

NYC Carbon Challenge for Universities and Hospitals Program Design

Background

On Earth Day 2015, New York City Mayor Bill de Blasio announced *One New York: The Plan for a Strong and Just City*, a groundbreaking effort to address New York City's long-term challenges: the forecast of 9 million residents by 2040, changing climate conditions, an evolving economy, and aging infrastructure. *OneNYC* represents a unified vision for a sustainable, resilient, and equitable city, and charts the path for collectively achieving this goal.

Recognizing the existential threat that climate change poses to New York City and the world, *OneNYC* sets the ambitious goal to reduce citywide greenhouse gas (GHG) emissions 80% below 2005 levels by 2050 (80 x 50). Because the energy used in New York City's one million buildings represents 68% of citywide GHG emissions, and more than 90% of the buildings that exist today will still be here in 2050, improving the energy efficiency of the city's existing building stock represents the greatest opportunity to reduce citywide GHG emissions.

New York City launched the NYC Carbon Challenge in 2007 to partner with private and institutional sector leaders across the city to achieve significant reductions in buildings-based GHG emissions. Over 100 participants have accepted the NYC Carbon Challenge, including the City's largest universities, hospitals, commercial owners and tenants, residential property management firms, and hotels. Participants have pledged to voluntarily reduce their building-based emissions by 30% or more over the course of ten years. In total, current participants account for over 500 million square feet of real estate, or more than 9 percent of citywide building square footage.

The NYC Carbon Challenge has been a success. Ten universities, hospitals, and commercial offices have already achieved the 30% goal, and more than half of the university and hospital participants have achieved reductions of at least 15%. These leaders have demonstrated that deep reductions in GHG emissions are achievable, while also realizing other benefits in the form of energy cost savings, energy reliability, and organizational resiliency. The program has also been a powerful demonstration that New York City's largest private and institutional sector organizations can work with the City toward a common goal of fighting climate change and creating a healthier and more sustainable place to live for all New Yorkers.

To help achieve New York City's ambitious 80 x 50 goal, the City will need to continue to look to our institutional sector leaders in to help pave the way and push towards deeper reduction in greenhouse gas emissions. As the universities and hospitals Challenges end in 2017 and 2019, respectively, the Mayor's Office of Sustainability is challenging current participants to increase their current GHG emissions reduction goals beyond the original 10-year commitment. Continuing to build upon the success of the program, this document details the NYC program design for universities and hospitals committing to 40% or more greenhouse gas reduction goal by 2030 or a more aggressive goal of a 50% greenhouse gas reduction by 2025.

For more information about the program, please visit www.nyc.gov/carbonchallenges as well as <http://www.nyc.gov/html/gbee/html/challenge/universities.shtml> for the Universities Challenge and <http://www.nyc.gov/html/gbee/html/challenge/hospitals.shtml> for the Hospitals Challenge.

The Challenge

The NYC Mayor's Office of Sustainability ("NYC Mayor's Office") invites universities and hospitals currently participating in the NYC Carbon Challenge to increase their current GHG emissions reduction goals and voluntarily reduce the GHG emissions intensity of their buildings and vehicle fleets (with the option of waste) measured as carbon dioxide equivalent per gross square foot (CO₂e/sq. ft.), by 40% from their selected base year by 2030 or 50% by 2025.

Benefits of the Challenge

Continuing to participate the Challenge offers participants the opportunity to take a leadership role within the program and be recognized for their efforts as part of broader citywide goals. Participating universities and hospitals have access to a diverse forum of peers, industry experts, and partner organizations that will provide contacts, best practices, technical assistance, and simple tools to help them realize continued reductions in energy use, costs, and GHG emissions.

Summary of the Program

Participation in the Challenge consists of the following (described in detail later in the document):

1. ***Accept the GHG Emissions Reduction Goal.*** To accept the expanded Challenge goal, each university or hospital must submit a participation letter to the NYC Mayor's Office confirming their commitment to the Challenge.
2. ***Tracking GHG Emissions.*** The program requires annual submissions of a GHG Emissions Inventory to track energy use and associated GHG emissions. To accurately measure energy consumption, participants must collect and submit data for electricity, district steam, and natural gas use, as well as heating fuel oil and diesel fuel oil purchases for all buildings. Tracking GHG emissions from solid waste and vehicle fleets is optional, but strongly encouraged to be included in reporting.
3. ***GHG Emissions Reduction Strategy.*** All participants will be required to develop a Climate Action Plan that maps out a strategy to reduce emissions to meet the Challenge goal and update this strategy bi-annually.
4. ***Regular Partner Meetings.*** The NYC Mayor's Office will organize quarterly meetings with all university and hospital participants to provide updates on the NYC Carbon Challenge and encourage the exchange of ideas and best practices. At least one representative from each participating university or hospital will be required to attend each meeting.
5. ***Individual Meetings and Working Groups.*** The NYC Mayor's Office will convene individual meetings with participants and voluntary working groups as needed to review progress, develop new initiatives, and/or resolve issues as they arise.
6. ***Promotion and Recognition.*** The NYC Mayor's Office will provide promotion and recognition of the Challenge participants including press conferences, news releases, and information posted on the NYC Carbon Challenge website.

