



BROWN



EIGHTH ANNUAL SUSTAINABILITY PROGRESS REPORT



Office of Sustainable Energy & Environmental Initiatives,
Facilities Management

Prepared by the Energy & Environmental Team

Fall 2015

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I. Executive Summary

This past year has proven to be a dynamic and accomplished year for the Sustainability Office. The Office has continued to work with the Sustainability Strategic Planning and Advisory Committee (SSPAC) to advance metrics collection, tracking, and standardization in order to facilitate future development of sustainability goals across operational areas including dining, transportation, energy, water, and waste diversion.

While Greenhouse Gas (GHG) emission reduction, through energy efficiency programs, continues to be our flagship sustainability program, there have been challenges in the past year; we had the coldest winter on record resulting in increased heating energy demand, although conservation efforts allowed Brown to actually decrease its energy use from the previous fiscal year by 2%. The cold winter played a significant role in this increase, primarily because the New England electricity grid utilized more carbon intensive fuels due to a shortage of natural gas pipeline infrastructure in the region, thereby increasing the CO₂ emissions per kilowatt-hour by 13%. That said, our GHG emissions increased from the previous year by more than 3200 metric tons, leaving us at 22% below 2007 levels as compared to our interim target of 28%. However, we are progressing towards reaching our goal of a 42% reduction in GHG emissions by 2020 from our 2007 baseline as indicated by our ability to grow while still reducing overall energy consumption – while New England electricity grid continues to invest in cleaner and renewable energy sources and Brown continues to invest in energy efficiency.

Since inception of our GHG reduction plan, we have added new systems and equipment whose energy consumption is equivalent to 6,400 Metric Tons of Carbon Dioxide Equivalents (MTCDE), 9% of our 2007 baseline emissions. These systems and equipment will continue to grow as the campus meets its research, teaching, and quality of life missions. Since 2008, we have already invested approximately \$24 million for a net investment of \$20 million after accounting for \$4 million in energy efficiency incentives. This has reduced our carbon footprint by almost 14,500 MTCDE, which is on track to meet our original energy efficiency plan. Although opportunities for reductions continue to become harder to find, we continue to invest in innovative technologies and systems to help achieve our 42% goal.

Beyond energy use, we have begun to gather baseline data this year, particularly in waste diversion, water conservation and management, and food systems that will lend to setting specific institutional goals in the near future. Lastly, we have reorganized our office to better support a more comprehensive campus-wide sustainability plan and better serve student and academic programs that engage the campus as a living lab. Our staff includes two energy engineers, a student engagement coordinator, and a sustainability manager dedicated to supporting and implementing the SSPAC recommendations. Brown University continues to expand and evolve its sustainability efforts, building on past success and integrating its goals within a growing network of trained and engaged members of the Brown community. For example, over the past year the Office of Sustainable Energy and Environmental Initiatives (E&E) has partnered with the Providence community and various Brown departments to spearhead two highly successful compost pilots in preparation for a campus-wide compost program. Also, Commencement 2015 was the first to feature a plastic water bottle free event that successfully hydrated over 10,000 participants.

The E&E Office is proud to share this report with our partners and friends throughout the Brown University community and our peer institutions.

II. SSPAC Overview and Movement in FY 2015

SSPAC

In March 2011, a group of undergraduates presented to the Brown University Community Council to encourage the creation of a Sustainability Strategic Plan. In response, the Sustainability Strategic Planning and Advisory Committee (SSPAC) was created in fall 2012.

SSPAC was then charged by the Provost and the President to create a draft proposal for a Sustainability Strategic Plan for the university. The Sustainability Strategic Plan will seek to decrease the university's environmental impacts, promote community engagement, and inspire innovation and excellence.

In November 2013, the Energy & Environmental Initiatives Office convened four SSPAC Working Groups: Food, Energy & Water, Transportation, and Waste & Recycling. Members of each working group were carefully selected based on his or her expertise in the group's specific focus issue. Each group includes faculty, students, staff, and administrators. Teams convene monthly for facilitated meetings with specific, measured outcomes. Each working group uses a framework of six criteria—academic integration, community inclusion, persona impact, metrics, communication, and structure & accountability—to develop high-level goals and projects based on research into best practices.

Each working group has created several high-level goals. These include designing campus-wide awareness events to promote sustainable behaviors, developing a holistic approach to resource management for consumable and durable goods, formalizing food studies as an academic discipline, reducing Brown's storm water impact and energy consumption, expanding the "Complete Street" program, and decreasing Brown's transportation-based carbon footprint.

SSPAC Working Groups (2014-2015)

Waste & Recycling

Jessica Berry | Office of Energy & Environment
Henry Huppert | Environmental Health & Safety
Donna Butler | Facilities Management
Will Battersby | Event Operations
Courtney Wuethrich | Purchasing
Haily Tran | Undergraduate
Jane Jacoby | Undergraduate
Harry Neurt | Undergraduate

Food

Margaret Klawunn | Campus Life & Student Services
Richard Bova | Campus Life & Student Services
Peter Rossi | Dining Services
Dawn King | Environmental Studies
Pat Vetere | Facilities Management
Nicholas Mol | Facilities Management
Isabelle Aubrun | Undergraduate

Energy & Water

Chris Powell | Office of Energy & Environment
Mike McCormick | Planning Design & Construction
Adam McGovern | Bio Med Facilities Planning & Operations
Chris Bull | School of Engineering
Ravi Pendse | CIS
Jeff Baum | Undergraduate
Sam Lee | Undergraduate

Transportation

Beth Gentry | Transportation
Cathy Lutz | Anthropology
Melissa Meo | Purchasing
Kurt Teichert | Environmental Studies
Emily Koo | City of Providence
Alan Harlam | Swearer Center
Arielle Johnson | Undergraduate, Bikes@Brown
Leah Haykin | Undergraduate, Bikes@Brown

