

2022-2023

Annual Sustainability Report



WPI

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INTRODUCTION

Overview

WPI's efforts in advancing sustainability extend from the campus facilities and operations across the globe through its projects programs and research. This document, WPI's 2022-2023 Annual Sustainability Report, details the university's efforts in furthering its commitment to sustainability over the past year. A focus is placed upon the 17 Sustainable Development Goals (SDGs) adopted by the United Nations, as these serve to provide a context for advancing sustainability and way to focus and understand WPI's efforts in this area. The report starts with an overview of two of this year's initiatives on the SDGs and climate action. Then, following the structure of WPI's five-year plan adopted in 2020, WPI's efforts are categorized into four sections: academics, operations and facilities, research and scholarship, and community engagement.



Academics

Graduates will leave campus with the mindset and abilities to develop sustainable solutions to the world's problems.



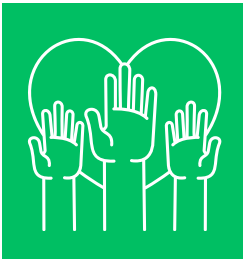
Operations and Facilities

Principles of sustainability guide our actions as well as our academic and research programs.



Research and Scholarship

Our research and scholarship will make significant contributions to the technologies, the policies, and the mindset to help assure a sustainable world.



Community Engagement

Every member of the WPI community will engage in sustainability related education, awareness, action, and service, in order to achieve positive, long-lasting change for all our communities.

Approach

WPI’s philosophy in increasing sustainability follows the guidelines of a systems-based approach. Three primary pillars (Environmental Stewardship, Social Justice, and Economic Security) are integrated through WPI’s standard of combined local and global action, and viewed through the lens of the Sustainable Development Goals. This is to reinforce the concept that sustainability has many interlocking aspects, including social and economic empowerment alongside traditional “green” objectives that must be developed in unison for the creation of a better society.

A primary goal is to have WPI become a “sustainability living and learning laboratory” in which sustainability is advanced in a unified ecosystem amongst the four areas and various initiatives. This ecosystem ideally embraces a sustainability-conscious culture, in which students are able to integrate sustainability into all aspects of their experience, including academics, projects, clubs, research, activities, and other areas.

WPI remains committed to advancing its sustainability in this way, and has done so through a number of programs and initiatives detailed in this report. These include initiatives to advance our sustainability through climate action and energy, the Sustainable Development Goals (SDGs), and a variety of programs and activities in academics, research, operations and facilities, and community engagement.



ONGOING INITIATIVES

CLIMATE ACTION AND ENERGY



WPI signed a Carbon Commitment with Second Nature in April of 2022. This commitment includes a pledge to develop a plan to transition to a carbon neutral campus. In the following year, WPI set up a Climate Action Committee and began the process of developing a Climate Action Plan, which included identification of potential partners to help WPI improve and modernize its on-campus energy infrastructure. At the end of 2022, WPI formally signed on with the investment firm Harrison Street in a public-private partnership. The agreement provides upfront capital funding for energy infrastructure projects, as well as a framework for supporting sustainability-related research. The initiative is also supported by a faculty resolution, passed in February 2023, that called for a number of actions to promote accountability in energy systems, climate action, and sustainability at WPI. Overall, the initiative provides opportunities for the community to engage with Harrison Street and their partners, from internships to projects and research.

This partnership kicked off at the beginning of 2023, and plans for energy efficiency projects commenced shortly thereafter. The first major energy efficiency project was an LED lighting upgrade effort in partnership with GreenerU, which is anticipated to save the institution approximately 400,000 kWh of electricity annually. In addition, Harrison Street partnered with Salas O'Brien to begin developing an energy roadmap for carbon neutrality and to evaluate alternative low-carbon energy solutions for WPI.



In April of 2023, WPI submitted its first formal greenhouse gas assessment for Second Nature. Our plan for the 2023-2024 academic year is to work with the Climate Action Committee and various partners to develop a Climate Action Plan, which should be finished in the summer of 2024. The plan will take a variety of factors into consideration - from the recommendations of Salas O'Brien's energy and carbon neutrality study to the overall input from the WPI community. The efforts include initiatives to advance curricula, projects and research that align with and support the transition to carbon neutrality. We encourage all WPI community members to consider how their own efforts align with and support the climate action and energy initiatives.



ADVANCING THE SUSTAINABLE DEVELOPMENT GOALS (SDGs)

A cross-campus SDG Self-Study Group was formed in 2021 by a team of academic and administrative staff from the Office of Sustainability, the Global School, the George C. Gordon Library, and the CEAE Department. The team's intention was to develop a better understanding of WPI's contributions in relation to the United Nations Sustainable Development Goals (UN SDGs). The team's overarching goal is to create a culture of meaningful reflection, accounting, and celebration of WPI research, teaching, and service related to the UN SDGs.

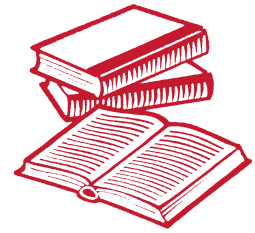
A key objective for the 2022-23 academic year was to participate for the first time in the Times Higher Education (THE) Impact Ranking, a global survey that serves as an instrument of self-study in relation to progress in addressing the SDGs. For the initial THE Impact Ranking submission, the team submitted data on our university's contributions to a set of 5 SDGs for which there was a good deal of interest and available data, which allowed for the manageable documentation of progress.

The team also prepared a report to share the information that was gathered in the process of completing the THE Impact Ranking. The intent was to build awareness, both within our campus and externally, of the work being done by the WPI community. The report provides highlights of data gathered regarding our contributions to the following SDGs:



The report can be found at the following link: [SDG Self-Study Report](#). The overall goal as we look forward is to raise awareness about WPI's contributions and inspire our community to share the work they are doing across these and all SDGs. In the sections of this annual report that follow we encourage members of the WPI Community to consider how their projects and activities can help to advance the various SDGs.

ACADEMICS



WPI offers hundreds of courses and 70+ degree programs in a variety of disciplines to graduate and undergraduate students alike. Many of these programs and courses intersect or focus on sustainability, enabling WPI graduates to incorporate this important goal into their future work. The university strives to create professionals who are not only technically skilled, but also understand the social implications of the work they are doing. The below programs are **sustainability-related**:

13+

Degree Programs

Including...

Architectural Engineering

BS, Minor

Civil Engineering

BS, MS, MEng, PhD

Community Climate Adaptation

MS

Environmental Engineering

BS, MS

Environmental and Sustainability Studies

BA, Minor

Science and Technology for Innovation in Global Development

MS

Sustainability Engineering

Minor

And more! [Click here](#) for a full list of sustainability-related academic program

150+

Academic Courses

Including...

Psychology for Sustainability

Undergraduate

Environmental Justice in Latin America and the Global Caribbean

Undergraduate

Energy Challenges in the 21st Century

Undergraduate

Sustainable Wastewater Engineering: Treatment and Reuse

Undergraduate

Climate Change: Vulnerability and Mitigation

Graduate

Renewable Energy

Graduate

And more! [Click here](#) for full list of sustainability-related courses

Great Problems Seminars

Started in 2007, the Great Problems Seminars are a collection of first-year programs that give students the opportunity to explore a particular set of social issues, often strongly correlating to SDGs, in-depth. They are designed to provide students with a social context in which they can view their future coursework and projects, as well as an introduction to project-based coursework and design thinking. This past year 8 courses were offered. Below is an example project from each course:

THORIUS: Powering our Green Future

Course: Climate Change

Creators: Donovan Bowley, Evan Lutz
Giampaolo Maneri, Gianni Rosato, Chenxi Zheng

Deer Population Control Measures in the Adirondacks

Course: Extinctions

Creators: Chantelle Chhoeuk, Kimberly Cummings, Brandon Engermen, Beth Irwin

South Bronx Bodegas: Ground Zero for the Obesity Epidemic

Course: Heal the World

Creators: McKenzie Anderson, Caroline Hlavachek, Camila Leathers, Kai Yawata

Ingenious Music: Bottle Marimba

Course: Recover, Reuse, Recycle

Creators: Ryan Addeche, Annarose Avery, Jack Denny, Brian Gomez, Emre Sunar

Moving Fashion Forward

Course: Seeking Sustainability

Creators: Corryn Fisher, Corinn Ouellette, Abigail Rivers, Jessica Shepard, Grace Venagro

Housing in Venezuela

Course: Shelter the World

Creators: Samuel Kelly, Rodrigo Marcenaro Palacios, Keenan Porter, Juan Andres Sanchez

Condensing Water from Air in Kharga Oasis, Egypt

Course: Humanitarian Engineering

Creators: Marie Howe, PJ Ryan, Spencer Fair, Jiaming Du, Joseph Abata

Encouraging Active Transport

Course: Power the World

Creators: Serena Russell, Paris Ojuma, Matthew Channell

Interactive Qualifying Projects

The Interactive Qualifying Project, or IQP, is a project undertaken by WPI students typically in their third year of study. The student team members expend an effort equivalent to three courses while studying and proposing a solution for a particular social problem. Many of these projects are completed at locations around the world through WPI's Global Projects Program. The problems almost always are related in some fashion to the sustainable development goals. **Over 500 sustainability-related projects** were completed during the 23-24 academic year.

