



2018

**SUSTAINABLE
COLUMBIA**
Annual Progress Report



“At Columbia, we have long understood the profound threat climate change poses to the future of our planet and the role our community should play in confronting it.”

– Columbia University President, Lee C. Bollinger



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INTRODUCTION

In the face of a changing climate and a changing world, Columbia University is more committed than ever as an innovator and leader in campus sustainability.

The 2018 Sustainable Columbia Annual Report is a snapshot of the transformative progress we have collectively made towards realizing the University's Sustainability Plan – now entering its third year – to support a more sustainable future.

This year, our Annual Report includes the Morningside, Irving Medical Center, and Lamont-Doherty campuses. All campuses significantly reduced energy consumption and greenhouse gas (GHG) emissions. With a 47 percent reduction in absolute GHG emissions at the Morningside campus, Columbia has exceeded its goal of cutting emissions by 35 percent over 2006 levels by 2020.

In 2018, Columbia achieved 100 percent zero emissions renewable electricity by supplementing New York solar and hydropower with a significant purchase of renewable energy certificates from wind generation. This is an exciting step in the University's strategy for mitigating our emissions as we begin to prepare our roadmap for becoming operationally carbon neutral.

Other highlights you will come across include achieving LEED Gold certification at three new buildings, earning a Gold rating for our overall sustainability efforts and recognition as the top school for sustainable transportation from the Association for the Advancement of Sustainability in Higher Education (AASHE), diverting over 500 tons of waste from landfills, and onboarding more than 170 green leaders through the Sustainable Leaders Network to promote culture change across our campuses.

The task of addressing climate change and reducing our carbon footprint is an imperative. I am proud of everything we have accomplished together this past year, and look forward to the continued progress that lies just around the corner.

The extraordinary energy of our University community propels our work forward. Thank you to each member of the Columbia community for your contributions and for your passion.



David M. Greenberg
Executive Vice President for University Facilities and Operations



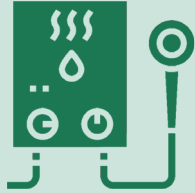
Columbia has purchased Renewable Energy Certificates (RECs) to **offset 100% of its electricity** from the Morningside, Manhattanville, CUIMC, and Lamont campuses.



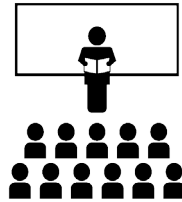
Morningside Campus has reduced GHG emissions by **47%** from baseline; Medical Center is down **11.31%**, and Lamont has reduced its percentage by roughly **20%**.



Columbia University was recognized as the **top school for Transportation** in AASHE's 2018 Sustainable Campus Index.



77% of 155 total energy meters have been installed in academic buildings.



13 schools and departments, comprising more than 65 teams, were certified in the Workspace Certification program. Two received Platnum certification.



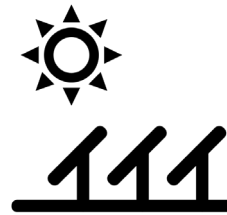
329,799 pounds of organic waste was collected from the residential portfolio by the Department of Sanitation.



Completed Energy Conservation Measures (ECMs) and Retrocommissioning Measures (RCMs) on the Morningside Campus have reduced GHG emissions by **58% and 85%** respectively.



CUIMC's Vagelos Education Center was **certified LEED Gold**.



The construction of the **Lamont-Doherty solar farms** was completed in November 2017 with the system interconnect by the utility company completed in June 2018.



There are now **40 residential buildings** participating in the organics collection program.



7 new groups joined the SLN Workspace Certification Program in year two; there are now **over 170 active green leaders** in the program.



Transitioning to electric buses will reduce Columbia's shuttle **GHG emissions by 70%** compared to diesel-powered shuttle buses.



Dyson hand dryers were added to 49 public restrooms on Morningside Campus, **avoiding over 1 ton**, or approximately 2200 lbs. of used paper towels daily.



Columbia submitted its first **Greenhouse Gas emissions inventory** to The Climate Registry (TCR) for Morningside Campus 2017, and it successfully passed a rigorous third-party verification.

An aerial photograph of a city skyline, likely New York City, with a teal overlay. The image shows a dense urban landscape with numerous skyscrapers and buildings. The text is overlaid on the right side of the image.

GREENHOUSE GAS EMISSIONS REDUCTION

Tracking, Reporting, and Goal-setting

Greenhouse Gas Emissions Reduction: Progress at a Glance

2017

2018

Morningside Campus Goals: Achieve a 35 percent absolute reduction in select Scope 1 and 2 emissions from a FY 2006 baseline by applying The Climate Registry (TCR) guidelines. Assess and establish new goals for 2020 and beyond for the expanded 2018+ inventory to align with NYC’s goal of reducing all greenhouse gas (GHG) emissions by 80 percent by 2050. Continue progress toward 30 percent carbon intensity reduction under the NYC Mayoral Carbon Challenge.

Compile historical data for GHG inventory to be submitted to TCR as Columbia’s first transitional inventory.	✓	
Report absolute carbon emissions to TCR beginning in 2018 and continue to report annual carbon intensity to NYC for the Mayoral Carbon Challenge.		✓
Prepare to expand transitional GHG inventory to include Scope 1, Scope 2, and Scope 3 emissions from business travel, commuting, and waste from operations.		✓

Medical Center Campus Goals: Reduce carbon emissions 80 percent by 2050.

Implement a web-based utility-bill tracking and analysis software that helps track and report carbon emissions.	✓	
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Lamont-Doherty Campus Goals: Reduce GHG emissions by 50 percent from 2016 levels by 2020, with an aspiration to match the University’s commitment to reach the NYC 80 percent reduction in carbon emissions goal by 2050.

Compile historical data for energy consumption and GHG emissions.	✓	✓
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MORNINGSIDE CAMPUS

GREENHOUSE GAS



Completed



On track



Pivot



Progress
beyond goal

GOAL

Expand the 2017 transitional inventory boundary to include all Scope 1 emissions; all Scope 2 emissions; and Scope 3 emissions from business travel, commuting, and waste from operations against a calendar 2006 baseline.

STRATEGY

Employ internationally accepted emissions accounting and reporting standards and methodologies by joining The Climate Registry (TCR). Begin reporting absolute greenhouse gas (GHG) emissions through transitional inventory over a two-year period.



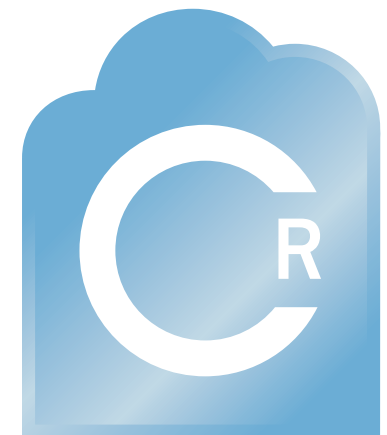
ACTION

Report absolute carbon emissions to TCR beginning in 2018.

Continue to report annual carbon intensity to NYC for the Mayoral Carbon Challenge.

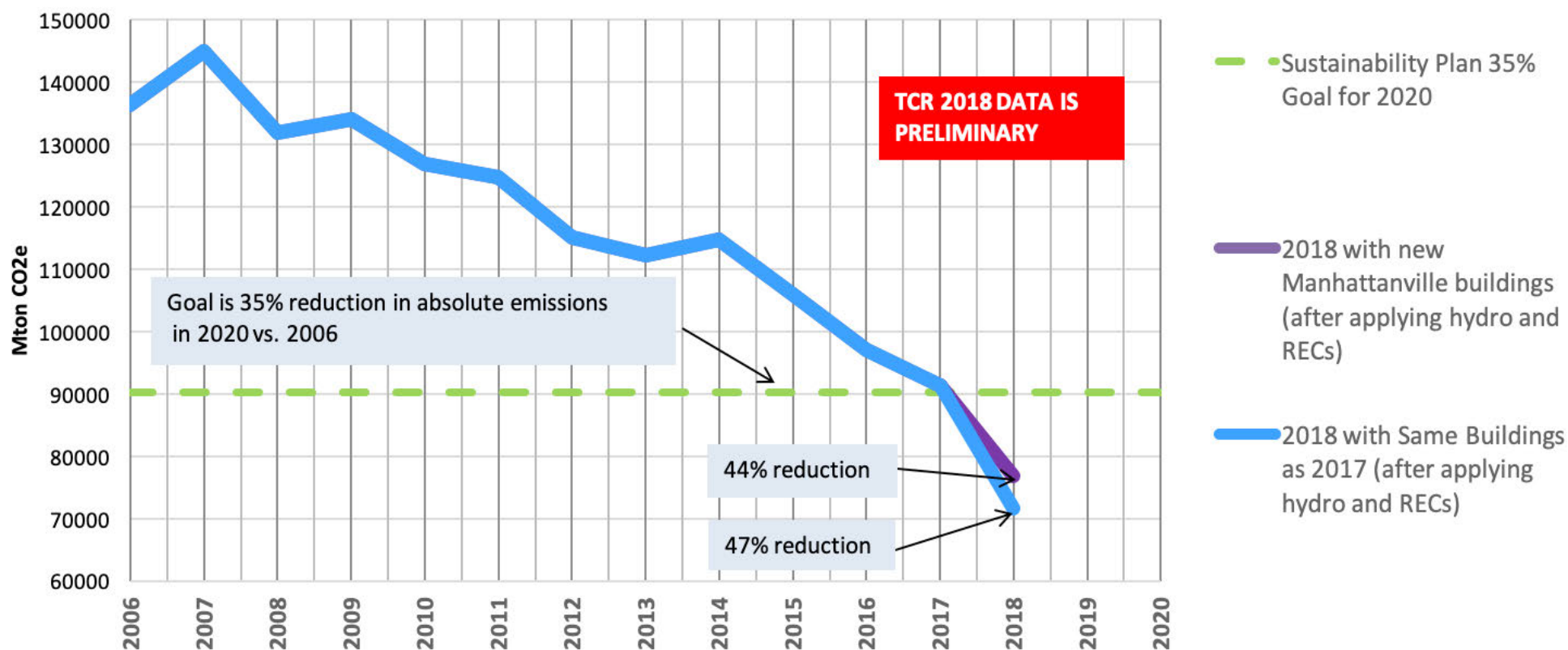
PROGRESS

Columbia submitted its first GHG emissions inventory to TCR for 2017. This inventory successfully passed a rigorous third-party verification and is publicly available on [TCR's website](#). Columbia will continue to submit to TCR on a yearly basis.



