

The Wharton Operations *Green Campus* initiative maintains a vision of environmental sustainability through management of Utilities & Operations, the Physical Environment, Waste Minimization and Outreach & Engagement. Its mission is Inspire leadership and innovation as advocates for the University of Pennsylvania's sustainability commitment by engaging the Wharton community, identifying opportunities and implementing strategies that substantially reduce our environmental impact.

The current Climate Action Plan, CAP 2.0, lays out strategies formalized by the respective Environmental Sustainability Advisory Committee (ESAC) Subcommittees organized by topic area to achieve the goal of carbon neutrality by 2042. Updated every 5-years, the ESAC sub-committees are currently developing the next campus sustainability plan (currently titled *Climate and Sustainability Plan*, or CLASP), set for release in the fall of 2019. Wharton Operations currently has representation on multiple ESAC sub-committees as well as the University's Sustainability Coordinators program and has an integral role in its development and execution. Attached to this report are draft recommendations by each sub-committee for reference.

This Sustainability Report serves to highlight the Wharton Operations *Green Campus* efforts in the 2018 calendar year.

Utilities & Operations

CAP 2.0 Target: *Promote and adopt best practices in energy management, design and maintenance to improve efficiency and reduce Penn's carbon footprint. Achieve Energy Reduction in Buildings of 10% by 2019 in comparison to the FY14 baseline.*

Wharton Status Update:

- Wharton's on campus buildings (Jon M. Huntsman Hall, Steinberg Hall Dietrich Hall, Vance Hall, Lauder Fischer Hall, Colonial Penn Center [*electric only*] and Steinberg Conference Center) used 61,384,227 kWh equivalent of energy (electric, steam and chilled water) during the 2017 calendar year - the equivalent to the 2017 average energy consumption of 5902 homes ([US Energy Information Association](#)). The total is a 1% normalized decrease over 2017 energy consumption and a **3.25% decrease over the CAP 2014 baseline**. Of the buildings, VH data showed that steam repairs made in 2017, which lead to a 30% drop in overall energy use, corrected the system anomalies as the building used the same reduced energy in 2018.
- Huntsman's building-wide VAV conversion to Phoenix valves along with the Aircurity CO2 sensor installation in all the classrooms and public areas began at the end of 2018. The project also completed installation of new airflow monitoring stations in the existing air handling units and rebalancing. Energy data benchmarking is occurring during these projects. Initial reporting from the AHU modifications alone indicate a savings of over \$340,000/year, or a payback of just 1.8 years.
- SHDH received retro-commissioning to assess the building's energy use and additional benefits for operations and maintenance, thermal comfort and indoor air quality. The draft report found 19 Retro-Commissioning items that address \$28,311 in possible future cost avoidances. The costs to implement these projects are \$91,670, with a 3.24 year simple payback.
- Wharton Operations in partnership with Penn's central facilities team conducts regular energy usage assessments. To assist with this ongoing task, the Operations group helped develop and pilot an energy dashboard. The dashboard shows real-time energy consumption for all the buildings in the Wharton complex. This tool has enabled the in house facilities team to quickly spot anomalies for quick correction that has saved energy, operating costs and prevented system failures.

- During peak electric load months (June – August), Wharton continued its participation in weekly meetings with FRES to strategize about energy cost saving measures. When notified of expected “Red Days”, a known peak 5 hour of electricity use, Wharton worked to reduce load as much as possible by coordinating the shutdown of HVAC equipment and contacting the Wharton community to advise them of the situation to shut off, or minimally use electrical appliances to the greatest extent possible. This past summer, the local power grid experienced a total of 13 Red Days. As opposed to 2017, the University’s capacity charge will increase slightly next season due to four of the five highest energy use days occurring when students returned from summer break.

Physical Environment

CAP 2.0 Target: *Create and maintain a sustainable campus by increasing green space, decreasing building energy consumption, and increasing education and awareness of sustainable design.*

Wharton Status Update:

- The Lauder Institute renovation project is targeting LEED v4 for Interior Design and Construction (LEED v4 ID+C) Silver certification – the first Wharton project to pursue version 4 certification.
- The Vance Hall 3rd and 4th floors renovation project is targeting LEED v4 for Interior Design and Construction (LEED v4 ID+C) Silver/Gold certification.
- The Wharton External Affairs fit-out in the FMC Tower will receive silver certification under the [WELL Building Standard](#) for New Interiors. WELL is the leading tool for improving health and human experience through design. With only 327 WELL projects in the United States, the External Affairs suite is the first WELL project at Penn, and will serve as a leading case study to inform future projects. Members of the Wharton Operations team will present a detailed project case study at the annual IMPACT conference in St. Paul, MN. IMPACT is a USGBC regional event for sustainable development, and this year, is in partnership with the Green Schools Conference & Expo, a national event bringing together those involved in making green schools a reality.
- Huntsman’s 8th floor event space was retrofitted with LED lighting which has enhanced the overall aesthetic and significantly improved the energy efficiency. Other items included occupancy, shade and lighting controls, window solar film, A/V upgrades including a new low power consumption LED video wall as well as sustainable finish updates that included locally sourced products, recycled materials and low VOC paint.
- Huntsman Hall received Philadelphia’s 2018 TOBY Award for “Best of the Best” in Green Practices from the [Building Operations Managers Association \(BOMA\)](#), recognizing the building’s quality, sustainable programs and excellent building management.
- The study carrel lighting fixtures in Huntsman’s student study lounges were updated to [Vode BoxRail](#) LED lights with integrated vacancy sensors.