The President's IQP Awards are handed out to IQP teams whose conception, performance, and presentation of their Interactive Qualifying Projects have been judged outstanding in focusing on the relationships among science, technology, and the needs of society. This year's finalists are given below:

Digital Preservation of Artisanal Culture in the Fez Medina

by Abigail Kihu (ME), Heather McGlauflin (IE), Julia Toplyn (ME), Kyra Tripp (CBC)

Advisors: Mohammed El Hamzaoui, Joseph Diron

4 QUALITY EDUCATION



Help the Soup Kitchen "Go Green"

by Samantha Braun (RBE/CS), Lali Berelashvili (CBC), Cal Lebak (CBC), Colette Webster (CE)

Advisors: Esther Boucher-Yip, Gary F. Pollice

2 ZERO HUNGER



Power, Responsibility, and Justice in Research with Indigenous Communities

by Logan Rinaldi (RBE), Melissa Hauman (ME), Samantha Havel (BME)

Advisors: Shana Lessing, Yunus Dogan Telliel

10 REDUCED INEQUALITIES



Restoring Mrigadayavan Palace

by Megan Cyr (BBT), Tovah Lockwood (CBC), Anne McNamara (AREN), Alyssa Magaha (CS)

Advisors: Holly Keyes Ault, Stephan Sturm

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Indoor Navigation for Blind Individuals using Computer Vision and Machine Learning

Students: Oliver Chen (IMGD), Kelsey Leach (BME), John Winship (ECE), Sam Mather (BME), Alex Demirs (ECE)

Advisors: Svetlana Nikitina, Ivan P. Mardilovich

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



Major Qualifying Projects

The Major Qualifying Project, or MQP, is a senior capstone project undertaken by WPI students. It is meant as a culmination of everything the student has learned so far in a large design or research project. Many of these projects can be related to the sustainable development goals. The Provost's MQP awards offer recognition to those students who have completed outstanding Major Qualifying Projects (MQPs) as a demonstration of their competency in a chosen academic discipline. Each academic department conducts its own competition to select the winners. Below are some examples of sustainability-related award winners.

Net Zero and Resilient Housing for Heat Waves

Students: Stefanie Beaudry, Vanessa Bussiere, Sarah Johnson, Athina Theofilou
Advisors: Soroush Farzin, Shichao Liu

11 SUSTAINABLE CITIES AND COMMUNITIES



Ropeless Lobster System: Resurfacing Oceanic Locator

Students: Caylee Butler, Slater Campbell, Trevor Parks, Charles Snow
Advisors: William Michalson

14 LIFE BELOW WATER



Stormwater Management and Design in Framingham, Massachusetts

Students: Adele Brochu, Evan Rios, Kali Sander, Caitlin Strzegowski
Advisors: Suzanne LePage, Paul Mathisen

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



Evaluating Quality, Environmental Impact, and Economic Sustainability in Support of Benchmarking Efforts at Twelve Guns Brewing

Students: Dante Coccagnia, Domenic DiCenso, Mary Suckow
Advisors: Edward Gonsalves, Aaron Sakulich

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Monitoring Ocean Microplastics Through Citizen Science

Students: Colby Frechette, Iris Morin
Advisors: Lauren Elgert, George Heineman

14 LIFE BELOW WATER



On Campus Projects

WPI considers itself a Sustainability Living and Learning Lab (SL3), and supports this effort by integrating project work and research related to topics that impact our campus and community directly. There have been an increasing number of projects addressing on-campus sustainability - both at the undergraduate and graduate levels. A few undergraduate examples from the academic year 2023 are included below:

Maximizing Food Waste Recovery: Developing an Approach for Expanding Collection and Engagement at WPI, by Brian Brooks,
Students: Kayla Carpenter, Katharine Dion, Jacob Elliott



Understanding the global impact of Worcester Polytechnic Institute through the lens of the UN SDGs: Clean Water (SDG6)
Students: Kayla Vega, Nikita Igoshin



Promoting Awareness and Development of Green Roofs at WPI,
Students: Jack Arabian, Sarah Chen, Bennet Kracz, and Atharva Tiwari



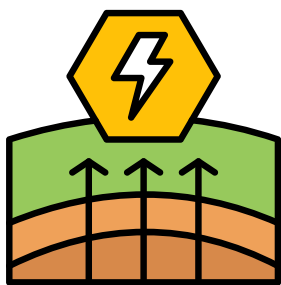
Quantifying Transportation Emissions at Worcester Polytechnic Institute
Students: Brian Fox and Bryan Silva



The Sustainability Projects Showcase

A prominent way for students to display and receive recognition for their work in sustainability is the annual Sustainability Projects Showcase. Encompassing the first year, undergraduate, and graduate categories, students are able to display their efforts in either in-class project work or extracurricular projects in a university-wide competition/expo. The winning projects for this year's event are given below. All projects are listed on the showcase web site:

<https://wp.wpi.edu/sustainabilitycompetition15/>



FIRST YEAR

Geothermal: A Green Solution to Rising Temperatures

Students: Alex Sheehey (CEAE, ME), Samantha Simmons (MA, DS), Federico Vegas (ME, RBE), Jackson Wambach (ECE)
Advisors: David Medich, Derren Rosbach

7 AFFORDABLE AND CLEAN ENERGY

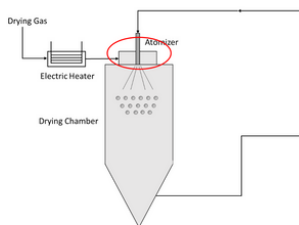


UNDERGRADUATE

Hecho en Monteverde: An evaluation of and improved criteria for a voluntary sustainability certification

Students: Sol Giesso (ESS), Patrick King (CHE)
Advisors: Robert Traver, Carol Stimmel

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Schematic of a simple spray drying system

GRADUATE

Spray Drying Using Novel Nozzle Design to Improve Droplet Formation for Fine Powders

Students: Mehrnoush Famil Dardashti (ME)
Advisors: Jamal Yagoobi

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



The Sustainability Living & Learning Lab (SL3)

The Sustainability Living and Learning Lab (SL3) is a virtual laboratory which represents the overall contributions of the sustainability research and various projects across campus in an integrated way, effectively recognizing our campus as a living and learning laboratory. The SL3 is intended to support and promote an engaged campus community in all three aspects of sustainability – environmental stewardship, economic security, and social justice. Through the Office of Sustainability, the SL3 aligns its activities with various aspects of the campus community including: Academic Programs, Project Work, and Innovative Research & Scholarship.

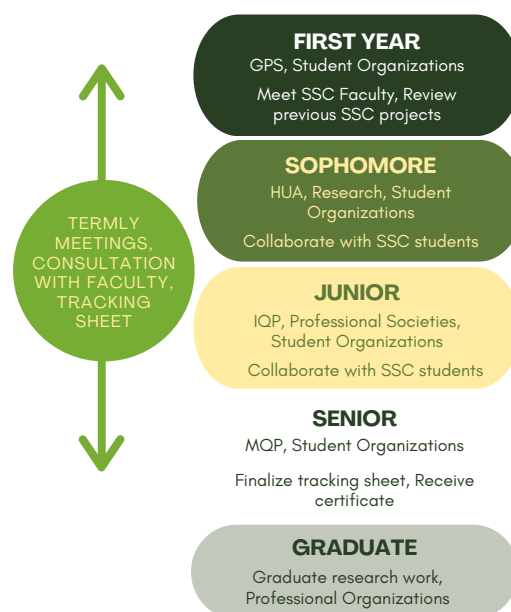
Moreover, SL3 collaborates with community engagement, facilities, & operations. This comprehensive approach aims to promote sustainability, not just as an academic pursuit, but as an integral part of daily living and learning for our students. See our website for more information on the SL3.

The Sustainable Solutions Collaborative

The Sustainable Solutions Collaborative (SSC) is a program that promotes the development of WPI projects and activities to develop real-world solutions to sustainability challenges. Participating students are encouraged to track their sustainability-related academics and activities in order to receive a recognition for sustainability leadership. Activities may include:

- Projects such as GPS, HUA, IQP and/or MQP
- Individual research, non-academic projects, and/or club activities

