, culminating in a 10.5% energy use reduction from the first month of the competition. In total, the first year of the competition realized an 8% energy savings in the residence hall, which translated to a 2% overall reduction in our baseline energy intensity and associated carbon emissions.

Not only did the competition translate to real energy savings and emissions reductions, it also facilitated greater energy consciousness and environmental awareness among the student body. Students became enthusiastic about the competition and formed “Energy Teams” that

led the floor-wide efforts to reduce energy consumption. A computer program developed by students in 2009 allowed students to track their floor’s energy usage in real time and pinpoint areas of particularly high energy use. Using this information, students came up with innovative ways to save energy by turning off lights, shutting down computers at night, and even sharing washing machines to ensure that only full loads of laundry were being washed. Resident Assistants (RAs) did their part to facilitate the competition by reminding residents to turn off lights and unused equipment and educating their peers on energy saving techniques.

The “How Low Can You Go?” competition was so successful that City Hall University has decided not only to continue the competition in the residence hall, but also expand the competition to the university’s academic departments. City Hall University believes it can continue to achieve a 2-3% reduction in energy and associated emissions over the baseline year for each additional year of the Challenge.



Image: Student engagement was a major factor for the success of “How Low Can You Go?”

# Next Steps

In this section, please detail your plan to reach your 30% emissions reduction goal. Please include:

- An overview of the section
- A description of Business as Usual Growth
- An estimate of remaining reductions needed to meet the 30% goal, taking into account both achieved reductions and business as usual growth
- A brief description of your university's project identification process
- A brief description of each planned project and/or strategy and the estimated energy reductions, carbon reductions, financial savings, and payback times
- A general plan for achieving the remaining reductions, broken down by broad strategy
- A brief description of your university's measurement and verification process
- Tables 11 and 12 from your Climate Action Plan Tool Kit
- A Wedge Chart illustrating a combination of your planned projects and additional opportunities for reductions by broad strategy

Please take what is useful from the following text.

## Overview

To achieve the Mayor's Carbon Challenge goal, [University Name] must identify and assess the estimated energy and carbon reductions from a range of potential projects. This section includes a list of [University Name]'s planned projects in the short term for which the

university has completed comprehensive analysis of energy projections, as well as a broader strategy to meet the goal based on potential opportunities that have not yet been fully assessed. Taken together, [University Name]'s planned projects and strategies provide a road map for meeting the Challenge goal.

## "Business as Usual" Projected Growth

If you have used an alternate calculation of business as usual growth, please remove the text below and describe your own calculation here. If you assume no business as usual growth, please explain why.

To map out the strategy for meeting the Mayor's Carbon Challenge goal, participants must understand both their base year level of emissions and, to a certain degree, their "Business as Usual" projected growth if no further action is taken to reduce energy use or carbon emissions. Based on the available historical data, the Mayor's Office assumes citywide "Business as Usual" growth to be roughly a 1% increase in emissions per year. The Mayor's Office is currently revising this projection, but because this analysis is not yet complete. For planning purposes, [University Name] will assume 1% annual growth under its "Business as Usual" scenario to account for expected increases in emissions as a result of greater intensity of energy use from IT equipment and other sources. This means that the university will plan to reduce emissions by *more than* 30% in order to offset this projected growth in emissions and meet the Challenge goal.

**The following is sample text—please remove and insert your own text in its place.**

### **Remaining Reduction**

In the six years since it joined the Mayor’s Carbon Challenge, City Hall University has reduced its carbon intensity by 23.8%. To reach the 30% goal, City Hall University must reduce its carbon intensity per square foot by an additional 6.2% by 2017. This corresponds to a drop in emission intensity from 16.55 Lbs. CO<sub>2</sub>e/Sq. Ft. in 2012 to 15.20 Lbs. CO<sub>2</sub>e/Sq. Ft. by the end of the Challenge.

However, assuming a “Business as Usual” projection of 1% growth in carbon intensity per year, City Hall University would expect emissions to increase by 5% if the university took no additional action. To offset this potential future growth, City Hall University plans to achieve an additional 18-20% reduction in carbon intensity from its base year levels.

### **Project Identification Process**

To identify additional projects to meet this goal, City Hall University engaged a private contractor to model the energy use of its properties to more fully understand the contribution of various equipment and design features of each building to the university’s total energy use. After developing a baseline model, the contractor is in the process of modeling separate energy conservation measures to understand the impact of each on total energy use, both separately and taken together. Based on this assessment, City Hall University will select a portfolio of projects that will reduce energy consumption and allow it to meet the Challenge goal.

City Hall University began its project identification process in January of 2013 and will complete the process by the end of the year. Based on the initial energy modeling, several specific projects have already been selected based their energy reduction potential.

### **Planned Projects and Strategies**

To help achieve this remaining goal, City Hall University has identified five projects and completed an assessment of potential energy reductions.