Completing the Challenge

To complete the Challenge, participants must reduce their GHG emissions intensity from their selected base year by 2030. GHG emissions must be reported using the templates and methodology outlined below with carbon coefficients provided by the NYC Mayor's Office. Participant submissions may be subject to verification by the NYC Mayor's Office. There are no negative consequences or punitive repercussions for not meeting the Challenge goal.

Details of the Program

1. **Accept the Challenge**

To accept the Challenge, each participating university and hospital must submit a participation letter to the NYC Mayor's Office confirming their continued commitment to reduce the GHG emissions intensity measured as carbon dioxide equivalent per gross square foot (CO₂e/sq. ft.), by 40% or more from the selected base year by 2030 or 50% by 2025. The letter must be signed by the university or hospital President, CEO, or other member of the administration with the authority to commit the institution to the program.

2. **Tracking GHG Emissions**

Each Challenge participant must measure building-based energy use and associated emissions in all owned, operated, and leased properties that are covered by the NYC Carbon Challenge. All Challenge participants agree to track their emissions intensity in the GHG Emissions Inventory calculator provided by the NYC Mayor's Office according to the methodology of the NYC Carbon Challenge. All participants in the Challenge agree to track and report their emissions intensity annually through 2030 or 2025.

- **GHG Emissions Inventory.** Participants will submit a GHG Emissions Inventory to track their emissions by May 15th of each year of the Challenge, unless otherwise specified. The NYC Mayor's will provide each participant with a GHG Emissions Inventory calculator that will automatically calculate the Challenge participant's emissions intensity.
- **GHG emissions per Square Foot.** The metric used for the Challenge will be carbon dioxide equivalent per gross square foot (CO₂e/sq. ft.) from the energy used in all owned and/or operated space, including all non-owned leased space over 10,000 square feet in floor area. Measuring GHG emissions per square foot standardizes emissions levels for growth and facilities of different sizes.
 - **Carbon Dioxide Equivalent.** The level of carbon dioxide (CO₂) that would have the same climate impact as a given concentration and type of greenhouse gas.
 - **Gross Square Feet.** The total number of square feet measured between the exterior surfaces of the enclosing fixed walls of all owned, occupied, and/or leased space covered by the NYC Carbon Challenge, including spaces such as vent shafts, stairs, basements, etc. All properties that are owned and/or operated by the participating university or hospital, including non-owned leased spaces over 10,000 square feet in floor area, must be counted toward the participant's gross square footage. Leased spaces less than 10,000 square feet in area are optional in the Challenge.
 - **Owned Leased Space.** All space greater than 10,000 square feet owned by the Challenge participant and leased to a third party. Only if electrically sub-metered, report 50% of leased square footage and remove electricity consumption from whole electricity building consumption.
 - **Non-Owned Leased Space.** All space greater than 10,000 square feet leased by the Challenge participant from a third party that is occupied at least 50% of the time and where the participant has direct operational control. Only if electrically sub-metered, report 50% of leased square footage and all electricity consumption.
- **Data and Disclosure.** All building-based energy use and associated emissions data will be received and kept confidentially by the NYC Mayor's Office. Participants are encouraged to request data for comparison against other participants, but any disclosed information will be anonymized and/or aggregated, unless the Challenge participant provides explicit approval to share individual data.

Methodology for the GHG Emissions Inventory

Challenge participants aggregate their annual energy use by fuel type and amount for all owned, operated and leased properties that are covered by the NYC Carbon Challenge and input these amounts into the GHG Emissions Inventory calculator for each calendar year. It is required that all participants report on their total annual gallons of fuel consumed by their owned vehicle fleet and optional to report on solid waste generation from all owned, operated, and leased properties that are covered by the NYC Carbon Challenge. The GHG Emissions Inventory calculator automatically applies New York City's carbon coefficients, held constant at 2005 levels, to each fuel type to calculate the participant's total emissions. A separate methodology is used to calculate the GHG emissions associated with electric heat. The calculator then divides this value by the gross square footage to calculate each participant's emissions intensity (CO₂e/sq. ft.).