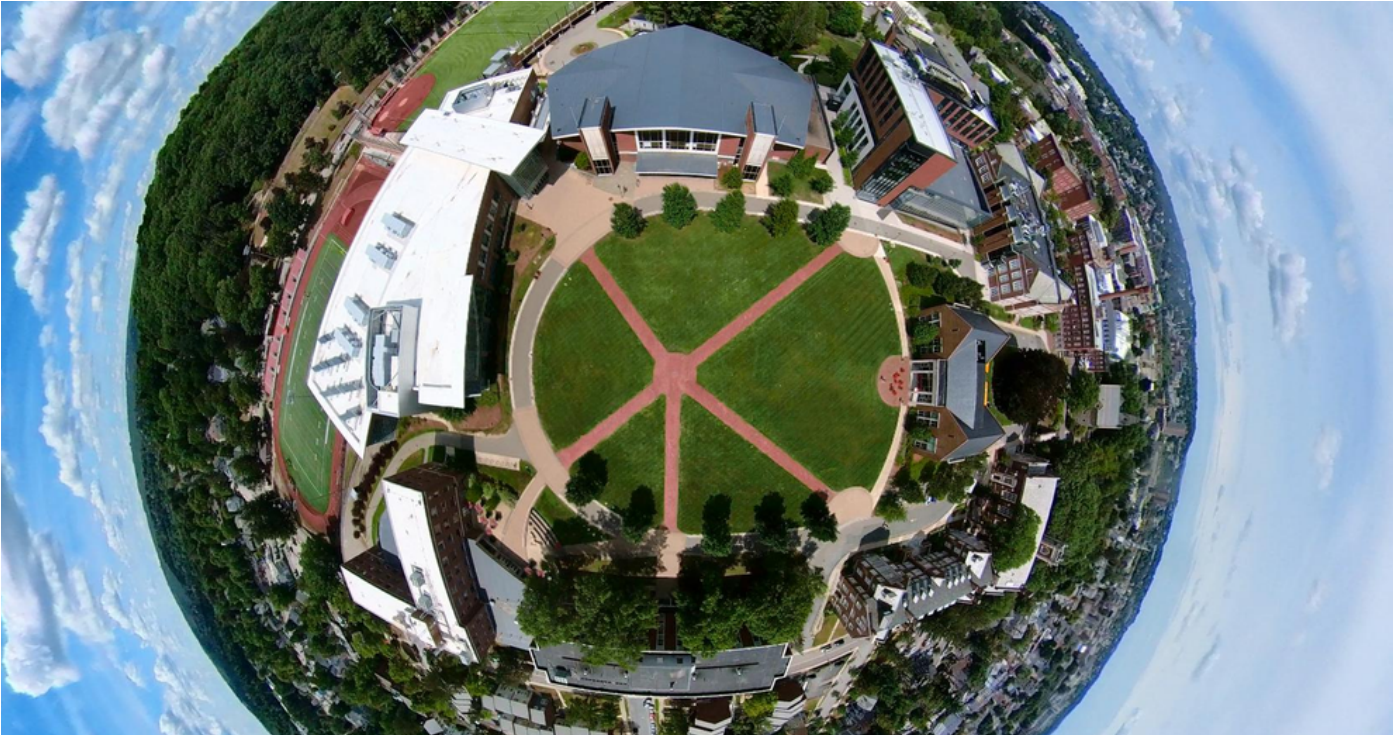
The SCC's goal is to involve students with sustainable solutions in a collaborative and creative fashion. More information can be found at the: [SSC Webpage](#).





OPERATIONS

WPI's has embarked on a number of exciting initiatives over the past year. These include a new collaboration with Harrison Street, updates to a number of buildings and facilities, and a commitment to carbon neutrality with Second Nature. This section includes an overview of these initiatives, along with an overview of WPI's progress in transportation options, energy, and resource use.

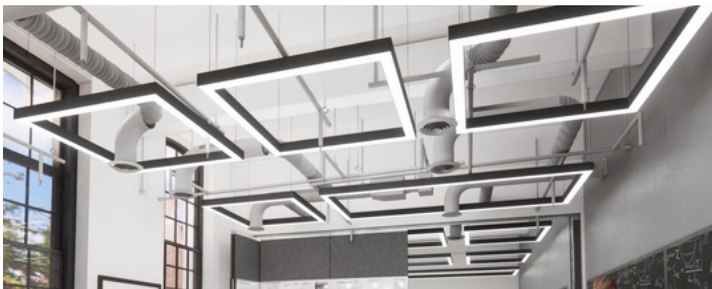


Harrison Street Collaboration

In early 2023, WPI signed a 40-year agreement with Harrison Street, a Chicago-based investment management firm, that is designed to advance numerous facilities-based sustainability initiatives on campus. Such measures might include improvements to the campus power plant, optimized temperature control systems, installation of solar panels, new lighting systems, and more. This collaboration brings hope of visible and significant progress towards a sustainable future for WPI.

Buildings and Facilities

Buildings are one of largest contributors to greenhouse gas emissions, making the reduction of energy consumption an important step in WPI's sustainability goals. The process of making campus infrastructure more sustainable is ongoing, taking the form of lighting upgrades, green roofs, more efficient heating systems, and building automation systems.

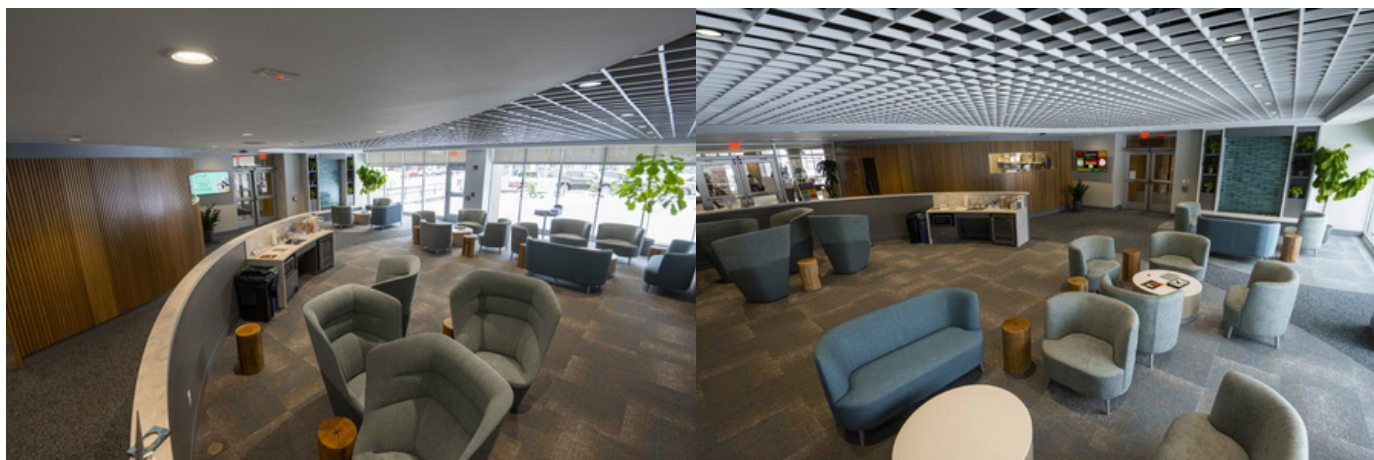


Renderings of Stratton renovations

A prominent project this year was the start of intensive renovation of **Stratton Hall**, where accessibility and sustainability are being improved in parallel through the addition of an elevator and more energy efficiency equipment. Other new sustainability features of the Stratton Hall design include aluminum clad windows, increased insulation and LED lighting. WPI's partner, Harrison Street, is providing the upfront funding for some of these upgrades that support the institution's energy initiative.

Center for Wellbeing

This year WPI finished construction of the newest addition to the wedge: the Center for Wellbeing. The construction included the addition of high efficiency heat pumps to reduce energy usage for heating. The new facility is important to WPI because it is intended to relieve stress and help students work through mental health struggles. It includes a zen space and gathering spots for student activities or organizations, as well as places to quietly meditate or reflect. So far this year it has hosted a variety of wellness-themed activities and programs including stuffed animal making and Project Connect aimed at helping students meet new people to socialize with. Well-being throughout our campus is an important consideration for WPI's sustainability goals, and we look forward to continued collaboration and initiatives involving Center for Wellbeing and Office of Sustainability.