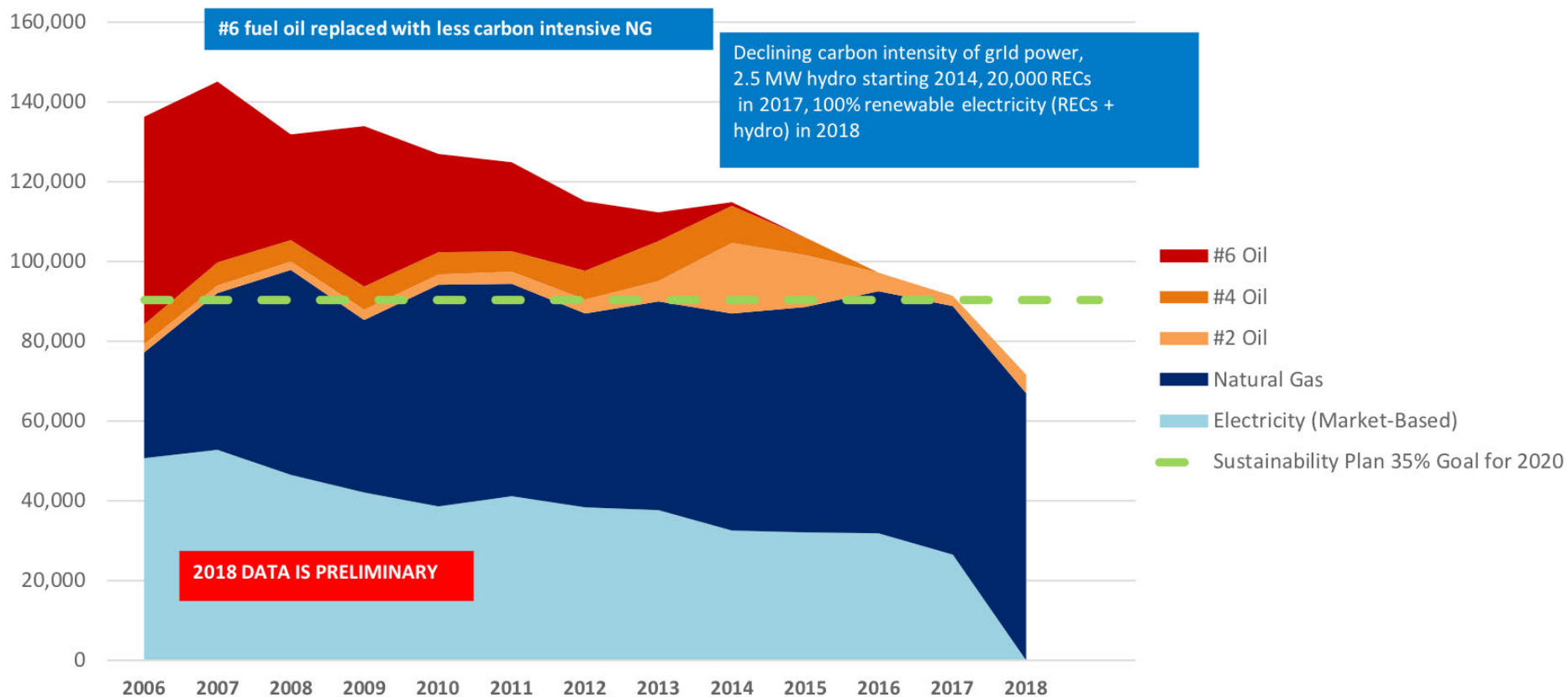
Climate Registered™

Absolute Greenhouse Gas Emissions, MTCO₂e Scope 1 Stationary Combustion & Scope 2 Purchased Electricity



Columbia has achieved a 47 percent reduction in absolute GHG emissions from the 2006 baseline year using the same boundary as the 2017 inventory. The University looks to expand the boundary in future years as new Manhattanville buildings come online (as reflected by the purple line).

Greenhouse Gas Emissions by Energy Type, MTCO₂e - 2018 with Same Buildings as 2017



ACTION

Prepare to expand transitional GHG inventory to include additional Scope 1, Scope 2, and Scope 3 emissions.

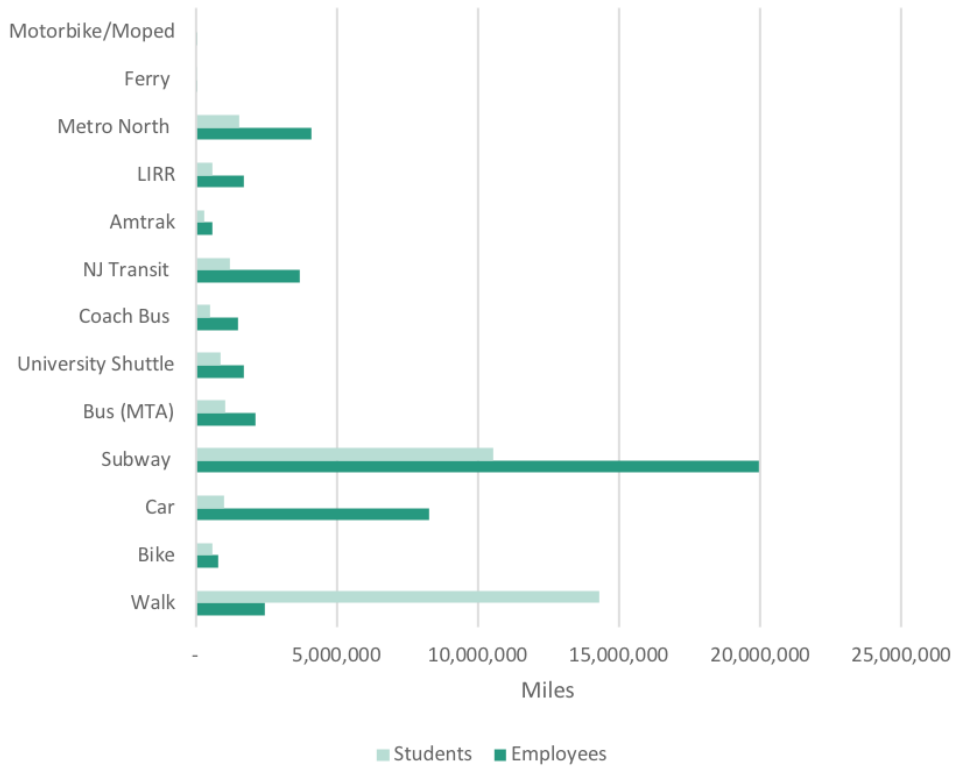
PROGRESS

Columbia is preparing to expand the 2017 inventory to include additional sources of Scope 1, 2 and 3 emissions, including emissions from business travel, commuting, and waste from operations.

Columbia-related Business Travel and Commuting: In 2018, Columbia began using a survey as a tool to collect air travel behavior from University stakeholders. The results from this survey were used to estimate total miles traveled, and associated emissions for the University.

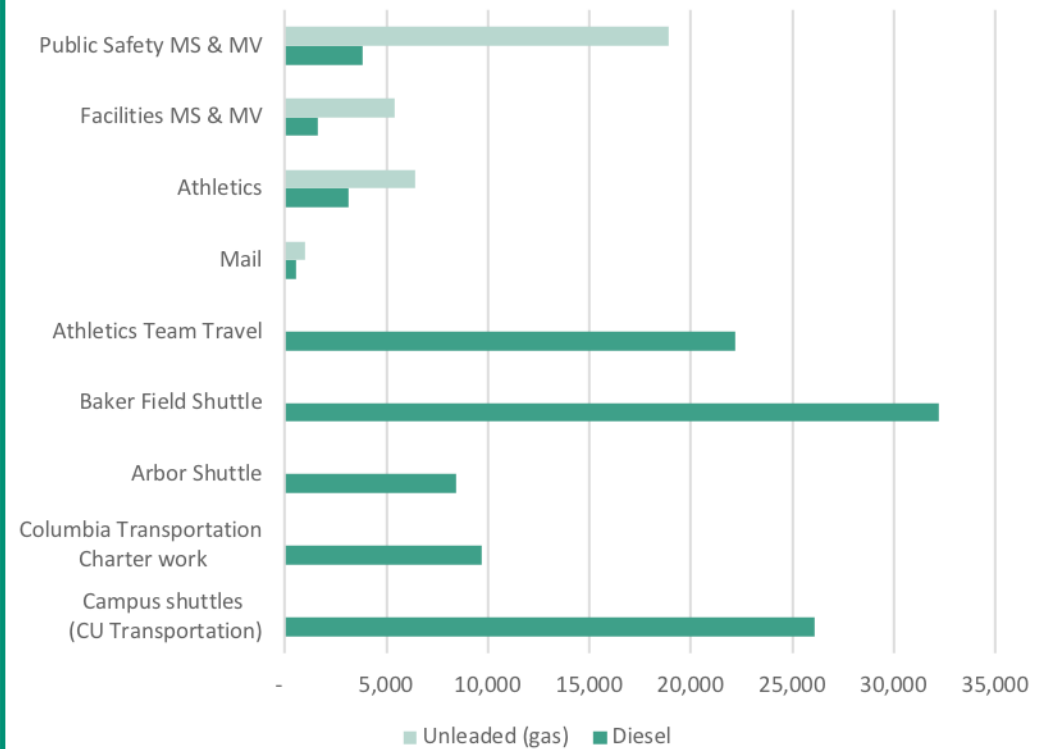
Fleet Vehicle Fuel Consumption: To baseline data for entry into the TCR GHG inventory, Columbia is now collecting fuel consumption and mileage data from campus vehicles and contracted fleets. This information will be used to calculate emissions data beginning in 2018. To collect baseline data, an Earth Institute capstone group researched best-practice methodologies to determine the best path forward.