III. Brown University Sustainability Timeline

Spring 2006: Energy and Environmental Advisory Committee formed

Jan 2008: Greenhouse Gas goals accepted by President Simmons

March 2012: Student SSPAC proposal to BUCC

Fall 2012: SSPAC Convened by past Provost

Jan 2013: Building for Environmental Research and Teaching opens for classes

Nov 2013: Phase one of SSPAC convenes

Dec 2013: Brown Convenes Environmental Task Force

April 2014: Institute for Environment and Society is launched

Nov 2014: SSPAC working groups prioritize initiatives

Nov 2014: Brown students attend the UN Climate Talks in Lima, Peru

Jan 2015: Compost pilots begin at two dining facilities

April 2015: Brown facilitates Providence Sustainability Roundtable

May 2015: First Sustainable Commencement

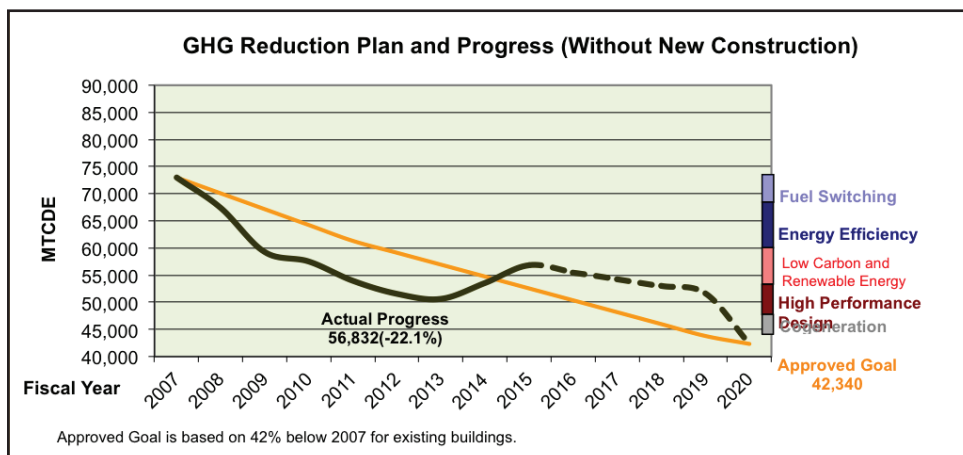
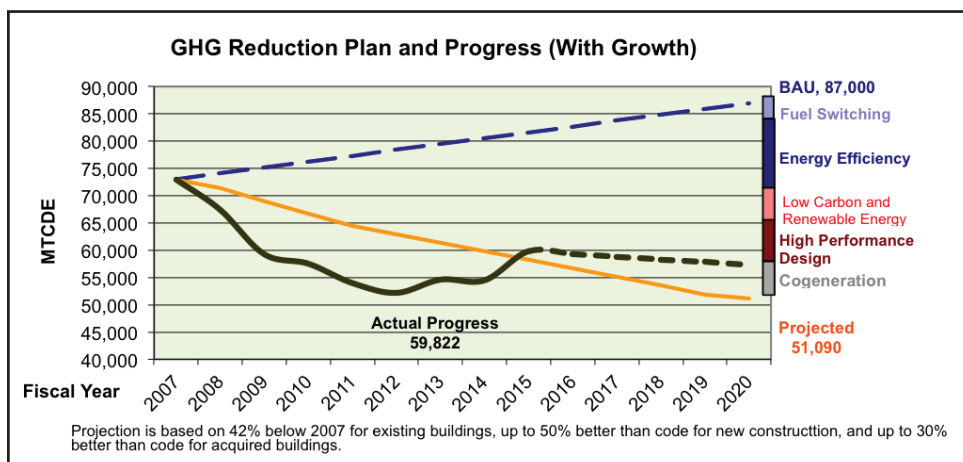


IV. Facilities Management

The Department of Facilities Management is responsible for ensuring that the planning, design, construction, operation, and maintenance of all University facilities and grounds support the academic, research, and administrative functions of the University, while balancing financial and technical constraints with aesthetic and historical concerns. In Providence the University owns and maintains 241 buildings, totaling approximately 6,900,000 gross square feet. The mission of Facilities Management is to support the University by enhancing the quality of physical facilities. Facilities does this through planning, designing, engineering, constructing, and maintaining in a responsive, service-oriented, effective, and environmentally-conscious manner.

A. Energy

i. Greenhouse Gas Goals



KEY:
MTCDE = Metric Tons of Carbon Dioxide Equivalent
BAU = Business as Usual
"With Growth" = Newly constructed buildings post 2007
The yellow line represents the projected level of carbon dioxide (CO₂) emissions reduced over time through the strategies listed on the right side of the chart and described in the report below.
The dark blue line indicates the level of CO₂ emissions that would be released if greenhouse reduction goals were not implemented.
The green line indicates the actual decrease in CO₂ emissions since implementing the strategies listed on the right hand side of the chart and described in the report on the page 2.

IV. Facilities Management... Energy

ii. Energy Efficiency Program

The energy efficiency investments in existing buildings are being achieved by:

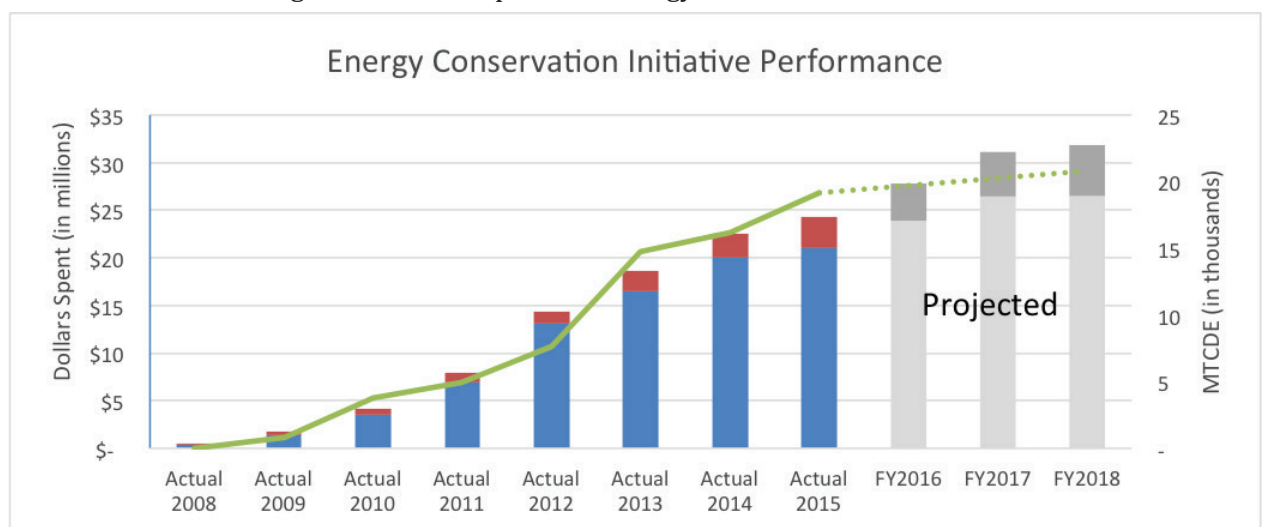
1. Steam System Condensate: Over 1,400 steam traps throughout campus buildings were replaced along with other improvements to increase the efficiency of the overall heating systems and improve system performance.

2. Lighting and Lighting Controls: A total of 93 buildings were upgraded between 2009 and 2014 with implementation costs of approximately \$3 million and an estimated annual savings of \$609,000 for an average payback of 5 years and an internal rate of return of 20 percent. We are currently beginning a new lighting initiative to convert campus lighting systems to LED systems with advanced controls.

3. Retro-Commissioning (RCx) for Existing Buildings: This program evaluates facilities both from an operational and system design perspective, identifying efficiency opportunities through improving how existing systems are operated and/or through replacement of existing systems or equipment. A majority of our buildings have completed this phase.

4. Brown Ongoing Commissioning (BOCx): As part of its ongoing and continuous building commissioning program, Brown deployed “SkySpark” software to test its ability to identify wasteful and/or unknown energy practices during normal building operation. The software downloads data from Brown’s existing controls systems and uses the data to determine if buildings are using energy effectively. In addition, we created a process to engage operations staff to minimize repeat “Sparks.” We have completed implementing this process on over 20 of our largest energy consuming buildings and are now working to expand as many as an additional 50 buildings.

5. Heat Recovery Systems: Developed and implemented our first heat recovery chiller system at MacMillan Hall. A heat recovery system takes the waste heat from an air conditioning system and recycles it for use in heating. This system is ideal when we have a simultaneous need for heating and cooling, as is the case in all of our lab facilities where we need dehumidification. We were able to eliminate two hot-water boilers from MacMillan Hall, reducing our carbon footprint and energy use.



Blue = Net Expenditures

Red = Incentives/Rebates

Green Line = GHG Reductions

IV. Facilities Management... Energy

ii. Brown Unplugged 2015

In its 5th year, this three week, energy savings competition was a huge success. The student-run Brown Unplugged Planning Team hosted a variety of outreach events to encourage energy saving techniques among residents. Weekly LED bulb swaps and dining hall sign-ups achieved commitments. Using [Lucid's Building Dashboard](#), students within residence halls could engage with the competition via user-friendly, real-time updates of building energy usage and trends.

Residents of the winning hall, Metcalf Hall, reduced their energy use by 14.4%, or 219 kWh. Winners were invited to a dinner hosted by President Paxson where ten tickets to Spring Weekend were raffled off to attendees. The entire competition consisted of nineteen residence halls and saved over 16,000 kWh.



**CONGRATS,
METCALF!**

14.4%
ENERGY REDUCTION

**RUNNER-UP:
LITTLEFIELD**
60% REGISTRATION

**BROWN UNPLUGGED
DORM ENERGY COMPETITION**

GO BEARS!
THIS MARCH, WE SAVED

\$2,140
16,468 kWh
17,637
POUNDS OF CO₂

A big thank-you to everyone who participated, and to our winning dorm, Metcalf! Prizes will be distributed in the coming weeks.