LEED Certifications

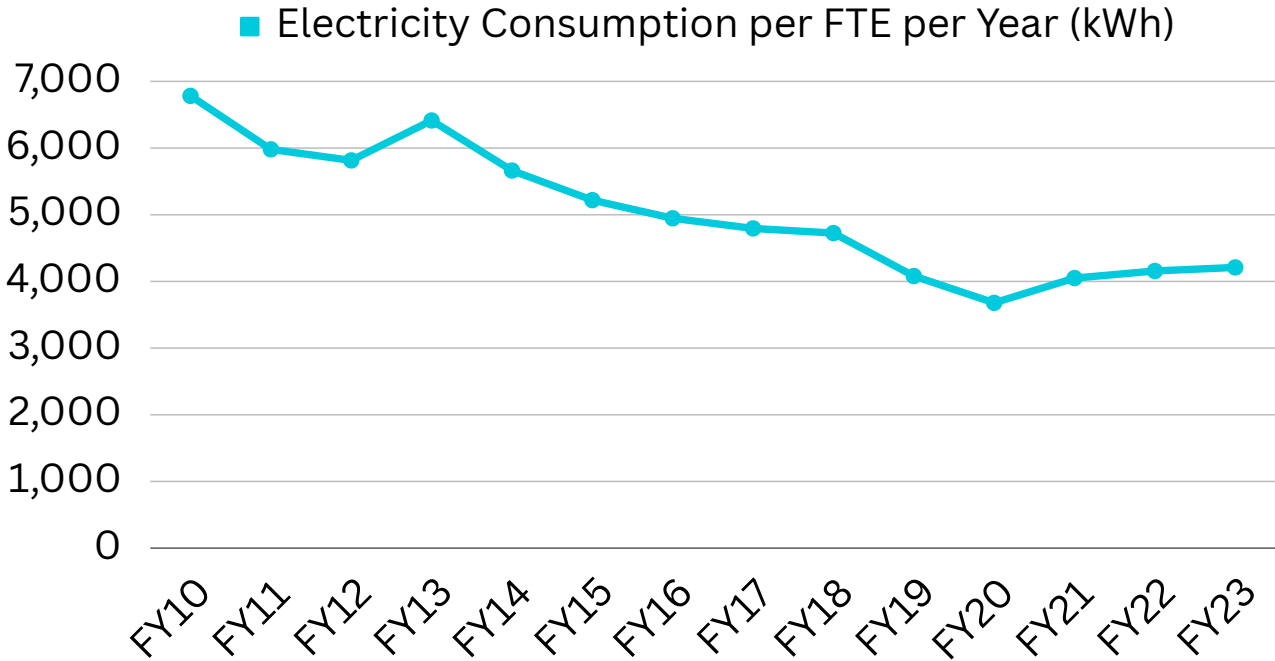
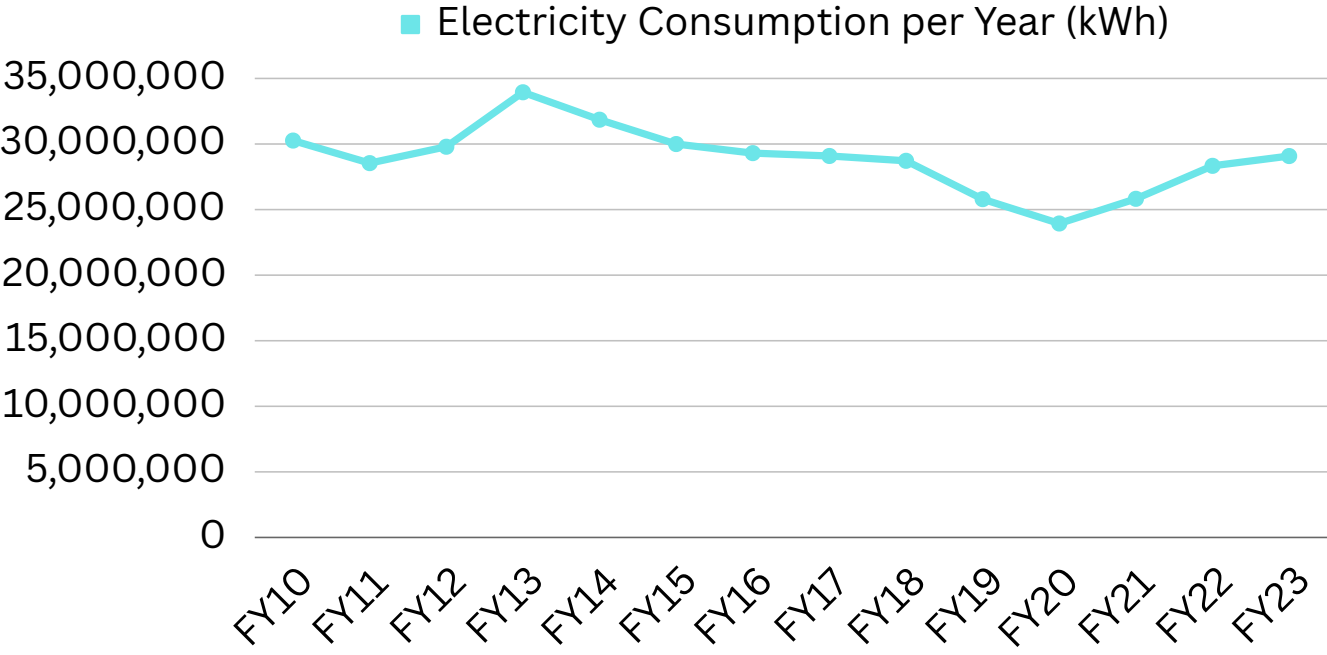
WPI implements a number of sustainability-driven measures in its buildings and facilities, including automatic heating setbacks, LED lighting retrofits, and seeking LEED certification for all new constructions. LEED-certified buildings currently include:

- East Hall (Gold)
- Sports and Recreation Center (Gold)
- Faraday Hall (Silver)
- Bartlett Center
- Innovation Studio (Gold)

WPI has also applied for the recently-constructed Unity Hall to be certified LEED Gold, however the process is still ongoing.

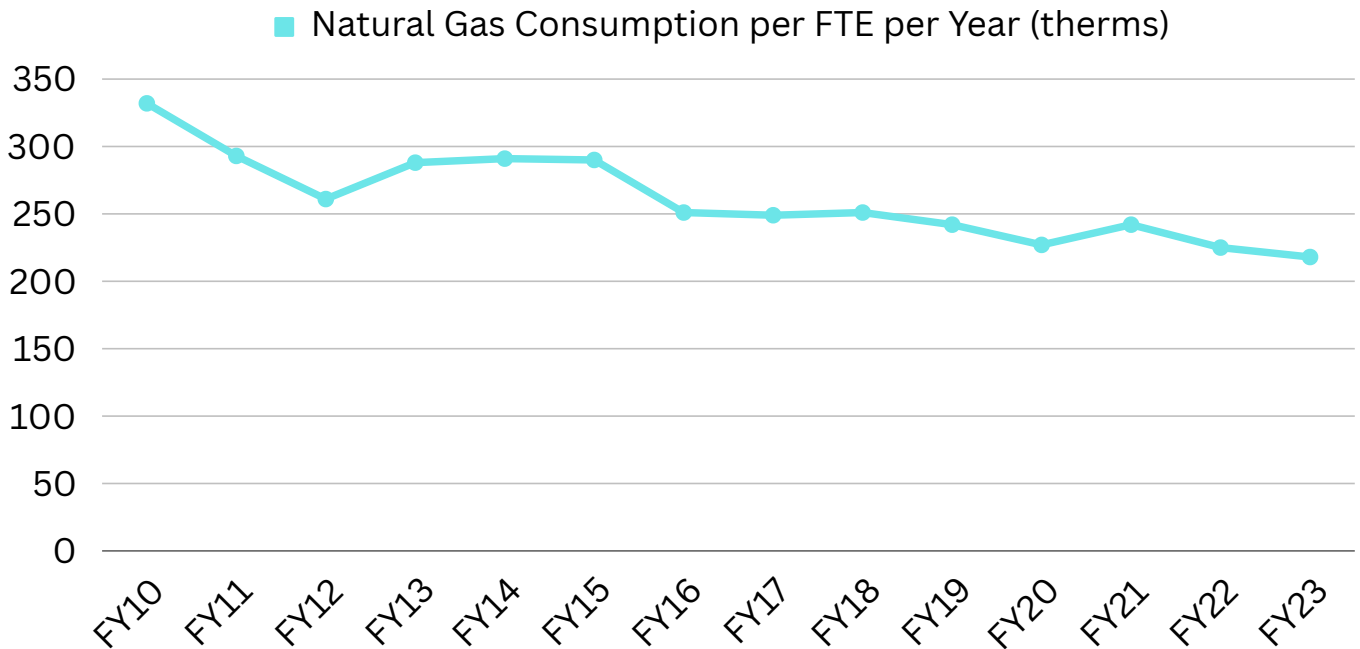
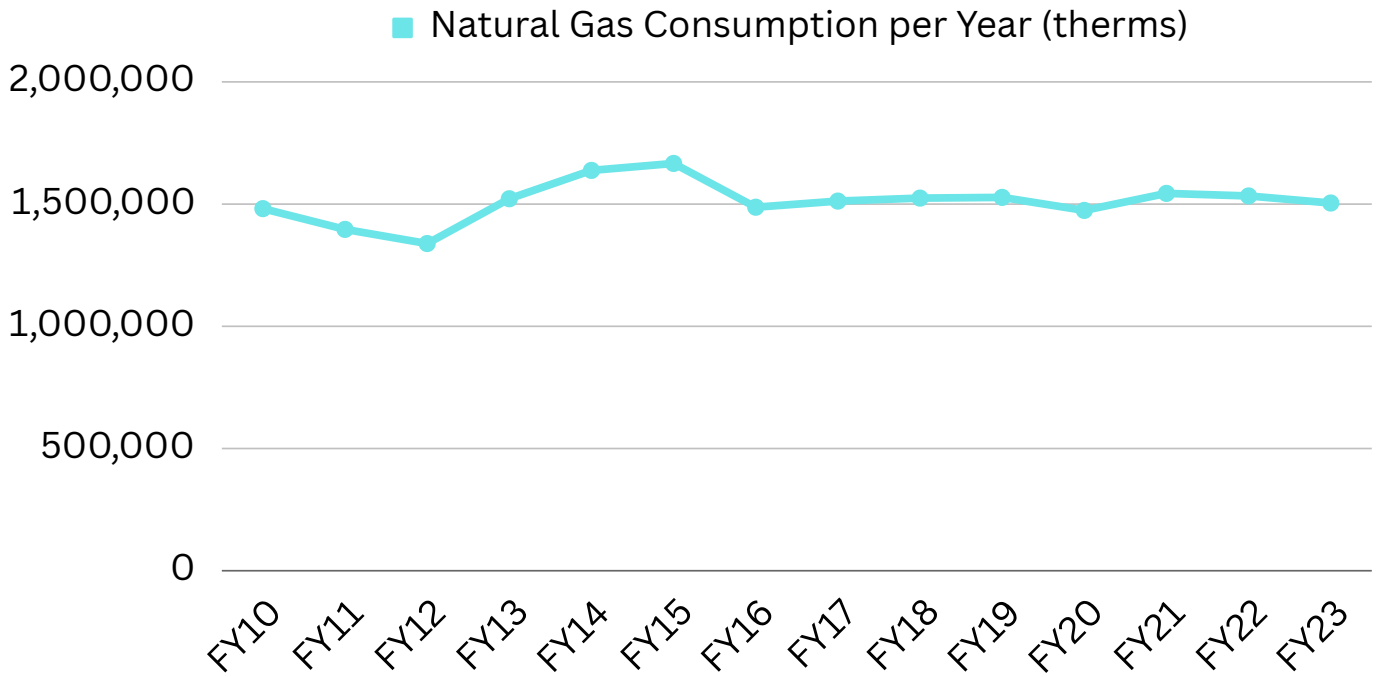
Electricity

WPI has undertaken a number of initiatives to reduce its electricity consumption, aiming for a 10% reduction in kWh/FTE (full-time equivalent) from FY19 by 2025. With that, WPI has also been expanding with new buildings and the addition of the South Village properties. Electricity consumption during the 2022-2023 fiscal year was approximately 29 million kWh which equates to about 4,200 kWh per full-time equivalent person at WPI.