*Strategy 1 – Complete Lighting Upgrades:* City Hall University has already replaced 50% of its existing lights with energy efficient LED lights. This has resulted in savings of more than 20% in annual energy use for lighting, translating to a 3% reduction in City Hall University’s carbon emissions per square foot. Over the next two years, City Hall University will complete the remaining lighting upgrades, realizing an additional 3% reduction in carbon intensity from baseline levels, bringing the total reduction to 6%. This corresponds to annual savings of 700,000 kWh of electricity annually, which translates to a GHG reduction of 296 metric tons of carbon dioxide equivalent. The payback time of this project is expected to be 2 years.

*Strategy 2 – Improve Operations and Maintenance of Equipment through Training:* City Hall University will hold annual trainings for all building managers and operators, which will focus on training for advanced control systems and active monitoring of building equipment. Based on the experience of similarly sized University, City Hall University expects to realize a 5% reduction in energy use and associated carbon emissions per square foot as a result. These reductions in energy consumption will

save an estimated \$51,000 in electricity costs annually, with a payback time of 2 years.

*Strategy 3 – Build all new buildings to LEED Silver Standards:* City Hall University has committed to build its new facilities in the TriBeCa neighborhood to a high-performance LEED Silver standard. As City Hall University continues to expand, these building standards are expected to reduce the carbon intensity of its facilities facilities by a total of 5%.

*Strategy 4 –Retro-Commissioning:* Beginning in 2014, City Hall University will begin retro-commissioning its facilities to optimize energy performance and comply with New York City’s Local Law 87. This includes auditing of its existing buildings and identifying low-cost improvements to equipment controls to optimize system performance. This will reduce City Hall University’s electricity consumption by an estimated 100,000 kWh, which translates to about 43 metric tons of carbon dioxide equivalent. The strategy will reduce energy costs by \$20,000 per year and is expected cost only \$50,000 to implement, implying a payback period of 2.5 years. The university expects this strategy to make a significant contribution to its goals by reducing its carbon emissions per square foot by an additional 4%.

*Strategy 5 – Behavioral Changes through Competitions:* The final component of City Hall University’s strategy focuses on behavioral changes it can sustain through the expansion of energy-saving competitions. The first year of the competition in the Manhattan Municipal Building Residence Hall realized an 8% energy savings in the office space, translating to a 2% reduction in overall carbon intensity. City Hall University will continue the energy-saving competition and create a new, inter-

departmental competition to achieve an additional 2% reduction in carbon intensity. The strategy will reduce energy costs by \$17,000 per year but is expected cost only \$10,000 to implement, so the payback is just 0.6 years.

These five projects represent relatively simple strategies to reduce City Hall University’s energy use and carbon emissions. Taken together, the strategies are projected to reduce City Hall University’s total energy use by about 17,660 MMBtu and cut GHG emissions by roughly 780 metric tons of carbon dioxide equivalent. Based on current electricity prices, this will save the university \$111,000 in energy costs annually with a payback time of 1.95 years overall.

#### **Additional Opportunities and General Strategy to Meet the Challenge Goal**

Based on the initial results of City Hall University’s energy model, the university estimates that it will achieve the remaining carbon reductions to meet the 30% reduction goal through three main strategies: additional lighting projects; plug load reductions through a combination of energy efficient purchasing standards, software controls, and student engagement; and on-site generation. The contribution of each strategy is demonstrated by the wedge chart below, which assumed a 1% annual growth in “business as usual” emissions for planning purposes.

#### **Measurement and Verification**

Because there is a degree of uncertainty in all projections, City Hall University will continue to update energy use projections over the next five years to reflect additional evaluation, measurement, and verification of its projects using the 2010 International Performance Measurement and Verification Protocol.