2018 Commute Miles Traveled
(All campuses except Medical Center)



In early 2018, the biannual commute survey was distributed via email university-wide. The survey asked participants about where they commute from and by what travel mode. The survey data was used to make an estimation on the cumulative total miles per travel mode by Columbia members each year. The results above will be used to estimate GHG emissions.

2018 Vehicle Fuel Consumption



The vehicle fuel consumption graph shows fuel consumption by university routes and departments. The information identifies opportunity areas for the sustainability team to develop solutions.

MEDICAL CENTER CAMPUS

GREENHOUSE GAS



**Completed
in 2018**



On track



Pivot

GOAL

Columbia University Irving Medical Center (CUIMC) plans to align with the Morningside campus and other Columbia campuses by reducing GHG emissions 80 percent by 2050.

STRATEGY

Implement a web-based utility-bill tracking and analysis software that helps track and report GHG emissions.



ACTION

CUIMC has created an internal carbon emissions tracking tool using inputs from the NYC Mayoral Carbon Challenge and a web-based utility bill-tracking software. CUIMC is also currently evaluating participation in TCR.

PROGRESS

By calendar year 2018, CUIMC has reduced its carbon emission intensity (pounds of CO₂/square foot) by 11.31 percent from the baseline year of 2010. CUIMC continues to invest in energy conservation measures and evaluate energy procurement strategies that will help reach the 80 percent carbon emissions reduction goal by 2050.

LAMONT-DOHERTY CAMPUS

GREENHOUSE GAS



Completed
in 2018



On track



Pivot

GOAL

The Lamont-Doherty Campus will reduce GHG emissions by 50 percent from 2016 levels by 2020, with an aspiration to match the University's commitment to reach the NYC 80 percent reduction in carbon emissions goal by 2050.

STRATEGY

Compile historical data for energy consumption and GHG emissions.



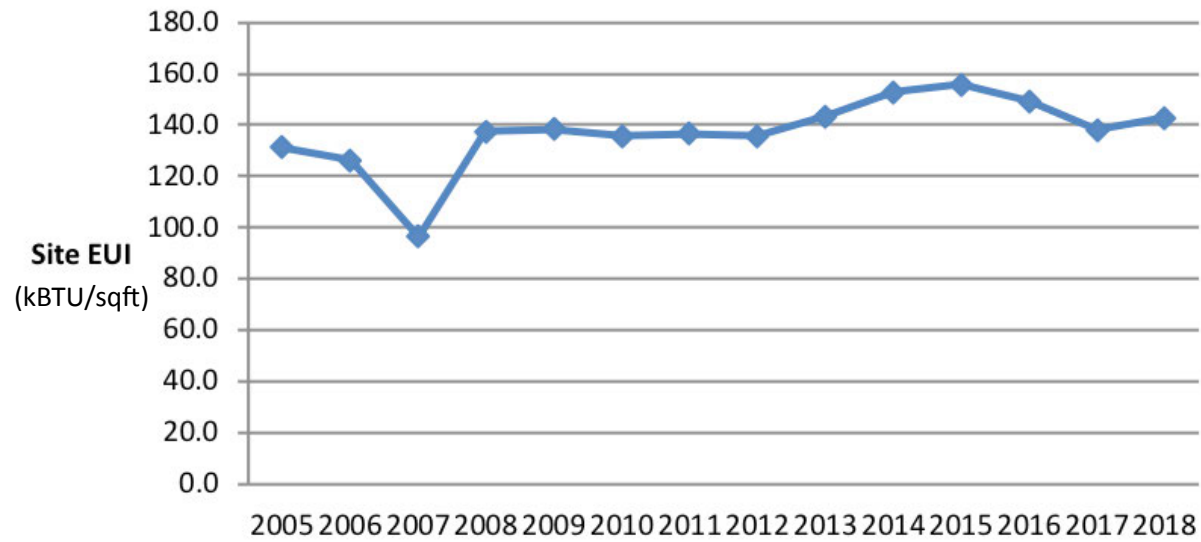
ACTION

Utilize the Environmental Protection Agency (EPA) Energy Star Portfolio Manager to track energy use intensity (EUI), energy consumption, and associated GHG emissions.

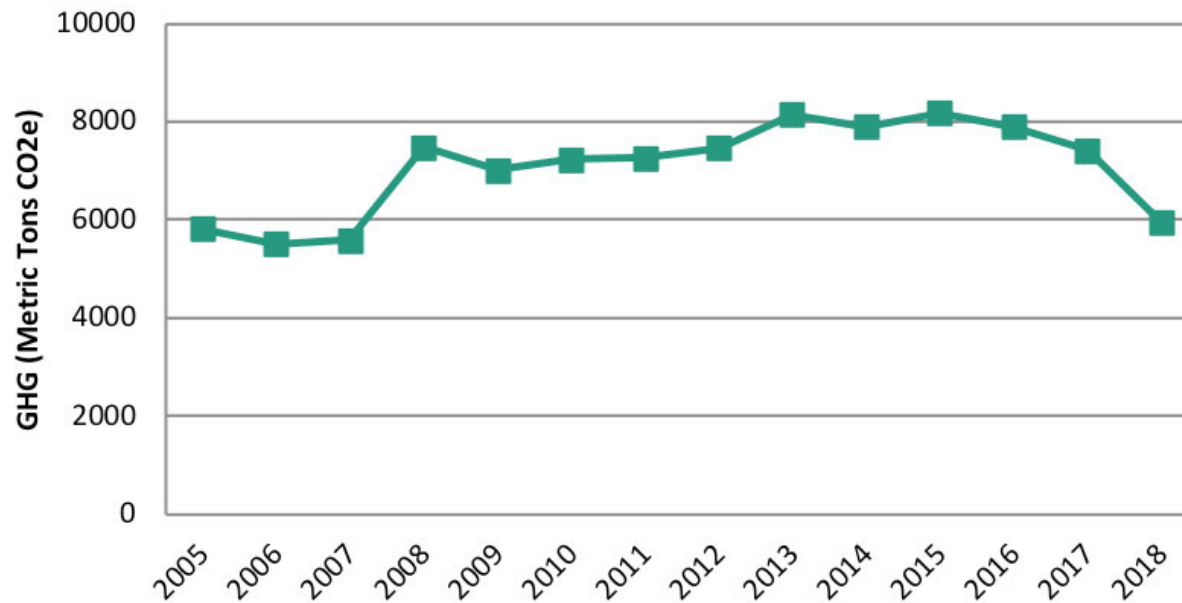
PROGRESS

Lamont's EUI for 2018 was 142.7 kBtu/square foot, which is consistent with the long-term mean for campus energy demand (natural gas + electricity) since 2007. In 2018, Lamont saw a substantial drop in GHG emissions to 5,961 metric tons of CO₂ equivalent, roughly a 20 percent reduction from the 2016 baseline year. This reduction is driven primarily by the production of electricity from two new solar farms constructed for the Lamont Campus. The two solar farms commenced production after mid-year, and produced roughly 40 percent of the amount of electricity expected in the future for an entire year.

Campus Site EUI

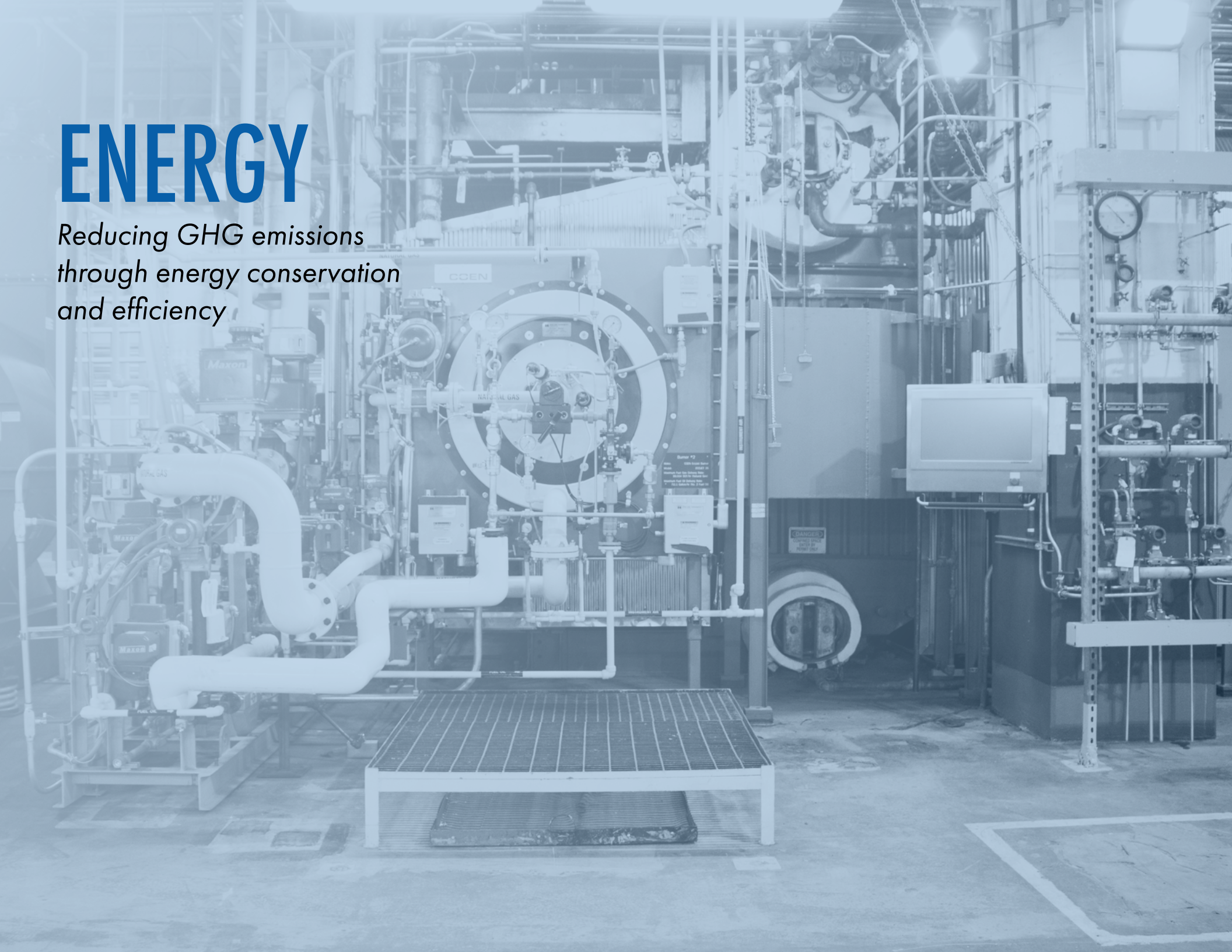


Campus Total GHG Emissions (Metric Tons CO2e)



ENERGY

*Reducing GHG emissions
through energy conservation
and efficiency*



Energy: Progress at a Glance

2017 2018

Morningside Campus Goals: Employ energy conservation as a central strategy to achieve a 35 percent GHG reduction by 2020.