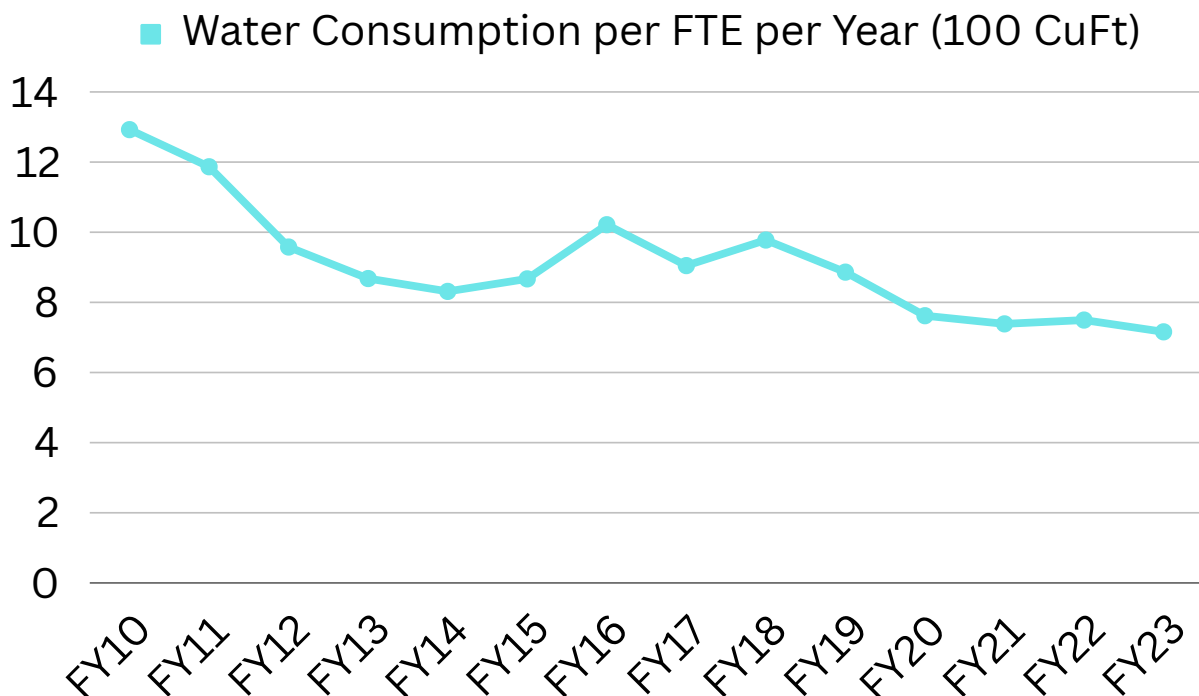
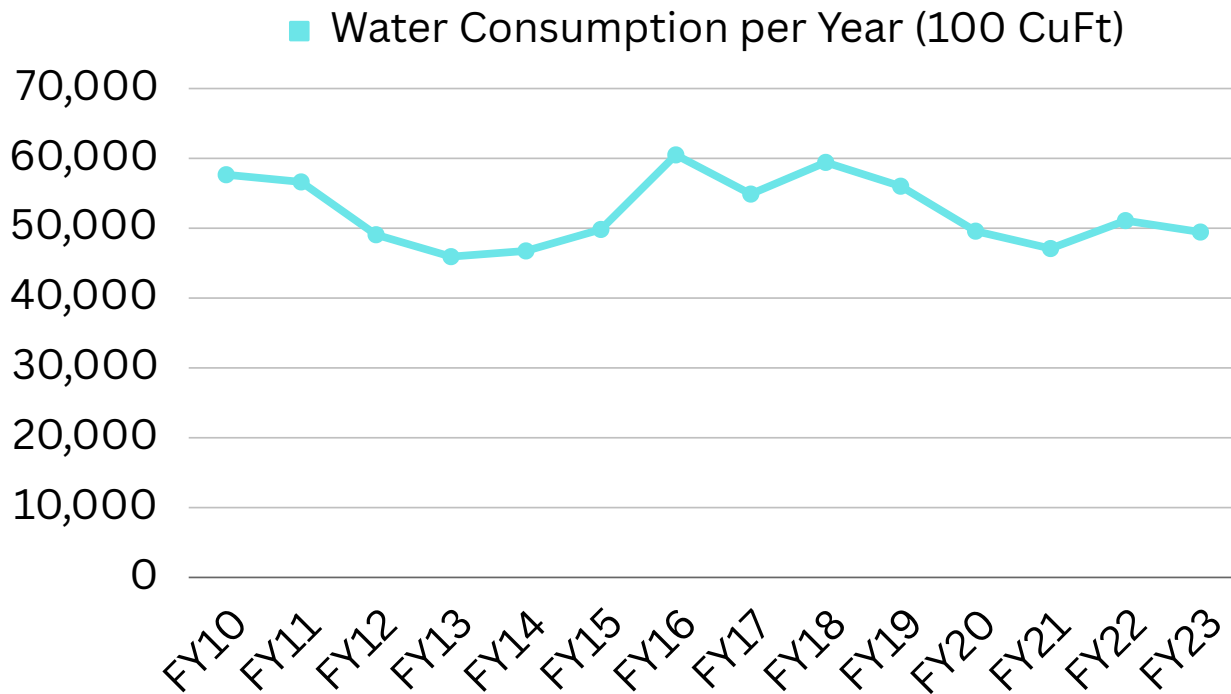
Gas

Natural gas provides the predominant source of energy to meet WPI's heating needs. The university has been using natural gas to heat water and generate steam for heating campus buildings for the last 20 years. While the overall use has remained generally constant over the last 8 years, new buildings have been added and the consumption per FTE (full-time equivalent) has still been decreasing. With our ongoing energy initiatives, we anticipate more decreases as we move forward.



Water

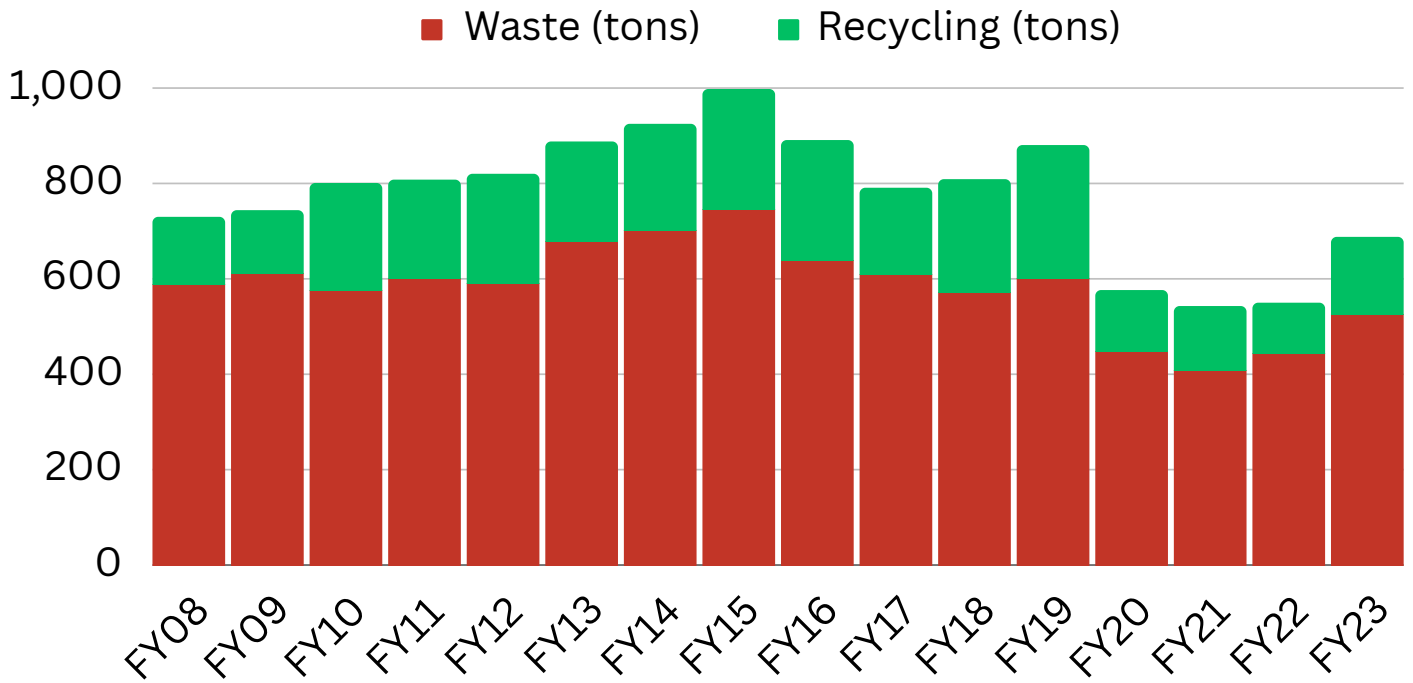
WPI has committed to reducing its water consumption, aiming for a 15% reduction per FTE (full-time equivalent) from FY19 by 2025. WPI's water consumption during the 2022-2023 fiscal year was around 37 million gallons and 5300 gallons per FTE. Per FTE consumption has reduced 19% since FY19, surpassing our 5-year goal.