Waste Minimization & Recycling

CAP 2.0 Target: *Improve Penn’s environmental performance by minimizing solid waste through community education, strategic purchasing, appropriate infrastructure and proper disposal, strengthened by relevant and accurate metrics. Increase recycling rate to 30% by 2019, and continue to reduce overall municipal solid waste.*

Wharton Status Update:

- Wharton Operations continues its role as part of the Solid Waste Management (SWM) ESAC sub-committee, with Maria O’Callaghan appointed as part of the Oversight Committee. Penn contracted with a new waste hauler in 2018. The new arrangement immediately addressed previous concerns to effectively track waste diversion and work with FRES to create campus-wide annual waste audits and messaging to improve human behavior.
- In 2017 Wharton generated 438 tons of municipal solid waste via JMHH and SCC compactors only (JMHH 187; SCC 251 tons). The total is only slightly less than last year, while SCC experienced a large increase in volume due to the WARB project. In June 2018, the SHDH compactor was removed and replaced with toters (collected by FRES trucks which cannot measure individual pick-ups). SHDH served as the central collection point for Vance, Lauder and McNeil. For the duration of the WARB project, Lauder and McNeil waste will be diverted to the SCC compactor, while Vance waste is collected separately via toters.

- Joe’s Café, Pret and Wharton Operations generated 19 tons of compost in 2018. This equates to 18% of total campus compost waste. The total is 3 tons less than last year despite Pret Café operating for a full year, namely as Joe’s Café was closed for the 2017 summer.
- In 2018, Huntsman Hall received a 24-hour waste audit as part of a campus wide audit coordinated thru FRES. The audit found a potential waste diversion rate of 52.4%. Additionally, the volume of total trash in the waste stream declined to its lowest point yet while the volume of organic waste reached its highest-level due to Pret. Operations continues to educate building occupants on effective waste management to minimize contamination risks. This includes a student lead initiative to conduct a post-consumer compost pilot in the JMHH 2nd floor lounge which tested various signage strategies to inform occupants on how to sort their waste.
- Over 18,000 special events take place in JMHH per year and most involve catering. In an effort to support ecologically sustainable events to the greatest extent possible, Wharton Operations partners with event organizers to minimize waste, source local foods and identify opportunities for bulk purchasing all of which have an enormous impact on decreasing our carbon footprint. In 2018, Operations successfully implemented a Zero Waste policy during the Wharton Commencement events resulting in a 1000 pound, or 60%, increase in compost collected from JMHH over monthly averages – waste that would typically end up in the landfill at regular events of this scale.
- Construction waste management on Wharton summer projects and storage clean-outs diverted 13 tons, or 81%, of construction debris from the landfill. The total tonnage is a sizable decrease over 2017 values as it represents mostly storage clean-out projects. Due to the size of Wharton’s 2018 capital projects, contractors are managing construction waste separately.
- Wharton Operations continues its participation in the [Carpet America Recovery Effort \(CARE\)](#) Program for carpet replacement projects. In 2018, Wharton projects diverted 33,700 square feet, the equivalent of 8 tons, of carpet from landfills.
- The Wharton public water bottle filler program diverted the equivalent of over 597,000 16 oz. plastic water bottles from the waste stream – JMHH alone offset over 524,000 bottles. Since the start of the program in November 2013, the bottle fillers have offset over 2.1 million plastic bottles.
- Wharton Computing and Information Technology (WCIT) recycled nearly 1300 pieces of used computer equipment in 2018, including monitors and TV’s, projectors, servers, printers, batteries, portable devices and misc. accessories.

Outreach & Engagement

CAP 2.0 Target: *Build a culture of sustainability that informs all constituents of University life.*

Wharton Status Update:

- Wharton Operations staff became a member of [Penn’s Green Fund](#) selection committee, providing grants to improve the University’s environmental performance and reduce campus emissions.
- Wharton faculty and staff [Eco-Reps](#) membership maintained consistent participation in 2018, including 2 members sitting on the 7-person Eco-Rep Steering Committee.
- The Wharton Green Team membership grew to include 14 Wharton Departments – including 3 located off campus. Green Team members represent the various departments within Wharton and work to minimize the environmental impacts of their workplace and teach fellow co-workers about sustainable practices.
- In 2018, Wharton doubled the number of offices participating in the [Green Office Certification](#) program to 8, including the addition of the first academic department: Legal Studies and Business Ethics, receiving the programs highest level certification (Level 4).

Academics

CAP 2.0 Target: *Expand opportunities for teaching, learning and researching sustainability among students, staff and faculty.*

Wharton Status Update:

- Wharton Operations housed a Masters of Environmental Studies (MES) student research pilot to assess indoor air quality (IAQ) and occupant knowledge of IAQ. The study involved installing IAQ monitors in the Operations suite, disseminating educational outreach throughout the duration of the pilot and presenting the findings. The results indicated that JMHH bettered national standards for all indoor metrics studied, including VOC's, CO2, particulate matter and formaldehyde.
- The Wharton Student Sustainability Advisory Board (SSAB), sponsored by Wharton Operations, lead initiatives to conduct a post-consumer compost pilot near the JMHH 2nd floor lounge which tested various informational signage strategies on proper waste sorting, and a behavioral gaming app that encouraged students to engage in socially responsible activities and track their impact. The latter was funded by a Penn Green Fund grant and with support from Wharton IGEL.
- Wharton Operations continues to serve as a co-sponsor and advisor for the multi-disciplinary student initiative *InstaHub*. Their product, a battery-powered device with occupancy sensing capabilities that attaches over existing toggle light switches for instant light automation, is the recipient of numerous awards including the Hult Prize Ivy. Operations staff accompanied them in the spring of 2018 to the TCU Neeley Institute for Entrepreneurship and Innovation Values and Ventures Competition and is currently piloting the latest prototype in our offices.
- Wharton Operations continues its partnership with the Wharton [Initiative for Global Environmental Leadership](#) (IGEL), contributing blog posts, participating in speaker panels and initiative partnerships.