Identify energy conservation measures/retrocommissioning measures (ECM/RCM) projects to be completed before 2020.	✓	
Install meters in University academic buildings and select a company that will support the implementation of projects.	✓	✓
Complete 75 percent* select ECM/RCM projects. * Language clarified to mean 75 percent emissions reduction from ECM/RCM projects.		✓
Create a green revolving fund to support a comprehensive energy conservation program over time.	✓	
Plan for continued greenhouse gas reductions beyond 2020.		✓

Medical Center Campus Goals: Align with the Morningside Campus plan to reduce carbon emissions 80 percent by 2050.

Implement a comprehensive set of energy efficiency measures identified by a recent campus-wide Local Law 87 (LL87) report. CUIMC will also seek to expand efforts to reduce laboratory energy consumption via hardware improvements and behavioral outreach.	✓	
Collaborate on procurement of electrical commodity with Morningside Campus.		✓
Achieve Leadership in Energy and Environmental Design (LEED) Certification for the Roy and Diana Vagelos Education Center (VEC) and the School of Nursing (SON)		✓
Engage the CUIMC community using the Sustainable Leaders Network (SLN) as a platform to influence change through education and targeted outreach in order to support the University’s energy goals through behavioral changes.	✓	

Lamont-Doherty Campus Goals: Reduce GHG emissions by 50 percent from 2016 levels by 2020, with an aspiration to match the University’s commitment to reach the NYC 80 percent reduction in carbon emissions goal by 2050.

Replace 75 percent of electric energy purchased from the NY State grid with solar energy.		✓
Replace gas-fired heating plants with geothermal systems providing both heating and cooling for buildings on campus.		✓
Implement measures to reduce energy demand and GHG emissions during all new construction, capital renovation, and State of Good Repair (SOGR) projects.	✓	✓
Identify creative financing and grant opportunities to introduce new infrastructure that requires little to no up-front capital outlay, reduces demand and GHG emissions, and self-funds through reduced operating costs.		✓

MORNINGSIDE CAMPUS

ENERGY



Completed



On track



Pivot



Progress
beyond goal

GOAL

Employ energy conservation as a central strategy to achieve a 35 percent GHG reduction from 2006 baseline by 2020.

STRATEGY 1

Implement identified energy conservation measures/retrocommissioning measures (ECM/RCM) to reduce energy intensity.



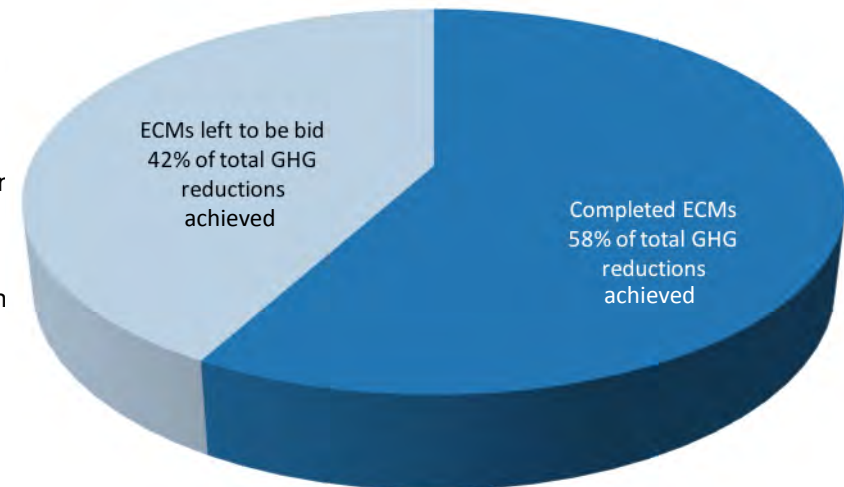
ACTION

Complete ECM/RCM projects that yield greatest reduction in GHG emissions. Aim to reduce GHG emissions by 75 percent from these initiatives.

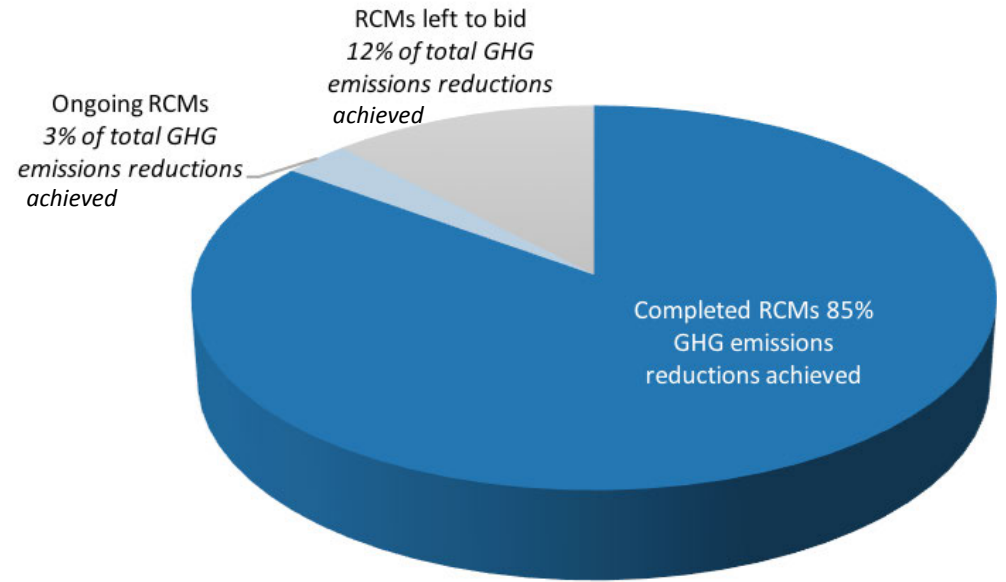
PROGRESS

Energy Conservation Measures (ECMs):

The percentage of emissions reduction completed to date represents 58 percent of the total identified measures. Since the original plan 12 additional measures were identified and added to the ECM plan, generating an additional reduction of 212 metric tons of CO₂ equivalent per year. The remaining measures are projected to reduce emissions by an additional 42 percent and will be complete by the Summer of 2019.



Retrocommissioning Measures (RCMs): The percentage of emissions reductions completed to date represents 85 percent of the total identified measures. The remaining measures are projected to reduce emissions by an additional 15 percent.



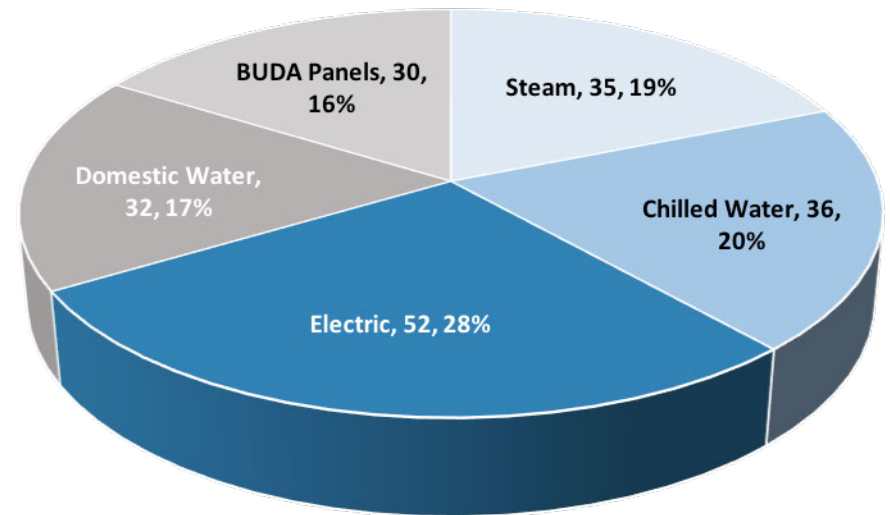
ACTION

Install energy meters in University academic buildings.

PROGRESS

77 percent of 155 total meters have been installed, as well as 27 percent of Buda Control Panels, with 22 partially completed.

Meter Project Plan



STRATEGY 3

Plan for continued greenhouse gas reductions beyond 2020.



ACTION

Organize a strategic effort to put the University on a path towards continued greenhouse emission reduction over the short-, mid-, and long-term.

PROGRESS

To begin to map a path forward, the University commissioned a renewable electricity study to inform a short- and mid-term plan to reduce the carbon impact of its electricity. As a result of the study, the University purchased 265,000 National Wind Renewable Energy Certificates (RECs) representing an equivalent number of megawatt-hours (MWhs) of renewable, zero emissions electricity. The RECs offset 100 percent of the “brown” power purchased in calendar year 2018 for all of Columbia’s New York campuses: Baker Field, Irving Medical Center, Lamont-Doherty Earth Observatory, Manhattanville, Morningside Academic, Nevis, and Residential Operations. Applying the accounting standards of The Climate Registry of which Columbia is a member, the University will reduce its GHG emissions by 70,000 metric tons of carbon dioxide equivalent (MTCO_{2e}) overall.