Waste

WPI has three main streams for dealing with waste: landfill, recycling, and e-waste. The first two are offered in paired bins throughout the campus with signage to direct people to the proper disposal method.

This year WPI produced 525 tons of waste, 157 tons of recycling, and 6 tons of E-waste.



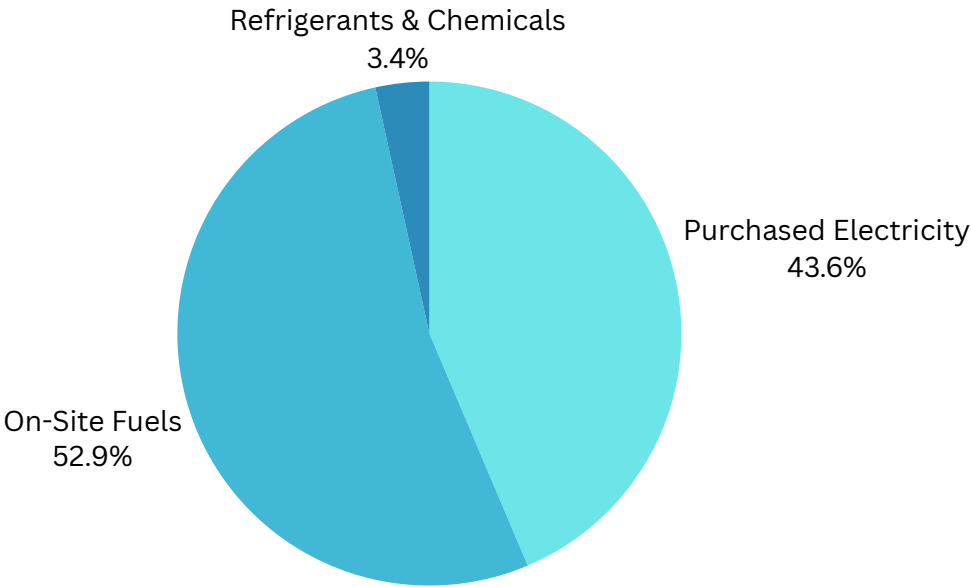
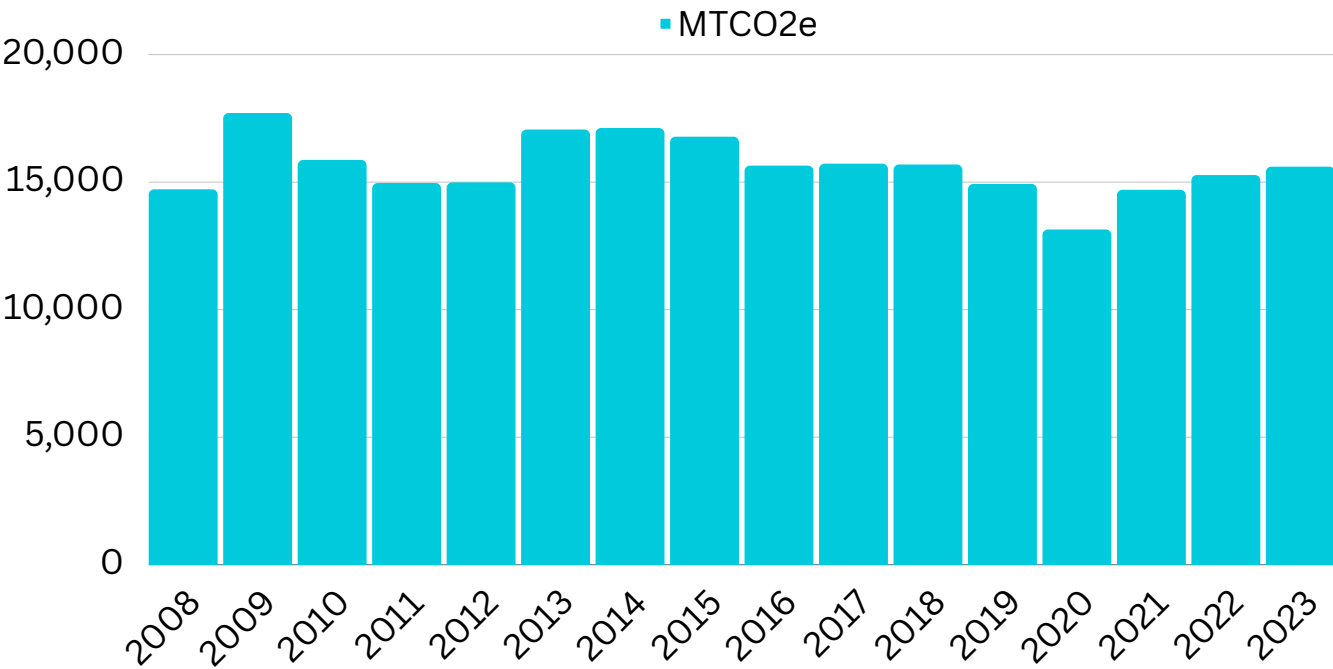
The annual E-waste drive was jointly hosted by Office of Sustainability and the Green Team. This event collects unwanted electronics from students, staff and faculty across campus. The recycling vendor selected responsibly sorts, repurposes and recycles the electronics collected.



Pre-consumer (from the kitchen) food waste from all dining locations and post-consumer (from the dining hall) food waste from Morgan Dining Hall are collected and made into animal feed. An estimated 5,000 lbs of food waste are diverted from the landfill each week during the academic year.

Greenhouse Gases

WPI tracks its greenhouse gas emissions using SIMAP, a software package that calculates based on electricity, gas, fuel, refrigerants, and other factors. These results were also submitted to Second Nature in support of WPI’s Carbon Commitment. Currently only Scope 1 and 2 emissions are accounted for, primarily because Scope 3 emissions are significantly more difficult to track (although implementation of Scope 3 tracking is ongoing). WPI produced approximately 15,600 metric tons of CO₂ in FY23. With the exception of the years influenced effects of the pandemic, this value is similar to previous years. The value provides a baseline against which we can compare future reductions in association with our Climate Action Plan.



Food

WPI partners with Chartwells to provide food and dining services to the WPI community. Chartwells has become involved in multiple initiatives to increase sustainability. Here are some examples:

Project Zero Waste

The WPI Green Team in collaboration with Chartwells this past year ran Project Zero Waste, an effort to measure the food waste generated at Morgan Dining Hall in hopes of discovering why food was being wasted and how to reduce that waste.



Community Garden

The WPI Green Team has partnered with the Office of Diversity, Inclusion, and Multicultural Education (ODIME) and worked with the Office of Sustainability to construct a community garden at ODIME's Collegiate Religious Center. Housed in a greenhouse and operated by the Green Team and a collection of volunteers, it will provide healthy food and a relaxing space to the campus community.

Green 2 Go

WPI offers a sustainable solution to takeout in the form of Green 2 Go containers, reusable takeout containers that can be used at the dining halls across campus. Once used, they can be given back to the kitchen to be cleaned and returned for future use, massively reducing plastic waste.



Community-Supported Agriculture with Stillman's Farm

Chartwells partners with Stillman's Farm in Braintree, MA to offer a CSA program to WPI staff, allowing them to purchase fresh produce directly from the farm to promote healthy, sustainable eating. Members can pick up bags of fresh produce from the farm weekly, distributed on campus by Chartwells staff and student volunteers.

Transportation

WPI offers several transport options for students to reduce dependence on motor vehicles, including shuttles and zipcars, as well as EV charging stations. Updates include the student-led Gompei's Gears Bikeshare initiative and the EV Charger upgrades.

Gompei's Gears

The newly refurbished Gompei's Gears Bike Share program launched on campus this year, featuring an all-new fleet of bikes, new bike stations, and more. The initiative is described further under community projects. Students can rent out bikes for free for up to 12 hours and return it to any bike station on campus. To learn more or register, visit [this page](#).