**BROWN UNPLUGGED
DORM ENERGY COMPETITION**

Above: Students creating posters for dorms to spread word about the competition with catchy messages.

The posters that advertised the results of the 2015 competition and the sticker passed out to students.

**BROWN UNPLUGGED
DORM ENERGY COMPETITION**

MAR 1 - MAR 21 // REGISTER TODAY
BUILDINGDASHBOARD.NET/BROWN

IV. Facilities Management...

B. Waste & Diversion

In FY 2015, considerable progress has been made toward understanding Brown University's waste stream, a major step in planning for programs that will significantly increase our waste diversion. Brown undertook several waste audits and pilots this year including: a dining waste audit, removal of desk-side waste bins pilot, campus-wide bin and signage assessment, and compost pilots. These initiatives allowed the university to identify gaps and potential options to increase overall campus waste diversion going into FY 2016.

The diversion rate for FY 2015 was **23.2 percent** of total waste, not including construction and demolition. Current diversion rates include a variety of methods such as recycling, donations, composting, and reuse. Brown will continue to work toward improving recycling rates by focusing efforts on bin standardization and communications. However, significant attention will be given to diverting organic waste due to the substantial impact it has on the university's waste stream as well as new Rhode Island State Law requiring organics diversion.

Based on the dining audit, with the implementation of organics diversion at the six main eateries on campus, overall campus waste diversion is expected to increase at least 10 percent. It is also expected, as the pilots revealed, with increased communication concerning organics diversion, recycling rates will increase as diners become more educated on proper waste disposal.

Recycling: Brown's recycling rate is a reflection of total tonnage of recyclables through our waste hauling service, i.e. cardboard, paper, bottles, cans. In FY 2015, Brown University recycled paper, containers and cardboard at a rate of **15.4 percent**.

Organic Diversion: In FY 2015 several organics diversion streams were utilized including composting, food donations, waste oil to biodiesel, and pre-consumer piggery diversion. The following reflect the pounds diverted in FY 2015:

FY 2015 Brown University Organics Diversion (lbs)	
Yard & Leaf Waste to Compost	110,400
Waste Oil to Bio Diesel	44,000
Pig Farm	160,000
Food Waste to Compost	47,000
Food Donations	25,076
TOTAL	386,476

Books: The library system partners with Better World Books to dispense unwanted and unneeded textbooks and other collegiate literature for resale. A portion of the proceeds are donated to charities. Books that cannot be sold are donated to soldiers serving overseas and to school programs.

Solar Powered Trash Compactors: Implemented in 2011, these BigBelly compactors are placed around campus grounds and reduce the gas and labor associated with frequent trash collection.

Special Materials Diversion and Donation: Special materials are waste products that are not recyclable as traditional glass, paper, metal, etc. These wastes include e-waste, batteries, light bulbs, ballasts, computers etc. In FY 2015 Brown properly disposed about **20 tons of special waste** through secure and environmentally preferable methods with a company that is e-Stewards and National Association for Information Destruction (NAID) certified. Additionally, over **12 tons of clothing** were collected and donated throughout the year.

IV. Facilities Management... Waste & Diversion

i. Unused Food Resources

a. Composting

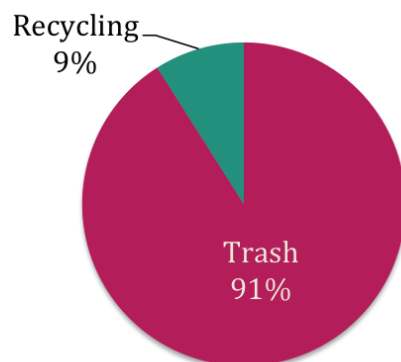
Composting is the process of transforming organic materials such as food waste into a nutrient-rich, natural fertilizer. Composting has many benefits, including enriched soils, reduced contributions to landfills, and decreased release of greenhouse gases into the atmosphere. As such, composting is an essential part of Brown's commitment to sustainability.

Students have shown themselves to be open to composting. In spring 2015, Brown recovered over 23 tons of organic waste in two, 10-17 week composting pilot programs. The diverted organic material was hauled by a local vendor to a local facility about 33 miles away from campus.

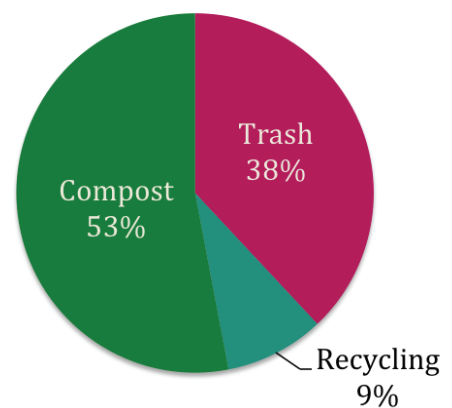
Brown is a leader among Rhode Island institutions in its commitment to comply with the state's 2014 Compost Law. Ideally, the Compost Law will eventually make composting less expensive and more convenient for Brown. The university will begin to plan for its campus-wide composting program in FY 2015, and expects to roll-out the program in late 2016 or early 2017. It is Facilities Management's goal to make this transition easy and accessible for all of Brown's staff, faculty, and students. In the future, all Brown dining facilities, offices and residential halls will divert organic materials.

The environmental impact of a campus-wide composting program will be highly significant. Through composting at just the six main eateries and catering, Brown could reduce its annual landfill-bound waste by 15.5 percent; this translates into about 420 tons of organic material that will become a useful local resource.

Andrews Dining Waste Stream
Without Compost (10 weeks)



Andrews Dining Compost **Pilot**
Waste Stream (10 Weeks)



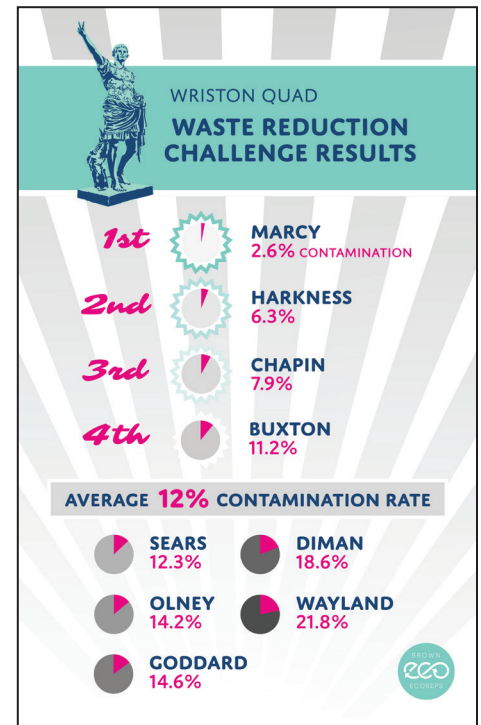
Based on these numbers, in one year, **88,366 lbs** of organic material from Andrews Dining could be composted, resulting in an overall Andrews Dining Hall diversion rate of **62%**.

IV. Facilities Management... Waste & Diversion

iii. Residential Life

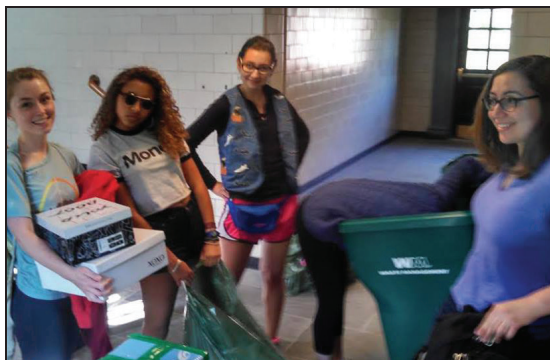
A. Wriston Waste Audit

Each year, student volunteers hold a Trash Sort. Students don HazMat suits and gloves in order to sort through residence hall waste and determine average contamination rates in trash and recyclables. The program assists in determining average recycling rates in residence halls, demonstrates which common items are consistently mis-sorted, and creates an educational spectacle for the student body. The residence halls on Wriston Quad have consistently achieved poor recycling rates from year to year, so students planned a Wriston Quad specific Trash Sort for both semesters during the 2014-2015 school year.