- **Base Year.** Each Challenge participant may keep the base year initially set for the 30% Challenge.
- **End Year.** The end year for university and hospital participants is 2030 for participants that have committed to the 40% reduction goal and 2025 for participants that have committed to the 50% reduction goal.
- **Calendar Year.** Energy use information for all GHG Emissions Inventories must be aggregated on a calendar year basis (January 1 – December 31).
- **Fuel Types.** Challenge participants measure their energy use by fuel type and amount. Energy use is reported using the following metrics:
 1. Electricity: Kilowatt-Hours (kWh)
 2. Electricity from heating and associated cooling: Kilowatt-Hours (kWh)
 3. Natural gas: Thermal Units (Therms)
 4. Heating oil distillates No. 2, No. 4, and No. 6: US Gallons (US Gal)
 5. Heating oil distillates No. 2, No. 4, and No. 6 with biodiesel blend: US Gallons (US Gal)
 6. District Steam: Thousand Pounds (Mlbs)
 7. Diesel or other fuels used for backup generation: US Gallons (US Gal)
 8. On-site/locally-based off-site renewable electricity: Kilowatt-Hours (kWh)
- **Fleets:** The total annual gallons of fuel consumed, aggregated by fuel type (gasoline, diesel, biodiesel). Fleets are vehicles owned and operated, which includes maintenance vehicles, intercampus bus/shuttles, and security vehicles, but does not include personal commuting or employer-owned vehicles that are leased to individuals.
 - **Electric Vehicles.** To promote increased implementation of electric vehicle charging stations, electricity consumed in these stations may be subtracted from the participant's total reported electricity consumption if sub-metered.
- **Waste:** The minimum reporting requirement for waste is the total annual tonnage of municipal solid waste (mixed/unsorted MSW), based on carter bills or an annual waste report. Completing a physical waste audit is optional, but will provide waste characterization percentages that will make the emissions calculations more accurate and most likely more favorable. The minimum waste characterization includes:
 1. Mixed/unsorted MSW include Mixed Recyclables: waste that could be recycled)
 2. Mixed Organics: waste that could be composted
 3. Sorted MSW: all remaining waste
- **Carbon Coefficients:** A carbon coefficient determines the level of carbon dioxide equivalent (CO₂e) associated with a given amount of fuel or energy use. All carbon coefficients for the NYC Carbon Challenge were developed by the NYC Mayor's Office and are compliant with

the Compact of Mayors and the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) BASIC level.

- **Electricity and District Steam.** The NYC Carbon Challenge uses the New York City specific carbon coefficients for electricity and district steam, held constant at 2005 levels. The coefficients for electricity and district steam can vary significantly across years. Holding the coefficients constant at 2005 levels ensures Challenge participants receive credit for their direct efforts, and not for exogenous changes to the energy supply.
 - **Electricity from Heat Pumps.** Heat pumps are devices that transfer thermal energy by absorbing heat from a one space and moving it to another. There are three types of heat pumps that conduct this thermal transfer process through different mediums: air source, water source, and ground source (defined below). Any electricity pulled from the electric grid to power these systems for both heating and cooling will use the 2015 carbon coefficient for electricity. To accurately measure energy consumption, these systems must use a Building Management System or a sub-meter. Utilizing the 2015 carbon coefficient for electricity will be advantageous for participants instead of relying on the 2005 carbon coefficient, which is roughly 65% more carbon intensive.
 - **Air source heat pump:** Use electricity to extract heat from cold outdoor air to heat buildings, and extract heat from indoor spaces to meet cooling needs. Centralized air source heat pump systems are often referred to as Variable Refrigerant Flow (VRF) systems, which have the ability to modulate and meet a building's heating and cooling needs to different zones within a building.
 - **Water source heat pump:** Operate much like an air source heat pump except that it extracts and dissipates heat into a water loop instead of ambient air.
 - **Ground source heat pump:** Use the relatively stable temperature of the earth to provide heating and cooling. These systems consist of a heat pump installed within the building and a ground coupling system that consists of piping or wells to transfer heat to and from the ground.
 - **Natural Gas, Biodiesel, Diesel, and Heating Oils No. 2, 4, and 6.** The NYC Carbon Challenge uses the nation-wide carbon coefficient for natural gas, biodiesel, diesel, and heating oils No. 2, 4, and 6, which were developed by the U.S. Environmental Protection Agency (EPA).
 - **Onsite and Locally-Based Offsite Renewable Electricity.** The electricity generated by onsite and locally-based offsite renewable sources (wind, solar, or geothermal) will have a carbon coefficient of 0.00.
 - **Waste.** The NYC Carbon Challenge uses waste coefficients that are calculated by the EPA Waste Reduction Model (WARM) Version 12 for mixed solid waste, recycled, and composted waste.
 - **Fleets.** The NYC Carbon Challenge uses fleet coefficients that are calculated by The Climate Registry's General Report Protocol—Version 2.0 for gasoline, diesel fuel, and gasoline with biodiesel blends.
- **Locally-Based Off-site Renewable Energy.** Off-site renewable energy purchased by a Challenge participant, such as through a power-purchase agreement, can count towards reductions in emissions intensity if 100% of the electricity generated feeds directly into New York City's electric grid (New York Independent System Operator Zone J). The off-site renewable energy project must be a newly constructed source. Challenge participants must