EV Chargers

WPI provides electric vehicle (EV) charging to its community members at no charge. There are 10 dual-chargers for students, faculty and staff to charge via a ChargePoint account. In the past year we have been doing ongoing maintenance on the chargers to ensure all stations are available for daily use. To sign up and use the EV chargers on campus, [download the ChargePoint app](#). Updates to the EV charging policies can be found on our website. Reach out to green@wpi.edu to be added to the EV users mailing list!

Shuttles

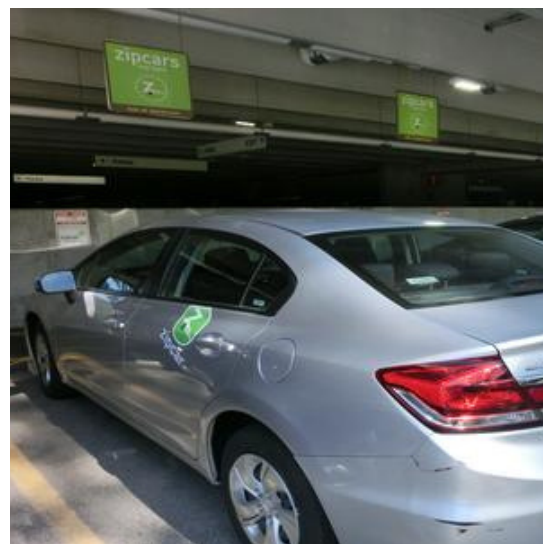
WPI provides students with several shuttle options to get to and from campus. The SNAP shuttle provides service in the evening and early morning to ensure safe travel for students after dark. There is also a daytime shuttle that has “On Demand” stops to help students get from the main campus to our satellite locations, as well as to a few areas of interest in Worcester. These shuttles reduce the number of cars on the road and save fuel in addition to increasing the safety of the community.



For more information on shuttle services at WPI, [visit the web site here](#).

Zipcars

WPI partners with Zipcars to offer a car rental service to its students, faculty and staff, and alumni. With the app you can rent a car by the hour and return it to the same location when finished, reducing the number of vehicles necessary to transport its population. This program reduces the number of cars required for the transportation needs of the WPI community, saving fuel and materials.





**\$25M+ awarded
on sustainability-
related research**



WPI conducts research in a variety of topics across numerous labs on campus, with topics ranging from improved global STEM education programs to secure embedded systems. Tens to hundreds of millions of dollars are awarded in grants every year, going to hundreds of different projects. And a good portion of these touch on the many aspects of sustainability. More than \$25M was awarded to sustainability-related research this year, including labs in the Global and Business Schools alongside the School of Engineering. This section contains examples of that research and related events.

REDI Annual Symposium

WPI's Research, Discovery, and Innovation (REDI) Annual Symposium was held on May 15th and 16th 2023. The program included two panels on WPIs emerging and existing startups and more established companies. It also included a poster session and lightning talks on topics involving the future of work, health, clean water, sustainable supply chains, climate resilience, sensors and robotics for sustainability, global initiatives, and others. Read more about it [here](#).

Driving the Future Event in Washington, DC

This year representatives from WPI attended a climate focused event on February 8, 2023 in Washington DC focused on WPI's role in creating sustainable technologies. Senator Edward Markey and Congressman Jim McGovern among others met with several WPI faculty including professors Danielle Cote and Micheal Timko as well as interim president Wole Soboyejo and President-Elect Grace Wang. The discussion covered topics such as clean energy, self-healing concrete, and battery upcycling among others. Read more about it [here](#).

A Few Research Projects

WPI has a wide variety of sustainability-related research. A few examples of this research are included for the purposes of this report. Others may be found throughout WPI's research web pages.



Wildfire Modeling

WPI researchers Albert Simeoni and James Urban have received \$514,981 in funding from the California Department of Forestry and Fire Protection to develop new models of how wildfires spread, particularly from wilderness areas to communities. A measure of factors in both rural and developed areas will be taken into account, and the project will ultimately enable fire protection engineers to better design homes and landscapes to reduce the risk of and damage from fires.

SDGS:

9 - Industry, Infrastructure, and Innovation

11 - Sustainable Cities and Communities

15 - Life on Land

Improved Li-ion Battery Electrodes

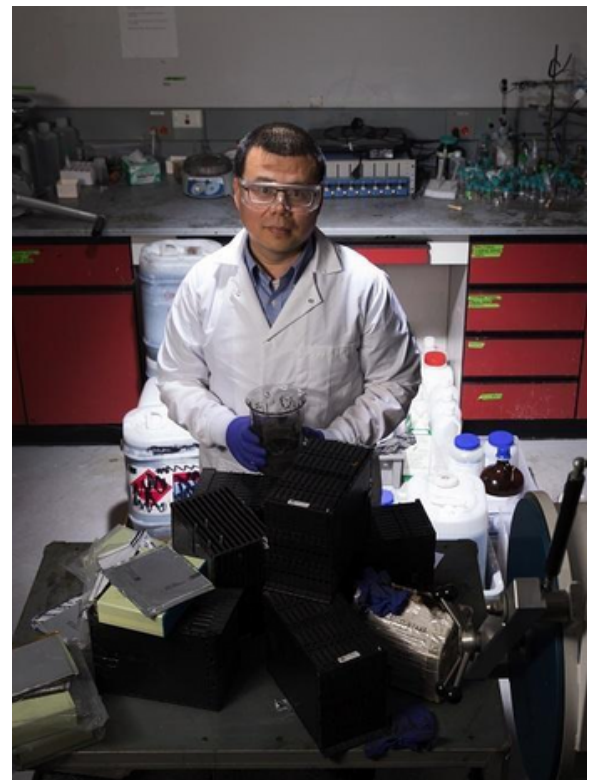
A team of WPI researchers led by Professor Yan Wang have developed a novel process to develop electrodes for lithium-ion batteries. Intended primarily for use in electric vehicles, the electrodes were observed to reach 78% charge capacity within 20 minutes, cost 15% less and use 47% less energy to manufacture than existing batteries, all without using any solvents (which are typically expensive, toxic, and/or flammable). Funding came from the US Department of Energy, United States Advanced Battery Consortium LLC, and the Massachusetts Clean Energy Center.

SDGS:

7 - Affordable and Clean Energy

9 - Industry, Infrastructure, and Innovation

12 - Responsible Consumption and Production



A Few Research Projects (continued)

Caribbean Climate Adaptation Network

The Global School has been awarded \$675,000 for a five-year project to create a Caribbean Climate Adaptation Network, focusing on alleviating social, environmental, and economic issues created or worsened by the effects of climate change in the Caribbean. Sponsored by the Climate Adaptation Partnerships program at NOAA, it will ultimately be a \$6 million endeavor involving research groups in the continental US, Puerto Rico, the US Virgin Islands, and other locations. Dean of The Global School Mimi Sheller, Professor Sarah Strauss, Professor Seth Tuler, Professor John-Micheal Davis, and Professor Emeritus John Jiusto are all researchers involved in the project.



SDGS:
1 - No Poverty
13 - Climate Action
17 - Partnerships for the Goals



Farm Soil Moisture Drone

A team of researchers led by professor Seyed Zekavat are conducting a project that uses ground-penetrating radar, artificial intelligence, and drones to map soil moisture levels as well as creating 3D maps to help farmers better understand monitor moisture in their fields. Ideally this will help farmers to irrigate their fields as efficiently as possible, helping ease critical water shortages that are mounting amongst a wave of droughts in recent years. Beginning in October 2022, the project has attracted \$1,172,896 in grants, currently working towards field tests at farms in Michigan (in collaboration with Michigan Technological University and Michigan Tech Research Institute).

SDGS:
2 - Zero Hunger
6 - Clean Water and Sanitation

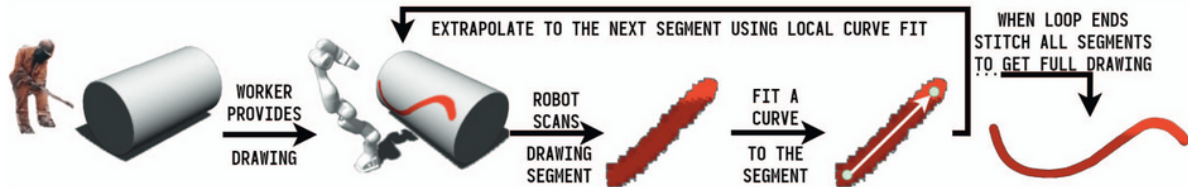
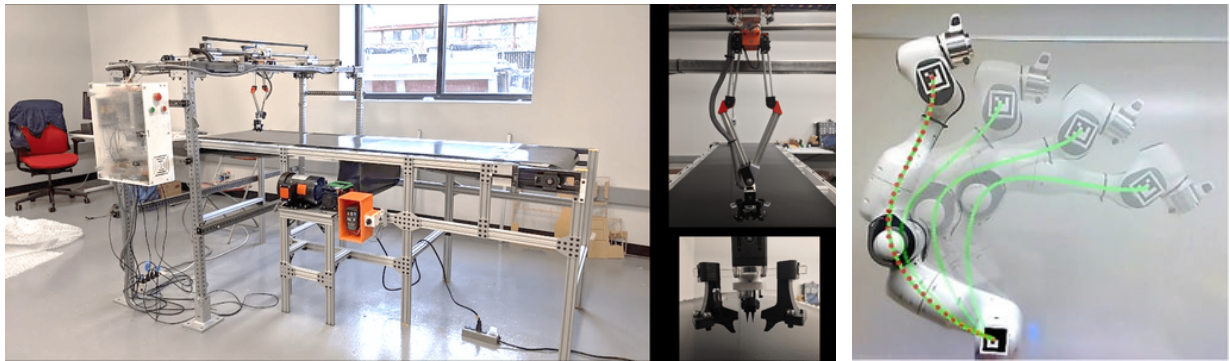
Research Centers and Laboratories

Two research laboratories/centers promoting innovation in sustainability are included below. Others laboratories and centers may be found [here](#).