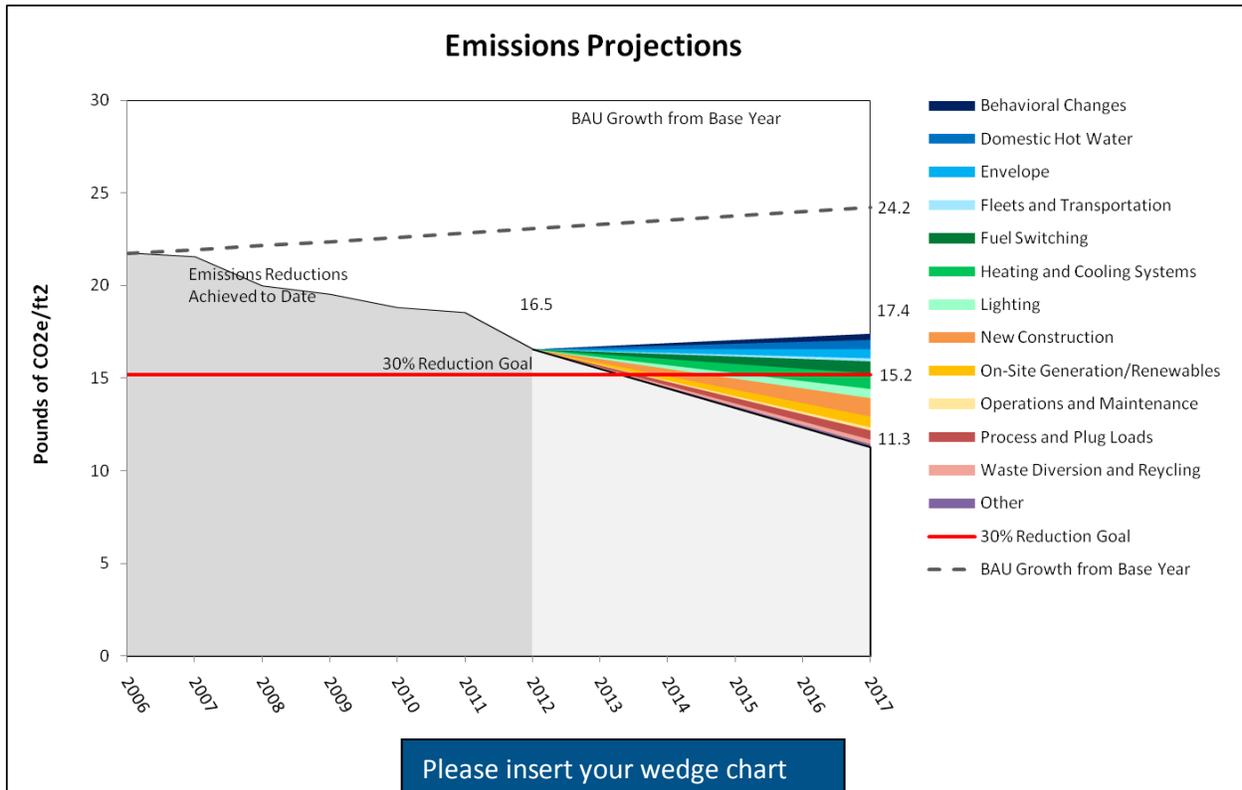
**[University Name]'s Planned Projects and Strategies**

Completed Project Information			Energy Savings	Cost Savings		GHG Reductions	
Energy Conservation Measure (ECM) Category	Measure Name	Project Description	Est. Electricity and Fuel Savings (MMBTU/yr)	Dollars Saved Annually (\$/yr)	Installation Cost (\$)	Simple Payback (Years)	Est. Emissions Reduction (MT CO2e/yr)
Lighting	Upgrade to LED	Complete upgrades on remaining 50% of university lights to LEDs, primarily in the Flushing Building	6,682	\$30,000	\$60,000	2.0	296
Operations_and_Main tenance	Facilities Staff Training	Hold annual trainings for all building managers and operators, which will focus on training for advanced control systems and active monitoring of building equipment	9,546	\$51,000	\$102,000	2.0	423
Operations_and_Main tenance	Retro-Commissioning	Comply with New York City's Local Law 87, including auditing of existing buildings and identifying low-cost improvements to equipment controls to optimize system performance	955	\$20,000	\$50,000	2.5	42
Behavior_Change	Other	Continue existing energy-saving competition and create a new, inter-departmental competition	477	\$10,000	\$5,000	0.5	21
Other_Measures	New Construction	Build Tribeca high-rise	Please fill out <a href="#">Tables 10-11</a> in your <a href="#">Climate Action Plan Tool Kit</a> and insert it in this section.			10.0	3,430

Total Energy Savings (MMBTU/yr)	Total Dollars Saved Annually (\$/yr)	Total Cost of ECMs (\$)	Simple Payback (Years)	Est. Carbon Reduction (Mg CO2e/yr)	Reduction in Carbon Intensity* (lbs CO2e/Sq Ft)
74,352	\$1,111,000	\$10,217,000	9.2	4,212	1.69

\*Estimated reduction in carbon intensity is based on current square footage, which is expected to change over the timeline of the Challenge.

[University Name]'s Plan



Please insert your wedge chart and projected reductions table from your Climate Action Plan Tool Kit in this section.

Energy Conservation Measure (ECM)	Reduction Target (% of current emissions)
Behavioral Changes	-2.0%
Domestic Hot Water	-3.0%
Envelope	-3.0%
Fleets and Transportation	-1.0%
Fuel Switching	-4.0%
Heating and Cooling Systems	-5.0%
Lighting	-3.0%
New Construction	-6.0%
On-Site Generation/Renewables	-3.5%
Operations and Maintenance	-1.0%
Process and Plug Loads	-3.0%
Waste Diversion and Recycling	-1.5%
Other	-1.0%
<b>Total Projected Reductions from 2012</b>	<b>-37.0%</b>
Carbon Intensity in 2012	16.55
Projected Carbon Intensity in 2017	10.42
<b>Total Projected Reduction from 2006</b>	<b>-52.0%</b>