B. Move Out / Clean Break

This year's Clean Break crew collected over 12 tons of clothing and other items for donation to the GoodWill of Rhode Island and the Furniture Bank. This program runs throughout the month of May and relies heavily on the hard work of student volunteers who bag and carry donations every morning to designated pick up locations across campus. Toters are placed at the entrances and in the lobbies of residence halls, and through the collaboration between the Office of Residence Life, Custodial Services, and the volunteers, students have the option of donating their unwanted items rather than throwing them in the trash.



IV. Facilities Management... Waste & Diversion

iv. Events

Brown University holds a variety of large, high-profile events each year that have significant impacts in terms of resource use, waste generation, and public attention. The conscious reduction and diversion of waste at these events has the ability to showcase Brown's commitment to sustainability at the university and as part of the Providence community. The E&E Office partnered with various stakeholders to identify and implement waste reduction and diversion strategies at these events.

A. Game Day Recycling Challenge



The Game Day Recycling Challenge is an annual beginning of the school year event for our sustainability student organizations. This year's selected game was the home game against Harvard. Twenty volunteers worked the tailgate, handing out bags for recyclables and encouraging football guests to sort their waste. Collectively, the 2014 event had a 26% diversion rate with over 1100 pounds of recycling collected from the tailgate.

B. Commencement: Brown Eliminates Sale and Distribution of Plastic Water Bottles

Each May, Brown University confers honorary, graduate, medical, and undergraduate degrees on Commencement day, the culmination of a campus-wide weekend celebration. It is a time of great ceremony, pageantry, and rejoicing, much of it representing traditions that are centuries old. Commencement is open to families, alumni, and the general public and host about 10,000 participants on Sunday's Commencement.

In the past, large events like Commencement have struggled with large volumes of waste coupled with challenging waste management conditions. This year Brown chose to take a proactive approach to waste reduction. While the university has made significant strides in overall campus sustainability including a 92% reduction in plastic water bottles on campus, a 23% waste diversion rate, and a 22.1% reduction in greenhouse gas emissions since 2007, large events such as Commencement have not, in the past, showcased these strides in sustainability.

This year however, the E&E Office, Dining Services, EcoReps, and Event Services worked together with various departments to fully eliminate the sale and distribution of plastic water bottles, and with huge success. Two thousand two hundred reusable, pre-filled and chilled, water bottles were distributed to graduating seniors and alumni. Additionally, three large scale water stations were set-up in the Commencement area to provide patrons the opportunity to refill personal bottles and reduce overall waste footprint.



IV. Facilities Management...

C. New Construction, High Performance Design & Leadership in Energy and Environmental Design (LEED®)

As Brown University constructs, rebuilds or expands its infrastructure, Facilities Management's Design & Construction Office is required to limit greenhouse gas emissions by reducing energy consumption for all newly constructed facilities to at least 25 percent with a goal of 50 percent below the standard required by state code.

New construction will, at a minimum, meet a silver standard in U.S. Green Building Council LEED® certification program. The standards of LEED® certification are silver, gold, and platinum. Categories in which points are earned are sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation and design. Projects at Brown, which have already achieved LEED® or are designed and registered to achieve LEED® certification, can be viewed at the interactive campus map and include:

Achieved Gold:

Rhode Island Hall, 2010
Stephen Robert '62 Campus Center, 2011
Medical Education Building, 2012
Perry and Marty Granoff Center for the Creative Arts, 2012
315 Thayer Street, 2013
Miller and Metcalf Residence Hall, 2014
Nelson Fitness Center, 2014
85 Waterman Street, 2014]



Achieved Silver:

Sidney E. Frank Hall for Life Sciences, 2009
Metcalf Complex, 2013

Designed to Gold:

School of Engineering (design development)
Division of Applied Math (under construction)
South Street Landing (design development)

WATER FEATURES

Rainwater Collection and Reuse System: This 6,500 gallon tank collects and retains precipitation from the roof to be used in toilets in the building that are all 35% more efficient. This reduces demand for potable water by at least 68% and this will increase during rainy periods.

Rain Garden: By creating the rain garden at 85 Waterman, stormwater runoff is expected to be reduced by 39%. Stormwater harvesting and vegetated strips will remove approximately 91% of total suspended solids from stormwater runoff.

IV. Facilities Management...

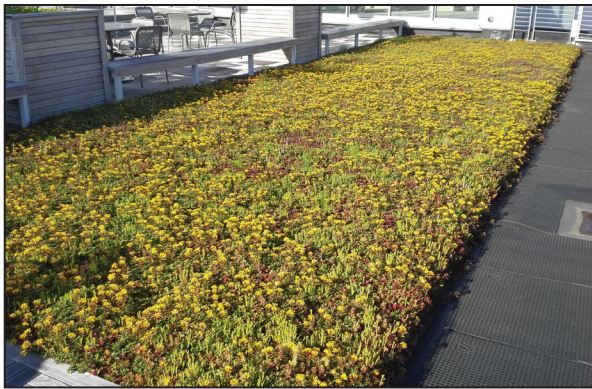
D. Custodial and Grounds

i. Grounds Division

Brown University Grounds Division manages over 113 acres of open space, parking lots, landscaped spaces, and athletic facilities. Grounds is committed to maintain the highest standards of aesthetic and healthy landscapes. In FY 2015, 85 percent of the fertilizers used were 100 percent organic, representing a 10 percent increase in organic fertilizers since 2012.

In FY 2014, the Grounds Office launched the Keep Brown Clean initiative, aimed at educating students and staff about cleaning up and taking ownership of communal campus spaces, and this program has proven to be highly successful in its second year.

The Grounds Division has been a key player in collaborating with the E&E Office to: improve large event clean-ups to increase and encourage appropriate waste diversion and disposal; track and measure Brown's Nitrogen Footprint; and participate in the Sustainability Strategic Planning Advisory Committee.



To the left:
Green spaces
on campus
maintained by
the Grounds
Division: Green
Roof on 222
Richmond and
plantings at
Brown
Stadium.

To the right:
Grounds
division
maintaining
trees around
campus
buildilngs in
the Jewelry
District.



IV. Facilities Management... Custodial & Grounds

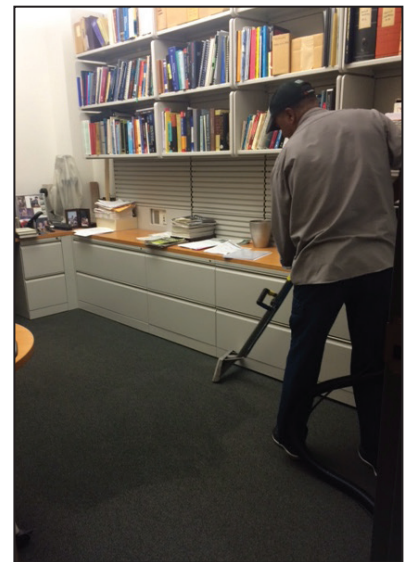
i. Custodial Office

Brown University began using green cleaning products in 2004, when they reached out to local vendors to replace current cleaning agents to more environmentally friendly alternatives.

Research and testing led to the purchasing of “green seal approved” chemicals, microfiber applications, non-acid bathroom products, and products containing hydrogen peroxide.

Brown is committed to keeping abreast of green, sustainable products that do a superior job of cleaning surfaces and removing or neutralizing infectious bacteria. Each product considered for use must meet the dual challenge of being an effective agent with no additional labor required and no damage to cherished historic surfaces. Products are rigorously tested prior to deploying them across campus. If the product passes the testing phase, it becomes a part of our green cleaning arsenal.