MEDICAL CENTER CAMPUS

ENERGY


**Completed
in 2018**


On track


Pivot

GOAL Align with the Morningside Campus plan to reduce carbon emissions 80 percent by 2050.

STRATEGY 1

Implement a comprehensive set of energy efficiency measures identified by a recent campus-wide Local Law 87 (LL87) report. CUIMC will also seek to expand efforts to reduce laboratory energy consumption via hardware improvements and behavioral outreach.



ACTION

Using the LL87 report, execute various energy efficiency conservation measures for significant energy and cost savings.

PROGRESS

Construction cost estimates on several identified energy conservation measures are currently under way. A detailed lighting audit will determine the carbon, energy, and cost savings to retrofit all buildings with new LED lighting and controls. Garage lighting retrofit and installation of a new building management system were completed at Russ Berrie Medical Science Pavilion. Additionally, a new building management system was installed at 51 Audubon.

STRATEGY 2

Collaborate on procurement of electrical commodity with Morningside Campus.

**ACTION**

Use available grants and utility rebates during execution of energy efficiency projects to reduce either the payback on the project or to generate revenue through which additional energy efficiency projects can be funded. Evaluate synergies in joint procurement of energy with other campuses for overall cost savings.

PROGRESS

CUIMC coordinated with the Morningside campus on a university-wide purchase of electricity. Projected annual savings to CUIMC are over \$2.5 million per year through this collaborative process.

STRATEGY 3

Achieve Leadership in Energy and Environmental Design (LEED) Certification for the Roy and Diana Vagelos Education Center (VEC) and the School of Nursing (SON).

**ACTION**

Purchase green power for building energy consumption and best design and construction practices.

PROGRESS

At VEC, 1,500,000 kilowatt hours (kWh) of clean energy were purchased to cover 70 percent of the building energy consumption over two years. At the SON building, thanks to an efficient design, water use has been reduced 40 percent and energy usage has been reduced 24 percent compared to existing building codes. In addition, 75 percent of construction waste was diverted from landfill.



*Image credit: Diller Scofidio + Renfro
LEED®, and its related logo, is a trademark owned by the U.S.
Green Building Council® and is used with permission.*

sustainable.columbia.edu

LAMONT-DOHERTY CAMPUS

ENERGY


**Completed
in 2018**


On track


Pivot

GOAL

The Lamont-Doherty Campus will reduce GHG emissions by 50 percent from 2016 levels by 2020, with an aspiration to match the University's commitment to reach the NYC 80 percent reduction in carbon emissions goal by 2050.

STRATEGY

Replace 75 percent of electric energy purchased from the NY State grid with solar energy.



ACTION

Build two remote net metered solar farms (each rated at 2 megawatts output) in Orange County, New York.

PROGRESS

The construction of the Lamont-Doherty solar farms was completed in November 2017 with the system interconnect by the utility company completed in June 2018. As of July 2018, the farms have been producing power credited to the Lamont Campus.

Photo: One of two remote net metered 2 MW solar farms built in Orange County to meet the electric supply requirements for the Lamont Campus. Both facilities were constructed on vacant agricultural land, requiring no deforestation.



STRATEGY

Replace gas-fired heating plants with geothermal systems, providing both heating and cooling for buildings on campus. This strategy alone can accomplish an additional 25 percent reduction in GHG emissions.



ACTION

Prepare for the renovation of Lamont Hall, anticipated to be Lamont's first geothermal building. This includes a feasibility study, planning, and fundraising.



ACTION

Determine feasibility for improvements of the other 20 buildings on campus in order to accomplish an 80 percent reduction in carbon emissions by 2050.

PROGRESS

An ongoing feasibility study is under way for the development of Lamont Hall. The additional capital cost of a geothermal system is currently estimated at \$1 million for the building.



Image: The signature building for the Lamont Campus is expected to be restored as a modern conference center supporting the campus's education and outreach efforts. It will also provide a suite of offices suitable for the directorate and development departments.

PROGRESS

A second ongoing study, sponsored by the New York State Energy Research and Development Authority (NYSERDA), considers a shared geothermal well field servicing a cluster of four campus buildings: Oceanography, Monell, Administration, and Cafeteria. The NYSERDA sponsored project, known as the Geothermal Clean Energy Challenge, has advanced to stage two in the competition, warranting a more advanced report expanding upon the economic analysis.

STRATEGY

Implement measures to reduce energy demand and GHG emissions during all new construction, capital renovation, and State of Good Repair (SOGR) projects.

**ACTION**

Introduce LED lighting, additional insulation and replacement windows, high-efficiency heating and cooling appliances, variable speed drive controls for pumps and fans, occupancy sensors, and improved building management systems (along with enhanced commissioning and recommissioning efforts).

PROGRESS

A number of renovations are in progress on Lamont's campus, and as applicable, Lamont is replacing windows, adding insulation, right-sizing mechanical equipment, and introducing LED lighting. As the majority of the renovation projects are focused on unique laboratory facilities supporting research, there is ample opportunity to optimize energy consumption for safety, comfort, and climate control. Developing a new graphical information system at Lamont is under consideration that will enable the campus to quantify how much progress is made in these key areas of renovation concern and to help identify the best targets of opportunity for planning capital renovations.

STRATEGY

Identify creative financing and grant opportunities to introduce new infrastructure that requires little to no up-front capital outlay, reduces demand and GHG emissions, and self-funds through reduced operating costs.

**ACTION**

Replicate financing model of solar farm projects, which deliver a \$16 million investment under a 25-year Power Purchase Agreement, expected to produce upwards of \$150,000 in utility cost savings each year.

PROGRESS

There is potential to use similar financial strategies (leveraging NYSERDA grants and tax incentives, requiring no up-front capital from Lamont) to replace obsolete diesel fuel emergency generators, introduce gas fired cogeneration with absorption refrigeration to power data centers and high heat load labs, provide electric vehicle recharging stations, implement lighting and building management retrofits, and introduce on-campus solar and geothermal systems.



TRANSPORTATION

Greener fleets and sustainable commuters

Transportation: Progress at a Glance

2017 2018

Morningside Campus Goals: Baseline GHG associated with all University-related and commuter travel. Reduce transportation emissions through greener campus fleets and encourage the use of sustainable commute alternatives.

Measure GHG emissions from University-owned and contracted fleet vehicles by finalizing transportation indicators, making an inventory of the campus-owned fleet, and analyzing the shuttle route system.	✓	
Develop University-wide vehicle purchasing guidelines.		✓
Incentivize and assist Columbia commuters to experiment with and switch to low-emission commute types.	✓	✓
Provide commuters with access to tools that will help reduce drive-alone commuters, such as carpool, vanpool, park and ride, guaranteed ride home, etc.	✓	✓
Look to progress "League of American Bicyclists" bike-friendly rating, including bicycle infrastructure, bike share, bike parking access, and engagement and education around bicycling on and around campus.		✓
Conduct best-practice research to evaluate how other institutions are tracking and/or offsetting GHG from related air and other types of travel.		✓
Determine how Columbia may pilot best practices for travel to business-related venues (conferences, research, etc.)		✓

Medical Center Campus Goals: Develop protocols and policies to support the measurement and subsequent decrease in GHG and particulate matter emissions associated with campus-related and commuter travel by 2020, with an aspiration to support the University's commitment to reach the NYC 80 percent reduction in carbon emissions goal by 2050.

Improve access to and education/engagement around bicycling.	✓	✓
Encourage commuter switchover to low-GHG transportation by developing new programs and infrastructure to support cleaner fuel types/transportation modes.		✓

Lamont-Doherty Campus Goals: Use protocols and policies developed by the University to support the measurement and subsequent decrease in GHG and particulate matter emissions associated with all University-related and commuter travel by 2020, with an aspiration to match the University's commitment to reach the NYC 80 percent reduction in carbon emissions goal by 2050.

Measure and mitigate GHG emissions from owned and contracted fleet vehicles.	✓	✓
Improve access, education, and engagement for bicycle use.		✓
Reduce GHG from University-related travel beyond the Lamont campus to neighboring cities or countries abroad, or offset what cannot be reduced.		✓

MORNINGSIDE CAMPUS

TRANSPORTATION



GOAL

Baseline GHG associated with all University-related and commuter travel. Reduce transportation emissions through greener campus fleets and encouraging the use of sustainable commute alternatives.

STRATEGY 1

Measure and mitigate GHG emissions from University-owned and contracted fleet vehicles.



ACTION

Develop University-wide vehicle purchasing guidelines.

PROGRESS

New Vehicle Purchasing Guidelines Support the Adoption of Environmentally Friendly Vehicles: New sustainable purchasing guidelines have been prepared to be incorporated into Columbia's Vehicle Purchasing Policy. The new standards invite fleet managers to research and select increasingly sustainable vehicles that still meet departmental needs. The policy will link to the Sustainable Columbia website, which will house resources for procuring greener fleet vehicles like an online tool that scores vehicles according to their [Green Score rating](#). The Green Score rating includes factors like fuel economy, GHG emissions, pollution from manufacturing processes, and materials.

New Electric Vehicles on Campus: Six new battery electric buses began operating on Columbia’s campus shuttle network, replacing the existing diesel-powered buses. The buses are among the first electric buses to be introduced in New York City, and they offer both environmental and health benefits, including reduced emissions and noise pollution, and improved air quality. Columbia’s campus shuttle network operates between campus locations in Manhattan, New Jersey, and Rockland County. The shuttles make over 1,400 rider trips daily and travel nearly 180,000 miles per year. Transitioning to electric buses is expected to reduce University shuttle GHG emissions by over 270 metric tons – a [70 percent reduction](#) from the diesel-powered shuttle buses. Additionally, Columbia Public Safety has acquired one new electric Chevy bolt and Grounds has purchased two new electric vantage vans.