MER Lab

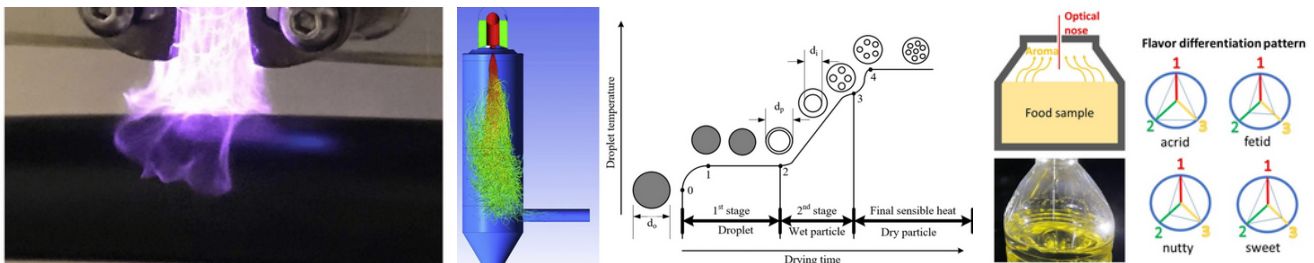
The Manipulation and Environmental Robotics Laboratory (MER lab) is a research center run by Professor Berk Calli that focuses on the sustainability applications of advanced robotic manipulators. The lab's projects include robotic scrap cutting, automated waste sorting, and technologies that will aid those projects such as dextrous in-hand manipulation.



CARD



The Center for Advanced Research in Drying (CARD) is a joint research center operated alongside the University of Illinois. It focuses on novel, energy-efficient methods for drying materials including textiles, agricultural products, and chemicals. Current projects include plasma drying of semi-moist materials, dehydration of slurry fluids using ultrasonic waves, and drying process quality monitoring via machine learning.



COMMUNITY ENGAGEMENT



A number of sustainability initiatives and events have taken place over the past year. From initiatives led by student clubs to events put on by academic departments and offices, there is no shortage of sustainability activities on WPI's campus. This section lists sustainability-focused clubs, along with the community projects and events that were held over the last year.



Sustainable Clubs and Organizations

WPI has many active clubs on campus, and a large number of them can be related to one or more UN Sustainable Development Goals. The clubs below either have a primary purpose in line with one of these goals, or includes these goals in its activities.

- Green Team
- Engineers Without Borders
- Habitat for Humanity
- Food Recovery Network
- American Academy of Environmental Engineers and Scientists
- Greenhouse and Horticulture Club
- Dough Club
- Enactus
- Exploradreams
- Outing Club
- Society of Women Engineers
- American Cancer Society
- Active Minds
- The Alliance

Check out our [Get Involved flipbook](#) for an overview and contact information for each club!

Community Projects

Gompei's Gears Bike Share

The WPI bike share program, named Gompei's Gears, began as an IQP in 2015 and launched initially in the 2016-2017 academic year. It provides a free ride-and-return system for renting bikes to WPI students, faculty/staff, and alumni, in order to ease transportation in the vicinity of WPI in an eco-friendly way. The program is currently run by the Green Team with support from the Office of Sustainability, and has recently undergone sweeping upgrades. New, more resilient bikes, a new app, a new management structure, and more will be unveiled this coming A-term.

Register for the program [here](#).

Community Garden

Another Green Team project currently underway is the upcoming community garden on the lawn of the Community Religious Center (CRC). Also run by the Green Team, the garden will consist of a greenhouse filled with a variety of edible plants to help improve community health and fight food insecurity.



Dough Club Food Pantry

This year on April 19th, 2023, the WPI DoughClub opened a community food pantry on campus, aimed at providing food insecure members of the WPI community with the nutrition that they need. Located on the first floor of the Innovation Studio, the pantry provides no-questions-asked food assistance to all community members, in the form of shelf-stable, nonperishable items. DoughClub hopes that this will eliminate any trace of food insecurity on campus, easing the burden in an intense university environment.

Events

Climate Fair 2023

This year the WPI Green Team and Office of Sustainability partnered with a number of other groups and offices to co-host the second annual Climate Fair, an event, where a number of WPI's sustainability-aligned organizations can show off their accomplishments and attract the attention of interested students. This year's event featured a speech by Professor Joseph Cullon and had participants ranging from Engineers Without Borders to the Gordon Library and the Society of Asian Scientists and Engineers.



Free Thrift Store

A series of four events, one for each term, the Green Team's Free Thrift Store made its return this year. Set up as a way for students to exchange clothing directly to reduce harmful consumerism, students donate unwanted clothes in a red bin in the Community Center over a series of several days before the clothing is placed out on tables in a large room for the taking. The leftover items were all donated to a charitable cause, different each quarter, including Abby's House and Gompei's Closet. Financial donations were also encouraged for causes such as the Turkish Student Association for earthquake relief in Turkiye.



Events

Careers for Sustainable and Just Communities

Another returning annual event this year was the Careers for Sustainable and Just Communities. A collaboration between the Global School, Green Team, Career Development Center, and Office of Sustainability, the gathering consisted of more than 30 companies and nonprofits dedicated to sustainability-aligned causes. Intended to provide opportunities for students to find careers in fields not traditionally present at larger career fair events, representatives came from as near as Worcester itself and as far away as Uganda.



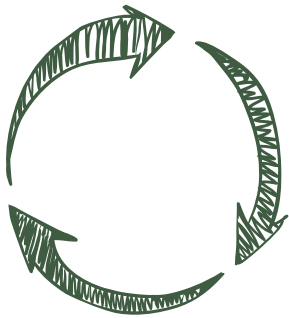
Global School Forum

The Global School Forum is hosted by the Global School, and was a series of keynote speakers and discussions centered around specific topics related to the UN's Sustainability Development Goals. The following events were held:

- **Saving Humanity:** Radical Confidence for a Positive Future, A Sustainable Development Talk with Rob Watson
- **Energy and Climate Change:** Lessons Shared from Aotearoa-New Zealand
- **Open Education, Global Learning and Social Justice** with Dr. Glenda Cox
- **The First Malaria Vaccine** Has Been Approved! What's next? With Ann M Moormann

The Sustainability Innovation Challenge

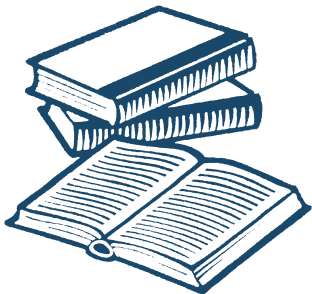
This year over A-B break WPI hosted the Sustainability Innovation Challenge, a competition to pitch ideas for programs and startups that could help improve the environmental impact of WPI. Several contestants entered, pitching ideas that ranged from the installation of novel wind power systems to improved ways for students to exchange unneeded items and prevent unnecessary purchases/waste. This year's winners are detailed below:



Project Revolve

Contestants: Sol Giesso, Can Guven, Efthymios Marios Loudekas, Henrique Checcuci Bahia dos Santos

Designed to reduce the large amounts of waste from dorm-specific furniture discarded by rising freshman and ease costs for incoming freshman, Project Revolve envisions a yearly market where such items can find their way into the hands of the incoming class.



Universal Education Initiative

Contestants: Cesar Guillen

A venture seeking to produce educational media that can empower vulnerable communities around the world, particularly in Venezuela, the project has taken the shape of a student-run nonprofit (talk to people about it)



Anaerobic Food Digestor

Contestants: Madison Morales, Nina Devries

A machine that can convert food scraps into energy by way of biogas, it has the potential to reduce food waste and create clean energy in a single solution.

Conclusion

WPI has made significant progress towards its sustainability goals this year, and continually seeks new methods of improvement to ensure an environmentally conscious future for the university. Through new campus infrastructure and community, WPI has continually decreased its resource consumption per FTE, a trend that has continued in the 22-23 school year. There are also many initiatives and progress that have not been detailed in this report; nevertheless, the intent is to provide comprehensive overview of the steps that have been taken over the academic year. WPI remains committed to sustainability in all its forms, and is prepared to face the challenges necessary in order to realize this commitment.

An aerial photograph of the WPI campus, showing various buildings, green spaces, and a central courtyard. The image is used as a background for the Acknowledgements section.

Acknowledgements

This report was made possible with the contributions of numerous WPI community members. Primary contributors were Office of Sustainability members Paul Mathisen (Director of Sustainability) and Nicole Luiz (Energy and Sustainability Manager).

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