Custodians are essential in campus sustainability efforts due to their recycling knowledge and dedication to helping student initiatives, including but not limited to Green Events and Clean Break.



Custodians using “green seal approved” cleaning products across campus.

V. Student Groups and Initiatives

Brown University fosters a large and varied student, environmental community. From campus gardens, bike share programs, conferences, energy initiatives and more, Brown students drive our momentum and success.

A. [EmPOWER](#) is Brown's student environmental umbrella organization. emPOWER's common meeting time and collaborative structure create a strong sense of community among member groups that address a wide variety of sustainability issues. The following student groups are included under emPOWER:



i. [Bikes@Brown](#) strives to facilitate and encourage bike usage on Brown's campus and throughout the Ocean State. The organization runs a free, full-service bicycle repair and rental shop in the basement of the Stephen Robert '62 Campus Center. Bikes@Brown also seeks to cultivate a cycling culture on campus by organizing bike rides, promoting bike safety, and volunteering at Recycle-a-Bike, a local nonprofit bike shop.

ii. In [Climate Action League](#) (formerly BCAF), students think of and lead projects and research to reduce Brown University's resource use and carbon footprint. Past projects include residence hall low-flow showerhead retrofits, photovoltaic solar array additions, Thayer Street recycling bins, waste station signage for Andrews Dining, partnership with the J.T. Owens Park green infrastructure outreach project, and community outreach on rising electricity prices in Rhode Island.



iii. [EcoReps](#) work with the department of Facilities Management to help foster a campus culture that embraces environmental conservation and sustainable resource management. EcoReps are passionate, environmentally-minded individuals who work to raise environmental awareness within the Brown community. In addition to encouraging sustainability in day-to-day life, EcoReps plan many popular annual events, such as GameDay Recycling, Brown Unplugged, America Recycles Day, Earth Week, and Clean Break.

iv. [Fossil Free Brown](#) (formerly Brown Divest Coal) is a campaign that is demanding Brown to divest from 200 companies with the greatest fossil fuel reserves. Since the group's conception in 2012, the Brown community has shown strong support for divestment. Although the Brown Corporation voted against divestment in October 2013, Fossil Free continues to push the University to commit to more socially responsible investment practices.



V. Student Groups and Initiatives...

v. Green Events, a student-driven initiative to promote and facilitate sustainable event planning at Brown, started as a final project for an environmental stewardship class in Spring 2012. In 2013-2014, Green Event was requested for over 50 events, from which 800 pounds of compost was collected. Green Event Certification provides a simple framework for reducing waste, lowering our carbon footprint, supporting local businesses, and educating consumers.



vi. The Healthy Housing Hub (HHH) aims to align the resources of Brown University, local nonprofits, and community members to address energy efficiency, sustainable living, and primary environmental health concerns in order to improve the state of healthy housing in Rhode Island. Currently, the HHH coordinates the Green and Healthy Homes Summer Research Institute and maintains a "healthy housing database" that is accessible to the public.

vii. Rhode Island Student Climate Coalition (RISCC) is a political action group and statewide alliance of students and youth working toward a clean, safe, and just future for all. Some of RISCC's projects include helping to pass the 2014 Resilient Rhode Island Act, transporting 400 Rhode Islanders to the People's Climate March in New York City, and opposing the construction of fossil fuel infrastructure within the state.



Brown University



Compost Here

viii. SCRAP, Brown's Student Composting Initiative, is working toward creating a zero-waste food cycle and making composting easily accessible at Brown University. Its mission is to expand composting awareness and practice through an improved campus-wide composting system. SCRAP has gained recognition on campus over the years by distributing its "famous" composting buckets to Brown community members. These bins can be emptied at two different campus locations.

ix. The Sustainable Food Initiative (SuFI) is a student group working with Brown and its surrounding community to provide local, organic food options. It does this by managing an on-campus, student-run garden and organizing food-related workshops. SuFI serves as an umbrella organization for Brown's many sustainable food groups, such as Market Shares, the Brown Vegetarian Society, the Student/Farmworker Alliance, Food Recovery Network, and Challah for Hunger.



V. Student Groups and Initiatives...

B. In addition to emPOWER, the following student initiatives had a strong campus presence in FY 2015.



i. The Brown Market Shares program is a student-run, campus-based food distribution program. Due to its low cost, Market Shares is highly accessible to all members of the Brown community. Inspired by the Community Supported Agriculture (CSA) model, the program partners with regional farmers to bring fresh, local, and sustainable produce, bread, eggs, dairy, and meat to the university community. The program is supported almost entirely by volunteers and is directed by a six person coordinating team.

ii. West House and North House are Brown's Environmental Program Houses. The houses are open to visitors every Friday for Open Dinner Night at 6:30 pm. All food prepared in the houses is vegetarian or vegan; and they strive to purchase local, seasonal produce. Each resident has a house job, such as coordinating environmental initiatives or managing the backyard compost system. Both houses present the opportunity to live with others who also care deeply about environmentalism.



iii. Outdoor Leadership Environmental Education Project (OLEEP) is an environmental mentoring program for Metropolitan Regional Career and Technical Center (Met) high school students that is run through the Swearer Center. Brown volunteers engage with Met students through one-on-one mentoring relationships, weekly educational environmental science workshops, and camping and backpacking trips. OLEEP strives to foster individual environmental awareness, experiential science education, personal challenge, and leadership skills in Brown and Met students as they learn from each other.

iv. Rainwater for Humanity (R4H) is a collaborative social enterprise initiated by Brown students in partnership with local organizations in Kerala, India. To address the potable water crisis in the region, R4H has financed the construction of 60 rainwater harvesting tanks under a sustainable pay-per-use water



vending model and trains rural women to manage each structure. These tanks supply 120 families with affordable, accessible water throughout the dry season, safeguarding community health and increasing household savings.

v. A Better World by Design (BWxD) is an annual student-organized collaboration between Brown and the Rhode Island School of Design that brings innovators from across the globe to Providence to bridge disciplines for a common goal: building a better world. Presenters share engaging stories, workshops teach creative skills, and discussions re-frame perspectives. BWxD is an immersive experience that deepens our understanding of the power of design and technology to engage communities and sustain the environment.



V. Student Groups and Initiatives ...

C. Student Initiative Spotlight: Food Recovery Network



In the United States, 40 percent of food goes uneaten - equivalent to about 20 pounds of uneaten food per person per month. Yet, one in six Americans are food insecure and by reducing these losses by just 15% could pull over 25 million Americans out of food insecurity. FRN is a national effort to bridge this divide between food waste and food insecurity.

FRN is a national student-run nonprofit organization founded at the University of Maryland. In 2011, Food Recovery Network at Brown (FRN@Brown) was started by four Brown undergraduates. Since then, the group has flourished, and now includes approximately 35 students. FRN partners with Brown Dining Services to recover food from campus eateries every day. In only four years, it has recovered over 50,000 pounds of food from Brown University dining halls.

FRN@Brown is a network of students at Brown volunteering to recover the surplus food from six different campus dining facilities and Thayer Street businesses such as Blue State Coffee. Food is then carried to a centralized storage facility in the Sharpe Refectory and then regularly brought to in-need Rhode Islanders through community partners such as Crossroads Rhode Island and the Women's Center of RI.

Above all, FRN@Brown aims to support food justice communities both on and off College Hill. These efforts have won the organization various awards and accolades, such as the BSA Inspire Grant.