Columbia Recognized as Top Performer by AASHE for Transportation: Columbia University was recognized as the top school for Transportation in the [2018 Sustainable Campus Index](#), a publication of the Association for the Advancement of Sustainability in Higher Education (AASHE) that highlights top-performing colleges and universities. Columbia’s #1 ranking was achieved for its electric and alternative fuel vehicle fleet, sustainable commuting options, bicycle-friendly amenities, carpool and car share incentives, and high percentage of students, faculty, and staff that utilize sustainable transportation.

STRATEGIES 2 & 3

Improve access, education, and engagement around bicycling; incentivize commuter mode choice to reduce GHG emissions by developing new programs and infrastructure to support cleaner fuel types/transportation modes, e.g., walk, bike, shuttle bus, electric vehicle-charging, public transit subsidies, and ferry services between New Jersey and Harlem (impacts Scope 3 emissions).



ACTION

Incentivize and assist Columbia commuters to experiment with and switch to low-emission commute types.

PROGRESS BEYOND GOAL

Smart Commuter Badge: Columbia launched the [Smart Commuter badge](#) initiative to affect behavior change across the university. Columbia members with a “smart commute” such as someone who walks, bikes, takes public transit, or carpools, can now place the smart commuter badge in their email signature to alert others about their sustainable commute habits. Smart Commuters link the email signature badge to Columbia’s Transportation website, which contains resources for finding sustainable travel modes, allowing others to learn about available resources. Those who self-designate as a Smart Commuter via the Sustainable Columbia website are entered into a bi-monthly raffle.



Smart Commuter

Subsidies Available for Former Zagster Members: Columbia is subsidizing Citi Bike memberships for qualifying Zagster members as a way to further support the growth of bike culture on campus. Due to Zagster’s decreasing ridership and the increase in Citi Bike stations in the Morningside and Manhattanville area, Columbia’s Zagster bike share program will come to an end in June. The subsidy is offered to frequent Zagster users to help keep cyclists moving.

Columbia Cyclist Appreciation: In October of 2018, Columbia hosted its second annual Bike Champions Breakfast on College Walk. This occasion provided an opportunity to thank cyclists for choosing a sustainable travel option. Awards were presented to frequent Zagster users and bike commuters who told us why they love their bike commute. The event served as a time for attendees to meet other Columbia cyclists as well as observe a bike tire changing demonstration presented by [BikeNY](#).



Expanded Electric Vehicle Charging Stations in Commuter and 24-Hour Parking Garages: For those that must drive to work, Columbia rewards those who drive electric vehicles by providing free vehicle charging ports. In 2018, six new electric vehicle charging ports were added to commuter and 24-hour parking garages, bringing the Morningside total to 10 charging ports. In addition, the Parking Office boosted the profile of the ports by sponsoring a rebranding effort that painted the spots and nearby poles “Sustainable Columbia” green.

Members of the Columbia Parking office stand near electric vehicle parking stations. From left: Susana Toribio, Dee Akpinar-Ozdenli, Nicole Thompson, Mashuk Arif



ACTION

Provide commuters with access to tools that will help reduce drive-alone commuters.

PROGRESS BEYOND GOAL

Incentives for Carpooling: Effective February 2018, Manhattanville affiliates and Manhattanville construction workers in carpool groups of three or more qualify for parking discounts. As of February 2019, three Columbia carpool groups and one construction worker carpool group are enrolled in this program.

Improvements to Intercampus Shuttle Routes System Help Affiliates Maintain Car-free Commutes: Affiliates can now travel on campus shuttles with their children. Columbia has added a new shuttle service between CUIMC and Fort Lee, which enhances and supports car-free commuting for Columbia affiliates. Columbia has also added service to the Lamont shuttle route during rush hours to better support ridership. Additional service was also added to the Intercampus shuttle’s evening hours between the Morningside and CUIMC campuses. To better serve the community, Columbia also expanded GPS tracking to the Lamont, Fort Lee, and Manhattanville shuttle loops, allowing riders to track the shuttle in real-time and receive delay announcements straight to their phones. Increased connection shuttles between the Manhattanville Campus and Harlem’s Metro North station will better support car-free commuters using the Metro North railroad.



A father and daughter ride the Intercampus Shuttle.

West Harlem Ferry: A stakeholder advocacy group was formed, in partnership with large institutions along the upper west side of Manhattan to garner support for a NY – Harlem ferry connection with New Jersey.

**ACTION**

Look to progress “League of American Bicyclists” bike-friendly rating, including bicycle infrastructure, bike share, bike parking access, and engagement and education around bicycling on campus.

PROGRESS

The League of American Bicyclists honored Columbia with a Silver-level Bicycle Friendly University award in recognition of the institution’s achievements in promoting and enabling safe, accessible bicycling on campus. In 2014, Columbia received a Bronze designation from the League of American Bicyclists. Improved access to shared bikes, additional bike enclosures, and access to showers on campus have led to the upgrade to Silver status.

**STRATEGY 4**

Reduce GHG emissions from University-related travel beyond Columbia’s campuses to neighboring cities or countries abroad, or offset what cannot be reduced (Scope 3 emissions).

**ACTION**

Determine how Columbia may pilot best practices for travel to business-related venues (conferences, research, etc.)

PROGRESS

Expanded Video Conferencing Rooms Minimize Travel: Lerner Hall added two new reservable spaces that can be used for video conferencing. Video conferencing allows affiliates to avoid travel and the associated emissions.

Capstone Group Develops Behavior Change Campaign to Increase Video Conferencing: An Earth Institute Sustainable Development capstone group developed a behavior change campaign to communicate both the environmental impacts of flying and available resources for video conferencing on campus, to avoid unnecessary travel. These resources are available on the new [Alternatives to Flying](#) webpage and will be distributed through the Sustainable Leaders Network.

Columbia Partners with Clean Air NY

At its first ever Campus Sustainability Fair in April 2019, Columbia was recognized as a Clean Air NY Campus Partner, an honor given to institutions of higher education who go above and beyond to encourage and facilitate their communities to carpool, take public transit, bike, or walk to campus. Clean Air NY sets targets and actions for its partner organizations, such as hosting bike to campus days, social media posts, setting up carpool incentives, and increasing the number of users in the [511 NY Rideshare system](#).



Director of Transportation Demand Management Dan Allalemdjian accepted the award on behalf of Columbia from Tom Conboy, Clean Air NY Program Coordinator, at the Campus Sustainability Fair. Clean Air NY participated in the fair as a vendor partner, providing attendees with information about 511 NY Rideshare and its commute services.

MEDICAL CENTER CAMPUS

TRANSPORTATION



Completed
in 2018



On track



Pivot

GOAL

Develop protocols and policies to support the measurement and subsequent decrease in GHG and particulate matter emissions associated with campus-related and commuter travel by 2020, with an aspiration to support the University's commitment to reach the NYC 80 percent reduction in carbon emissions goal by 2050.

STRATEGY 1 & 2

Improve access to and education/engagement around bicycling. Encourage commuter switchover to low-GHG transportation by developing new programs and infrastructure to support cleaner fuel types/transportation modes, e.g., walk, bike, shuttle bus, electric vehicle-charging, public transit subsidies, and carpooling with members of CUIMC's neighboring institutions.



ACTION

Add new bike racks and inform staff about access to storage space.



ACTION

Add more electric vehicle (EV) charging ports in CUIMC parking lots.

PROGRESS

CUIMC has added 4 bike racks that can accommodate about 40 bikes at the 100 Haven Ave. parking lot, as well as an additional bike rack adjacent to the Irving Cancer Research Center (ICRC) parking lot that can accommodate about 10 bikes. There is also bike parking in the Russ Berrie/School of Nursing parking lot, and CUIMC staff does personal outreach to let employees within the School of Nursing building know they can park their bikes there.

PROGRESS

CUIMC has increased the availability of EV charging ports from 3 to 11 with more being planned. Upgrades to electrical infrastructure to accommodate additional EV charging ports have been completed at ICRC.

LAMONT-DOHERTY CAMPUS

TRANSPORTATION



Completed
in 2018



On track



Pivot

GOAL

Use protocols and policies developed by the University to support the measurement and subsequent decrease in GHG and particulate matter emissions associated with all University-related and commuter travel by 2020, with an aspiration to match the University's commitment to reach the NYC 80 percent reduction in carbon emissions goal by 2050.

STRATEGY 1

Measure and mitigate GHG emissions from owned fleet of vehicles.



ACTION

Right-size owned fleet vehicles.

PROGRESS

The Lamont fleet has been reduced to maintain a critical mass of 4 pick-up trucks from an original fleet of 13. Replacement vehicles include small vehicles for use on campus only, a small passenger vehicle for intercampus courier service, and a cargo van for on-campus mail and package deliveries. As new vehicles are purchased, consideration is given to vehicles with the smallest GHG and carbon footprint necessary for the task assigned, and exploration is made to determine if electric or hybrid alternatives are available within budgetary limitations. Benefits realized from right-sizing the fleet include reduced fuel consumption and carbon footprint, but also reduced insurance and maintenance costs, as well as less vehicle congestion in the operations yard.

**ACTION**

Evaluate Lamont shuttle ridership to ensure ridership is matched with vehicle capacity.

PROGRESS

A new fleet of electric buses was deployed in 2018 to support the Lamont shuttle service. This fleet was equipped with technology to better track ridership, and routes were rearranged to provide better transportation services between various parts of the University traveling to Lamont, specifically from the Manhattanville Campus, CUIMC, and Parker Plaza. A new park and ride commuter option was introduced at Lamont to provide for a fixed number of commuters from the area to utilize available shuttle seats to ride into the city. New campus access controls are to be deployed to enable better tracking of Lamont parking lot utilization with the intent of growing the park and ride opportunity in future years.

STRATEGY 2

Improve access, education, and engagement for bicycle use.

**ACTION**

Introduce or improve facilities to support bicycle use.