have direct ownership of the offsite renewable energy or must directly purchase the offsite renewable energy from the energy provider, as per a contract or other form of agreement such as a power-purchase agreement, and may not sell any RECs or environmental attributes generated by the renewable energy on the open market.

3. GHG Emissions Reduction Strategy

Each Challenge participant is required to develop an emissions reduction strategy in the form of a Climate Action Plan and update it bi-annually. The plan should include information on planned energy efficiency strategies. If the Challenge participant has previously submitted a Climate Action Plan, they will be required to update the plan to report their strategy to achieve the Challenge goal. The NYC Mayor's Office will provide Challenge participants with a template to complete the Climate Action Plan. All Climate Action Plans will be kept confidentially by the Mayor's Office; however, participants are encouraged to publically disclose their Climate Action Plan.

- ***The Climate Action Plan includes:***

- Background information about the Challenge participant's owned buildings and facilities, rental properties, and tenant spaces
- An overview of results from the Challenge participant's most recent GHG Emissions Inventory, Local Law 84, Local Law 87
- Information about the Climate Action Plan development and update
- An explanation of operations and maintenance plans and procedures
- A description of the strategy and projects completed to date
- A description of the proposed strategy to achieve the remaining reductions needed to meet the Challenge goal

- ***The Climate Action Plan Template and Toolkit.*** The NYC Mayor's Office will provide a Climate Action Plan Template and Toolkit that includes the minimum information that a participant must submit for the Climate Action Plan. Challenge participants are encouraged to submit additional information, but must complete their plan within the format provided by the NYC Mayor's Office.

4. Regular Partner Meetings

Regular partner meetings will be organized quarterly by the NYC Mayor's Office and held on the premises of a university or hospital participant or a partner organization. Meetings may include, but are not limited to:

- An update from the NYC Mayor's Office staff
- Presentations by technical speakers and guest speakers of interest
- Open discussion
- Networking

5. Annual One-on-One Meetings

The Mayor's Office staff and representatives from each participating building may meet once a year to review participant progress, consider any obstacles to achieving reductions, and discuss strategies to reach the Challenge goal. The Mayor's Office staff and individual Challenge participants will also meet on an as-needed basis. Meetings will cover:

- Background information about the Challenge partner and any material changes to building ownership, management, and operations
- Current progress toward the Challenge goal
- Status of deliverables to Mayor's Office, including the Climate Action Plan and annual updates to the GHG Emissions Inventory
- Strategy moving forward, any issues in achieving the Challenge goal, and potential solutions to help achieve success

6. Working Groups

The Mayor's Office will organize volunteer working groups of Challenge participants to discuss and develop solutions to any additional issues as they arise. These working groups will be convened on an as-needed basis.

7. Promotion and Recognition

The Mayor's Office will recognize the efforts and achievements of participating entities and their buildings. Promotion and recognition will include, but is not limited to:

- Press announcements from the Mayor's Office
- Placement of news articles and other media highlighting the success of Challenge participants
- Case studies highlighting participant progress and best practices
- Promotion of participant involvement at Mayor's Office and industry events
- Individually tailored Mayor's Office of Sustainability promotional materials
- Inclusion of firm name, logo, and profiles on official NYC documents, website, and social media outlets
- The ability to self-promote participation in the Challenge, including the use of the NYC Carbon Challenge logo on vetted documents, web pages, social media, or other media