THE PROBLEM	THE SOLUTION
<p>American colleges waste 22 million pounds of food a year. At the same time, 1 in 6 Americans don't know where their next meal is coming from.</p> 	<p>FRN brings wasted food from dining halls to people in need. We've already recovered 80,000 pounds of food this year at a cost of only 10 cents a meal.</p> 
<p> JOIN OUR NETWORK HERE: www.foodrecoverynetwork.org/campaign </p>	

V. Student Groups and Initiatives...

D. Earth Week Initiative

The 2015 Brown Earth Week was an ambitious collection of events planned and run by the student group, emPOWER. The planning committee targeted various Brown community audiences through mindful and varied events. Key events included a staff plant give-away, nightly films from the Up Up Farm Film Festival, and a 'dirt cup' give-away featuring the compost-themed musical stylings of Noah Goodman. Brown Dining Services hosted their annual Local Food Celebration on Earth Day, where student volunteers collected all post-consumer waste for composting. The week culminated in the Community Fair, where local musicians performed while students engaged in a variety of activities, including the Clothing Swap.



[Earth Week 2015 Facebook Page](#)

[Brown University News about Earth Week](#)

[The Brown Daily Herald: "Earth Week Plants Seeds of Change"](#)

MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Earth Week Kick-off & Seedling Giveaway 11am-4pm Blue Room Patio Green Plate Event 4-9pm Blue Room GH* Movie: To Make a Farm 7-9pm Petteruti Lounge *learn more at thegreenhorns.net	Climate Action League Solar Demo 12pm Science Park Green (corner of Geochem and MacMillan) GH Movie: Betting the Farm 7-9pm Salomon 203	EcoReps Classy-not-Trashy Trash Sort 11am-1pm Wriston Core Weapon in the Fight Against Climate Change? // Panel discussion about putting a price on carbon 3-4pm Wilson 102 Earth Day Dinner 4-7:30pm The Ratty	"Green Careers After Grad" Luncheon 12-1pm Starr Plaza, Watson Institute Hillel Phone-a-thon 2-3pm Hillel GH Movies: The Greenhorns, Brookford Almanac 7-9pm Salomon 203 Artbeat Workshop: Recycled Garden 8pm List 225
FRIDAY	SATURDAY	SUNDAY	
Revealing the Artbeat Installation 9am Main Green Compost with SCRAP 11am-1pm Andrews GH Movies: Root Hog or Die, Brookford Almanac, Sourlands, Brunswick 4-9pm Wilson 101	Blackstone Bike Ride 11am Meet at Faunce Arch Bike Ride and Picnic with Bikes@Brown 11am Meet at Faunce Arch GH Movies: International Perspective Shorts, Rural Roots Shorts 2pm Smith-Buonanno 106	Greenhorns Panel 4:30pm-5:30pm Smith-Buonanno 106 GH Movies: Hanna Ranch, Pig Business, American Meat 5:30-9pm Smith-Buonanno 106 Young Activist Folk Music + Q&A Session with Penn Johnson 8pm The Underground	Earth Week Community Fair: Sustainability Here, Sustainability There, Sustainability Everywhere! 11am-4pm Main Green



VI. Research & Teaching in Sustainability

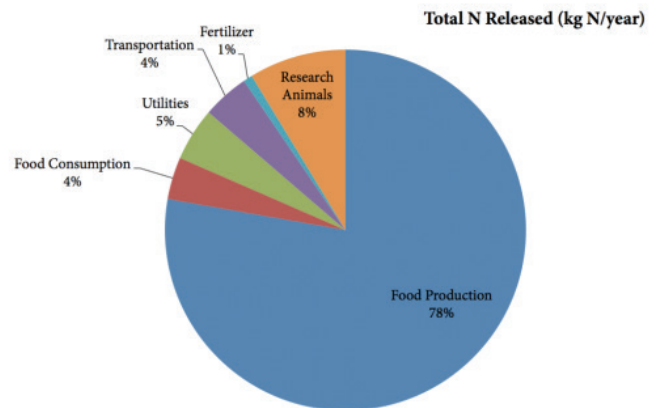
A. Brown Nitrogen Footprint

Brown University was selected as one of ~10 institutions to test the first Institutional Nitrogen Footprint Tool. This entailed gathering, organizing, and analyzing a wide range of data across many sectors of the university. Once the baseline nitrogen footprint was calculated, scenarios for pollution reduction can be tested within the tool. This can help project the likely impact of sustainability initiatives. Brown's Nitrogen Footprint Project is spearheaded by a team of faculty scientists, undergraduate researchers, and sustainability staff from across campus.

A nitrogen footprint is the contribution of the university to nitrogen pollution through its activities. Like carbon, nitrogen is released into the environment through fossil fuel energy consumption for utilities and transportation. Additional activities that are big contributors to nitrogen release are also food production, consumption, and waste management. The calculation of a nitrogen footprint gives an indication of how much reactive nitrogen different activities contribute. Using the nitrogen footprint tool will help institutions reduce losses of nitrogen to the environment as a result of their activities and use of resources.

What have we learned so far?

On the whole, activities on campus contribute to the release of 126,000 kilograms of nitrogen per year to the environment. As expected, food production is the biggest contributor to the university's nitrogen footprint (78% of the total). Production of meat, dairy and eggs are the biggest contributor to the university's nitrogen footprint. Other contributors to the overall nitrogen footprint includes the use of fossil fuels for utilities and transportation (9% total), use of research animals (8%), food consumption (4%), and the use of fertilizer on campus (1%). The amount of nitrogen released from utilities was surprisingly small, reflecting the reliance in New England on natural gas.



What are the next steps?

In the coming year, Brown's Nitrogen Footprint team will be refining our calculation to best represent the university's activities, and understand how the Nitrogen Footprint has changed in the last several years. We will also be exploring ways in which changes to our Nitrogen Footprint can support existing sustainability initiatives or help identify new opportunities. For example, we will be investigating how much composting food waste, increasing food donations, and increasing poultry and vegetarian protein options might reduce the excess nitrogen released into our environment.

Preliminary Scenario Tests for Reducing N Footprint:

- Composting food waste:
~ 4.5% reduction of total
- Replacing 25% of beef with chicken:
~3% reduction of total
- More local food:
Marginal reduction

VI. Research & Teaching in Sustainability...

B. Institute at Brown for Environment and Society (IBES)

While sustainability learning outcomes are integrated within various departments and championed by faculty and leadership throughout, undergraduate concentrations in Environmental Studies and Environmental Science are housed within IBES, the [Institute at Brown for Environment & Society](#). IBES organizes research into four interdisciplinary thematic areas, each centered on an organizing question and led by a faculty member with expertise in the area: Natural Systems, Food and Water, Human Health and Well-Being, and Equity and Governance.

IBES is housed in 85 Waterman Street, home to the [Climate Development Lab](#) which was recognized at the UN Climate Talks in Peru. The Urban Environmental Lab at 135 Angell Street hosts a community garden and integrated space for student engagement in environmental consciousness and urban self-sufficiency.



A group of Brown students attending the U.N. climate change negotiations in Peru as part of an environmental studies course.

VI. Research & Teaching in Sustainability...

C. Tri-Lab

The [Brown University TRI-Lab Program](#) is an initiative that promotes collaboration among students, faculty, and the Rhode Island community in order to engage with and address complex social issues. Topics are based on a combination of faculty and student interests and community needs.

Students take an in-depth one- or two-semester seminar on the Lab's topic, in which they harness their diverse perspectives to come up with creative solutions. After the seminar, Labs apply for funding in order to continue their efforts.

There are currently three TRI Labs: the Healthy Early Childhood Development (2013-2014), Healthy Food Access (2014-2015), and Climate Change and Environmental Justice (2015-2016) Labs.

Healthy Early
Childhood
Development
(2013-2014)

Healthy
Food Access
(2014-2015)

Climate Change
and Environ-
mental Justice
(2015-2016)

The [Healthy Food Access Lab](#) investigates approaches to increase access to healthy food and reduce obesity, food insecurity, and hunger. The Lab focuses on behavioral change, improved socioeconomic conditions, and enhanced policy structures. This Lab is co-chaired by Professor Kim Gans and Courtney Bourns, Senior Program Officers at the Henry P. Kendall Foundation. The Lab is broken into three working groups: the Fresh-to-You, Food as Medicine, and Data and Public Policy teams.