PROGRESS

The new electric shuttles were equipped with bicycle carriers to facilitate the transport of bicycles between campuses when time or weather does not permit riding the entire distance. Particular attention has been paid during annual pavement inspections to repair potholes and drain, manhole, and valve covers in the streets which might provide hazards to bicyclists.

WASTE

Diverting more campus waste from landfill



Waste: Progress at a Glance

2017 2018

Morningside Campus Goals: Baseline metrics for waste streams, calculate University’s first waste-diversion rate, expand composting, recycling, and waste management to divert more materials from landfill.

Build out waste inventory to map the expansion of key programs.	✓	
Audit “Grove” waste disposal area to determine waste disposal patterns from generators.	✓	
Calculate University diversion rate (baseline).	✓	
Conduct a gap analysis to prioritize which programs will have the highest impact. Evaluate success of waste diversion programs and determine feasibility of improving, expanding, or launching new programs.		✓
Based on 2017 baseline year diversion rate, set a 2020 waste reduction/diversion rate goal.		✓
Bring together a work-team around procurement with the goal of developing a set of guidelines; reach out to University vendors and discuss greener product/ packaging options.		✓

Medical Center Campus Goals: Expand waste management efforts with the purpose of setting and achieving an aggressive waste reduction goal and calculating a more comprehensive waste diversion rate. Align with NYC’s OneNYC waste-to-landfill goal by 2030.

Identify key secondary waste streams lacking metrics and develop measurement methodologies in order to create a more complete waste baseline.	✓	✓
Expand or create programs to increase recycling diversion and minimize waste, which include relevant short- and long-term goals.	✓	

Lamont-Doherty Campus Goals: Quantify Lamont’s waste stream by both absolute and per-capita metrics, and benchmark its performance against peer institutions by 2020. Lamont will also establish targets for per-capita waste minimization to 2050.

Using 2016 waste collection data, establish baseline per-capita waste performance metrics for waste-to-landfill and waste-to-recycling facilities with an eye toward minimizing these metrics in the future.	✓	✓
Expand and create programs to minimize waste.	✓	✓
Engage the Lamont community through education and targeted outreach to influence behavioral change in support of campus goals.	✓	✓

MORNINGSIDE CAMPUS

WASTE



Completed



On track



Pivot



Progress beyond goal

GOAL

Baseline metrics for waste streams, calculate University's first waste-diversion rate, expand composting, recycling, and waste management to divert more materials from landfill.

STRATEGY 2

Expand or create programs to increase waste diversion and minimize waste; set a short- and long-term goal.



ACTION

Conduct a gap analysis to prioritize which programs will have the highest impact. Evaluate success of waste diversion programs and determine feasibility of improving, expanding, or launching new programs.

PROGRESS

Improved Recycling Signage for Public Spaces on Campus: Facilities and Operations collaborated with the Environmental Stewardship office to create new recycling and trash signage for public spaces on campus. The new signage features increased specificity and detail on what can be thrown into each bin, and includes visual icons to further aid users as recommended by the student group Columbia EcoReps. The icons were voted on and selected by members of the Sustainable Leaders Network.





ACTION

Based on 2017 baseline year diversion rate, prepare to set a waste reduction/diversion rate goal in 2020.

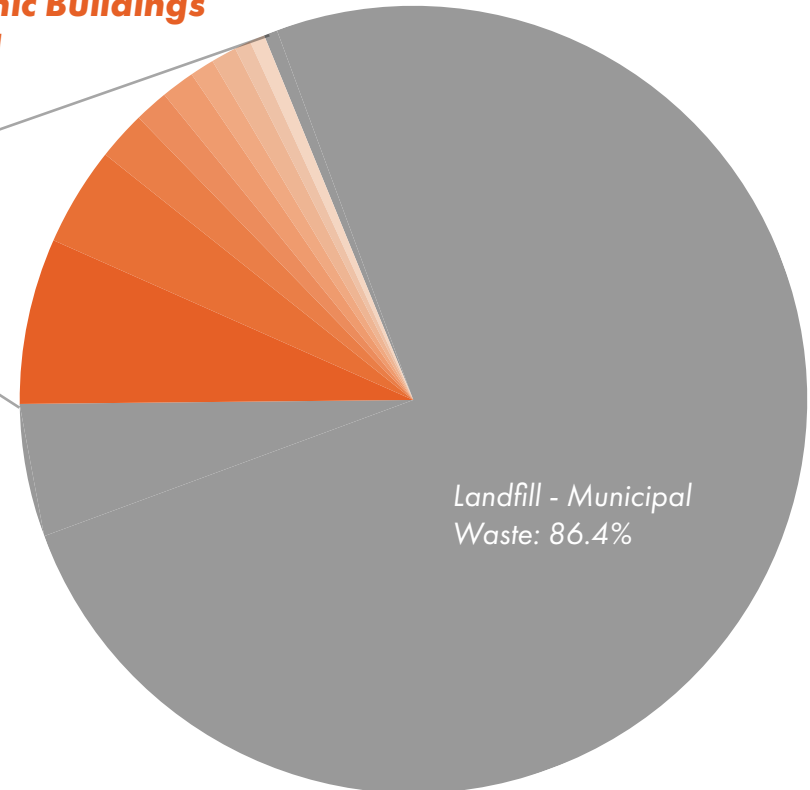
PROGRESS

Columbia has achieved a 13.6 percent diversion rate of material from landfill in 2018. The landfill volume remained constant to 2017, and the recycling streams decreased, indicating a reduction in recycled waste generated. This supports Columbia’s goal to minimize waste generation at the source.

- Metal, Glass, Plastic, and Cartons: 4.6%
- Organics: 3.1%
- Paper: 2%
- Columbia Renovation Projects, Construction & Demolition: 1.5%
- Electronics: 1%
- Reuse: 0.8%
- Lightbulbs: 0.3%
- Textiles: 0.2%
- Batteries: 0.1%

2018 Morningside Campus Academic Buildings Waste Diversion Rate from Landfill

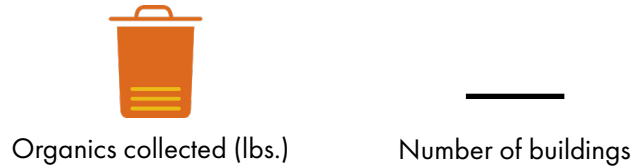
Diversion Rate:
13.6%



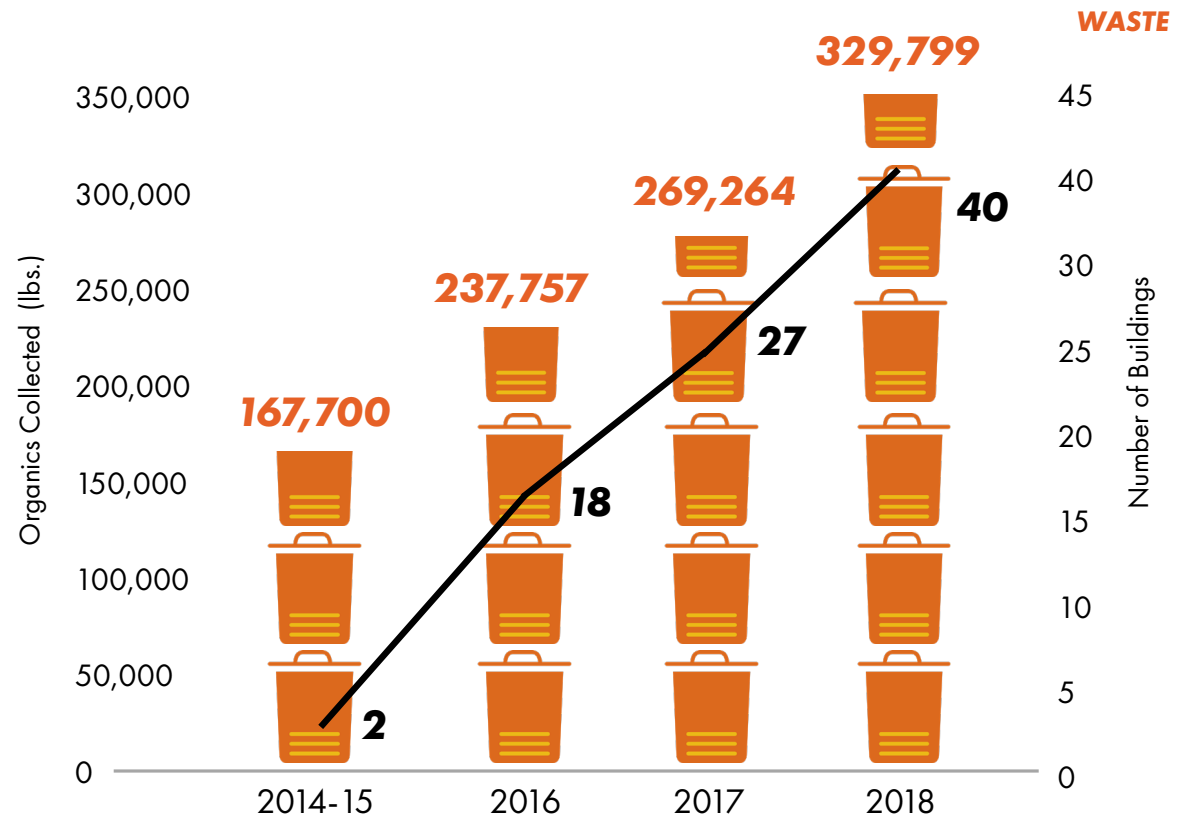
Dyson hand dryers were added to 49 public restrooms on campus, thereby avoiding over 1 ton, or approximately **2200 lbs.** of used paper towels daily.

Columbia Dining Transitions Away from Plastic Straws: Columbia Dining is transitioning to [100 percent compostable paper straws](#) and plant based plastic cups for to-go cold beverages. Columbia Dining has used compostable paper plates, bowls, cups, and plastic cutlery since 2008, as part of Columbia’s commitment to sustainability. In John Jay Dining hall, reusable china and flatware is utilized. Plastic, bendable straws for accessibility purposes are available upon request at all units.

Morningside Campus Residential Buildings Organics Program



Expanded Organics Program: Columbia's organics program now includes 40 residential buildings. In 2018, a total of 329,799 pounds of organic waste was collected from the residential portfolio by the Department of Sanitation.



STRATEGY 3

Engage preferred vendors to help support University waste reduction and other sustainability goals, with particular attention to reducing plastic bottle waste on campus; develop user guidelines for socially and environmentally responsible purchasing.



ACTION

Bring together a work-team around procurement with the goal of developing a set of guidelines; reach out to University vendors and discuss greener product/packaging options.

PROGRESS

In partnership with key vendor partners at Columbia including Synovos and Staples, the University has begun to identify ways to prioritize sustainability in the supply chain in the following areas: toner cartridges, office products, water bottles, cleaning products, paints, and other operations-related products.

MEDICAL CENTER CAMPUS

WASTE



**Completed
in 2018**



On track



Pivot

GOAL

Expand waste management efforts with the purpose of setting and achieving an aggressive waste reduction goal and calculating a more comprehensive waste diversion rate. CUIMC will work toward the long-term aspiration of aligning with NYC's OneNYC waste-to-landfill goal by 2030.

STRATEGY 1 & 2

Identify key secondary waste streams lacking metrics and develop measurement methodologies in order to create a more complete waste baseline. Once a baseline is established, increase diversion rate in accordance with OneNYC's waste-to-landfill goal.



ACTION

Create a more complete picture of waste management on campus through the collection of data from each waste stream.



ACTION

Expand or create programs to increase recycling diversion and minimize waste, which include relevant short- and long-term goals.

PROGRESS

CUIMC's baseline tonnages and diversion rates are currently collected for major waste and recycling streams. After changing vendors, CUIMC can now track the waste being generated by its housing portfolio. Furthermore, the campus now has a recycling compactor on the residential side to better measure total recycling.

PROGRESS

Composting was implemented in two residential buildings: 154 Haven Ave. and 390 Fort Washington Ave.

LAMONT-DOHERTY CAMPUS

WASTE



**Completed
in 2018**



On track



Pivot

GOAL

Quantify Lamont's waste stream by both absolute and per-capita metrics, and benchmark its performance against peer institutions by 2020. Lamont will also establish targets for per-capita waste minimization to 2050.

STRATEGY 1

Establish baseline per-capita waste performance metrics for waste-to-landfill and waste-to-recycling facilities using 2016 waste collection data.



ACTION

Identify waste per-capita benchmarks from peer institutions and establish short- and long-term goals.

PROGRESS

The Lamont recycling rate for 2018 was 47 percent, slightly less than the 5 year average of 49 percent. At the same time, total waste generated on campus was 9.6 percent less than the 5 year average, with each category of waste lower than average. This does not appear to be a trend, just a normal variation most likely related to activity on campus. The top category of recyclables was scrap metal at 12.2 tons, followed by paper and cardboard at 16.5 tons.

STRATEGY 2

Expand and create programs to minimize waste.

**ACTION**

Evaluate success of waste minimization and diversion programs.

PROGRESS

Lamont has engaged in green cleaning and continues to use Greenseal products for custodial services, including paper goods, and supporting toilets and lavatories.

At Lamont, all standard copier and printer paper for the campus is supplied centrally by Facilities Management. In 2018, Lamont switched to using Forest Stewardship Council (FSC) certified paper.

STRATEGY 3

Engage the Lamont community through education and targeted outreach to influence behavior change in support of campus goals.

**ACTION**

Provide additional recycling signage.

PROGRESS

Lamont has provided additional signage at recycling stations to guide consumers to be more deliberate in separating and rinsing containers.

BEHAVIOR CHANGE

Engaging the community to support sustainability



BEHAVIOR CHANGE



Completed



On track



Pivot



**Progress
beyond goal**

GOAL

Engage the Columbia community using the Sustainable Leaders Network (SLN) as a platform to influence change through education and targeted outreach in order to support the University's goals through behavioral changes.

STRATEGY

Engage a wide range of stakeholders from across campuses to collaborate in developing and endorsing a set of these actions that can serve to guide Columbia's schools to foster a culture of sustainability.



ACTION

Engage Columbia's schools and departments to empower them to implement sustainable action in their workspaces.

PROGRESS BEYOND GOAL

Seven additional groups joined the SLN Workspace Certification Program in year two, including Facilities and Operations Finance, Information Technology and Human Resources, Butler Hall, Campus Services, Public Safety, Lerner Hall, The Earth Institute, and the Office of the Executive Vice President for Research. There are now over 170 active green leaders in the program, representing large and small departments across Columbia's campuses.



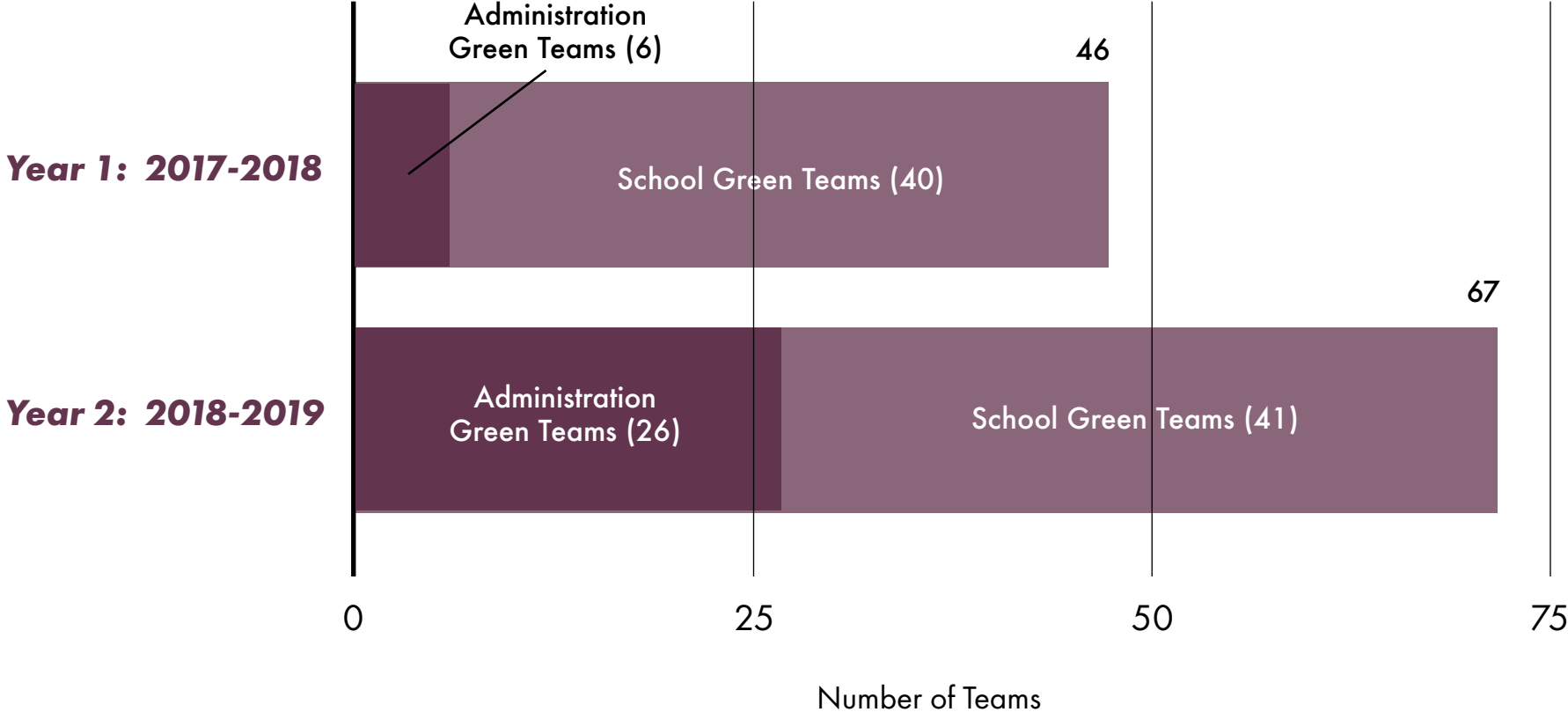
ACTION

Schools/departments select an opportunity area from the guidelines to drive measurable culture change over the course of the year.

PROGRESS

In Year Two of the program, two schools received a Platinum certification for the first time ever, and a total of 13 schools and large administrative departments, comprising more than 65 teams, received certifications.

Active SLN Teams by Year



SUSTAINABLE COLUMBIA | Workspace Certification

On April 12, 2019, the Environmental Stewardship office hosted a Campus Sustainability Fair, at which participants of the SLN Workspace Certification program were recognized for their work and progress during year two of the program. The event was keynoted by Alex Halliday, Director of the Earth Institute. Participants also had the opportunity to partake in a vendor resource fair, where campus partners such as Staples, Ricoh, The Department of Sanitation, The NYC Mayor's Office, and more were present to answer questions about how they could act as resources to participants in the program. Newcomers were also encouraged to attend the event and sign up for the certification program.

Platinum:

School of Nursing
School of Professional Studies

Gold:

The Earth Institute
Butler Hall
Public Safety
The School of General Studies
Studebaker Building
Research

Silver:

Campus Services
CUFO Finance / Human Resources / Information Technology
School of Engineering and Applied Sciences
School of Journalism

Bronze:

The Law School

Honorable Mention:

Institute for Human Nutrition (Part of Physicians and Surgeons Green Team) – GOLD Certification
Orthopedic Surgery (Part of Physicians and Surgeons Green Team) – GOLD Certification

For more information on how to join the SLN workspace certification program, [visit our website](#).



Earth Institute Director Alex Halliday gave the keynote speech for the awards ceremony

CERTIFIED GREEN TEAMS, CAMPUS SUSTAINABILITY FAIR 2019



ACKNOWLEDGMENTS

Sustainable Leaders Network Certification Program Participants

Senior Sustainability Advisory Committee

Sustainability Focus Team Members

Environmental Stewardship Office

Campus Partners

Strategic Communications

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