The [Climate Change and Environmental Justice Lab](#) investigates the future potential impacts of climate change on Rhode Island's most vulnerable communities, with the goal of reducing climate change-related public health risks and increasing resiliency within these populations. The Lab is co-chaired by Professor Timmons Roberts, and Robert Vanderslice and Julia Gold from the Rhode Island Department of Health.



VII. Departmental Reporting

A. Brown Dining Services

BDS is committed to improving the local food system through sustainable initiatives, which work to support local farmers, reduce waste output, and purchase fairly-traded, sustainably-sourced and environmentally-friendly foods.

BDS's commitment to sustainability is demonstrated by the following initiatives:

Through the [Community Harvest](#) program, initiated in 2002, BDS aims to purchase sustainable, local food to increase Brown's support of Rhode Island food producers.

BDS maintains committed [partnerships with local farmers](#) in order to bring fresh, sustainable produce to Brown dining halls. This program expands each year, and now represents a network of over 50 local farms.



BDS is a founding partner of [Farm Fresh Rhode Island \(FFRI\)](#). Created in 2004, FFRI is a non-profit organization whose mission is to strengthen Rhode Island's food system by creating connections between producers, consumers, and the environment. FFRI manages eight urban farmers' markets and with BDS, co-manages a weekly market held on Brown's campus.

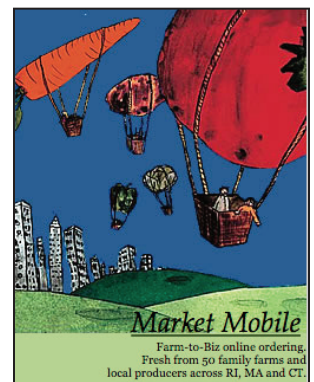


The [Market Mobile](#), a FFRI initiative developed in 2008, provides a centralized distribution system for Rhode Island farmers. Through this program, farmers can post prices for their products online, and local institutions view the list and place orders. The Market Mobile picks up farmers' products from one central location and delivers them to consumers.

Brown Catering Services has developed options for Green Catering. These meals include local, seasonal items that have minimal packaging and waste and are served on compostable Greenware.

Through the [After the Harvest \(AtH\)](#) initiative, established in 2005, BDS coordinates efforts to both reduce food waste and reroute overproduced food to local hunger relief programs.

Since 2005, BDS has donated over 85,000 pounds of local food to local organizations including We Share Hope, The Rhode Island Community Food Bank, and Providence Rescue Mission.



In 2010, BDS implemented [Eco To-Go](#), a reusable takeout container program, which reduces the amount of disposable to-go containers that Brown sends to the landfill



BDS has partnered with [Newport Biodiesel](#), a local company that transforms used fry-oil into fuel for diesel engines and home heating. Since 2010, four participating dining locations have donated 22,509 gallons of oil and grease to be refined into fuel.

VII. Departmental Reporting ... Brown Dining Services

Over 20% Real Food



35% of food locally-sourced



16% of meat ecologically sound



100% fair trade coffee



6% of food humanely-sourced



97% of seafood locally-sourced



95% cage-free eggs

Quick facts

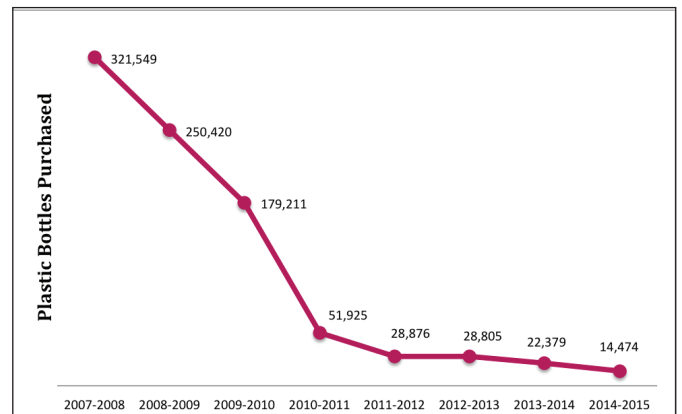
In 2009, due to a grassroots effort led by a group of students, BDS committed to meeting the [Real Food Challenge](#). The goal of the resulting Real Food Initiative is to create a process through which all food purchasing decisions consider four main criteria: whether foods are local, ecological, fair, and humane.

BDS diverts an estimated 275,000 pounds of pre-consumer waste from the landfill every year by sending food waste to a local pig farmer, a local compost facility, and Newport Biodiesel.

★
THE
COMPOST
PLANT

In 2008, BDS implemented [trayless dining](#) in Verney-Woolley. Trayless dining conserves half a gallon of heated water per tray, translating to a savings of over 155,000 gallons per school year. Studies also suggest that eliminating trays may reduce food waste because people take fewer items without them.

[Beyond the Bottle \(BtB\)](#) is an initiative started by students with the goal of reducing the supply and demand of bottled water at Brown. As a result, BDS has reduced its water bottle purchasing by 95% since 2008. This goal is supported by the installation of hydration stations across campus, which encourage the use of reusable water bottles.



VII. Departmental Reporting ...

B. Transportation & Parking Services

Public Transportation: Brown University is making great strides toward increasing the availability of public transportation. With the Rhode Island Public Transportation Authority (RIPTA) U-Pass program in its sixth year, all Brown University ID holders (faculty, staff and students) may ride any RIPTA bus or trolley free of charge anywhere in the state of Rhode Island.

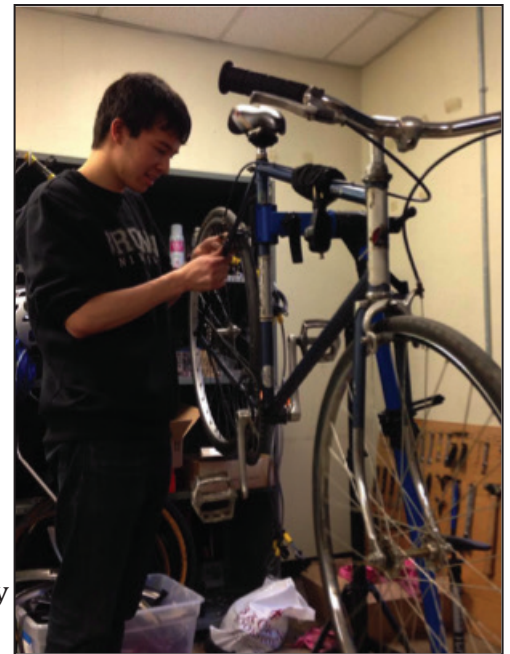


Zipcars: The university has partnered with Zipcar to offer Brown community members an alternative to driving to campus. Brown University students, faculty and staff pay an annual \$20 fee. Hourly rates range from \$7.25 to \$11.00 depending on the type of vehicle reserved. Nine of the 25 vehicles are hybrids and 2,600 Brown-related members use them to travel 30,000 miles a month.

Electronic Vehicle Charging Station: Brown University now has two plug-in electric vehicle charging stations available for public use. One is located in Lot #44 on Brook Street, behind Minden Hall. The other is in the Richmond Street parking garage, entrance on Eddy Street.

Bicycle Racks: Brown has bicycle racks in convenient places across campus, offers bicycle registration to discourage theft, and is working with various civic groups to help promote cycling in the city. All new construction and major renovations are required to install racks as part of their projects.

Bicycle Sharing: Bikes@Brown, a student initiative, launched a bike-sharing program in March 2009 utilizing Brown University funds to purchase three new Schwinn Cruisers and four Mongoose mountain bikes. They now have a fleet of thirty-two bicycles, which can be signed out for a week at a time at no charge and for no deposit.



Next Steps: Sustainable transportation on campus is an issue directly addressed by Brown's Sustainability Strategic Planning Advisory Committee (SSPAC) through its transportation subcommittee. Objectives of the SSPAC transportation team include:

Creating a more economically efficient and equitable transportation portfolio

Expanding Providence's "Complete Streets" program

Decreasing Brown's transportation-based carbon footprint

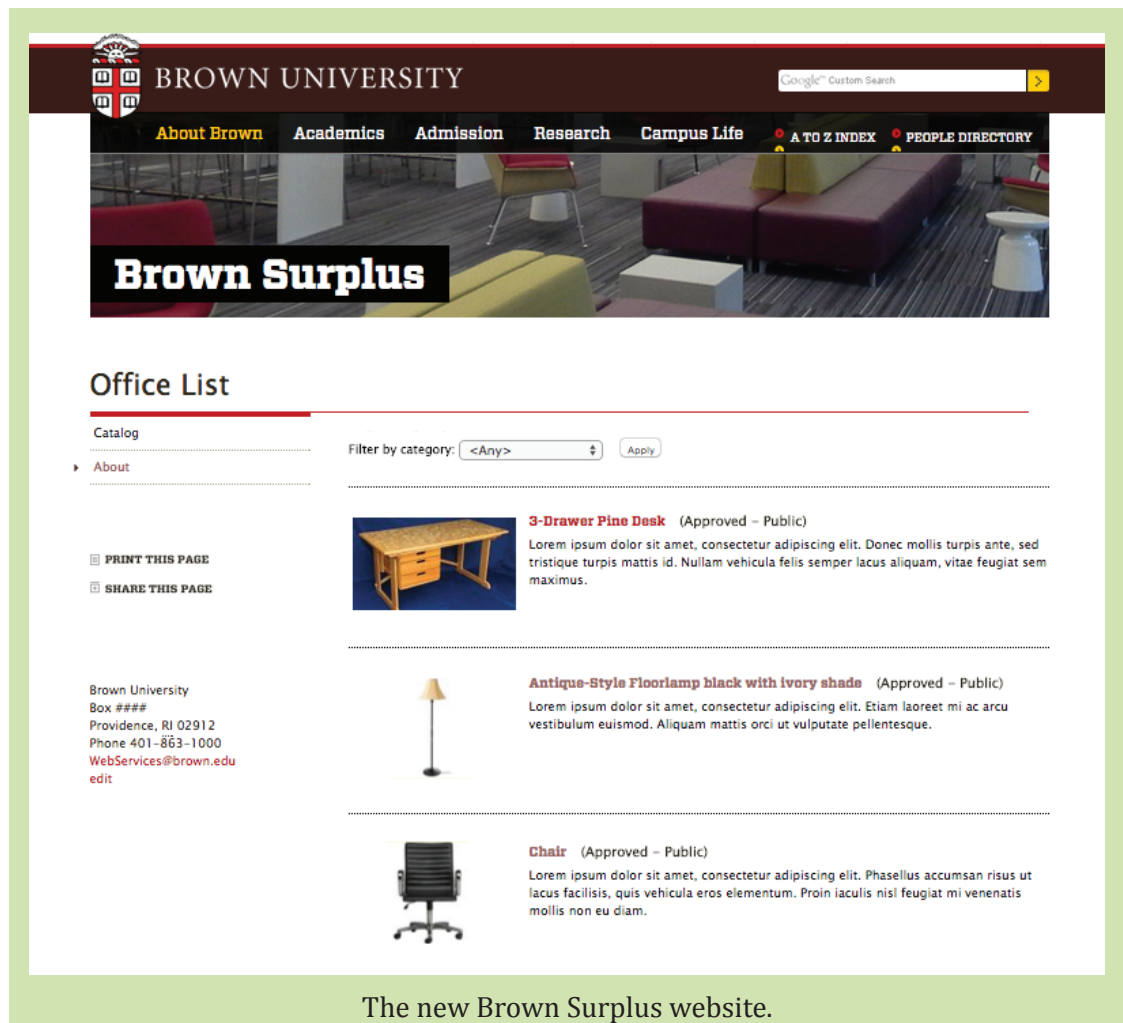
VII. Departmental Reporting ...

C, Purchasing Services

Faculty, staff, and students are strongly encouraged to be proactive in identifying and examining opportunities to procure “environmental friendly” materials/equipment. This effort focuses along the complete “supply chain” process including assessment of alternative materials, vendor sourcing and selection, and ultimate disposal of waste/surplus.

Brown strongly recommended that appliances, building products, computers, electronics, heating and cooling, lighting, fans, and plumbing equipment meet or exceed the ENERGY STAR® rating.

Purchasing Services manages a surplus program with a goal to repurpose Brown-owned furniture after it has been used for its original purpose. Additionally, Purchasing is currently developing an on-line furniture “Craig’s List”- type interface that will allow departments to procure previously used items. Items not absorbed back into campus will be open for donation to authorized local organizations – thereby promoting Brown’s commitment to support Providence public schools and local organizations.



The screenshot shows the Brown University website's 'Brown Surplus' section. At the top, there is a navigation bar with the university logo and name, a search bar, and links for 'About Brown', 'Academics', 'Admission', 'Research', 'Campus Life', 'A TO Z INDEX', and 'PEOPLE DIRECTORY'. Below the navigation is a large banner image of a modern office lounge with the text 'Brown Surplus' overlaid. The main content area is titled 'Office List' and features a 'Catalog' section with a 'Filter by category' dropdown set to '<Any>' and an 'Apply' button. A sidebar on the left contains links for 'About', 'PRINT THIS PAGE', and 'SHARE THIS PAGE'. The main list displays three items: a '3-Drawer Pine Desk' (Approved - Public) with a placeholder image and text, an 'Antique-Style Floorlamp black with Ivory shade' (Approved - Public) with a placeholder image and text, and a 'Chair' (Approved - Public) with a placeholder image and text. At the bottom of the page, there is a footer with contact information for Brown University: 'Brown University, Box ####, Providence, RI 02912, Phone 401-863-1000, WebServices@brown.edu, edit'.

The new Brown Surplus website.

VIII. Awards

Princeton Review's "Guide to Green Colleges"

Sierra Club "Cool Schools"

Climate Change Awards: Green University of 2014

Food Recovery Network Certified

Brown Dining Services

An 'A' rating on the 2015 PETA Vegan Report Card

2014 Boston.com Top 25 Healthiest Colleges in the United States

#41 ranking in The Daily Meal's Top 52 Best Colleges for Food (2014)

2014 Green Certification, Rhode Island Hospitality Association

Brown was recognized as 'Friend' of the Rhode Island Food Bank (2014)

IX. Ways Forward for Brown's Sustainability

The E&E Office and the Sustainability Strategic Planning and Advisory Committee (SSPAC) continue to seek out new ways to develop and enhance the university's social and environmental impact while incorporating student learning and development in fields that contribute to global wellbeing. Over the next year we aim to look at innovative technology and research to develop a robust data tracking tool that will guide Brown in identifying baseline metrics and determining goals on: waste reduction and diversion; alternative transportation; stormwater management and water conservation; food and product purchasing; and nitrogen footprint reduction.

Over this coming year we look forward to working with Brown University departments, students, and faculty; peer institutions; and our surrounding community to collectively progress our campus' commitment to social and environmental responsibility. We are excited to increase our E&E internship program, which is not only essential to building sustainability on campus but directly contributes to educating and preparing students to enter the next phase of their professional development.

Please feel free to contact the E&E Office at brownisgreen@brown.edu for further information.



X. Acknowledgments

The E&E Office would like to acknowledge the contributions and efforts of the staff of Brown Dining Services, Office of Transportation and Parking Services, Facilities Management and the Sustainability Strategic Planning and Advisory Committee, and all campus members who served as advocates for sustainability. In particular, we would like to thank the E&E interns, EcoReps, and emPOWER students without whom it would not be possible for Brown University to continue its commitment to sustainability.

